The relationship between information technology, logistics service quality and perceived performances in Vietnam logistics service industry

Minh Tuan Nguyen[a] and Thi Ngoc Linh Vo[b*]

[a]Faculty of Postgraduate, Ho Chi Minh University Banking, Vietnam
[b]Faculty of Business Administration, Ho Chi Minh University Banking, Vietnam

A B S T R A C T

This study investigated the relationship between information technology, logistics service quality, and perceived performances. Data collected from an online survey through questionnaires was sent to 470 customers who have been using logistics services in Vietnam and 458 valid responses were received. This study discovered that innovation capability has a positive impact on personal contact quality, order fulfillment, information quality and social responsibility. Personal contact quality, order fulfillment, information quality and social responsibility positively affect the customer satisfaction, while customer satisfaction positively affects perceived performances. This study provides insights into the importance of customer satisfaction and perceived performances of customers in the logistics industry and highlights the need for logistics companies to prioritize customer satisfaction and improve their overall performance as well as their competitiveness.

1. Introduction

In recent years, with the trend of globalization and economic integration between countries, e-commerce and automation have been constantly developing, opening many opportunities for development of the logistics services sector. Logistics is the process of planning, implementing, and controlling procedures for the efficient and effective transportation and storage of goods including services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements and includes inbound, outbound, internal and external movements, according to the Council of Supply Chain Management Professionals (previously the Council of Logistics Management). The Article 233 of the Commercial Law of 2005 states "Logistics service is a commercial activity whereby a trader organizes to perform one or more jobs including receiving goods, transporting, storing, warehousing and customs clearance, other paperwork, customer consultation, packaging, marking, delivery or other services related to goods as agreed upon with customers for compensation". In general, the quality of logistics services in Vietnam is experiencing significant changes in a positive direction in recent years, in which, infrastructure of trade - transportation, telecommunications and information technology as well as the quality of logistics services has improved markedly. Vietnam with the advantage of geographical location and favorable natural conditions, a road system connecting provinces and regions and connecting to international border gates, has many seaports, international airports, etc. are suitable conditions for the development of the logistics service industry in Vietnam. The Vietnamese logistics market is placed 11th among 50 worldwide growing logistics markets, per the rankings published by Agility 2022. Vietnam's logistics market is expected to develop at a compound annual growth rate (CAGR) of 5.5% in the period 2022-2027. The average annual growth rate of the industry is 14-16%, the number of logistics enterprises and the quality of logistics services are increasingly improved, making an important contribution to bringing the total import and export turnover of Vietnam in 2022 to 730.2 billion USD, up 9.1% compared to 2021.

* Corresponding author
E-mail address linhvtn@hub.edu.vn (T. N. L. Vo)

Research by Lyu et al. (2019) indicates that information technology can help develop strategic for businesses and change competitive advantage. Information technology has enabled companies to make better decisions, improve their processes and thus create higher quality products and services. They have also improved the ability to collect, analyze and share information of companies. Information technology advancements enable businesses to provide the most precise solutions to satisfy customer needs while also enhancing the quality of their services. Research by Akoğlu et al. (2022) has found that information technology has a positive influence on the logistics quality services. According to Jang et al. (2013), logistics service quality is a tool to measure customers' perceptions of the logistics service provided to show the company's ability to deliver in response to the price of the service. The logistics quality services are one of the important factors to ensure customer satisfaction and strengthen the competitive position of enterprises, helping Vietnam's logistics service industry to attract investment and have many opportunities for development and improve business performance. Research by Hasan Uvet (2020), Hafez et al. (2021), Lin et al. (2023) have found that logistics service quality positively affects customer satisfaction. According to Lai et al. (2007), satisfaction is the first step to increasing harmony in relationships and is a strategic approach in improving efficiency. Research by Simon et al. (2009) shows that customer satisfaction has a significant positive impact on organizational performance. Customer satisfaction leads to retaining existing customers and attracting potential customers, thereby improving operational performance.

This study, based on the previous theoretical background about information technology, logistics service quality and perceived performances to develop a framework model to empirically examine the relationship between technology information, factors of logistics service quality, satisfaction, and perceived performances in the logistics service industry in Vietnam. Thereby, it gives management implications to improve the logistics quality services and perceived performances for Vietnam's logistics service industry. The study contributes to providing practical information and scientific arguments as a basis for business leaders and managers to orient, build, improve satisfaction and perceived performances through investment in information technology in the logistics service industry in Vietnam.

2. Literature review and hypotheses

2.1. Information technology

Information technology is the use of any computer, storage device, network and other physical device, infrastructure, and processes to create, process, store, secure, and exchange all electronic data types. Information technologies are preferred by companies in order to gain a competitive advantage over their competitors, improve business methods, provide new business areas and increase performance. Businesses desire to apply information technologies in order to gain a competitive advantage over their competitors, enhance operational procedures, open up new business opportunities, and increase performance (Lambert & Peppard, 1993). Information technologies provide quick and accurate information gathering, its transfer across essential resources, enabling efficient and low-cost procurement practices in the supply chain and the integration of the entire process (Bharadwaj, 2000). Thanks to information technologies, businesses can reduce unnecessary activities and increase their quality standards. They improve their capacity to respond more rapidly and accurately to client wants and expectations in this way (Han et al., 2009). Information technology is an important resource for the logistics service industry if they want to combine systems with their customers to increase satisfaction and perceived performance of the business and improve logistics service quality. The results of the study by Lyu et al. (2019) indicate that information technology can help develop strategic utilities for businesses and change competitive advantage.

2.2. Logistics quality services

Logistics service quality is defined as a measure of the customer's perceived value created by a service provider. According to Lewis and Booms (1983), service quality is a measure of how well the service level delivered matches customers' expectations. According to Parasurman et al. (1985, 1988), service quality is considered as the gap between service expectations and customers' perception when using that service. Logistics service quality is a process aimed at increasing understanding of how customers form perceptions of logistics services and satisfaction with logistics services (Mentzer et al., 2001). Saura et al. (2008) argue that logistics service quality is a form of assessing each level of activity necessary to provide services and simplify processes by creating products and services. In other words, logistics service quality is a measure of customers' perceptions of the logistics service provided to show the company's ability to deliver in response to the price of customer service (Jang et al., 2013; Liu et al., 2010).

One of the key elements in ensuring customer satisfaction and enhancing an enterprise's competitive position is the quality of the logistics services provided. A service quality model developed by Parasuraman et al. (1985, 1988) and Gronroos (1984) and applied to the logistics industry by Mentzer et al. (1999). The study's findings indicated that the components of logistics service quality include personal contact quality, order release quantities, information quality, ordering procedures, order accuracy, order condition, order quality, order discrepancy handling, and timeliness. Alemu (2016) proposed that service quality includes: information quality, order procedure, timeliness, order condition, order accuracy, order discrepancy handling, and personal contact quality. Besides, according to Thai (2008), social responsibility is an important aspect that can promote or hinder the image or reputation of a business and services quality. Summarizing previous studies, it can be seen

that the factors of logistics services quality include personal contact quality, order fulfillment, information quality and social responsibility.

2.3. Customer Satisfaction

There is a lot of research on customer satisfaction and many different interpretations of this concept. According to Lin and Hsieh (2006), customer satisfaction is the state or feeling of a customer towards a service provider after using that service. According to Zeithaml and Bitner (2000), customer satisfaction is the customer's evaluation of a product or service that meets their needs and expectations. Schneider and White (2004) argue that satisfaction is mainly a customer's evaluation of the emotional impact of service delivery. Satisfaction is related to the fact that customers spend a certain amount of money but are effectively compensated in the purchase process. Satisfaction is when the consumer feels that past purchases and consumption, the expected benefits from the product or service brand meet the consumer's goals (Bergman & Klefsjo, 2010; Rathi & Given, 2017). According to Baker and Crompton (2000) service quality has become an effective strategy to assess perceived satisfaction and is considered an important premise to determine customer satisfaction.

2.4. Perceived performances

Perceived performance is defined as the extent to which customers perceive the quality of a product or service relative to the price they pay (benefits versus costs) (Westbrook and Reilly, 1983). Sink et al. (1984) gave a definition of performance including the following criteria: effectiveness, efficiency, quality, productivity, quality of work life, innovation, and profitability. Chow et al. (1994) defined logistics performance as the degree to which the following objectives are achieved: cost effectiveness, profitability, social responsibility, on-time delivery, product availability, flexibility operation, low loss and damage, keeping promises, fair prices for inputs, customer satisfaction, sales growth, job security and working conditions.

2.5. Research framework

The proposed research model is based on a combination of the preceding findings related to information technology, logistics service quality and perceived performances. Akoğlu et al. (2022) show the role of information technology for the logistics services quality. Research by Harash Sachdev et al. (2015) on the market of U.S.A logistics service providers shows that satisfaction has an impact on operational performances. The relevant research papers in Vietnam have also not studied these issues. Therefore, the study proposes a research model framework as follows:
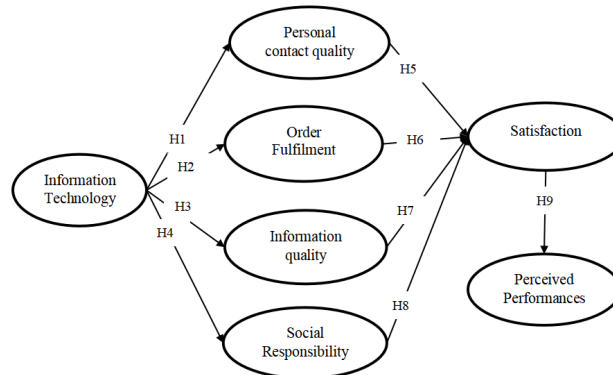

Fig. 1. Proposed model

2.6. Hypothesis

Information technology enables companies to collect information quickly and accurately, enables efficient and low-cost procurement in the supply chain, and ensures the integration of the entire process (Bharadwaj, 2000). Thanks to information technology, businesses can reduce unnecessary activities and raise their quality standards. As a result, businesses gain the ability to respond to customer needs and expectations more quickly and accurately (Han et al., 2009). DeGroote and Marx (2013) contend that information technology reduces costs and, accordingly, improves the ability to respond to consumer needs more quickly and with higher quality, which benefits business operations. According to Close et al. (1997), information technology increases the overall performance of the company, increases the logistics services quality and reduces costs. The information technology system is one of the most important factors for effective logistics service quality, according to research by Prahalad and Krishnan (1999). According to Founou (2002), information technology utilization in logistics increases productivity and competitiveness. An adequate information technology system is one of the most important factors to improve the quality of logistics services, according to Bienstock et al. (2008). Han et al. (2009) argued that businesses can use information technology to connect operations, improve quality by eliminating unnecessary activities, and guarantee customer satisfaction. Tadejko (2015) asserted that the development of logistics activities is facilitated using logistics information

systems. The results in the study by Civeek et al. (2022) have shown the role of information technology in improving the logistics services quality. Thus, the following hypothesis is proposed:

H₁: *Information technology has a positive impact on personal contact quality.*
H₂: *Information technology has a positive impact on order fulfillment.*
H₃: *Information technology has a positive impact on information quality.*
H₄: *Information technology has a positive impact on social responsibility.*

Cronin and Taylor (1992) also provide empirical research for the view that "perceived service quality does in fact lead to satisfaction". Providers are looking for better ways to understand how customers perceive service quality and how perceived service quality positively impacts customer satisfaction and loyalty (Chin et al., 2013). Most research results indicate that in order to increase the level of customer satisfaction, organizations should provide a high level of service quality because service quality is often considered as an antecedent of customer satisfaction goods (Saura et al., 2008). The core competitiveness of e-commerce enterprises is not only limited to price competition, but logistics services are becoming more and more important, and logistics services have an influence on consumer awareness and trust. According to Jang et al. (2013), logistics service quality is a tool to measure customers' perceptions of the logistics service provided to show the company's ability to deliver in response to the price of the service. The higher the ability of logistics service providers to meet customer expectations, the higher customer satisfaction. This is consistent with the results of research conducted by Kilibarda and Andrejic (2016), indicating that logistics service quality has a significant relationship with customer satisfaction. Politis et al. (2014) also found that, there is a significant influence on the relationship between logistics service quality and customer's perception and actions about logistics services. According to the research results of Mentzer et al. (2001), all factors of logistics service quality have a positive relationship and significant positive impact on customer satisfaction. The quality of logistics service performance is an important key component that helps create customer satisfaction. Excellence in logistics has been recognized as an area where companies can create a competitive advantage because of the impact service has on customers. Therefore, these hypotheses are proposed:

H₅: *Personal relationship quality has a positive impact on satisfaction.*
H₆: *Order fulfillment has a positive effect on customer satisfaction.*
H₇: *Information quality has a positive impact on customer satisfaction.*
H₈: *Social responsibility has a positive effect on satisfaction.*

According to Wang et al. (2007), satisfaction is the first step to increase harmony in relationships and is a strategic approach in improving performance. Any company looking to improve its performance considers customer satisfaction a top priority among its strategic goals. Companies seeking a competitive advantage and improving performance use strategies to satisfy customer needs. Several studies observed that customer satisfaction has a significant positive impact on organizational performance (Simon et al., 2009). Customer satisfaction leads to retaining existing customers and attracting potential customers, thereby improving operational performance. Hence, the following hypothesis is proposed:
H9: Satisfaction has a positive effect on perceived performance.

3. Methodology

According to Hair et al. (1998), the research sample size must be at least 5 times larger than the number of variables in the factor analysis. Tabachnick and Fidell (1989) shows that a sample size of 300 is good, 500 is very good and 1000 is excellent. The research applies mixed research methods, including qualitative research and quantitative research, specifically as follows: Before carrying out quantitative research, the research conducts preliminary research through focus group discussions research methods and in-depth interviews with experts in the field of logistics services. The qualitative research method helps the author collect information to adjust, supplement and complete the scale of concepts and the official questionnaire used in the quantitative research content. After building a complete scale and questionnaire, the author conducts a survey of customers who have been using logistics services in Vietnam, focusing on major economic regions such as Hanoi Capital, Hai Phong City, Da Nang City, Ho Chi Minh City, Binh Duong, Dong Nai and Can Tho. Data collection is carried out in two forms: Direct survey through distributing paper-based questionnaires to customers and online survey through sending questionnaires to customers' email boxes or through other social media. After collecting the data sample to ensure the appropriate sample size, the researcher will re-test the research scale and model. The research uses SPSS, Amos, to process the collected data. Cronbach Alpha reliability coefficient, exploratory factor analysis, confirmatory factor analysis and structural equation modeling analysis were used to test the relationship between information technology, factors of logistics service quality and perceived performances in the logistics service industry in Vietnam.

3.1. Questionnaire design

The scale used in this study is a Likert scale from 1 to 5 (1: Very dissatisfied, 2: Dissatisfied, 3: Normal, 4: Satisfied, 5: Very satisfied). The scales taken from the prior studies were utilized to measure the constructs. To measure information technology, the scales adopted by Aslan et al. (2018) were used. The logistics service quality dimension was measured with scale

developed by Thai (2013). The scales which were developed by Xiaofang Lin (2023) were used to measure satisfaction. The dimension of the perceived performance was measured with a scale developed by Aslan et al. (2018). Moreover, social networking was observed using four items based on Pratono (2018). Table 1 will show all detailed measurement items.

Table 1
Constructs and measurement items

Construct	Items	Measures	Supporting Refences
Information technology	IT1	I can easily do what I want with the technology used by the logistics company we work with	Aslan et al. (2018)
	IT2	The technology used by the logistics company we work with is useful.	
	IT3	The technology used by the logistics company we work with increases my productivity	
	IT4	My technology activity used by the logistics company we work with increases	
	IT5	Thanks to the technology of the logistics company, we work with, I intend to continue doing business with this logistics company	
Personal contact quality	PC1	Staff's attitude and behavior in meeting customers' satisfaction	Thai (2013)
	PC2	Responsiveness to customers' needs and requirements	
	PC3	Knowledge/understanding of customers' needs and requirements	
	PC4	Staff's competence	
Order fulfillment	OF1	Order accuracy (meeting customers' requirements)	Thai (2013)
	OF2	Order condition (free of damage, fault or loss)	
	OF3	Order discrepancy handling	
	OF4	Consistency in order handling process	
Information quality	IQ1	Reliability of order information	Thai (2013)
	IQ2	Application of information technology in customer service	
	IQ3	Availability of order information	
	IQ4	Shipment tracing capability	
Social responsibility	SR1	Socially responsible behavior and concerns for human safety	Thai (2013)
	SR2	Environmentally safe operations	
	SR3	Record of engagement in community activities	
	SR4	Performance statement and vision towards community responsibility	
Satisfaction	ST1	I am delighted with the performance of my logistics service provider.	Xiaofang Lin (2023)
	ST2	The services offered by the logistics service provider meet my expectations.	
	ST3	The services provided to you through the logistics service provider are good.	
	ST4	My feelings towards the logistics service provider are very positive.	
Perceived performance	PP1	The logistics company I work with complies with the promised dates regarding my orders.	Aslan et al. (2018)
	PP2	The logistics company I work with delivers the products it carries without any damage.	
	PP3	The logistics company I work with gives importance to our needs	
	PP4	The logistics company we work with is in contact with us to do the job right.	
	PP5	The logistics company we work with is in contact with us to do the job right.	

4. Results and findings

4.1. Demographic statistics

The questionnaire was distributed to 470 respondents using a Google form. The 20 invalid responses were because the respondents incorrectly answered the reverse-scale questions. The genders were equally divided; however, most respondents were younger than 35 years. The occupation of respondents most is office staff and business. The demographic statistics are shown in Table 2.

Table 2
Response rate of groups

Category	Number of respondents	Percentage
Gender		
Female	219	49%
Male	231	51%
Age		
18 - 22	86	19%
23 - 35	246	55%
36 - 45	96	21%
Above 45	22	5%
Education		
High school or below	84	19%
University	270	60%
Master's or Doctoral studies	96	21%
Occupation		
Student	31	7%
Office staff	233	52%
Business	114	25%
Others	72	16%

4.2. Confirmatory factor analysis (CFA)

Bagozzi and Foxall (1996) showed that confirmatory factor analysis (CFA) can be used to evaluate reliability and validity. The CFA's goodness-of-fit was used to further examine the construct's convergent validity. According to Hair et al. (2010), the following indices were used in the CFA to evaluate: Chi-square/df (cmin/df), goodness of fit index (GFI), comparative fit index (CFI), root mean squared error of approximation (RMSEA), Tucker Lewis Index (TLI). Results, all variables in this study were within the acceptable range (see Table 3). Specific, chi-square/df (cmin/df) = 1.313 less than 3 is good, goodness of fit index (GFI) = 0.933 greater than 0.9 is good, comparative fit index (CFI) = 0.986 greater than 0.95 is very good, root mean squared error of approximation (RMSEA) = 0.026 less than 0.06 is good, and Tucker Lewis Index (TLI) = 0.986.

Table 3
Confirmatory factor analysis

Measure	Threshold	Results	Source
Chi-square/df (cmin/df)	≤ 2: good; ≤ 5: acceptable	1.313	Hair et al. (2010)
Goodness of fit index (GFI)	≥ 0.9: good; ≥ 0.95: very good	0.933	Hair et al. (2010)
Comparative fit index (CFI)	≥ 0.9: good; ≥ 0.95: very good; ≥ 0.8: acceptable	0.986	Hair et al. (2010)
Root mean squared error of approximation (RMSEM)	≤ 0.08: good; ≤ 0.03: very good	0.026	Hair et al. (2010)
Tucker Lewis Index (TLI)	≥ 0.9: good	0.986	Hair et al. (2010)

Construct validity: According to Hair et al. (2010), average variance extracted (AVE) scores should be around 0.5 and should explain 50% or more of the variance. The reliability of all the variables, including Information technology, Personal contact quality, Order fulfillment, Information quality, Social responsibility, Satisfaction, Perceived performance, ranged from 0.831 to 0.935 (see Table 4), greater than 0.5, therefore, the reliability of these findings is satisfactory. The factor loading of all items exceeded 0.5 (Hair et al., 2010). All the variables ranged from 0.690 to 0.910 (see Table 4), greater than 0.5. Moreover, AVE for each construct was greater than 0.5, and the construct reliability (CR) of all the latent variables was higher than 0.7. All indicators had significant loading into the respective latent constructs, with values between 0.554 and 0.786. Therefore, the results were acceptable and could explain over 50% of the variance (see Table 4).

Table 4
Confirmatory factor analysis (CFA) fitting Indices

	Estimate	Cronbach	CR	AVE
Information technology		0.895	0.895	0.631
IT1	0.794			
IT2	0.779			
IT3	0.808			
IT4	0.819			
IT5	0.770			
Personal contact quality		0.833	0.833	0.555
PC1	0.770			
PC2	0.704			
PC3	0.741			
PC4	0.764			
Order fulfillment		0.915	0.916	0.731
OF1	0.837			
OF2	0.881			
OF3	0.870			
OF4	0.830			
Information quality		0.935	0.936	0.786
IQ1	0.825			
IQ2	0.905			
IQ3	0.910			
IQ4	0.903			
Social responsibility		0.831	0.832	0.554
SR1	0.812			
SR2	0.728			
SR3	0.741			
SR4	0.690			
Satisfaction		0.884	0.884	0.657
ST1	0.831			
ST2	0.827			
ST3	0.777			
ST4	0.807			
Perceived performance		0.899	0.899	0.640
PP1	0.845			
PP2	0.838			
PP3	0.777			
PP4	0.760			
PP5	0.776			

According to Hair et al. (2010), discriminant validity ensures that a concept measure is statistically distinctive and accurately depicts phenomena that other measures in a structural equation model miss. This was tested by comparing if the square root of AVE, in a latent construct, was higher than all the construct correlations. The results showed that the square of AVE values, for all the variables, Information technology, Personal contact quality, Order fulfillment, Information quality, Social responsibility, Satisfaction, Perceived performance were higher than the inter-construct correlations (see Table 5). Table 5 shows that the outer loading values of all indicators were higher than the values of all cross-loadings on the other constructs. Thus, the outcomes were considered appropriate.

Table 5
Discriminant validity

	PP0	IT0	IQ0	ST0	SR0	PC0	OF0
PP0	**0.800**						
IT0	0.195***	**0.794**					
IQ0	0.615***	0.225***	**0.886**				
ST0	0.690***	0.175**	0.592***	**0.81**			
SR0	0.509***	0.079	0.486***	0.487***	**0.744**		
PC0	0.462***	0.234***	0.489***	0.416***	0.401***	**0.745**	
OF0	0.662***	0.209***	0.673***	0.673***	0.632***	0.454***	**0.855**

4.3. Structural Equation Modeling (SEM)

The data analysis indicates that information technology is significantly positively related to personal contact quality ($\beta = 0.266$, $p < .001$, t-value = 4.796), order fulfillment ($\beta = 0.276$, $p < .001$, t-value = 4.773), information quality ($\beta = 0.359$, $p < .001$, t-value = 5.086) and social responsibility ($\beta = 0.127$, $p < .001$, t-value = 2.186). Thus, H1, H2, H3, H4 is supported. In addition, personal contact quality has significantly positive impact on satisfaction ($\beta = 0.110$, $p < .001$, t-value = 2.464), order fulfillment has significantly positive impact on satisfaction ($\beta = 0.442$, $p < .001$, t-value = 10.043), information quality has significantly positive impact on satisfaction ($\beta = 0.214$, $p < .001$, t-value = 6.737) and social responsibility has significantly positive impact on satisfaction ($\beta = 0.107$, $p < .001$, t-value = 2.529). Thus, H5, H6, H7, H8 is supported. Finally, satisfaction is significantly positively affected by perceived performances ($\beta = 0.654$, $p < 0.001$, t-value = 11.671). Thus, H6 is also supported. Table 6 represents the results briefing.

Table 6
Results of hypothesis test

Hypotheses	Path	Standardized path coefficient	T-value	Result
H1	Information technology → Personal contact quality	0.266***	4.796	Support
H2	Information technology → Order fulfillment	0.276***	4.773	Support
H3	Information technology → Information quality	0.359***	5.086	Support
H4	Information technology → Social responsibility	0.127*	2.186	Support
H5	Personal contact quality → Satisfaction	0.11*	2.464	Support
H6	Order fulfillment → Satisfaction	0.442***	10.043	Support
H7	Information quality → Satisfaction	0.214***	6.737	Support
H8	Social responsibility → Satisfaction	0.107*	2.529	Support
H9	Satisfaction → Perceived performance	0.654***	11.671	Support

5. Discussion

A total of 470 surveys were sent to the customers who have been using logistics services in Vietnam via the Internet and 450 valid responses were received. In addition, this study relied on previously-published measurements such as Thai (2013), Aslan et al. (2018) and Xiaofang Lin (2023). These items were assessed using a 5-point Likert scale. The goal of this study was to determine the link between information technology, factors of logistics service quality, satisfaction and perceived performances in the logistics service industry in Vietnam by examining nine hypotheses. The results indicate that information technology has a positive impact on personal contact quality, order fulfillment, information quality and social responsibility. Personal contact quality, order fulfillment, information quality and social responsibility have a positive impact on customer satisfaction, customer satisfaction has a positive impact on perceived performance. Previous studies supported the results of this study. The results of the study by Akoğlu et al. (2022) showed the role of information technology in improving the quality of logistics services. Hasan Uvet (2020), Hafez et al. (2021), Lin et al. (2023) found that logistics service quality positively affects logistics service customer satisfaction. As a result of the study by Aslan (2018), it has been found that the quality of logistics service significantly affects firm performance in a positive direction.

The study found a positive relationship between information technology and logistics service quality factors. This result is consistent with the results in a previous study by Civeek et al. (2022). The result of the positive relationship between

technology information and personal contact quality indicates that logistics companies applying information technology in their operations will improve the personal contact quality and promptly meet customer needs. The outcome of this study suggests that technology information has a significant connection with order fulfillment. Order fulfillment refers to order accuracy, order condition, order discrepancy handling and consistency in order handling process. Therefore, the application of information technology will help make order fulfillment better and error-free. This study revealed that technology information offers a significant connection with information quality. Information quality refers to the timeliness, accuracy, completeness, relevance, and clarity of information provided to customers. Therefore, the application of information technology will help increase information quality for logistics services. This study also found that technology information has a significant positive effect on social responsibility. This indicates that information technology helps logistics companies perform socially responsible behavior. Moreover, the study showed that logistics service quality factors have a positive relationship with satisfaction, which is in accordance with previous studies of Mentzer et al. (2001), Kilibarda and Andrejic (2016), Hasan Uvet (2020). This study finds that there is a significant relationship between personal contact quality and satisfaction in logistics services. As personal contact quality increased, customers were more likely to be satisfied with their received logistics services, that highlighted the importance of human factors in service delivery. The result of the study posited that order fulfillment positively influences satisfaction. Order fulfillment influences the overall experience of the customer, from the order placement process to the delivery of goods. The faster and more accurately the logistics service provider can deliver goods, the greater the possibility of gaining satisfaction via the services. This study revealed that information quality offers a significant connection with satisfaction for logistics services. Logistics services rely heavily on the information exchange and communication between service providers and customers, making information quality a crucial factor in satisfaction. The outcome of this study suggests that social responsibility has a significant connection with satisfaction in logistics services. Finally, this study also found that satisfaction has a significant positive effect on perceived performance. This shows that the more satisfied customers are with logistics service, the higher the customer's perceived performance towards the business.

6. Conclusion and Managerial implications

6.1. Conclusion

Logistics service quality has an increasing importance day by day due to its ability to affect customer satisfaction directly, thus profit and the performance of the entire organization (Water, 2003). This study aims to determine the link between technology information, factors of logistics service quality, satisfaction, and perceived performances with the moderate of social networks in the logistics service industry in Vietnam. In this study, a questionnaire was applied to the customers who have been using logistics services in Vietnam, focusing on major economic regions such as Hanoi Capital, Hai Phong City, Da Nang City, Ho Chi Minh City, Binh Duong, Dong Nai and Can Tho. Analysis was made based on the data collected from the customers. As a result of the structural equation model analysis, it was determined that the use of logistics information technologies affected the logistics service quality positively, the logistics service quality affected satisfaction positively and the satisfaction affected perceived performances positively. The findings obtained at the end of the research are compatible with other studies in literature.

6.2. Managerial implications

The outcomes of this research offer practical implications for logistics service providers seeking to improve customer satisfaction and increase perceived performance. First, logistics service providers should invest in information technology and apply information technology in the company's operations to improve the logistics service quality, thereby satisfying customers. Second, logistics service providers should concentrate on implementing customer relationship management systems. These systems can help staff in better managing customer interactions and offering individualized services to improve personal contact quality. Employees who directly interact with customers might receive training in interpersonal skills and effective communication can better understand customer needs and preferences and offer more individualized services. Employees can be inspired to deliver higher-quality service by being encouraged and recognized for providing excellent customer service. Based on this analysis suggests that improving personal contact quality might raise consumer satisfaction with logistical services. Third, to meet customer expectations and improve their overall experiences, logistics service providers should focus on factors like companies that can offer flexible and customizable delivery options, like same-day or time-specific deliveries, timely and accurate delivery, effective problem-solving, clear, and comprehensive information, and polite and friendly communication. In addition, the quality of the information that logistics service companies give their clients should also be improved. This can entail creating approachable platforms and user interfaces, offering current, reliable information, and enhancing communication routes. By doing so, logistics service providers can improve their market competitiveness and increase their customer base.

Furthermore, logistics service providers should also participate in community activities, environmental safety activities, and community responsibility activities to create a reputation in the industry. Finally, logistics service providers must ensure that their clients are happy with the services they receive by meeting their needs and expectations. This can be accomplished by ongoing service quality monitoring and enhancement, as well as regular customer interaction to learn about their preferences

and issues. By doing this, logistics service companies may enhance their reputation, attract new customers, and increase their earnings.

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