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How Can Perceived Logistics Service Quality (LSQ) be Differentiated between Carriers and Shippers in Global Supply Chains?

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ABSTRACT

Despite various research perspectives on global logistics service, there is a lack of research on the gaps in LSQ between carriers and shippers. Therefore, this study aims to analyze the gaps in perceived LSQ between customers and shippers in global supply chains. To attain the objective, this study utilizes data from 190 carriers and 146 shippers. The reliability and validity of the data are verified through various analytical methods, and the hypotheses are tested using analysis of variance (ANOVA) and post hoc analysis. The results are as follows: Firstly, there are gaps in the recognition of LSQ between carriers and shippers, particularly in the service focus and the service needs. Secondly, the results of the post hoc analysis indicate that the recognition of carriers is higher than that of shippers in the serrvice focus. This suggests that carriers need to develop differential services compared to their competitors. Thirdly, the recognition of carriers is higher than that of shippers in the service needs, as indicated by the results of post hoc analysis. This suggests that carriers need to enhance their services to meet the needs of shippers. Fourthly, there are no gaps in the service response and the service flexibility. This is connected with the focus strategy, implying that carriers should maintain current services and minimize costs.

Key words : logistics service quality, global supply chains, carriers, shippers, gaps

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1. Introduction

Supply chains consist of networks that connect suppliers, manufacturers, and customers. Supply chain management (SCM) refers to the sequential process of planning, implementing, monitoring, and optimizing these networks, focusing on supply chain participants. Specifically, Korean manufacturing firms produce goods in low-cost countries, manage the processes in Korea, and sell the goods to the global market. Consequently, the global SCM of Korean manufacturing firms is crucial from both external and internal perspectives (Bae and Grant, 2018). Furthermore, as demanders of global logistics services, these firms are also customers of global logistics firms. From a global SCM perspective, there is high uncertainty in global supply chains due to non-face-to-face interactions with shippers. To address this uncertainty, this study needs to analyze gaps in the perceived LSQ between carriers as service providers and shippers as customers.

Ports consist of various participants, providing shippers with maritime transportation, loading, unloading, bonded transportation, bonded warehouses, customs clearance, tally, inspection, freight forwarding, and more. Carriers play a crucial role in connecting with shippers with port logistics services and global transportation services, making them providers of global logistics services, with shippers as their customers. In global supply chains, the services provided by carriers and perceived by shippers are based on LSQ. Are there gaps in the perception of suppliers and customers regarding LSQ? (RQ 1) If there are gaps, what types of gaps exist? (RQ 2) This study will then propose methods to maximize these services, which are considered important to both carriers and shippers.

Prior research has explored logistics service in ports from the various viewpoints. Some researchers have examined the role of ports in global SCM (Demirbas et al., 2014; Hussein and Song, 2023; López and Poole, 1998; van der Lugt and de Langen, 2005), while others have focused on LSQ in ports (Cuadrado et al., 2004; Golias et al., 2009; González-Ramirez et al., 2021; Sohail et al., 2006; Ugboma et al., 2004). The latter has performed to the various viewpoints. Researchers have identified service quality in port logistics (Durvasula et al., 1999; Juga et al., 2010; Phan et al., 2021; Thai, 2008) and have verified customer service in port logistics (Bask, 2001; Kim et al., 2020; Mehta and Durvasula, 1998; Sinha and Chowdhury, 2019).

Despite various viewpoints of global logistics services, there are limitations of prior research. First, there is a gap in LSQ due to differences in approaches to services provided in ports, particularly in the context of global logistics services. Shippers become customers and carriers become suppliers in global logistics services processes. Non-face-to-face contact between suppliers and customers, a characteristic of these services, contributes to gaps in perception. Thus, this study needs to verify these gaps in perception between carriers and shippers in global supply chains.

Second, research on gaps in LSQ between shippers and carriers emphasizes the provision of high-quality services in global supply chains. Customer service provided by carriers forms the basis of service quality perceived by shippers, leading to identified gaps in service provision. This study will address this by confirming LSQ offered by global logistics firms, analyzing gaps in LSQ between carriers and shippers, and proposing methods for carriers to provide high-quality services to shippers. The overall aim of the study is to verify gaps in LSQ between carriers and shippers in global supply chains, with the results contributing to a better understanding of LSQ offered by global logistics firms.

2. Literature Review

2.1 Service Quality and Customer Service

Customer service is acknowledged as one of the methods through which firms can attain sustainable competitive advantages. By structuring relationships focused on customers, firms can comprehend customer needs and achieve sustainable competitive advantages by meeting those needs. The structural components of customer service serve as the basis for measuring the service, grounded in customer needs (Collins et al., 2001). Service quality, a measuring variable commonly used to investigate customer needs, is linked to customers' perceptions of service quality and satisfaction, ultimately influencing repurchasing intention and customer loyalty. The marketing perspective shapes the development of various measurement items assessing service quality. Research on customer service particularly emphasizes the measurement of service quality provided to customers (Durvasula et al., 1999).

The study of service quality originated with Parasuraman et al. (1985), and many researchers continue to use the scales developed by them. Service quality measures the level of performance that customers desire when purchasing specific services (Kim and Park, 2006). Service quality is determined by the gaps between provided services and expected services, with minimized gaps leading to improved service quality. Stank et al. (2001) extended the evaluation of customer service by service providers based on the items provided by Parasuraman et al. (1985). Service providers' understanding of the advantages and disadvantages of their services enable them to assess and enhance their services. For this reason, service providers can analyze the limitations of services they provide, and this analysis forms the basis for improving their services.

Prior research had explored various perspective on service quality and has been conducted in different areas. Based on prior research, the viewpoint of customer service signifies the response of suppliers as measured by service providers, while the viewpoint of service quality represents customers, response to services

provided by suppliers. These perspectives are intertwined with the viewpoints of both customers and suppliers and may vary from each other. Furthermore, research on service quality approaches the service from the perspective of customers, but it starts from the internal processes of service providers. From the customer's standpoint, service quality is associated with customer satisfaction and repurchasing intention (Bae and Ha, 2017b). Additionally, from the supplier's viewpoint, customer service is linked to customer performance and firm performance (Bae and Ha, 2017a). Therefore, comparing service quality with customer service allow for a realistic estimation of LSQ provided. By identifying and addressing gaps between these two services, it becomes possible to suggest solutions for the problems in global LSQ.

Prior research has verified the relationships between service quality, customer satisfaction, and customer loyalty of global logistics firms (Ellinger et al., 1997; Gaudenzi et al., 2021; Gupta et al., 2022; Kannan, 2010; Kilibarda et al., 2016; Pantouvakis and Patsiouras, 2016; Sohn et al., 2017; Steven et al., 2012; Thai, 2008; Ugboma et al., 2004). The service quality of global logistics firms refers to the quality of the logistics service they provide to shippers. Carriers are service providers that offer transportation service and related accessories to shippers. They provide logistics services such as international transportation, bonded transportation, customs clearance, loading/unloading, and storage under contracts with shippers. The measurement items for service quality are outlined in prior research such as tangible, reliability, responsiveness, assurance, and empathy (Durvasula et al., 1999; Hsu et al., 2010; Kilibarda et al., 2016; Michalski and Montes-Botella, 2022; Mukherjee and Nath, 2005; Pantouvakis, 2010; Ugboma et al., 2004), operational quality, resource quality quality, information quality, personnel contact quality, and customization and innovation (Gupta et al., 2022), operational, personal and technical service quality (Juga et al., 2010), customer focus, employee development, leadership commitment, employee involvement, continuous improvement, quality data and measurement, process management, and supplier quality management (Kersten and Koch, 2010), port service quality such as outcomes, process, management, image/social responsibility and satisfaction (Phan et al., 2021; Thai, 2008), personnel quality, information quality, and order quality (Saura et al., 2008), outcome quality, process quality, and capability quality (Sohn et al., 2017), and resources, outcomes, process, management, image, and social responsibility (Thai, 2008).

The service quality of global logistics is accessed through various measurement items. Prior research has analyzed service quality across different service sectors, and numerous research papers delve into the examination of service quality within global logistics. In earlier studies, service quality was categorized into tangibility, reliability, responsiveness, assurance, and empathy, primarily based on customer service (Stank et al., 2001). The measurement items in customer service, as identified in global logistics research, include routine TPL service, standard TPL

service, and customized TPL service (Bask, 2001), tangibility, reliability, responsiveness, assurance, and empathy (Chang and Chen, 1998; Durvasula et al., 1999; Mehta and Durvasula, 1998; Parasuraman et al., 1994), product availability, order cycle time, complete orders shipped, accurate invoices provided, and damaged products (Collins et al., 2001), reliability, special equipment, PU & D, carrier salesmanship, rate, loss and damage, transit time, claims, expediting, rate charges service frequency, linehaul service, financial stability, scheduling flexibility, operating personal, service charge, equipment availability, and tracing (Kent and Parker, 1999), efficiency, timeless, and security (López and Poole, 1998), and customer focus, customer needs, customer response, and flexibility (Stank et al., 2001).

After researching Parasuraman et al. (1985), the measurement items of service quality have been employed in various fields, including port logistics firms, liners, and port authority. Furthermore, the concept of customer service involves internal service processes assessed by service providers, while service quality pertains to customers' response when services are rendered. This indicates differing perspectives between suppliers and customers regarding the same LSQ. In this study, the measurement of customer service aligns with the viewpoints of suppliers and customers on key elements such as the service focus, the service needs, the service response, and the service flexibility based on the research conducted by Stank et al. (2001). These measurements are applied in accordance with the items proposed by Parasuraman et al. (1985) and subsequently adopted by Stank et al. (2001).

Prior research has established a connection between customer service and performance (Cuadrado et al., 2004; Emerson and Grimm, 1996; Michalski and Montes-Botella, 2022; Sinha and Chowdhury, 2019). The customer service of global logistics firms involves assessing the logistics service that these firms, as service providers, offer to shippers as customers. This aspect of customer service has a direct effect on firm performance. Consequently, the evaluation of customer service in global logistics firms can be conducted independently.

From the above viewpoint, this study needs to identify gaps in the perceived LSQ between carriers and shippers in global supply chains. The results of this study are grounded in strategic decision-making to enhance the customer service of carriers and provide improved LSQ for customers. Furthermore, carriers with robust internal service processes can cultivate a high standard of LSQ by developing services for the global SCM of shippers as customers.

Additionally, the outcomes directly impact the training of experts in global logistics services by confirming existing LSQ and analyzing the strengths and weaknesses of LSQ. These experts play a crucial role in the field, becoming valuable internal resources, and consequently, contributing to the development of new services for global logistics firms.

2.2 Hypotheses

Prior research on service quality has been conducted from various perspectives. Parasuraman et al. (1985) categorized it into tangible, reliability, responsiveness, assurance, and empathy, and this classification has been utilized in various research papers related to global logistics. Conversely, research on customer service within global logistics firms has not been as active. Research on the performance of global logistics firms has primarily focused on the supply chain perspective, concurrently examining the viewpoint of suppliers (carriers) providing services and the viewpoint of customers (shippers) receiving services (Bae and Ha, 2017a).

LSQ from the carrier's perspective exhibit different characteristics compared to those seen from the viewpoint of manufacturers as shippers. LSQ from the manufacturer's viewpoint is based on LSQ they offer to final customers, whereas LSQ from the viewpoint of service providers, such as carriers in global supply chains, is categorized into two perspectives: LSQ they provide and LSQ that shippers, as customers, receive. LSQ is divided into perspectives of suppliers and customers. In this context, carriers services are analyzed from both the standpoint of the customer service they provide and the perspective of service quality received by customers. Since these two services may show gaps in perspectives of the same service, these gaps constitute perceived discrepancies in LSQ within global supply chain processes.

These perceived gaps ultimately influence strategic decisions from the carrier's perspective. If there is a high level of service perceived by customers compared to the provided service, carriers can reduce costs by decreasing service (cost leadership strategy). Conversely, if there is a low level of perceived service compared to the provided service, carriers can enhance customer satisfaction by adding services (differentiation strategy). Additionally, if the perceived service is similar to provided service, carriers can pursue a strategy that retains customers by maintaining the current service and minimizing costs or a strategy that attracts new customers by maintaining current costs and maximizing services (focus strategy). Therefore, examining the perceived gaps in LSQ between carriers and shippers in global logistics processes provides insights into strategic consideration evaluating current LSQ and suggesting future LSQ. This is based on the following hypotheses.

H1. There exists a perceived gap between the service focus provided by carriers and the service focus experienced by shippers.
H2. There exists a perceived gap between the service needs provided by carriers and the service needs experienced by shippers.
H3. There exists a perceived gap between the service response provided by carriers and the service response experienced by shippers.
H4. There exists a perceived gap between the service flexibility provided by carriers and the service flexibility experienced by shippers.

3. Methodology

3.1 The Definitions of the Variables

To achieve the aim, this study analyzes perceived gaps in LSQ between shippers and carriers. The definitions of the variables are extracted from prior research. Customer service represents LSQ that carriers provide to shippers (Stank et al., 2001). Additionally, service quality refers to LSQ that shippers are provided by carriers in global logistics processes. LSQ can be categorized into the service focus, the service needs, the service response, and the service flexibility. The measurement items are presented in Appendix 1. All measurment items are assessed based on by respondents' perception using a seven-point Likert scale.

3.2 Analytical Methods

The measurement items are developed from prior research to test the hypotheses. The definitions and the measurement methods of LSQ are as follows: The service of carriers refers to LSQ provided by carriers to shippers as their customers. It is considered a sub-dimension of LSQ, characterized by non-face-to-face contact with shippers in global logistics processes. In this context, LSQ needs to be simultaneously assessed from two viewpoints: one is service quality, which gauges shippers, perception of LSQ provided by carriers and the other is customer service, which carriers, as service providers, evaluate LSQ from a professional standpoint. This is manifested as perceived gaps in LSQ between carriers and shippers. The conceptual and operational definitions of the variables used in this study are drawn from prior research and are applied correspondently to the aim of this study.

There are two populations in this study: carriers as logistics service providers and shippers as customers of global logistics service. Additionally, two sample frames are utilized. The sample frame for carriers is a membership list of the Busan Port Authority, chosen because Busan port ranks the seventh container port in the world (2023), and nearly all Korean port logistics firms are members of this list, making it a suitable sample frame. The other sample frame pertains to shippers and is confirmed by a membership list of Korea International Trade Association (KITA), as almost all shippers are members of KITA. Responding firms are selected using a random sampling method within the two sample frames. This study confirmed that the responding firms handle container cargo in the survey. The process involves numbering the firms in order on the lists, generating random numbers in SPSS, and then randomly extracting 1,000 firms based on these random numbers. The survey is conducted with staff in the sale department of carriers and the international trade department of shippers. This choice is made beccause these individuals are well-versed in global logistics service due to their collaboration in

the respective departments.

This survey is performed by Google Form. Prior to the survey, the researcher contacts the participating firms to inquire whether they are willing to respond. If they express interest in participating, the questionnaire is then sent to them. Before analyzing the data, a non-response bias check is performed. Following the approach outlined by Armstrong and Overton (1977), the collected questionnaires are divided into four clusters in chronological order. If there is no significant gap between the first cluster (representing the quickest responses, i.e., ardent responses) and the last cluster (representing the latest responses, i.e., prudent responses), it indicates no issue with non-response bias. The analysis results reveal that there is no discernible problem with non-response bias.

This study employs various analytical methods to asssess the reliability and validity of the collected data. First, the reliability of the variables is assessed using Cronbach's alpha coefficient. If the coefficient exceeds 0.6, it indicates satisfactory reliability (Nunnally, 1978). Second, validity is examined through convergent validity and discriminant validity. Convergent validity is verified using factor analysis, with three criteria: factor loading coefficients above 0.5 in a factor, each item included in one factor, and eigenvalue exceeding 1.0. As a stringent test for convergent validity, this study also investigates average variance extracted (AVE). AVE above 0.5 indicates no issues with convergent validity (Bagozzi and Yi, 1988). Discriminant validity is confirmed by comparing AVE with the squares of correlation coefficients. If AVE is higher than the squares of correlation coefficients with the variable, it indicates satisfactory discriminant validity. Additionally, relationships between variables are explored through correlation analysis. In case of a high correlation coefficient, multicollinearity should be assessed. If the results show no problems, the hypotheses can be tested.

Hypotheses in this study are tested by analysis of variance (ANOVA) and post hoc analysis. First, gaps in LSQ between carriers and shippers are examined using ANOVA. Prior research categorized of LSQ into the service focus, the service needs, the service response, and the service flexibility, and these categories are directly applied to LSQ (Stank et al., 2001). This study investigates gaps in LSQ between shippers and carriers, and if gaps are identified, implications are provided.

When shippers' LSQ surpasses carriers' LSQ, shippers perceive that they receive high levels of LSQ. Consequently, carriers can save costs by meeting customer needs for services. Conversely, if carriers' LSQ outperforms shippers' LSQ, carriers may believe they are providing high-quality service to shippers, but shippers recognize receiving lower levels of LSQ. In this scenario, carriers can address customer needs elevating the quality of their services. If no gaps exist between carriers' LSQ and shippers' LSQ, carriers should maintain their current services to minimize costs. Therefore, carriers can make strategic decisions regarding their services based on the results of this study.

Second, actual gaps in LSQ between carriers and shippers in global logis-

tics processes are examined through post hoc analysis. While the result of ANOVA indicates gaps between clusters, it has the drawback of not revealing the actual gaps between these clusters. To address the limitation, this study assesses two perspectives: the evaluation of carriers as service providers on LSQ and the evaluation of shippers as customers on LSQ. Consequently, real enhancements in LSQ are proposed based on these identified gaps. Therefore, the findings of this study are grounded in strategic directions for carriers to enhance their performance. The analyses are conducted using SPSS 29.

4. Results

4.1 General Characteristics of Responding Firms

To fulfill the research aim, this study examines two clusters: carriers and shippers as their customers. The dataset comprises 190 responses from shippers and 146 responses from carriers. The general characteristics of the participating firms are outlined Table 1.

Table 1. The general characteristics of shippers

Type of business	N (%)	Annual turnover (U$ million)	N (%)
Ecletric/electronic	12 (6.3)	Less than 1	2 (1.1)
Metal/non-metal	10 (5.3)	1–10	46 (24.2)
Machine/transport/equipment	30 (15.8)	10–50	48 (25.3)
Textile/cloth/leather	46 (24.2)	50–100	38 (20.0)
Timber/paper/furniture	4 (2.1)	Over 100	24 (12.6)
Food/beverage	12 (6.3)	No response	32 (16.8)
International trade	54 (28.4)	Number of staff	N (%)
Others	6 (3.2)	Less than 10	10 (5.3)
No response	16 (8.4)	10–30	48 (25.3)
Total	190 (100.0)	30–50	30 (15.8)
		50–100	16 (8.4)
		100–500	16 (8.4)
		Over 500	52 (27.4)
		No response	18 (9.4)

Table 2. The general characteristics of carriers

Type of business	N (%)	Annual turnover (U$ million)	N (%)
Liners	37 (25.3)	Less than 1	47 (32.2)
Agents	28 (19.2)	1–5	22 (15.2)
Forwarders	62 (42.5)	5–10	18 (12.3)
Others	9 (6.1)	Over 10	30 (20.5)
No response	10 (6.9)	No response	29 (18.8)
Total	146 (100.0)	Total	146 (100.0)
Foundation year	N (%)	The number of employees	N (%)
Before 2000	62 (42.4)	Less than 10	44 (30.1)
2001–2010	44 (30.2)	11–30	64 (43.8)
After 2011	40 (27.4)	31–50	2 (1.4)
No reponse	0 (0.0)	51–100	6 (4.2)
Total	146 (100.0)	Over 101	30 (20.5)
		Total	146 (100.0)

Table 1 displays the general characteristics of shippers. The dataset comprises 190 firms, with trading firms being the most prevalent (54 firms) and timber, paper, and furniture firms with the least represented (4 firms). Regarding annual turnover, the highest number falls within the range of over U$ 10–50 million dollars, with 48 firms falling into this category. Additionally, there are 52 firms with over 500 employees.

Table 2 presents the general characteristics of carriers, encompassing a total 146 respondent firms. Among these, international freight forwarders constitute the highest category, with 62 firms. The others with 9 firms are engaged in various types of businesses, such as bonded warehouses, bonded transporters, customs brokers, and container terminals. In terms of foundation year, 62 firms were established prior 2000. Additionally, 64 firms have a workforce ranging from 11 to 30 employees.

4.2 Reliability and Validity Tests

Based on the gethered data, reliability is assessed using Cronbach's alpha coefficient, and validity is confirmed through factor analysis. The outcomes are as follows.

Table 3 displays the outcomes of reliability and validity assessments. Factor 1, representing the service flexibility, comprises four items, factor 2, reflecting

Table 3. The results of reliability and validity

Item	Factor 1	Factor 2	Factor 3	Factor 4	AVE	Cronbach
ser 1	0.317	0.183	0.776	0.138	0.626	0.830
ser2	0.082	0.318	0.817	0.067		
ser3	0.050	0.360	0.781	0.154		
ser 5	0.287	0.773	0.245	0.129	0.604	0.894
ser 6	0.324	0.775	0.251	0.185		
ser 7	0.118	0.839	0.233	0.039		
ser 8	0.247	0.736	0.344	0.101		
ser12	0.082	0.157	0.175	0.904	0.607	0.650
ser13	0.563	0.112	0.122	0.629		
ser15	0.859	0.108	0.156	0.048	0.683	0.899
ser16	0.847	0.237	0.047	0.162		
ser18	0.780	0.325	0.226	0.041		
ser19	0.818	0.229	0.093	0.152		
Eigenvalue	3.440	2.970	2.307	1.376	–	–
%variance	26.463	22.845	17.746	10.587	–	–

KMO=0.897, Bartlett test: Chi-square=2,727.884, *df*=78, *p*=0.000.
AVE, average variance extracted.

the service needs, includes four items, factor 3, representing the service focus, consists of three items, and factor 4, indicating the service response, encompasses two items. All factors demonstrate Cronbach's alpha coefficients exceeding 0.6 indicating satisfactory reliability and validity. Additionally, there is strong evidence of convergent validity, as all AVE coefficients surpass 0.5.

Table 4 presents the results of the correlation analysis. The correlation coefficients are slightly high, prompting a multicollinearity analysis. The outcomes indicate that the service focus has a tolerance of 0.473 and a MAX-VIF of 2.114,

Table 4. The result of correlation analysis

Variable	Average	SD	Focus	Needs	Response	Flexibility
Focus	4.345	1.018	1.000			
Needs	4.452	1.076	0.646*** (0.417)	1.000		
Response	4.970	0.928	0.393*** (0.154)	0.418*** (0.175)	1.000	
Flexibility	4.464	1.045	0.391*** (0.153)	0.549*** (0.301)	0.522*** (0.272)	1.000

***〈0.01, The number in parenthesis is the square of a correlation coefficient.
SD, standard deviation.

the service needs has a tolerance of 0.691 and a MAX-VIF of 1.447, the service response has a tolerance of 0.691 and a MAX-VIF of 1.447, and the service flexibility has a tolerance of 0.600 and a MAX-VIF of 1.667. There are no issues in the results. Discriminant validity is confirmed by comparing AVE with the square of correlation coefficients. The results indicate no issue, as the former values are higher than the latter.

4.3 Results

The hypotheses are tested because there are no issues in the results of reliability and validity analyses. The results of the hypotheses tests are as follows.

Table 5 presents the results of the ANOVA on customers' LSQ and shippers' LSQ. Gaps exist between carriers and shippers in the service focus and the service needs (H1 and H2 are supported). However, there are no disparities between carriers and shippers in the service response and the service flexibility (H3 and H4 are rejected). The ANOVA results provide insights into the presence of gaps between the clusters. Consequently, post hoc analysis is employed to assess the real gaps between the clusters.

Table 6 illustrates gaps in LSQ between carriers and shippers. The averages of carriers are higher than those of shippers across all variables. However, there are not statistical gaps in the service response and the service flexibility, consistent with the results of the ANOVA. To confirm the real gaps in LSQ between carriers and shippers, this study conducts post hoc analysis on all measurment items.

Table 7 presents the result of post hoc analysis on the service focus. The

Table 5. The result of ANOVA

Variable	Sum of square		*df*	Mean of square	*F*-value	*p*-value
Focus	Between group	22.322	1	22.322	22.927	0.000
	Within group	325.186	334	0.974		
	Total	347.508	335			
Needs	Between group	6.831	1	6.381	5.581	0.019
	Within group	381.857	334	1.143		
	Total	388.238	335			
Response	Between group	0.229	1	0.229	0.265	0.607
	Within group	288.474	334	0.864		
	Total	288.702	335			
Flexibility	Between group	0.125	1	0.125	0.114	0.736
	Within group	325.186	334	1.096		
	Total	347.508	335			

ANOVA, analysis of variance.

Table 6. The result of post hoc analysis

Variables		Focus	Needs	Response	Flexibility
Carriers (146)	Average	4.639	4.609	5.000	4.486
	SD	1.035	1.085	0.913	1.104
Shippers (190)	Average	4.119	4.331	4.947	4.447
	SD	0.947	1.056	0.941	0.999

SD, standard deviation.

analysis reveals statistically significant gaps in all items, with the averages of carriers being higher than those of shippers.

Table 8 depicts the result of post hoc analysis on the service needs. According to the result, there are statistically significant gaps in three items, excluding item 6. Additionally, the result indicates that the averages of carriers are higher than those of shippers in all items.

Table 9 displays the result of post hoc analysis on the service response. There is no statistically significant gap in item 12, whereas item 13 reveals a statistically significant gap between carriers and shippers. The average of carriers is higher than that of shippers in factor 13.

Table 7. Post hoc analysis on the service focus

Items		1	2	3
Carriers (146)	Average	4.58	4.68	4.66
	SD	1.138	1.149	1.212
Shippers (190)	Average	4.18	4.26	3.92
	SD	0.997	1.175	1.223
ANOVA (F)		p=0.001 (11.536)	p=0.001 (10.844)	p=0.000 (30.616)

SD, standard deviation; ANOVA, analysis of variance.

Table 8. Post hoc analysis on the service needs

Items		5	6	7	8
Carriers (146)	Average	4.79	4.51	4.59	4.55
	SD	1.162	1.288	1.306	1.151
Shippers (190)	Average	4.46	4.37	4.21	4.28
	SD	1.258	1.200	1.163	1.290
ANOVA (F)		p=0.014 (6.116)	p=0.311 (0.031)	p=0.005 (7.856)	p=0.053 (3.784)

SD, standard deviation; ANOVA, analysis of variance.

Table 9. Post hoc analysis on the service response

Items		12	13
Carriers (146)	Average	5.14	4.86
	SD	1.041	1.080
Shippers (146)	Average	5.29	4.06
	SD	0.996	1.167
ANOVA (*F*)		*p*=0.159 (1.990)	*p*=0.035 (4.469)

SD, standard deviation; ANOVA, analysis of variance.

Table 10. Post hoc analysis on the service flexibility

Items		15	16	18	19
Carriers (146)	Average	4.67	4.26	4.38	4.63
	SD	1.308	1.198	1.158	1.180
Shippers (190)	Average	4.25	4.41	4.34	4.79
	SD	1.251	1.247	1.075	1.097
ANOVA (*F*)		*p*=0.003 (8.881)	*p*=0.266 (1.240)	*p*=0.703 (0.146)	*p*=0.230 (1.630)

SD, standard deviation; ANOVA, analysis of variance.

Table 10 presents the result of post hoc analysis on the service flexibility. There are no statistically siginificant gaps in the result, but item 15 reveals a statistically sigificant gap in the averages between carriers and shippers. The average of carriers is higher than that of shippers in item 15.

5. Discussion

The discussion of the results are as follows. First, there are gaps in the recognition of LSQ between carriers and shippers, particularly in the service focus and the service needs. This implies variations in differentiated services, the existence of programs for improving operations, and customer segmentation between carriers and shippers. Additionally, gaps exist in regular contacts with customers, the reflection of customer needs, close contracts with customers, and sustained improvement of logstics service between carriers and shippers. In this regard, the study identified gaps in the service focus and the service needs among the subdimensions of LSQ. However, no gaps were found in the service response and the service flexibility. This has several practical implications. Specifically, carriers should analyze their LSQ and identify methods to bridge the gaps between carriers and shippers.

The ANOVA results revealed gaps in service focus and service needs between carriers and shippers. However, no significant gaps exist in service focus and service needs. Identifying gaps in LSQ between carriers and shippers is essential for pinpointing where carriers can improve their LSQ. Carriers are aware of the issues with the LSQ they provide, and shippers are aware of the issues with LSQ which they are provided. Disparities between the prespectives of carriers and shippers highlight areas of LSQ that carriers should enhance, which can be seen as a step toward implementing total service quality management in partnership with shippers. By adopting total service quality management, carriers can enhance their perormance, and LSQ becomes a critical competitive advantage in the logistics service sector.

Second, the results of the post hoc analysis indicate that the recognition of carriers is higher than that of shippers in the service focus. This suggests that shippers are not satisfied with the service focus provided by carriers. From the perspective, carriers need to develop differential services compared to their competitors. Carriers should differentiate their services provided to shippers, and ultimately leading to increased customer satisfaction and subsequently, customer loyalty. Furthermore, carriers should establish programs for improving operations that align with customer needs and proivde the differential services that shippers require through customer segmentation. Carriers meeting the service focus that fulfills customer needs can enjoy sustainable comparative advantages in global supply chains.

Third, the recognition of carriers is higher than that of shippers in the service needs, as indicating by the results of post hoc analysis. In comparision with shippers, carriers highly value the service needs associated with LSQ they provide to shippers. This suggests that carriers have a need to enhance their services to meet the needs of shippers. For instance, carriers should gain an understanding of customer needs by increasing the frequency of contact with shippers. If these needs are consistently reflected and improved in LSQ, carriers can effectively meet the needs of shippers. Additionally, carriers can achieve the needs of shippers by developing new services through sustainable contact with them. Carriers adopting such strategies can enjoy sustainable comparative advantages in the market.

Fourth, there are no gaps in the service response and the service flexibility. This is connected with the focus strategy, implying that carriers should maintain current services and minimize costs. According to the results of post hoc analysis, the recognition of carriers is statistically higher than that of shippers in providing consistent answers to customer needs and increased flexibility in operations based on cooperation with customers. This indicates that carriers can enhance the flexibility of operations through cooperation and consistent responses with shippers from the perspective of differentiation strategy. Consequently, carriers that excel in providing such services can enjoy sustainable comparative advantages in the market.

6. Conclusion

The aim of this study is to verify gaps in perceived LSQ between carriers and shippers in global supply chains. To achieve the aim, this study develops conceptual and operational definitions of LSQ in global supply chains based on prior research. The questionnaire is distributed to carriers and shippers, and data are collected from 190 carriers and 146 shippers. The reliability and validity of the data are tested through factor analysis and Cronbach's alpha coefficients. The hypotheses are examined using ANOVA and post hoc analysis. Managerial implications, limitations, and directions for future research are as follows.

The managerial implications of the results are as follows. First, managers of carriers should develop LSQ with a customer-centric approach, and to achieve this, they need to understand customer needs. While carriers highly recognize LSQ they provide, shippers perceive these services less favorably. The gap suggests that carriers are delivering distinctive logistics services to shippers compared to competitors by actively striving to meet customer needs. Therefore, carriers should prioritize customer focus and gain a thorough understandng of customer needs to pursue a differentiation strategy.

Second, managers of carriers should identify methods to become leaders in global supply chains. The distinctive characteristic of global LSQ is that service providers have non-face-to-face contact with customers. For instance, carriers offer shippers global logistics services, including value-added services such as bonded transportation, bonded warehouses, customs clearance, and loading/unloading services. Value-added service providers deliver these services to shippers through strategic alliances with carriers, resulting in a high level of non-face-to-face interactions. In this context, carriers should strive to become leaders in global supply chains, acting as intermediaries in the relationships between shippers and value-added service providers. Consequently, carriers can emerge as leaders in global supply chains.

Limitations and directions for future research are as follows. First, there are no gaps in the service response and the service flexibility. While this can be explained by a focus strategy, deeper analyses are required in the future. Second, only two items are classified under the service response. This implies that the excluded items may not accurately reflect the market reality. Therefore, future research should focus on developing measurement items for LSQ that better reflect the service response in the market. The identified limitations are intertwined with directions for future research.

References

Armstrong, J. S. and Overton, T. S. (1977) Estimating Nonresponse Bias in Mail Surveys. *Journal of Marketing Research* 14(3):396-402.

Bae, H. S. and Grant, D. B. (2018) Investigating Effects of Organisational Culture and Learning on Environmental Collaboration and Performance of Korean Exporting Firms. *International Journal of Logistics Research and Applications* 21(6):614-630.

Bae, H. and Ha, M. (2017a) An Analysis of the Relationships between Customer Service and Firm Performance of International Logistics Firms. *International Business Studies* 32(1):45-61.

Bae, H. S. and Ha, M. S. (2017b) The Effect of Service Quality of Port Logistics Firms on Customer Satisfaction and Customer Loyalty of Korean Exporters. *International Commerce* 32(4):339-358.

Bagozzi, R. P. and Yi, Y. (1988) On the Evaluation of Structural Equation Models. *Journal of the Academy of Marketing Science* 16(1):74-94.

Bask, A. H. (2001) Relationships among TPL Providers and Members of Supply Chains: A Strategic Perspective. *Journal of Business & Industrial Marketing* 16(6):470-486.

Chang, T. Z. and Chen, S. J. (1998) Market Orientation, Service Quality and Business Profitability: A Conceptual Model and Empirical Evidence. *Journal of Services Marketing* 12(4):246-264.

Collins, A., Henchion, M., and O'Reilly, P. (2001) Logistics Customer Service: Performance of Irish Food Exporters. *International Journal of Retail & Distribution Management* 29(1):6-15.

Cuadrado, M., Frasquet, M., and Cervera, A. (2004) Benchmarking the Port Services: A Customer Oriented Proposal. *Benchmarking: An International Journal* 11(3):320-330.

Demirbas, D., Flint, H., and Bennett, D. (2014) Supply Chain Interfaces between a Port Utilizing Organisation and Port Operator. *Supply Chain Management* 19(1):79-97.

Durvasula, S., Lysonski, S., and Mehta, S. C. (1999) Testing the SERVQUAL Scale in the Business-to-Business Sector: The Case of Ocean Freight Shipping Service. *Journal of Services Marketing* 13(2):132-150.

Ellinger, A. E., Daugherty, P. J., and Gustin, C. M. (1997) The Relationship between Integrated Logistics and Customer Service. *Transportation Research Part E: Logistics and Transportation Review* 33(2):129-138.

Emerson, C. J. and Grimm, C. M. (1996) Logistics and Marketing Components of Customer Service: An Empirical Test of the Mentzer, Gomes and Krapfel Model. *International Journal of Physical Distribution & Logistics Management* 26(8):29-42.

Gaudenzi, B., Confente, I., and Russo, I. (2021) Logistics Service Quality and Customer Satisfaction in B2B Relationships: A Qualitative Comparative Analysis Approach. *The TQM Journal* 33(1):125-140.

Golias, M. M., Boile, M., and Theofanis, S. (2009) Berth Scheduling by Customer Service Differentiation: A Multi-Objective Approach. *Transportation Research Part E: Logistics and Transportation Review* 45(6):878-892.

González-Ramirez, R. G., Villalobos, J. R., and Meneses, C. (2021) The Strategic Design of Port Services based on a Total Landed Cost Approach. *The International Journal of Logistics Management* 32(1):96-120.

Gupta, A., Singh, R. K., Mathiyazhagan, K., Suri, P. K., and Dwivedi, Y. K. (2022) Exploring Relationships between Service Quality Dimensions and Customers Satisfaction: Empirical Study in Context to Indian Logistics Service Providers. *The International Journal of Logistics Management* 34(6):1858-1889.

Hsu, C. L., Chen, M. C., Chang, K. C., and Chao, C. M. (2010) Applying Loss Aversion to Investigate Service Quality in Logistics. *International Journal of Operations & Production Management* 30(5):508-525.

Hussein, K. and Song, D. W. (2023) Port Supply Chain Integration and Sustainability: A Resource-Based View. *The International Journal of Logistics Management* 35(2):504-530.

Juga, J., Juntunen, J., and Grant, D. B. (2010) Service Quality and its Relation to Satisfaction and Loyalty in Logistics Outsourcing Relationships. *Managing Service Quality: An International Journal* 20(6):496-510.

Kannan, V. (2010) Benchmarking the Service Quality of Ocean Container Carriers Using AHP. *Benchmarking: An International Journal* 17(5): 637-656.

Kent, J. L. and Parker, R. S. (1999) International Containership Carrier Selection Criteria. *International Journal of Physical Distribution & Logistics Management* 29(6):398-408.

Kersten, W. and Koch, J. (2010) The Effect of Quality Management on the Service Quality and Business Success of Logistics Service Providers. *International Journal of Quality & Reliability Management* 27(2):185-200.

Kilibarda, M., Nikolicic, S., and Andrejic, M. (2016) Measurement of Logistics Service Quality in Freight Forwarding Companies: A Case Study of the Serbian Market. *The International Journal of Logistics Management* 27(3):770-794.

Kim, G. S., Lee, S. W., Kim, C. S., and Seo, Y. J. (2020) Evaluation of Logistics Service for Multimodal Transport Via the Trans-Siberian Railway: A Perspective of Shippers in South Korea. *Journal of International Logistics and Trade* 18(4):169-180.

Kim, Y. D. and Park, M. J. (2006) A Study on the Factors Associated with the Measurement of the Service Quality in Liners by using the SERVPERF Model. *The Korean Journal of Shipping and Logistics* 49(6):43-65.

López, R. C. and Poole, N. (1998) Quality Assurance in the Maritime Port Logistics Chain: The Case of Valencia, Spain. *Supply Chain Management* 3(1):33-44.

Mehta, S. C. and Durvasula, S. (1998) Relationships between SERVQUAL Dimensions and Organizational Performance in the Case of a Business-to-Business Service. *Journal of Business & Industrial Marketing* 13(1):40-53.

Michalski, M. and Montes-Botella, J. L. (2022) Logistics Service Quality in an Emergent Market in Latin America. *The International Journal of Logistics Management* 33(1):79-101.

Mukherjee, A. and Nath, P. (2005) An Empirical Assessment of Comparative Approaches to Service Quality Measurement. *Journal of Services Marketing* 19(3):174-184.

Nunnally, J. C. (1978) *Psychometric Theory*. New York, NY: McGraw-Hill.

Pantouvakis, A. (2010) The Relative Importance of Service Features in Explaining Customer Satisfaction. *Managing Service Quality: An International Journal* 20(4):366-387.

Pantouvakis, A. and Patsiouras, C. (2016) Exploring the Role of Leadership Style on the Service Quality-Customer Satisfaction Link: Evidence from a B2B Environment. *International Journal of Quality and Service Science* 8(1):88-101.

Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1985) A Conceptual Model of Service Quality and its Implications for Future Research. *Journal of Marketing* 49:41-50.

Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1994) Reassessment of Expectations as a Comparison Standard in Measuring Service Quality: Implications for Further Research. *Journal of Marketing* 58:111-124.

Phan, T. M., Thai, V. V., and Vu, T. P. (2021) Port Service Quality (PSQ) and Customer Satisfaction: An Exploratory Study of Container Ports in Vietnam. *Maritime Business Review* 6(1):72-94.

Saura, I. G., Frances, D. S., Contri, G. B., and Blasco, M. F. (2008) Logistics Service Quality: A New Way to Loyalty. *Industrial Management & Data Systems* 108(5):650-668.

Sinha, D. and Chowdhury, S. R. (2019) Optimizing Private and Public Mode of Operation in Major Ports of India for better Customer Service. *Indian Growth and Development Review* 12(1):2-37.

Sohail, M. S., Bhatnagar, R., and Sohal, A. S. (2006) A Comparative Study on the Use of Third Party Logistics Services by Singaporean and Malaysian Firms. *International Journal of Physical Distribution & Logistics Management* 36(9):690-701.

Sohn, J. I., Woo, S. H., and Kim, T. W. (2017) Assessment of Logistics Service Quality Using the Kano Model in a Logistics-Triadic Relationship. *The International Journal of Logistics Management* 28(2):680-698.

Stank, T. P., Keller, S. B., and Closs, D. J. (2001) Performance Benefits of Supply Chain Logistical Integration. *Transportation Journal* 41(2/3):32-46.

Steven, A. B., Dong, Y., and Dresner, M. (2012) Linkages between Customer Service, Customer Satisfaction and Performance in the Airline Industry: Investigation of Non-linearities and Moderating Effects. *Transportation Research Part E: Logistics and Transportation Review* 48(4):743-754.

Thai, V. V. (2008) Service Quality in Maritime Transport: Conceptual Model and Empirical Evidence. *Asia Pacific Journal of Marketing and Logistics* 20(4):493-518.

Ugboma, C., Ibe, C., and Ogwude, I. C. (2004) Service Quality Measurements in Ports of a Developing Economy: Nigerian Ports Survey. *Managing Service Quality: An International Journal* 14(6):487-495.

van der Lugt, L. M., and de Langen, P. W. (2005) The Changing Role of Ports as Locations for Logistics Activities. *Journal of International Logistics and Trade* 3(2):59-72.

Appendix 1. The measurement items

Variables	Items
The service focus	Differentiated port logistics services (ser 1) Existence of programs for improving operations (ser 2) Customer segmentation (ser 3) Providing value added services (ser 4)
The service needs	Regular contacts with customers (ser 5) Reflection of customer needs (ser 6) Close contacts with customers (ser 7) Sustained improvement of logistics services (ser 8) Existence of differentiated services for core customers (ser 9)
The service response	Managing logistics services with customers (ser 10) Accepting customers' requests for special logistics services (ser 11) Punctuality for delivery date (ser 12) Consistent answers to customer needs (ser13) Providing additional services to meet customer needs (ser 14)
The service flexibility	Increasing flexibility in operations based on cooperation with customers (ser 15) Proper answers to changed requirements of customers (ser 16) An ability for information sharing with customers (ser 17) Providing value added services (ser 18) An ability for collaborative problem solving with customers (ser 19)