The Effect of Service Attributes in Korean Marine Transportation Services

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Abstract

Purpose: Marine transportation companies must improve service quality to secure competitive advantage and continuous relationships with customers. This study explores the value and necessity of service quality in the industry by empirically identifying the factor that would have the largest effect on the improvement of service quality, also examining whether such improvement may actually influence continuous relationships. **Research design, data and methodology**: Based on an online survey with those in the Korean marine transportation industry, this study conducted statistical analyses using structural equation modeling. Based on relevant previous studies, the current study constructed a total of 55 survey questions. Finally, 281 questionnaires were collected, but 68 were excluded owing to invalid responses. **Results:** Information service attribute had the largest effect on service quality, whereas communication did not demonstrate a significant influence. In addition, distribution and information services exerted a positive effect on service satisfaction through service quality, and finally influenced relationship continuity. **Conclusions**: The results shows that marine logistics service quality strategies which were centered on time or local factors, should be considered in terms of the development of innovative services. In particular the improvement of information service systems and strategies in changed business environment.

Keywords : Internal Marketing, Service Immersion to Customers, Perceived Organizational Support

JEL Classification Code : M20, M31, M10, M16, M00

1. Introduction

Looking at the trend of the East Asian marine transportation industry, the industry was formed centered on Singapore, Hong Kong, and Kobe ports in the 1980s and reorganized centered on Singapore, Kaohsiung, Hong Kong, and Busan ports in the 1990s. In the 2000s, The four-port structure emerged with the rapid rise of Chinese ports. Since then, due to the accelerated growth of Ningbo and Shanghai ports in China and environmental changes in the global marine transportation industry, the competition among ports has been increasing (Durvasula, Lysonski, & Mehta, 2000). As the global economic recession led to a decrease in sea freight traffic, the hardships of the international companies in the industry have continued, especially since 2010. The China Containerized Freight Index has also dropped below 1,000 points since 2015 and has remained stalled.

In addition, the development of information and communication technology has brought about innovative changes in the logistics sector. In particular, the growth of e-commerce has brought great innovations in the logistics system sector (You, & Kim, 2011).

Therefore, as the uncertainty of the global marine transportation industry environment has increased, it is necessary for international companies in the industry to make efforts to have innovative and market-oriented ideas, which reflect the environment, and enhance their service capacity, with a view to securing and maintaining competitive advantage. In particular, customers of regular liners have moved away from the attitude of focusing solely on prices and have increasingly become interested in service providers' abilities as they attempt to use marine transportation services conveniently, safely, and easily, considering customer service aspects, specialty, safety,

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reliability, quality, and service accessibility (Lai, 2004; Bae, Kim, & Oh, 2019).

This is not much different from the actual work sites where, in the case of purchasing marine transportation services, customers choose convenient, stable, and highly professional companies even at higher rates rather than considering only low prices and attempt to make the final contracts, building a close relationship with the companies as their main service providers (Hwang & Goo, 2015). In addition, in terms of the state of the contemporary marine transportation market, in which regular liners are pursing similar sizes due to continuous investments through strategic alliances, combined transportation, and self-fleet and route expansion among them, qualitative criteria, such as customer service by human resources and service reliability, have recently become of grave importance for customers' choices (Panigyrakis & Theodoridis, 2007). Thus, in order to create superior customer values and competitive advantage, marine transportation companies should provide quality services differentiated from those of their competitors by responding to various needs of their customers in the severely competitive market. Then, they can provide superior value for their customers, and based on this, continue business relationships by building good relationships with customers (Boso, Story, & Cadogan, 2013).

To secure competitive advantage by satisfying the needs of global customers, the marine transportation companies need the market-oriented ideas and creative innovations. Such ideas are expected to be closely associated with entrepreneurial orientation, but studies on this are lacking (Cho, 2006). Previous researches (Collison, 1984; Ha, 2003; Thai, 2008; Yuen & Thai, 2015) have highlighted that service quality and customer satisfaction are key success factors for securing competitiveness among service providers. These factors are recognized as important by all managers who compete for customers in the contemporary customer-oriented market.

However, despite numerous previous studies on service quality, customer satisfaction, and the relationship between service providers and consumers, their effects on customer behavior still remain as main issues. In addition, most previous studies focused on samples with strong human service characteristics, such as hotels, hospitals, and banks. Relatively few studies have been conducted on service quality, customer satisfaction, and relationship with customers in an industry with more distinctive characteristics of a globally competitive market and equipment factors than other industries(Im, Kim, & Yang, 2017; Shin, Hwang, Lee, & Cho, 2015).

In this context, this study sought to find ways to secure market-oriented service quality of marine transportation companies and improve their global competitiveness by suggesting and empirically analyzing a research model that explains the structural relationship of service quality, customer satisfaction, and relationship continuity. To achieve competitive advantage in effective marketing activities, which are differentiated from those of other competitors in the market and helpful for the company's growth, examining changes of service quality factors and analyzing their structural relationships with customer relationship and relationship continuity are very important at both the marine transportation industry and company levels.

2. Literature Review

2.1. Service Quality of Marine Transportation

The definition of service quality is largely determined from a customer need perspective and a customer quality recognition perspective (Tabash, Albugami, Salim, & Akhtar, 2019). The marine transportation market is divided into three segments, that is, regular liners, non-regular lines, and tankers, and these markets cannot be considered the same. However, from the viewpoint of marine transportation, freight owners' expectations focus on various factors, such as freight safety, speed, and reliability of companies. Therefore, service quality of marine transportation should be interpreted according to the expectancy disconfirmation paradigm, which views the quality as the difference between the perceptions of expectation and performance. That is, it can be defined as "a judgment about the degree of incongruence between a freight owner's expectation regarding a marine transportation company and its performance he or she perceives" (Lai, 2004).

Tse and Wilton (1988) argued that "whether consumers are satisfied with a service depends on the degrees of their expectation, and their satisfaction is dependent upon how they perceive it." File, Cermak, and Prince (1994) defined service quality as "a measure of how congruent a service delivered is with the customer's expectation." Gronroos (1984) referred to this concept as "quality perceived by a consumer that is distinguished from objective quality." Vuorinen, Jarvinen, and Lehtinen (1998) classified it into "physical, company, and interaction qualities." Durvasula et al., (2000) defined it as "the degree of discrepancy between a customer's expectation or desire and perceived performance."

Regarding the measurement of the attribute factors of service quality of marine transportation, it has generally been argued that the five dimensions of Parasuraman, Zeithaml, and Berry (1988) are applicable to port services (Patrick, McCleary, & Swan, 1996). Based on Gronroos'

(1984) research, several studies divided service quality into functional and technical qualities, which were constructed with two dimensions of "technical and process quality" (Song & Song, 2004). Other studies expanded these two dimensions of service quality by adding physical environment, and constructed Logistics service quality with the three dimensions (Kim, 2016; Dai & Lee, 2018). Shirley, Strasser, Hopkins, and Foster (1993) constructed service quality of marine transportation with core and surrounding functions and identified timeliness/completeness, safety, reliability, and conformability through a study on service quality recognition of marine transportation.

Regarding representative relevant previous studies on factors influencing service quality of marine transportation, the Oliver (1980) argued that distribution cost was an important factor of the efficiency and competitiveness of the industry. Under the assumption that freight owners' interests were homogeneous, Carpenter (2008) classified the service quality into production and transaction qualities; the determinants of the former included the frequency of freight damage, loading capacity, delay of transshipment, service frequency, and uncertainty and those of the latter were the clarity of service type, accessibility of the supplier, ease of negotiation, insurance status, and reliability of contract fulfillment (Cha & Seo, 2019; Um & Park, 2019).

On the other hand, in a study of analyzing service quality and the economic feasibility of marine transportation companies, Brady and Cronin (2001) argued that service quality is economically very important because it has a great effect on resource consumption of both the companies and freight owners in large-scale distribution processes and that in particular, the quality variable was an observable characteristic that affected the costs of both the companies and freight owners. Further, as the types of the service quality, the author included average transportation time, passage time, loss and damage, shipment size, and available transportation equipment. Hurley and Estelami (1998) divided service quality into convenience of sales, flexibility and dependence, contribution to the service improvement, and overall image, and included timeliness, reliability, rapid document processing, and prevention of freight damage as the attributes of service quality. In addition, Zeithaml (2000) presented nine factors: service reliability, compliance with transportation and delivery time, availability of promised and published transportation capacity, freight safety, freight movement management and tracking, validity of documents and information distribution, control, management and settlement costs, service status and future plan, and combined transportation management.

Regarding these various arguments, Durvasula et al. (2000) divided the factors affecting the improvement of service quality of the transportation sector into internal and external components. Kwak, Park, and Back (2016) classified service quality of container terminals into internal quality, which is the capacity of the terminal itself, and external quality as the capacity of the external environment that affects the container terminal, and suggested a 3-factor service quality measurement model by adding interaction quality, which has recently received increasing interest.

Table 1: Attribute factors influencing service quality of marine transportation

Researchers (Year)	Attribute factors
Crosby and Stephens (1987)	Service time, facility and equipment, transportation service price and freight charge, marketing service
Miller (1993)	Freight tracking service capacity, accuracy of billing and documents, long-term relationship build-up possibility, freight handling capacity, customer approval capacity, influence on the freight owner's negotiation status, comparison with other shipments
Shin (2000)	Image and sales promotion strategy of the transportation service company, technical contents of transportation service, transportation service management system
Brady and Cronin (2001)	Average transportation time, passage time, loss and damage, shipment size, available transportation equipment
Chinonye et al. (2004)	Distribution network, freight charge, reliability, ship procurement of the ship owners, investment policy, company, image, building relationships between ship operators and freight owners, linkage with the forwarding industry, guaranteeing transportation service

In particular, in terms of interaction quality, focus on the factors affecting service quality of marine transportation has changed due to the enhancement of customer-oriented services. Nelson and Cooprider (1996) emphasized communication, and Mohr and Spekman (1994) focused on information sharing. Murphy (1992) and Moberg, Culter, Gross, and Spech (2002) emphasized the importance of ties and communication in the partnership relationship of port service companies. Furthermore Panayides, Lambertides, and Savva (2011) divided information service into four items and presented customer satisfaction according to information services in the marine transportation service. And Choi, Back, Won, and Park (2015) focused on the importance of the satisfaction with information service in terms of marine transportation test operation.

In this context, the current study classified factors influencing the improvement of service quality of marine transportation into Logistics service, which considers internal and external corporate resource elements, communication, which affects interaction quality, and information service, which is an external environmental factor according to the development of technology. Then, it established the following hypotheses, attempting to reveal the impact relationship and importance.

H1: Marine transportation companies' logistics service will have a positive effect on the improvement of service quality of marine transportation.
H2: Marine transportation companies' communication will have a positive effect on the improvement of service quality of marine transportation.
H3: Marine transportation companies' information service will have a positive effect on the improvement of service quality of marine transportation.

2.2. Service Quality, Service Satisfaction, and Relationship Continuity

Hunt (1991) and Moorman (1992) defined customer satisfaction with a service as the assessment that the consumption experience was better than at least his or her minimum expectation. Aaker and Day (1986) referred to it as a total concept rather than a simple assessment in that it depends upon the customer's expectation level rather than the quality level of the product or service. Oliver (1981) defined it as an overall psychological state generated by a combination of disconfirmed expectation and the emotion the customer had prior to the consumption experience. As such, the expectancy disconfirmation paradigm is a theoretical foundation for the relationship between service quality and service satisfaction, and the relationship has been supported by other studies (Chane, Fathian, & Gholamian, 2011; Kuo, Wu, & Deng, 2009; Ganesan, 1994; Morgan & Hunt, 1994; Selnes, 1998).

In relation to service quality of marine transportation, Song and Panayiders (2008) empirically analyzed whether dimensions of service quality of container ports had a differentiated effect on service satisfaction, intention to reuse, and word of mouth intention, categorizing the service quality into internal, external environmental, and interaction qualities(Park, 2019; Rahman, 2018; Lee, 2017). Yang, Marlow, and Lu (2009) divided the service quality into tangibility, reliability, and certainty. Their empirical results revealed that all the dimensions of the service quality affected service satisfaction. In previous studies in other service areas, the positive link between service quality and satisfaction has also been supported (Chane et al., 2011; Kuo et al., 2009).

Moreover, service satisfaction results in repeat purchases and continuous transactions (Kotler & Gertner, 2002). In numerous studies (Dick & Basu, 1994; Reynolds & Arnold, 2000; Carpenter, 2008), customers' satisfaction with services has been confirmed to enhance their loyalty as well as relationship continuity, which indicates continuous relationships and purchases. Even in the marine transportation service, it is expected that the higher the level of customers' service satisfaction is, the higher their relationship continuity is. In this regard, Basir, Modding,

Kamase, and Hasan (2015) reported that better service quality of marine transportation had a positive influence on customer satisfaction and loyalty. Nam, Kim, and Carnie (2018) also empirically demonstrated that the service quality positively affected service satisfaction and continuous relationships. In addition, Durvasula et al. (2000) argued that greater service capacity of ports resulted in higher purchase continuity. Based on the results of these previous studies, considering the characteristic that the customers are mainly companies, the current study redefined customer satisfaction as service satisfaction and repeat purchases as relationship continuity in the case of marine transportation service. Then, the following hypotheses were suggested:

H4: The improvement of service quality of marine transportation companies will have a positive effect on service satisfaction.
H5: Satisfaction with the services provided by marine transportation companies will have a positive effect on relationship continuity.

3. Methods

3.1. Research Model

This study sought to empirically analyze the effects of logistics service, communication, and information service on service satisfaction, which in turn affects relationship continuity, through service quality of marine transportation. In the industry, transportation service quality has diverse influences on service satisfaction, depending on logistics service, communication, and information service. Therefore, more satisfactory levels of the aforementioned will have a positive effect on service quality and in turn bring about higher degrees of service satisfaction and relationship continuity. Focusing on the hypotheses regarding these relationships, which were suggested based on previously studies, the current study established a research model, as shown in Figure 1.
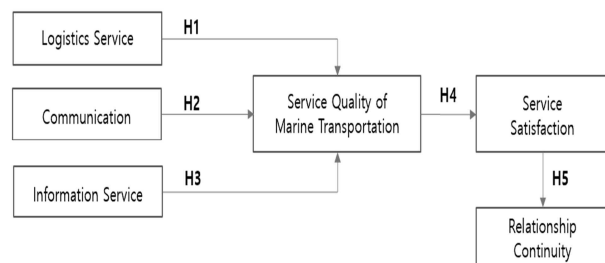

Figure 1: Research model

The independent variables were the three services of distribution, communication, and information, which included 12 sub-factors, the mediating variable was service quality of marine transportation, and the dependent variables were service satisfaction and relationship continuity. This study analyzed each relationship through a path analysis based on structural equation modeling (SEM) and then sought to verify the mediating effects of service quality of marine transportation.

3.2. Measurement Variables

A survey was conducted to collect the data for the analysis. The current study constructed the survey questions from the previous studies presented in Table 2, and operationally defined the factors constructed from the questions. The operational definitions of the variables used for the survey were as follows. First, "logistics service" refers to service activities that include the service areas, freight charges, schedules, support of salespersons, and so on, which a marine transportation company provides for its client companies. Second, "communication" is defined as interactive service activities, such as communication and information sharing through formal and informal channels between a marine transportation company and its client companies. Third, "information service" refers to activities for the service improvement and convenience related to information, such as the level of information that a marine transportation company offers its client companies, extension of information usability, and so forth. Fourth, the mediating variable, "service quality of marine

transportation," is defined as the measure of how congruent the service of a marine transportation is with its client companies' expectations. Finally, as the dependent variables, "service satisfaction" refers to client companies' overall satisfaction with the service of their marine transportation companies, and "relationship continuity" is defined as client companies' intention to continue transactions and future-oriented relationship with their current marine transportation companies.

The survey questions for these variables used a 5-point Likert scale. Logistics service was measured with three items of "service provision areas," "price competitiveness," and "service expertise" which were based on three previous studies (Crosby & Stephens, 1987; Chinonye, Callistus, & Innocent, 2004). For communication, this study drew three items of "communication," "information sharing," and "mutual trust" from Mohr and Spekman (1994), Nelson and Cooprider (1996), and Madhook (1995). Based on Panayides et al. (2011), information service was measured with four items, "information diversity," "information provision level," "information complementation," and "information usability." The three items for service quality of marine transportation concerned "timeliness," "stability," and "reliability," respectively, which were based on Gronroos (1984) and Hurley and Estelami (1998). Finally, the dependent variables, service satisfaction and relationship continuity, were measured with three items based on Chane et al. (2011) and Kuo et al. (2009) and four based on Reynolds and Arnold (2000), Dick and Basu (1994), and Carpenter (2008).

Table 2: Variable definitions

Factors	Operation Definition	Items	References
Logistics service	Service activities that include the service areas, freight charges, schedules, support of salespersons, and so on, which a marine transportation company provides for its client companies	3	Crosby and Stephens (1987) Chinonye et al. (2004)
Communication	Interactive service activities, such as communication and information sharing through formal and informal channels between a marine transportation company and its client companies	3	Mohr and Spekman (1994), Nelson and Cooprider (1996), Madhook (1995)
Information service	Activities for the service improvement and convenience related to information, such as the level of information that a marine transportation company offers its client companies	4	Panayides et al. (2011)
Service quality of marine transportation	The measure of how congruent the service of a marine transportation is with its client companies' expectation	3	Gronroos (1984), Hurley and Estelami (1998)
Service satisfaction	The overall satisfaction of client companies with the service of their marine transportation companies	3	Chane et al. (2011), Kuo et al. (2009)
Relationship continuity	Client companies' intention of continuing transactions and future-oriented relationship with their (current) marine transportation companies	4	Reynolds and Arnold (2000), Dick and Basu (1994), Carpenter (2008)

3.3. Data Collection and Analytic Methods

The survey was conducted with those in the marine transportation Logistics service industry. A 1:1 online survey was conducted with those in marine transportation distribution, exporting, and importing companies located in the Seoul metropolitan area and Gyeongsangnam-do. The survey was administered for 77 days from March 20 to June 5, 2019, and 281 questionnaires were collected. A total of 68 questionnaires were excluded due to invalid responses. Therefore, the analysis was conducted with 213 questionnaires. SPSS 24.0 was employed for the analyses concerning demographic properties, descriptive statistics, and exploratory factor analysis; AMOS 25.0 was used for confirmatory factor analysis (CFA), model test, and path analysis based on structural equation modeling (SEM). Finally, to test the mediating effects, this study estimated the direct, indirect, and total effects by employing the Bootstrapping method.

4. Research Results

4.1. Demographic Information

This study was conducted with those in the marine transportation logistics service industry.

Table 3: Demographic information of survey participants

Category		Frequency	Ratio
Gender	Female	111	52%
	Male	102	48%
	Total	213	100%
Age Range	0-30 years	38	18%
	30-39 years	70	33%
	40-49 years	82	38%
	50 years	23	11%
	Total	213	100%
Role Position	Provider	98	46%
	User	115	54%
	Total	213	100%
Experience	Less than 5 years	43	20%
	5-10 years	68	32%
	10-20 years	75	35%
	More than 20 years	27	13%
	Total	213	100%
Job Position	Executive	19	9%
	Director	40	19%
	Manager	79	37%
	Staff	75	35%
	Total	213	100%

In terms of providing services, 46% of the respondents were those who worked in companies related to shipping companies and ports, and IT and other port logistics services; in terms of using services, the rest (54%) were those of corporates associated with manufacturing and supply chain management, trade business, and freight forwarders/non vessel owning common carriers. The sex ratio of the respondents was 52% for females and 48% for males. In relation to age, 18% were under the age of 30, 33% were in their 30s, 38% in their 40s, and 11% were in their 50s and older; those in their 40s represented the highest proportion. Regarding work experience, those having less than 5, 5-10, 10-20, and more than 20 years' experience accounted for 20%, 32%, 35%, and 13%, respectively; those with 10-20 years' experience represented the largest proportion. In terms of job position, staff, managers, directors, and executives accounted for 35%, 37%, 19%, and 9%, respectively; with staff and managers representing the highest proportion.

4.2. Reliability and Validity

As shown in Table 4, the reliability and convergent validity of the measurement model were found to be satisfactory. Regarding the analysis of the reliability and validity of an SEM measurement model, a composite reliability index of 0.7 or higher indicates that the reliability of internal consistency is supported (Bhatnagar, Schiffter, & Coussios, 2014); with factor loadings of 0.5 or higher, Cronbach's α of 0.6 or greater, and composite reliability of 0.7 or higher, the measurement model is considered to have an appropriate level of convergent validity (Anderson & Gerbing, 1988). In accordance with these criteria, all the factor loadings were between 0.634 and 0.886, and composite reliabilities were between 0.847 and 0.941. That is, all the factor loadings and composite reliabilities showed a satisfactory level. The former were also statistically significant as their t values were higher than 7.0. In addition, the values of average variance extracted (AVE) ranged from 0.735 to 0.801, and those of Cronbach's α from 0.776 to 0.871. Therefore, the convergent validity was found to be supported.

In relation to correlation analysis, the discriminant validity between the latent variables is found to be supported if the square root value of the AVE of each latent variable is higher than the correlation coefficients of the variable (Yoo & Kim, 2019). Therefore, as shown in Table 5, AVE values and correlation coefficients of all the latent variables were calculated. The discriminant validity was verified because the square root of the AVE of each variable had a value greater than its correlation coefficients.

Table 4: Results of reliability and convergent validity test

Variables	Standard loading	Standard error	t value	CR	AVE	Cronbach's α
Logistics service	0.709	-	-	0.907	0.766	0.776
	0.806	0.131	8.966***			
	0.698	0.126	8.482***			
Communication	0.844	-	-	0.847	0.735	0.777
	0.752	0.125	7.616***			
	0.716	0.082	9.521***			
Information service	0.779	-	-	0.941	0.762	0.871
	0.835	0.085	12.591***			
	0.768	0.091	11.478***			
	0.695	0.079	10.24***			
Service quality	0.823	-	-	0.922	0.801	0.82
	0.886	0.083	12.964***			
	0.653	0.087	9.772***			
Service satisfaction	0.685	-	-	0.91	0.773	0.818
	0.822	0.117	9.97***			
	0.835	0.136	10.032***			
Relationship continuity	0.634	-	-	0.932	0.775	0.849
	0.865	0.123	9.803***			
	0.814	0.119	9.464***			
	0.766	0.126	9.076***			

Notes: * $p<0.05$, ** $p<0.01$, *** $p<0.001$

Table 5: Correlation matrix and AVE

Classification	AVE	Logistics service	Communica-tion	Information service	Service quality	Service satisfaction	Relationship continuity
Logistics service	0.766	**0.875**					
Communica-tion	0.735	0.308	**0.857**				
Information service	0.762	0.379	0.562	**0.873**			
Service quality	0.801	0.515	0.355	0.586	**0.895**		
Service satisfaction	0.773	0.201	0.262	0.131	0.160	**0.879**	
Relationship continuity	0.775	0.320	0.179	0.158	0.301	0.648	**0.880**

Note: The square root of AVE is shown in bold letters.

4.3. Results of Hypotheses Test

The results were as follows. $\chi2$ (p) and $\chi2$ /df were 248.544 (p=0.000) and 1.534, respectively. According to the criteria of Hu and Bentler (1999), the goodness of fit index (GFI) and normal fit index (NFI) were a little lower than 0.9, having the value of 0.895 and 0.884. However, the root mean square residual (RMR), adjusted goodness of fit index (AGFI), and root mean square error of approximation (RMSEA) had values of 0.31, 0.864, and 0.050, respectively (see Table 6). Overall, the model was found to have an adequate fit as, except for GFI, the other

fit indices showed a better value than the standards. CFI (Comparative Fit Index), which indicates the explanatory power of the model but is not affected by the sample, was 0.956, and the Tucker-Lewis index (TLI), which is also used for judging the explanatory power of the model, had a value of 0.984. Thus, the basic model was found to fit very well with the data.

According to the test results of the above hypotheses through a path analysis based on the SEM in Table 7, only one of the five hypotheses was not supported. Of the service factors, logistics service was found to have a positive influence on service quality of marine transportation (t = 4.218, p<0.001). However,

communication did not have a statistically significant effect on service quality (t=0.07), but information service did (t=4.79, p<0.001). In addition, service quality was positively related to service satisfaction (t=2.591, p<0.01), which had a positive influence on relationship continuity (t=6.528, p<0.001).

As a result, the factors influencing service quality of marine transportation were logistics service and

information service except communication. The affected service quality of marine transportation had a significant effect on service satisfaction, and service satisfaction also had a positive effect on relationship continuity. Finally, it was analyzed that relationship continuity should be achieved only by service satisfaction based on service quality of marine transportation.

Table 6: Model fit indices for the structural models

Model	χ2(df)	χ2 /degrees of freedom	RMR	GFI	AGFI	NFI	TLI	CFI	RMSEA
Original Model	248.544	1.534	0.310	0.895	0.864	0.884	0.984	0.956	0.050

Table 7: Results of hypothesis test

Hypothesis (path)	Path coefficient	t value	Support (Y/N)	R2
Logistics service → Service quality	0.343	4.218***	Y	
Communication → Service quality	0.006	0.070	N	0.445
Information service → Service quality	0.453	4.790***	Y	
Service quality → Service satisfaction	0.208	2.591*	Y	0.043
Service satisfaction → Relationship continuity	0.655	6.528***	Y	0.429

Notes: * p<0.05, ** p<0.01, *** p<0.001

4.4. Mediating Effects

This study calculated the direct, indirect, and total effects and tested the significance of the indirect effects using the Bootstrapping method, which estimates the statistics with standard errors. The results in Table 8 revealed that distribution and information services showed an indirect effect on service satisfaction through service quality

(p<0.05), while communication did not. The same results were found for relationship continuity. That is, distribution and information services also had an indirect influence on relationship continuity via service satisfaction (p<0.05), but communication did not. Thus, the results suggest that it is necessary to manage distribution and information services to improve relationship continuity through service satisfaction.

Table 8: Results of mediating effect

Dependent Variable	Explanatory Variable	Direct Effect	Indirect Effect		Total Effect
Service quality (SQ)	Logistics service	0.343	-	-	0.343
	Communication	0.006	-	-	0.006
	Information service	0.453	-	-	0.453
Service satisfaction (SS)	Logistics service	-	0.071* (SQ)	-	0.071
	Communication	-	0.001 (SQ)	-	0.001
	Information service	-	0.094* (SQ)	-	0.094
	Service quality	0.208	-	-	0.208
Relationship continuity (RC)	Logistics service	-	-	0.047*(SQ x SS)	0.047
	Communication	-	-	0.001(SQ x SS)	0.001
	Information service	-	-	0.062*(SQ x SS)	0.062
	Service quality	-	0.136* (SS)	-	0.136
	Service satisfaction	0.655	-	-	0.655

5. Conclusion

5.1. Discussion and Implications

This study found that distribution and information services affected service quality provided by marine transportation companies, and information service was found to be more important. This highlights the importance of managing and exchanging information in accordance with changes in the service process driven by information-based systems and technical innovation even in marine transportation services. However, unlike in previous studies (Mohr & Spekman, 1994; Nelson & Cooprider, 1996; Madhook, 1995), interactive communication, such as communicating and building times between marine transportation and customer companies, did not have a direct effect on service quality. This suggests that because marine transportation services are transacted within company-to-company interactions, securing service factors leading to transaction success, such as distribution and information, rather than transaction closeness through interactions, is more reliable.

Thus, this study has the following academic implications. First, with marine transportation companies, it empirically demonstrated the effects of logistics service as well as communication and information services on service satisfaction and relationship continuity through service quality. Previous studies (Boso et al., 2013) addressed how service capacity or quality of marine transportation companies affected company performance from a comprehensive perspective, but had the limitations of conducting analyses of minor factors according to prices or local conditions. However, according to the market changes that require enhanced interaction quality or information services in line with the changing circumstances of the times, it is necessary to present studies that focus on such factors. Thus, this study can have an academic significance of extending factors that influence logistics services in the marine transportation industry.

Second, this study made an academic contribution in that with marine transportation companies, the theoretical argument that factors of service resources or provision affected service quality, which in turn had a direct influence on service satisfaction and relationship continuity, is verified. Existing studies on service quality of marine transportation companies mainly demonstrated that service quality exerted a direct effect on customer satisfaction or loyalty (Barney, 1991; Grant, 1991). And if differentiated improvements to customer service are made, customer satisfaction will be higher (Kim, S. H. et al., 2018). However, because service quality is considerably influenced depending upon what service resources and processes are provided, it functions as a mediator between service attribute factors and service satisfaction. In this respect, this study is significant as it presented a comprehensive service relationship model for marine transportation companies that considered both service attribute factors and quality.

Third, service quality of marine transportation still has limitations in terms of research scope and measurement due to its elusive characteristics and unclear structure, and thus there is a lack of research on it. Nonetheless, considering the importance of the industry, it is necessary to conduct studies on service quality of companies, which need conversion and innovation toward a market oriented service company. Thus, this study has academic significance in that it demonstrated the empirical relationships between service factors and quality of marine transportation companies.

5.2. Research Limitations and Future Research

Despite these research implications, this study has the following limitations. First, the generalization of the results is limited as it was conducted on Korean marine transportation companies. Therefore, considering the global market of the future marine transportation industry, it will be necessary to conduct a survey on representative global marine transportation companies in diverse countries and draw more macroscopic and generalized results about service attribute factors or quality of the companies. Second, this study constructed service attribute factors with distribution, communication, and information, which were only based on existing studies. Most of all, since the marine transportation industry and market are rapidly changing due to environmental changes, new innovative service activity factors are emerging. Therefore, future studies need to draw new service factors in the industry through qualitative studies and present more diverse variables that affect service quality. Finally, this study did not analyze the differences depending upon the size and service type of the companies and between regular and non-regular liners. Thus, it will be necessary to compare and analyze the structural relationships between the attribute concepts, which consider these differences.

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