HOW DOES E-LOGISTICS SERVICE QUALITY INFLUENCE CONSUMER SATISFACTION IN E-COMMERCE? AN EMPIRICAL STUDY IN VINH LONG PROVINCE

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Abstract: ***This study investigates the influence of e-logistics service quality on consumer satisfaction in the context of e-commerce in Vinh Long Province, Vietnam. A quantitative research approach was employed, and data were collected from 289 valid survey responses. The reliability and validity of the measurement scales were confirmed using Cronbach's Alpha and Exploratory Factor Analysis. Multiple linear regression analysis in SPSS 27.0 was conducted to examine the effects of six e-logistics service quality dimensions including order accuracy, order condition, timeliness, order discrepancy handling, shipping cost, and customer service on consumer satisfaction. The results show that all six dimensions have significant positive impacts, with order accuracy having the strongest effect with a beta value of 0.324. This study provides empirical evidence in a provincial context and offers practical insights for e-commerce businesses seeking to improve delivery performance, service reliability, and cost transparency.***

• Keywords: *e-logistics; service quality; consumer satisfaction; e-commerce; delivery performance.*

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1. Introduction

The rapid development of information technology and e-commerce has significantly reshaped consumer behavior around the world. As more transactions move to digital platforms, logistics is no longer simply a back-end function but a critical part of the customer experience. According to Grand View Research (2024), the global e-commerce market reached approximately USD 25.93 trillion in 2023 and is expected to continue expanding strongly in the coming years. In particular, the post-pandemic period has accelerated the adoption of online shopping and, in turn, increased the importance of e-logistics in ensuring efficient delivery, order fulfillment, and return handling (UNCTAD, 2021). In Vietnam, e-commerce has developed rapidly and is now one of the major pillars of the digital economy. Retail B2C e-commerce revenue in 2022 was estimated at USD 16.4 billion, representing an increase of about 20% compared with the previous year (Vietnam E-commerce and Digital Economy Agency, 2022). Alongside this growth, consumers have become increasingly sensitive to the quality of e-logistics services. Their expectations now extend beyond simply receiving an order; they also include on-time delivery, intact goods, reasonable shipping costs, and convenient after-sales support. These service dimensions directly shape consumer satisfaction in the online shopping process. In Vinh Long Province, e-commerce has grown noticeably in recent years, but the quality of e-logistics services may still be influenced by local conditions such as transport infrastructure, delivery costs, and service capacity. Although numerous domestic and international studies have examined the relationship between e-logistics service quality and customer satisfaction, most have focused on the national level or on large urban markets. As a result, empirical evidence at the local level remains relatively limited, especially in provinces such as Vinh Long. Against this background, this study was conducted with three objectives. First, it seeks to identify the dimensions of e-logistics service quality that affect consumer satisfaction in Vinh Long Province. Second, it examines the relative impact of each dimension. Third, it proposes managerial implications to improve e-logistics service quality and, in turn, enhance consumer satisfaction in the local context.

2. Literature Review

2.1. E-Logistics and Service Quality in E-Commerce

Logistics plays a critical role in supporting e-commerce activities by ensuring that goods, information, and services are delivered efficiently from sellers to customers. According to the Council of Supply Chain Management Professionals (2013), logistics refers

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to the process of planning, implementing, and controlling the efficient flow and storage of goods, services, and related information from the point of origin to the point of consumption in order to meet customer requirements. With the rapid expansion of online shopping, logistics has evolved into e-logistics, which integrates traditional logistics operations with digital technologies and e-commerce platforms.

Bayles (2002) defined e-logistics as the application of logistics processes to online business activities through the Internet, while Gunasekaran et al. (2007) highlighted the importance of technologies such as electronic data interchange (EDI), radio frequency identification (RFID), and information systems in enhancing coordination among logistics actors. In addition, Wang et al. (2004) noted that e-logistics operates under a demand-driven or pull-based mechanism, meaning that distribution activities are closely synchronized with actual customer orders. This mechanism allows logistics operations to be more flexible and responsive compared with traditional distribution systems.

In the context of e-commerce, service quality is not evaluated solely based on delivery outcomes but also on the overall service experience throughout the transaction process. Consumers expect accurate delivery, intact products, timely service, transparent information, and responsive support when problems arise. Therefore, e-logistics service quality can be viewed as a multidimensional construct that reflects the provider's ability to deliver reliable, efficient, and customer-oriented services in the digital environment (Parasuraman et al., 2005; Liu et al., 2008; Rajendran et al., 2018; Choi et al., 2019; Nguyen & Huynh, 2023).

Previous studies have identified several key dimensions of logistics service quality that are particularly relevant in e-commerce settings. Mentzer et al. (1989) and Bienstock et al. (1997) emphasized timeliness, order accuracy, and order condition as fundamental components of service quality. Mentzer et al. (2001) later added order discrepancy handling, reflecting the firm's ability to resolve problems occurring during or after delivery. More recent research has also highlighted the importance of shipping cost transparency and customer service responsiveness in shaping consumer evaluations of e-logistics performance (Rao et al., 2011; Hafez et al., 2021; Do et al., 2023).

2.2. Consumer Satisfaction

Consumer satisfaction is widely recognized as a key outcome of service quality and an important indicator of business performance. Oliver (1980) defined satisfaction as a psychological state resulting from the comparison between consumers' expectations and their actual experience after using a product or service. When service performance meets or exceeds expectations, satisfaction increases; when performance falls short of expectations, dissatisfaction is likely to occur.

In e-commerce, consumer satisfaction is influenced not only by product-related factors but also by the logistics process that supports the transaction. Because online consumers cannot physically inspect products before purchase, they rely heavily on logistics services to deliver the expected value. As a result, delivery accuracy, product condition, delivery time, and after-sales support become critical determinants of satisfaction.

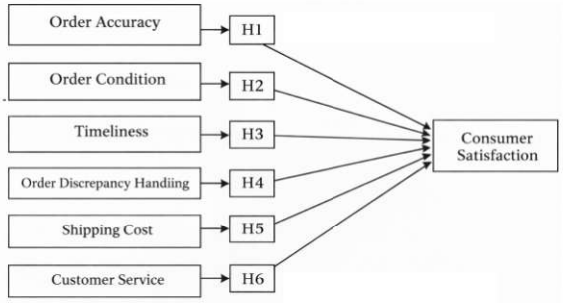
Several studies have confirmed the positive relationship between logistics service quality and customer satisfaction in the online shopping environment. For example, Rao et al. (2011) found that reliable delivery and transparent shipping costs significantly improve consumer satisfaction. Similarly, Cao et al. (2018) reported that post-purchase logistics experiences, including delivery performance and customer service, have a direct influence on customer satisfaction and repurchase intention. In addition, Hafez et al. (2021) demonstrated that timely response and effective service recovery contribute to stronger customer trust and satisfaction.

Despite the growing body of research on e-logistics service quality, empirical evidence at the provincial or local level remains limited. In Vinh Long Province, where transportation infrastructure, delivery distance, and service capacity may differ from those in major urban centers, the determinants of consumer satisfaction may also exhibit unique characteristics. Therefore, examining the relationship between e-logistics service quality and consumer satisfaction in this local context is both practically and academically meaningful.

2.3. Research Hypotheses

Order accuracy is a core dimension of e-logistics service quality. It refers to the ability of the service provider to deliver the correct product, in the correct quantity, and in accordance with the original order specifications. In e-commerce, where consumers cannot physically examine products before purchase, order accuracy becomes an essential basis for evaluating the reliability and professionalism of the provider. Previous studies have consistently shown that accurate order fulfillment has a positive effect on customer satisfaction in e-logistics services (Bienstock et al., 1997; Mentzer et al., 2001; Gligor, 2015; Akıl & Ungan, 2022).

Order accuracy reflects the provider's ability to deliver the correct product in the correct quantity as specified in the order. In e-commerce, accurate fulfillment is a fundamental indicator of reliability and is consistently associated with higher consumer satisfaction (Bienstock et al., 1997; Mentzer et al., 2001; Akıl & Ungan, 2022).



Source: Proposed by the authors

H1: Order accuracy has a positive impact on consumer satisfaction.

Order condition refers to whether goods arrive intact and undamaged, indicating the effectiveness of packaging, handling, and transportation. The physical condition of delivered products serves as a visible signal of service quality and directly shapes customer evaluations (Bienstock et al., 1997; Vasić et al., 2021).

H2: Order condition has a positive impact on consumer satisfaction.

Timeliness is defined as the ability to deliver orders within the promised time frame. Reliable delivery schedules help build trust and maintain satisfaction, particularly in regions where logistics performance may be influenced by distance and infrastructure conditions (Jain et al., 2021; Akıl & Ungan, 2022).

H3: Timeliness has a positive impact on consumer satisfaction.

Order discrepancy handling represents the firm's ability to respond to delivery problems such as incorrect, missing, or damaged items. Effective handling of these issues reduces customer frustration and supports positive service evaluations (Hafez et al., 2021).

H4: Order discrepancy handling has a positive impact on consumer satisfaction.

Shipping cost influences consumers' perceived value because it affects the total cost of purchase. Transparent and reasonable delivery fees are therefore important for maintaining satisfaction in online transactions (Rao et al., 2011; Do et al., 2023).

H5: Shipping cost has a positive impact on consumer satisfaction.

Customer service reflects the responsiveness and support provided during and after the transaction. Clear communication and timely assistance strengthen customer confidence and contribute to a more positive overall experience (Cao et al., 2018; Hafez et al., 2021).

H6: Customer service has a positive impact on consumer satisfaction.

3. Methodology

3.1. Data Collection

The target respondents of this study were consumers living, studying, or working in Vinh Long Province who had engaged in online shopping and used e-logistics services within the previous six months. The study employed a quantitative research design and collected data through an online survey using Google Forms. A five-point Likert scale was used to measure all constructs, and convenience sampling was adopted due to the practical constraints of data collection.

A total of 315 questionnaires were collected. After screening for completeness and validity, 289 responses were retained for analysis. The sample was composed mainly of female respondents (60.6%), with the largest proportion in the 18-24 age group (45.0%). Students accounted for the largest occupational group (43.3%), and respondents with a monthly income below VND 5 million represented 45.0% of the sample. Most participants reported shopping online one to three times per month (56.1%). These characteristics suggest that the sample largely reflects young and relatively active online consumers in the study area.

3.2. Data Analysis

The data were processed using SPSS 27.0. Cronbach's Alpha was first applied to assess the reliability of the scales, with a threshold of 0.6 for Cronbach's Alpha and 0.3 for corrected item-total correlation. Exploratory factor analysis (EFA) was then conducted to examine construct validity, using the criteria of KMO > 0.5, Bartlett's Test significance < 0.05, Eigenvalue > 1, and total variance explained > 50%. Next, Pearson correlation analysis was used to examine the linear associations between the independent variables and consumer satisfaction. Finally, multiple linear regression was employed to test the proposed hypotheses and assess the relative effect of each e-logistics service quality dimension on consumer satisfaction. Model adequacy was evaluated through Adjusted R^2, the F-test, Durbin-Watson statistics, and variance inflation factors (VIF).

4. Results and Discussion

4.1. Reliability and Validity of the Scales

The results of Cronbach's Alpha testing show that the measurement scales generally met the required reliability standards. Two observed variables did not satisfy the acceptable corrected item-total correlation threshold: OC3 from the order condition scale and CS4 from the customer service scale, with values of 0.298 and 0.273, respectively. These items were therefore removed from the analysis. After their removal, the reliability of both scales improved. Cronbach's Alpha for order condition increased from 0.713 to 0.771, while Cronbach's Alpha for customer service

increased from 0.674 to 0.726. The remaining scales showed satisfactory reliability, with Cronbach's Alpha values ranging from 0.771 to 0.846. In total, 26 observed variables were retained for further analysis.

Table 1. Results of scale reliability testing

Variable	Code	Number of items removed	Lowest corrected item-total correlation	Cronbach's Alpha
Order accuracy	OA	0/4	0.573	0.794
Order condition	OC	1/4	0.582	0.771
Timeliness	TL	0/4	0.642	0.832
Order discrepancy handling	ODH	0/4	0.572	0.784
Shipping cost	SC	0/4	0.621	0.835
Customer service	CS	1/4	0.543	0.726
Satisfaction	SAT	0/4	0.655	0.846

Source: Calculated from the research data.

The EFA results also support the validity of the scales. For the independent variables, the KMO coefficient was 0.896 and Bartlett's Test was significant at 0.000, indicating that the data were suitable for factor analysis. Six factors were extracted, consistent with the proposed research model, and the total variance explained reached 65.811%. All observed variables loaded on their expected factors with loadings above 0.5, and no problematic cross-loadings were detected. For the dependent variable, consumer satisfaction, the KMO coefficient was 0.818 and Bartlett's Test was significant at 0.000. Only one factor was extracted, with an Eigenvalue of 2.741 and total variance explained of 68.516%. These results confirm that the scales achieved acceptable reliability and construct validity.

Table 2. EFA results

Variable	Number of items removed	Factor loading range
OA	0/4	0.662 - 0.801
OC	0/3	0.698 - 0.782
TL	0/4	0.749 - 0.774
ODH	0/4	0.653 - 0.755
SC	0/4	0.673 - 0.779
CS	0/3	0.659 - 0.760
SAT	0/4	0,807 - 0,847

Source: Calculated from the research data

4.2. Correlation Analysis

Pearson correlation analysis was conducted to examine the relationships between the independent variables and consumer satisfaction. The results indicate that consumer satisfaction is positively correlated with all six e-logistics service quality dimensions, namely order accuracy, order condition, timeliness, order discrepancy handling, shipping cost, and customer service. All correlations are statistically significant at the 1% level. This provides preliminary support for the proposed hypotheses and justifies proceeding to multiple linear regression analysis.

Table 3. Correlation analysis results between independent and dependent variables

Relationship		OA	OC	TL	ODH	SC	CS
SAT	Coefficient	0,627	0,583	0,530	0,522	0,599	0,627
	Sig	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01	< 0,01

Source: Calculated from the research data

4.3. Regression Results

The regression analysis shows that the model explains 68.3% of the variation in consumer satisfaction, as reflected by an Adjusted R^2 value of 0.683. The ANOVA result is statistically significant (Sig. = 0.000), indicating that the model fits the data well. In addition, the Durbin-Watson statistic is 1.895, suggesting that autocorrelation is not a concern, while all VIF values are below 2, indicating no serious multicollinearity.

All six factors have positive and statistically significant effects on consumer satisfaction. Order accuracy has the strongest effect (β = 0.324), followed by customer service (β = 0.260), order condition (β = 0.178), shipping cost (β = 0.162), timeliness (β = 0.143), and order discrepancy handling (β = 0.090). Therefore, all six hypotheses are supported.

Table 4. Regression analysis results

Independent variable	Beta coefficient	Sig.	Conclusion	VIF
Order accuracy	0,324	0,000	Positive effect, H1 accepted	1,331
Order condition	0,178	0,000	Positive effect, H2 accepted	1,574
Timeliness	0,143	0,000	Positive effect, H3 accepted	1,443
Order discrepancy handling	0,090	0,027	Positive effect, H4 accepted	1,486
Shipping cost	0,162	0,000	Positive effect, H5 accepted	1,623
Customer service	0,260	0,000	Positive effect, H6 accepted	1,534

Source: Calculated from the research data.

4.4. Discussion

The findings suggest that consumers in Vinh Long evaluate e-logistics services through multiple concrete aspects of the online shopping experience rather than through a general impression alone. Among the six dimensions, order accuracy emerges as the most influential factor. This result is understandable in the context of online shopping, where consumers rely heavily on product descriptions and images rather than direct inspection. Receiving the correct product, in the correct quantity, and as originally ordered is therefore central to their evaluation of service quality.

Customer service is the second strongest factor. This highlights the importance of responsiveness, attentiveness, and clarity of support throughout the online shopping process. In a digital environment where interaction often takes place through platforms, chat systems, or phone support, the quality of communication can strongly affect trust and satisfaction.

Order condition also has a meaningful effect on satisfaction, indicating that consumers not only care about receiving the right item but also expect it to arrive in good condition. Damaged or poorly packaged goods may reduce confidence in both the seller and the logistics provider. Shipping cost, meanwhile, has a notable positive effect, reflecting consumers' sensitivity to pricing transparency and perceived fairness. In a province such as Vinh Long, where distance from major distribution centers may affect delivery fees, reasonable and clearly

communicated shipping costs can make a meaningful difference in satisfaction.

Timeliness remains an important factor, though its relative effect is lower than that of the dimensions above. This suggests that on-time delivery is still expected, but it may be seen more as a basic requirement than as a strong source of added satisfaction. Finally, order discrepancy handling has the weakest, though still significant, effect. Even if not all consumers frequently experience delivery problems, they still value having transparent and supportive procedures in place when issues arise. This contributes to a sense of security and confidence in online transactions.

Overall, the results are consistent with prior studies showing that e-logistics service quality plays a vital role in shaping customer satisfaction. At the same time, this study adds local evidence from Vinh Long Province, where empirical work on the topic remains limited.

5. Managerial Implications

Several managerial implications can be drawn from the findings.

First, businesses should prioritize order accuracy. Sellers and logistics providers need to standardize picking, checking, and packing procedures to minimize mistakes in product type, quantity, and destination. Providing complete and consistent order information across the system may also reduce fulfillment errors.

Second, customer service should be strengthened. Businesses should improve the responsiveness and quality of support provided before, during, and after delivery. Clear communication, timely feedback, and professional attitudes can help reduce uncertainty and improve the overall customer experience.

Third, greater attention should be paid to order condition. Sellers should adopt more appropriate packaging practices, while logistics providers should improve handling and storage conditions throughout transportation. Ensuring that goods arrive intact is essential for maintaining consumer trust.

Fourth, shipping cost policies should be reviewed and made more transparent. Consumers are more likely to feel satisfied when shipping fees are clearly communicated, reasonable, and free from hidden charges. Flexible pricing schemes or promotional shipping policies may also help improve perceived value.

Fifth, timeliness in delivery should continue to be improved through better coordination, route optimization, and faster order processing. Even if timeliness is often considered a basic expectation, failing to meet this expectation may quickly reduce satisfaction.

Finally, the handling of order discrepancies should be made simpler, faster, and more transparent. Return, exchange, and refund procedures should be clearly communicated and easy to follow. Although this factor has the weakest coefficient in the model, it still matters in maintaining customer confidence, especially when service failures occur.

Conclusion

This study examined the impact of six dimensions of e-logistics service quality on consumer satisfaction in Vinh Long Province. The findings show that order accuracy, order condition, timeliness, order discrepancy handling, shipping cost, and customer service all have positive and statistically significant effects on satisfaction. Among them, order accuracy has the strongest influence, followed by customer service, order condition, shipping cost, timeliness, and order discrepancy handling.

These findings contribute additional empirical evidence to the literature on e-logistics service quality, particularly in a local Vietnamese context. They also provide a practical basis for businesses to identify which areas of service improvement should be prioritized in order to enhance consumer satisfaction.

However, the study has several limitations. The survey was limited to Vinh Long Province, the sampling method was convenience-based, and the model focused only on e-logistics service quality without considering other factors that may also affect satisfaction. In addition, the data were collected at a single point in time, which limits the ability to capture changes in consumer perceptions over time. Future research may expand the geographical scope, adopt more representative sampling methods, include additional explanatory variables, and use longitudinal designs to provide a deeper understanding of consumer satisfaction in the e-logistics context.

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