



Print ISSN: 1738-3110 / Online ISSN 2093-7717
 JDS website: <http://accesson.kr/jds>
<http://doi.org/10.15722/jds.24.01.202601.45>

Logistics Service Quality in E-Commerce: The Impact of Order Fulfillment Systems on Customer Repurchase Intention

Dam Tuan Anh LE¹, Bui Thanh KHOA², Minh Thanh NGO³

Received: August 23, 2025. Revised: October 07, 2025. Accepted: January 05, 2026.

Abstract

Purpose: This study examines how order processing system components influence customer repurchase intentions in e-commerce through both direct and satisfaction-mediated pathways, investigating the individual effects of timeliness, order accuracy, product condition, and order discrepancy handling. **Research design, data and methodology:** A quantitative approach utilizing structural equation modeling analyzed data from 314 Vietnamese e-commerce customers. The measurement and structural models were assessed using Smart-PLS 4.0 software. **Results:** The findings provide empirical support for all hypothesized relationships. All four order processing components significantly influence both customer satisfaction and repurchase intention. Customer satisfaction strongly mediates the relationship between order processing components and repurchase intention, while significant direct effects persist, indicating partial mediation. **Conclusions:** This study contributes to e-commerce literature by establishing a dual-pathway model that explains how operational excellence influences customer loyalty through both satisfaction formation and direct behavioral reinforcement mechanisms. The findings highlight that investments in order processing systems yield double dividends, enhancing customer satisfaction while also creating direct pathways to repurchase behavior through trust development and habit formation. E-commerce managers should prioritize order accuracy and timeliness while developing robust systems for handling order discrepancies when they occur.

Keywords : Order processing systems, customer satisfaction, repurchase intention, e-commerce, structural equation modeling, service quality

JEL Classification Code: M15, L81, M31, D12, O33

1. Introduction

The customer journey in e-commerce presents unique challenges that distinguish it from traditional retail environments. Unlike brick-and-mortar transactions, where customers can immediately evaluate products and complete purchases in real time, e-commerce relies heavily on post-

purchase fulfillment processes and logistics execution to deliver customer expectations and create satisfactory experiences (Rita et al., 2019). Contemporary studies reveal that when delivery lead times are too long, almost half of omnichannel consumers will shop elsewhere, highlighting the critical importance of order processing excellence and logistics network responsiveness in meeting evolving

1 First Author. Lecturer, Faculty of Business Administration and Marketing, Hung Vuong University of Ho Chi Minh City. Email: anhldt@dhv.edu.vn

2 Corresponding Author and Second Author. Lecturer, Faculty of Commerce and Tourism, Industrial University of Ho Chi Minh City, Ho Chi Minh, Viet Nam. Email: buihanhkhoea@iuh.edu.vn

3 Third Author. Bachelor holder and graduated from the Faculty of Business and Law, University of Northampton, Northampton, United Kingdom. Email: minhthanngo.research@gmail.com

© Copyright: The Author(s)
 This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted noncommercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

customer expectations (John et al., 2021; Tran & Khoa, 2025). The order fulfillment phase, encompassing everything from inventory allocation and picking operations to shipment consolidation and last-mile delivery, represents the most critical touchpoint at which customer satisfaction is either confirmed or destroyed. During this vulnerable period, customers form lasting impressions of service quality, reliability, and overall brand competence based primarily on logistics performance metrics rather than marketing promises or product features.

Contemporary research on e-commerce customer behavior has extensively examined various antecedents of customer satisfaction and repurchase intention, including website design, product quality, pricing strategies, and general service quality dimensions (Ashiq & Hussain, 2024; Khoa & Huynh, 2024; Sayem et al., 2025). However, a significant gap exists in understanding how specific order processing system components and logistics service quality dimensions systematically influence customer behavior through direct and mediated pathways. Research consistently demonstrates strong positive relationships between distribution service excellence and customer satisfaction across various trade contexts, with order fulfillment components showing substantial effects on customer behavior outcomes. While existing service quality frameworks provide broad conceptualizations of service excellence, they often treat order fulfillment as a single dimension rather than examining the distinct mechanisms through which different logistics processing components affect customer outcomes (Khoa & Huynh, 2023; Zhang et al., 2024). This limitation has created substantial theoretical and practical gaps in understanding how distribution network investments can be strategically allocated to maximize customer retention.

Despite the acknowledged importance of order processing excellence in e-commerce success, the current academic literature lacks a comprehensive theoretical framework that specifically examines how distinct order processing components influence customer repurchase intentions through multiple pathways. Most existing research treats order fulfillment as a unidimensional construct within broader service quality models, failing to capture the nuanced ways in which different processing elements affect customer psychology and behavior (Ginting et al., 2023). This theoretical gap has significant practical implications, as e-commerce managers lack evidence-based guidance for prioritizing operational improvements and allocating resources to different order processing capabilities.

The Vietnamese e-commerce market presents a uniquely valuable context for examining order processing effects. With a compound annual growth rate of 25% between 2020-2025 and projected market value of \$29 billion by 2025 (Van, 2025), Vietnam represents one of the fastest-growing

e-commerce markets globally. Unlike more mature markets studied in previous research, Vietnam's e-commerce landscape is characterized by rapidly evolving logistics infrastructure, unique last-mile delivery challenges in densely populated urban centers, and consumer preferences shaped by collectivist cultural values that emphasize reliability and trust. These contextual factors potentially influence how order processing quality affects customer behavior, distinguishing this study from research conducted in Western or more developed Asian markets.

Furthermore, while extensive research has demonstrated the mediating role of customer satisfaction in service quality-behavioral intention relationships, limited attention has been paid to understanding whether order processing components also exert direct effects on repurchase intention, independent of satisfaction formation (Teo et al., 2025). This dual-pathway question has important theoretical implications for understanding customer decision-making processes and practical implications for companies seeking to optimize their operational strategies for maximum customer retention.

This study addresses three primary research questions that collectively examine the role of order processing systems in driving customer repurchase intentions:

RQ1: How do order processing system components (timeliness, accuracy, condition, and discrepancy handling) directly influence customer satisfaction in e-commerce contexts?

RQ2: What are the direct effects of order processing system components on customer repurchase intentions in e-commerce environments?

RQ3: To what extent does customer satisfaction mediate the relationships between order processing components and repurchase intentions?

This study makes several important contributions to both theoretical knowledge and practical understanding of e-commerce customer behavior. From a theoretical perspective, this study extends the service quality literature by providing the first comprehensive framework specifically focused on order processing components as distinct antecedents of customer behavior. By disaggregating order fulfillment into its constituent elements and examining their individual and collective effects, this study addresses a significant gap in existing service quality models and provides a more nuanced understanding of operational-behavioral linkages.

2. Literature

2.1. Theoretical Foundations

Contemporary research demonstrates that logistics service quality operates through multiple dimensions

including timeliness, availability, condition, and accuracy, which align closely with the order processing components examined in this framework (Rashid & Rasheed, 2024). Recent studies establish that logistics excellence creates customer value through reliability demonstration, expectation fulfillment, and trust building, providing theoretical justification for examining order processing as a driver of customer satisfaction and behavioral intentions. Research in supply chain management emphasizes that operational excellence in order fulfillment represents a key differentiator in competitive digital marketplaces (Jahani et al., 2023). Expectation Confirmation Theory, developed by Oliver (1980) and adapted for information systems contexts by Bhattacharjee (2001), provides crucial insight into how order processing experiences influence customer satisfaction and behavioral intentions. Recent applications of ECT in e-commerce contexts demonstrate its continued relevance for understanding customer behavior in digital environments (Yi et al., 2024). ECT posits that customer satisfaction results from the confirmation or disconfirmation of initial expectations, with positive disconfirmation occurring when performance exceeds expectations and negative disconfirmation occurring when performance falls short.

Order processing systems increasingly rely on sophisticated technologies for order tracking, communication, and problem resolution. Customers' perceptions of these technological interfaces influence their overall service experience and willingness to continue using the platform. Recent studies examining e-commerce platform development demonstrate that perceived usefulness of order management systems significantly influences customer satisfaction and behavioral intentions (Miao et al., 2022). Research has successfully integrated TAM with service quality constructs to provide more comprehensive explanations of technology acceptance in e-commerce environments (Wang et al., 2023). Hence, this study proposed the research model as Figure 1.

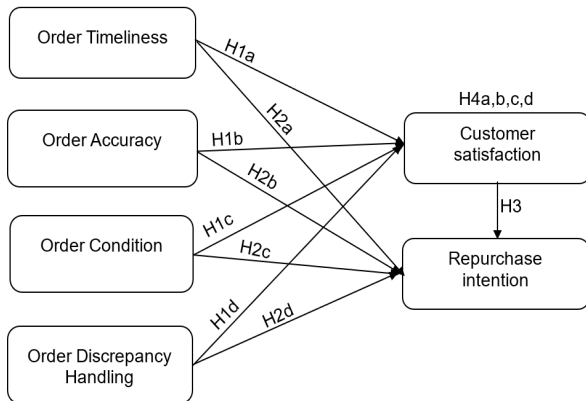


Figure 1: Research Model

2.2. Order Processing Components and Customer Satisfaction

Order timeliness represents the most visible and frequently measured aspect of order processing performance, defined as the delivery of products within promised timeframes or customer expectations. Contemporary research reveals that delivery time significantly affects repurchase behavior, with even small variations in promised versus actual delivery times creating measurable differences in customer retention (Harter et al., 2025). Operations research demonstrates that companies are increasingly investing in artificial intelligence and automation to improve delivery speed and accuracy, with 98% of executives embracing AI to transform at least one aspect of their supply chain management (Abby, 2025).

The theoretical relationship between timeliness and customer satisfaction operates through multiple mechanisms grounded in expectation confirmation theory and service quality frameworks. When orders arrive within promised timeframes, customers experience expectation confirmation that validates their decision to purchase from the specific retailer. Recent studies in quick commerce platforms demonstrate that delivery timeliness creates positive spillover effects on overall brand evaluation and competitive positioning (Phan Tan & Le, 2023). Supply chain research indicates that companies prioritizing data-driven approaches to demand and supply planning achieve superior delivery performance, directly contributing to customer satisfaction formation (Marisa, 2024).

Order accuracy encompasses the precision with which companies fulfill customer specifications, including correct items, quantities, colors, sizes, and other product attributes. Accuracy represents a fundamental service quality dimension because errors directly violate customer expectations and create utilitarian and emotional costs that extend far beyond the immediate transaction. Recent research consistently identifies order accuracy as one of the strongest predictors of customer satisfaction in e-commerce contexts (Zhang et al., 2024).

The theoretical relationship between order accuracy and customer satisfaction operates through cognitive dissonance reduction and trust formation mechanisms. When customers receive exactly what they ordered, their purchase decisions are validated and cognitive dissonance is minimized. Contemporary studies demonstrate that order accuracy effects on satisfaction are particularly strong for complex or customized products where errors create greater disruption and replacement difficulty (Rashid & Rasheed, 2024). Warehouse management systems and automated picking have notably enhanced industry-wide order accuracy (Deloitte, 2024).

Order condition refers to products arriving undamaged and in acceptable physical condition, encompassing packaging quality, product protection during shipping, and absence of defects or deterioration. Condition represents a critical quality dimension because it affects both utilitarian and hedonic aspects of the customer experience while serving as a tangible indicator of overall service quality. Recent research demonstrates that product condition serves as a mediator between shipping processes and customer satisfaction, with packaging quality and handling procedures significantly moderating these relationships.

Contemporary supply chain management research emphasizes the importance of packaging innovation and protective logistics processes in maintaining product condition throughout the fulfillment process (Extensiv, 2025). The integration of advanced materials handling systems and robotics in modern fulfillment centers has substantially improved product condition outcomes while reducing handling-related damage.

Order discrepancy handling encompasses the effectiveness with which companies manage order errors, customer complaints, and service recovery when problems occur. This component represents a unique service quality dimension because it operates primarily during negative service experiences, creating opportunities to transform dissatisfaction into loyalty through superior problem resolution. Contemporary research confirms the service recovery paradox in various digital service contexts, demonstrating that customers who experience excellent problem resolution show higher loyalty levels than those who never encounter problems (Savastano et al., 2024).

Recent research in customer service automation demonstrates that artificial intelligence and machine learning technologies are increasingly being deployed to improve discrepancy handling processes, with 53% of survey respondents say AI being used in either a few areas or widely to anticipate and mitigate supply chain disruptions (PwC, 2025). These technological advances enable more proactive identification and resolution of potential order discrepancies before they impact customer experience. Table 1 summarized the previous studies related to the logistics service quality as well as delivery system quality.

Table 1: Summary of Previous Studies

Author(s)	Study Focus	Key Findings
Zhang et al. (2024)	Logistics service quality (LSQ) in cross-border e-commerce	Identified order accuracy and product condition as fundamental dimensions of LSQ that are strong predictors of customer satisfaction.
Harter et al. (2025)	Effect of delivery time on repurchase in quick commerce.	Found that even small variations in delivery timeliness have a measurable and significant impact on customer retention and repurchase behavior.

Author(s)	Study Focus	Key Findings
Savastano et al. (2024)	Service recovery paradox in digital contexts.	Confirmed that excellent handling of order discrepancies and problems can lead to higher customer loyalty than if no problem had occurred at all.
Ginting et al. (2023)	E-service quality's mediated effect on repurchase intention.	Provided evidence that operational excellence creates benefits (like trust and convenience) that can directly encourage continued patronage, independent of satisfaction levels.
Yi et al. (2024)	Customer experience and repurchase in live-stream shopping.	Demonstrated the robust positive relationship between customer satisfaction and repurchase intention, and also found direct effects of performance on behavior, even after controlling for satisfaction.
Rashid and Rasheed (2024)	LSQ (accuracy/condition) and product satisfaction.	Showed that order accuracy's effect on satisfaction is especially strong for complex products, as errors cause greater disruption for the customer.
Teo et al. (2025)	E-service quality's direct and mediated effects on repurchase.	Showed that direct vs. mediated effects vary by component (e.g., timeliness has a more direct effect, while accuracy is more mediated).

2.3. Hypotheses Development

Based on the comprehensive theoretical foundation and empirical evidence reviewed above, this study proposes 12 specific hypotheses that collectively examine the relationships between order processing components, customer satisfaction, and repurchase intention through both direct and mediated pathways.

The service quality and expectation confirmation theory literature provides strong theoretical justification for positive relationships between each order processing component and customer satisfaction. These relationships operate through expectation confirmation, quality perception formation, and trust-building mechanisms.

H1a: Order timeliness positively influences customer satisfaction.

H1b: Order accuracy positively influences customer satisfaction.

H1c: Order condition positively influences customer satisfaction.

H1d: Order discrepancy handling positively influences customer satisfaction.

Beyond satisfaction-mediated effects, order processing components may also influence repurchase intention through direct mechanisms, including habit formation,

switching cost creation, and trust development, which operate independently of conscious satisfaction evaluation.

H2a: Order timeliness positively influences repurchase intention.

H2b: Order accuracy positively influences repurchase intention.

H2c: Order condition positively influences repurchase intention.

H2d: Order discrepancy handling positively influences repurchase intention.

The marketing literature extensively documents satisfaction as a primary predictor of repurchase intention across various service contexts, with particularly strong relationships in e-commerce environments where customers rely heavily on service experiences for relationship evaluation.

H3: Customer satisfaction positively influences repurchase intention.

The integration of direct and mediated pathways acknowledges that customer satisfaction serves as an important, but not exclusive, mechanism through which order processing excellence influences behavioral intentions. These mediation relationships vary in strength across different order processing components.

H4a: Customer satisfaction partially mediates the relationship between order timeliness and repurchase intention.

H4b: Customer satisfaction partially mediates the relationship between order accuracy and repurchase intention.

H4c: Customer satisfaction partially mediates the relationship between order condition and repurchase intention.

H4d: Customer satisfaction partially mediates the relationship between order discrepancy handling and repurchase intention.

3. Research Methods

The four order processing components were measured using scales adapted from Lee and Kim (2008), who developed and validated these measures in the context of online retail logistics service quality. These scales were selected because they have demonstrated strong psychometric properties in previous e-commerce research and specifically address the operational dimensions of order fulfillment that this study aims to investigate. The scale

measure order accuracy (OAC – 3 items); order condition (OCO – 3 items); timeliness (TIM – 3 items); and order discrepancy handling (ODH – 3 items). Customer Satisfaction (CSA) was measured using three items adapted from Sayem et al. (2025). Repurchase Intention (REI) was assessed using three items adapted from Khoa et al. (2020), which measure customers' intentions to continue patronizing the e-commerce platform in the future.

All of the constructs were measured on a 5-point Likert-type scale as follows: 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree.

The target population for this study consisted of Vietnamese consumers who had made at least one online purchase in the three months prior to data collection. This recency criterion ensured that respondents could accurately recall their order processing experiences. A non-probability sampling approach combining purposive and snowball sampling techniques was employed to reach e-commerce consumers across different demographics and regions in Vietnam.

With 18 measured items in the model, a minimum sample of 180 was required. Second, power analysis using G*Power software indicated that a sample size of 278 would be sufficient to detect medium effect sizes ($f^2 = 0.15$) with a power of 0.95 at a significance level of 0.05. The final sample of 314 exceeded these minimum requirements, ensuring adequate statistical power for the analyses.

Data were collected through an online survey administered via Google Forms between March and April 2025. The questionnaire was first developed in English, then translated into Vietnamese using the back-translation method to ensure conceptual equivalence. Two bilingual academics independently translated the items, and discrepancies were resolved through discussion with a third bilingual expert. The survey link was distributed through multiple channels, including social media platforms (Facebook, Zalo), professional networks, university student groups, and e-commerce customer communities. An introductory message explained the purpose of the study, assured confidentiality, and provided contact information for the researchers. Screening questions confirmed that respondents had made at least one online purchase in the previous three months and were 18 years or older.

While probability sampling would be ideal, obtaining a sampling frame of all Vietnamese e-commerce users proved impractical due to privacy restrictions and platform fragmentation. The combined purposive and snowball sampling approach allowed us to reach diverse e-commerce users across demographic segments. To assess potential sampling bias, we compared our sample demographics with those reported in Vietnam E-commerce Association's 2024 market report. Our sample showed reasonable alignment with known population parameters.

To increase response rate and quality, participants were offered the chance to enter a lucky draw for five 500,000 VND (approximately \$20 USD) e-gift cards. The survey took approximately 10-12 minutes to complete. A total of 342 responses were collected, of which 28 were excluded due to incomplete data or failing attention check questions, resulting in 314 valid responses for analysis (91.8% completion rate). The demographic was described in Table 2.

Table 2: Demographic Statistics of Respondents

Characteristics	Categories	n	%
Gender	Male	139	44.3
	Female	174	55.7
Age	18-24	112	35.7
	25-34	115	36.6
	35-44	56	17.8
	45-54	23	7.3
	55 and above	8	2.6
Education	High school or less	34	10.8
	Vocational/Technical certificate	25	8
	Some college	55	17.5
	Bachelor's degree	156	49.7
	Graduate degree	44	14
Monthly income (VND)	Less than 5 million VND	68	21.7
	5-10 million	103	32.8
	10-15 million	72	22.9
	15-20 million	39	12.4
	More than 20 million	32	10.2

4. Result

The measurement model was assessed to ensure the reliability and validity of the constructs before proceeding to hypothesis testing. This assessment examined indicator reliability, internal consistency reliability, convergent validity, and discriminant validity.

Table 3 presents the results for indicator reliability and internal consistency. Indicator reliability was assessed through outer loadings (OL), with values ranging from 0.822 to 0.956, exceeding the recommended threshold of 0.7 (Hair et al., 2019). Internal consistency reliability was evaluated using both Cronbach's alpha and composite reliability (CR). The Cronbach's alpha values (CA) ranged from 0.869 to 0.931, significantly above the recommended threshold of 0.7, indicating strong internal consistency of the measurement items. Similarly, the composite reliability values ranged from 0.919 to 0.956, well above the 0.7 threshold, further confirming the reliability of the constructs.

Convergent validity was assessed using the average variance extracted (AVE) for each construct. As shown in Table 3, the AVE values ranged from 0.788 to 0.877, all

exceeding the recommended threshold of 0.5 (Hair et al., 2019). These results indicate that each construct explains more than 50% of the variance in its indicators, providing strong evidence of convergent validity.

Table 3: Convergent Validity Results

Construct	OL	CA	CR	AVE
TIM	0.853-0.924	0.887	0.93	0.816
OAC	0.884-0.942	0.919	0.949	0.861
OCO	0.822-0.914	0.869	0.919	0.792
ODH	0.868-0.932	0.901	0.938	0.834
CSA	0.886-0.948	0.917	0.948	0.858
REI	0.897-0.956	0.931	0.956	0.877

The high values for all reliability and convergent validity metrics indicate that the measurement items are consistent in measuring their respective constructs. Particularly notable are the strong composite reliability values for Repurchase Intention (0.956) and Order Accuracy (0.949), suggesting these constructs demonstrate excellent internal consistency. The high AVE values, especially for Repurchase Intention (0.877), indicate that a substantial portion of variance in the indicators is captured by the construct rather than by measurement error, providing confidence in the measurement model's quality.

Discriminant validity was assessed using the Heterotrait-Monotrait ratio of correlations (HTMT) approach, which is considered a more robust criterion than the traditional Fornell-Larcker approach (Henseler et al., 2014). Table 4 presents the HTMT results for all constructs in the model.

Table 4: Discriminant Validity Results (HTMT)

Construct	TIM	OAC	OCO	ODH	CSA	REI
TIM	-					
OAC	0.748	-				
OCO	0.691	0.729	-			
ODH	0.642	0.712	0.698	-		
CSA	0.772	0.817	0.758	0.785	-	
REI	0.727	0.761	0.705	0.738	0.836	-

The HTMT values ranged from 0.642 to 0.836, all below the conservative threshold of 0.85, indicating good discriminant validity. This confirms that each construct in the model is empirically distinct from other constructs, and the correlations among the indicators of the same construct are higher than correlations among indicators across different constructs.

The highest HTMT value (0.836) was observed between Customer Satisfaction and Repurchase Intention, which is theoretically expected given the strong conceptual relationship between these constructs established in prior literature. Nevertheless, this value remains below the threshold, indicating sufficient discrimination between these

constructs. The lowest HTMT value (0.642) was observed between Timeliness and Order Discrepancy Handling, suggesting these constructs are the most distinctly different among the order processing components.

Overall, the assessment of the measurement model confirms that all constructs demonstrate satisfactory reliability and validity, providing a solid foundation for the structural model analysis and hypothesis testing.

After confirming the reliability and validity of the measurement model, the structural model was evaluated to test the hypothesized relationships. This assessment examined the coefficient of determination (R^2), predictive relevance (Q^2), effect sizes (f^2), collinearity (VIF), and significance and relevance of path coefficients.

Table 5 presents the results for R^2 , adjusted R^2 , Q^2 , and predictive relevance for the endogenous constructs in the model. The R^2 values for Customer Satisfaction (0.712) and Repurchase Intention (0.764) exceed the threshold of 0.5, indicating substantial explanatory power of the model (Hair et al., 2019). This suggests that the four order processing components collectively explain 71.2% of the variance in Customer Satisfaction, while the combined effect of these components and Customer Satisfaction explains 76.4% of the variance in Repurchase Intention.

The Q^2 values for both Customer Satisfaction (0.607) and Repurchase Intention (0.664) are substantially above zero, indicating strong predictive relevance of the model.

The high Q^2 values suggest that the model accurately predicts the data points of indicators in reflective measurement models of endogenous constructs.

Table 5: Model Fit and Predictive Relevance

Construct	R^2	R^2 Adjusted	Q^2	Predictive Relevance
CSA	0.712	0.708	0.607	Strong
REI	0.764	0.759	0.664	Strong

The high R^2 values provide strong evidence that the order processing components effectively explain a substantial portion of the variance in both customer satisfaction and repurchase intention. Particularly noteworthy is the high R^2 value for Repurchase Intention (0.764), indicating that the model explains over three-quarters of the variance in this critical business outcome. The strong Q^2 values further validate the model's predictive power, suggesting that it accurately represents the underlying phenomena and can be used with confidence for managerial decision-making.

Table 6 presents the results of the hypothesis testing, including path coefficients (β), standard errors, t-values, p-values, VIF values, and effect sizes (f^2) for all hypothesized relationships. All VIF values were below 3.0, well below the threshold of 5.0, indicating no multicollinearity issues in the model.

Table 6: Path Coefficients and Hypothesis Testing

Hypothesis	Path	β	Standard Error	t-Value	VIF	f^2	Result
H1a	TIM → CSA	0.273	0.049	5.571	2.37	0.156	Supported
H1b	OAC → CSA	0.326	0.053	6.151	2.65	0.21	Supported
H1c	OCO → CSA	0.184	0.05	3.68	2.43	0.084	Supported
H1d	ODH → CSA	0.241	0.051	4.725	2.52	0.132	Supported
H2a	TIM → REI	0.153	0.046	3.326	2.66	0.075	Supported
H2b	OAC → REI	0.172	0.05	3.44	2.93	0.089	Supported
H2c	OCO → REI	0.124	0.047	2.638	2.54	0.053	Supported
H2d	ODH → REI	0.148	0.048	3.083	2.74	0.07	Supported
H3	CSA → REI	0.413	0.054	7.648	2.82	0.301	Supported
H4a	TIM → CSA → REI	0.113	0.026	4.346	-	-	Supported
H4b	OAC → CSA → REI	0.135	0.027	5	-	-	Supported
H4c	OCO → CSA → REI	0.076	0.023	3.304	-	-	Supported
H4d	ODH → CSA → REI	0.1	0.025	4	-	-	Supported

All hypothesized relationships were statistically significant ($p < 0.01$), providing strong support for all hypotheses in the research model. The following paragraphs provide a detailed analysis of the results for each set of hypotheses.

The H1 group of hypotheses (H1a-H1d) revealed significant positive effects of all order processing components on customer satisfaction, with a clear hierarchical pattern of influence: order accuracy

demonstrated the strongest effect ($\beta = 0.326$, $f^2 = 0.210$), followed by timeliness ($\beta = 0.273$, $f^2 = 0.156$), order discrepancy handling ($\beta = 0.241$, $f^2 = 0.132$), and order condition ($\beta = 0.184$, $f^2 = 0.084$). This pattern aligns with Expectation Confirmation Theory, as accuracy represents the most fundamental confirmation of customer expectations in e-commerce transactions. The notably strong effect of accuracy in the Vietnamese market may reflect heightened concerns about product authenticity and

fulfillment reliability in a rapidly developing e-commerce ecosystem, while the substantial impact of timeliness underscores Vietnamese consumers' growing expectations for rapid fulfillment—a challenge given the country's developing logistics infrastructure and dense urban environments.

The f^2 values indicate that order accuracy had a medium to large effect on customer satisfaction ($f^2 = 0.210$), while timeliness and order discrepancy handling had medium effects ($f^2 = 0.156$ and 0.132 , respectively). Order condition had a small to medium effect ($f^2 = 0.084$). These results suggest that while all components significantly contribute to customer satisfaction, accuracy in order fulfillment appears to be the most crucial determinant, followed by timely delivery.

Analysis of the H2 group (H2a-H2d) confirmed significant direct effects of all order processing components on repurchase intention, independent of satisfaction formation. The hierarchy remained consistent with order accuracy showing the strongest direct effect ($\beta = 0.172$, $f^2 = 0.089$), followed by timeliness ($\beta = 0.153$, $f^2 = 0.075$), order discrepancy handling ($\beta = 0.148$, $f^2 = 0.070$), and order condition ($\beta = 0.124$, $f^2 = 0.053$). These direct effects suggest that operational excellence creates value through mechanisms beyond satisfaction, including trust development, habit formation, and reduced cognitive effort in purchase decisions. In Vietnam's competitive e-commerce landscape, where platforms like Shopee, Lazada, and Tiki vie for market share, these findings indicate that consistent operational performance can foster customer loyalty through behavioral reinforcement, even when satisfaction levels might be moderate rather than exceptional. This is particularly relevant in Vietnam's collectivist culture, where reliability and consistency are highly valued in commercial relationships.

The f^2 values for these direct effects were smaller than those for customer satisfaction, ranging from small to medium effects. This suggests that while the direct pathways are significant, the order processing components may have a stronger influence on repurchase intention through the satisfaction-mediated pathway than through direct effects. Customer satisfaction had a strong positive effect on repurchase intention ($\beta = 0.413$, $t = 7.648$, $p < 0.001$, $f^2 = 0.301$), supporting hypothesis H3. The large effect size ($f^2 = 0.301$) indicates that customer satisfaction is a powerful predictor of repurchase intention, consistent with the theoretical foundations and prior research in this domain.

The analysis of indirect effects revealed significant mediation effects of customer satisfaction in the relationships between all four order processing components and repurchase intention, supporting hypotheses H4a through H4d. The strongest indirect effect was observed for order accuracy ($\beta = 0.135$, $t = 5.000$, $p < 0.001$), followed

by timeliness ($\beta = 0.113$, $t = 4.346$, $p < 0.001$), order discrepancy handling ($\beta = 0.100$, $t = 4.000$, $p < 0.001$), and order condition ($\beta = 0.076$, $t = 3.304$, $p = 0.001$).

Since both direct and indirect effects were significant for all relationships, the results indicate partial mediation. This suggests that while customer satisfaction plays a significant mediating role, the order processing components also influence repurchase intention directly through mechanisms such as trust formation, habit development, and convenience perceptions.

The comprehensive support for all hypotheses confirms the dual-pathway model proposed in this study, highlighting both the direct and satisfaction-mediated mechanisms through which order processing components influence customer repurchase intention in e-commerce contexts.

5. Discussion

The findings from this study provide substantial empirical support for the proposed theoretical framework, confirming that order processing components influence customer repurchase intention through both direct and satisfaction-mediated pathways. This section discusses the key findings and their theoretical and practical implications.

The significant positive effects of all four order processing components on customer satisfaction highlight the critical role of operational excellence in shaping customer experiences in e-commerce contexts. The finding that order accuracy emerged as the strongest predictor of customer satisfaction ($\beta = 0.326$, $f^2 = 0.210$) aligns with expectation confirmation theory, as receiving exactly what was ordered represents the most fundamental confirmation of customer expectations in the order fulfillment process. This finding extends previous research by Zhang et al. (2024), who identified accuracy as a fundamental dimension of logistics service quality that strongly predicts customer satisfaction.

The substantial effect of timeliness on satisfaction ($\beta = 0.273$, $f^2 = 0.156$) underscores the importance of delivery speed and reliability in modern e-commerce, where customers increasingly expect rapid fulfillment. This finding is consistent with recent research by Harter et al. (2025), who found that even small variations in delivery time can significantly impact customer satisfaction and retention in quick commerce settings.

The significant effect of order discrepancy handling on satisfaction ($\beta = 0.241$, $f^2 = 0.132$) highlights the importance of effective service recovery in maintaining customer satisfaction when problems occur. This aligns with the service recovery paradox documented by Savastano et al. (2024), where excellent problem resolution can transform

negative experiences into satisfaction-building opportunities.

The smaller but still significant effect of order condition on satisfaction ($\beta = 0.184$, $f^2 = 0.084$) suggests that while product condition is important, customers may be somewhat more tolerant of minor packaging issues compared to other fulfillment aspects. This finding extends the work of Rashid and Rasheed (2024), who identified condition as an important but secondary factor in logistics service quality perceptions.

The confirmation of both direct and indirect pathways from order processing components to repurchase intention represents a significant theoretical contribution. The finding that customer satisfaction mediates these relationships while direct effects remain significant supports a more nuanced understanding of customer decision-making processes in e-commerce contexts.

The strong effect of customer satisfaction on repurchase intention ($\beta = 0.413$, $f^2 = 0.301$) confirms the central role of satisfaction in driving loyalty behaviors, consistent with extensive prior research in marketing and e-commerce contexts (Yi et al., 2024). However, the significant direct effects of order processing components on repurchase intention, even after controlling for satisfaction, suggest that operational excellence creates value through additional mechanisms beyond satisfaction formation.

The pattern of stronger indirect effects compared to direct effects for all order processing components indicates that satisfaction formation remains the primary mechanism through which operational excellence translates into loyalty behaviors. However, the persistent direct effects suggest that factors such as habit formation, switching costs, and trust development may create additional pathways to retention that operate independently of conscious satisfaction evaluation, extending the findings of Ginting et al. (2023).

These findings have important implications for e-commerce strategy, suggesting that investments in order processing excellence can yield double dividends by simultaneously enhancing satisfaction and creating direct behavioral reinforcement mechanisms that encourage repurchase regardless of satisfaction levels.

6. Conclusion

6.1. Theoretical Contributions

Our study reveals an intriguing theoretical paradox: while service quality literature traditionally positions customer satisfaction as the primary mediator between operational performance and behavioral outcomes, our findings demonstrate that significant direct pathways exist independently of satisfaction formation. This suggests a

more complex relationship than previously theorized, where operational excellence creates value through parallel cognitive and behavioral mechanisms.

This study makes three primary theoretical contributions. First, we extend logistics service quality theory by establishing that order processing components operate through dual pathways—both enhancing satisfaction and directly reinforcing repurchase behavior. The partial mediation observed for all components indicates that satisfaction alone cannot fully explain how operational excellence translates into loyalty, suggesting concurrent trust-building and habit-formation mechanisms.

Second, our findings contribute to expectation confirmation theory by demonstrating that different types of expectation confirmation (accuracy, timeliness, condition, problem resolution) have varying weights in satisfaction formation. This refinement suggests ECT should account for the differential importance customers assign to service attributes when forming overall satisfaction judgments—with order accuracy emerging as particularly influential in e-commerce contexts.

Third, our findings highlight a context-specific pattern of effects in Vietnam's developing e-commerce landscape. The hierarchy of influence (accuracy, timeliness, discrepancy handling, condition) offers a nuanced understanding of how logistics capabilities affect customer behavior in emerging markets with evolving distribution infrastructure.

6.2. Practical and Managerial Implications

The findings of this study offer clear, actionable guidance for e-commerce managers, logistics directors, and distribution network planners seeking to enhance customer retention through operational excellence.

The primary implication is that investments in order processing systems and logistics infrastructure are not just operational costs but are direct drivers of revenue through customer loyalty. Managers can use the findings to strategically allocate resources across their distribution networks. For example, if order accuracy has the strongest impact on customer satisfaction, managers should prioritize investments in warehouse management systems (WMS), automated storage and retrieval systems (AS/RS), pick-to-light technologies, and quality control processes to minimize errors in their distribution centers.

Finally, the evidence of direct paths to repurchase intention means that consistency and reliability in logistics operations can foster customer habits that transcend satisfaction alone. This implies that even when a customer is not actively "delighted," the sheer convenience and reliability of the distribution service can be enough to secure their repeat business. Therefore, managers should focus on

building frictionless, predictable, and dependable fulfillment processes and logistics execution to create subtle but powerful switching costs through operational excellence.

Organizations should consider reconfiguring their distribution networks to optimize for the most impactful order processing components. The findings suggest that companies should evaluate their third-party logistics partnerships based not only on cost but on their ability to deliver accuracy and timeliness. Last-mile carriers should be selected based on their demonstrated ability to maintain product condition and handle discrepancies effectively. Companies might also consider implementing hub-and-spoke distribution models that balance centralized quality control with decentralized delivery speed, potentially leveraging urban micro-fulfillment centers to enhance timeliness while maintaining accuracy through advanced inventory positioning systems and distributed order management (DOM) capabilities.

In the increasingly competitive e-commerce landscape, where product differentiation is often minimal and price transparency is high, excellence in distribution operations and logistics execution represents one of the most sustainable forms of competitive advantage. This research provides a clear roadmap for organizations seeking to leverage their supply chain capabilities and distribution network design to drive customer loyalty and long-term business success in the digital economy.

6.3. Limitations and Directions for Future Research

Despite the significant contributions of this study, several limitations should be acknowledged as highlighted by our reviewers. First, the cross-sectional nature of our data collection presents limitations in establishing causal relationships between order processing quality and repurchase intention. While our theoretical framework suggests directional relationships, only longitudinal designs can fully confirm the temporal sequence of these effects. The reliance on retrospective self-reported measures may introduce common method bias despite our procedural and statistical remedies. Future research should incorporate objective fulfillment metrics from e-commerce platforms and track actual repurchase behavior over time rather than behavioral intentions.

Our sampling frame focused primarily on urban Vietnamese consumers (Hanoi, Ho Chi Minh City, and Da Nang), potentially limiting generalizability to rural consumers who face different logistics challenges. Additionally, our study examined general e-commerce purchases without differentiating product categories, potentially masking category-specific effects. The strength of order processing components likely varies across product types (e.g., perishable versus durable goods) and price

points. Furthermore, our model did not account for the moderating effects of consumer characteristics such as technology readiness, risk aversion, or prior negative experiences. Future research should explore these boundary conditions, particularly examining how the dual-pathway mechanism operates across different product categories, consumer segments, and cultural contexts beyond Vietnam's collectivist orientation. Researchers should also investigate how emerging technologies (e.g., AI-driven fulfillment, blockchain traceability) influence the relative importance of different order processing components in shaping e-commerce loyalty.

Our use of non-probability convenience and snowball sampling, while justified by the absence of comprehensive sampling frames for Vietnamese e-commerce consumers and cultural sensitivities surrounding consumption data, introduces potential self-selection bias and overrepresentation of younger, more educated urban consumers—future research should employ stratified random sampling in collaboration with e-commerce platforms to enhance representativeness. Additionally, our parsimonious model excluded potentially important control variables (e.g., consumer demographics, purchase characteristics) and moderators that might influence the relationship between order processing quality and consumer responses, potentially inflating observed effect sizes and overlooking boundary conditions—subsequent studies should enhance model robustness by incorporating controls and investigating how customer experience, product type, platform trust, and psychological factors such as risk aversion and uncertainty avoidance moderate the dual-pathway effects observed in Vietnam's rapidly evolving e-commerce ecosystem.

Declarations

Ethics Approval and Consent to Participate

This research involved the use of existing data and was determined to be exempt from review by the Institutional Review Board of Industrial University of Ho Chi Minh City in accordance with 296/QĐ-ĐHCN, 24 February 2023.

Competing Interests

The authors declare that they have no competing interests.

Funding

No funding was received to assist with the preparation of this manuscript.

Author Contributions

Dam Tuan Anh LE conceived and designed the study, conducted the data analysis, and wrote the original draft. 1,

Minh Thanh NGO contributed to data collection and manuscript revision. Bui Thanh KHOA supervised the project, secured funding, and critically revised the manuscript. All authors read and approved the final manuscript.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Generative AI and AI-assisted Technologies in the Writing Process

During the development of this work, the author(s) utilized Grammarly to improve language and readability. After utilizing this tool, the author(s) examined and modified the text as appropriate and take full responsibility for the content of the publication.

References

- Abby, J. (2025). *12 supply chain trends for businesses to watch in 2025*. Retrieved May 14th from <https://www.netsuite.com/portal/resource/articles/inventory-management/supply-chain-trends.shtml>
- Ashiq, R., & Hussain, A. (2024). Exploring the effects of e-service quality and e-trust on consumers'e-satisfaction and e-loyalty: insights from online shoppers in Pakistan. *Journal of Electronic Business & Digital Economics*, 3(2), 117-141. <https://doi.org/10.1108/JEBDE-09-2023-0019>
- Bhattacharjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS quarterly*, 351-370. <https://doi.org/10.2307/3250921>
- Deloitte. (2024). *Restructuring the supply base: Prioritizing a resilient, yet efficient supply chain*. <https://www2.deloitte.com/us/en/insights/industry/manufacturing/global-supply-chain-resilience-amid-disruptions.html>
- Extensiv. (2025). *Supply chain challenges in 2025 & how to overcome them*. Retrieved April 17th from <https://www.extensiv.com/blog/supply-chain-management/challenges>
- Ginting, Y. M., Chandra, T., Miran, I., & Yusriadi, Y. (2023). Repurchase intention of e-commerce customers in Indonesia: An overview of the effect of e-service quality, e-word of mouth, customer trust, and customer satisfaction mediation. *International Journal of Data & Network Science*, 7(1). <https://doi.org/10.5267/j.ijdns.2022.10.001>
- Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (Vol. 8). Cengage Learning, Hampshire, United Kingdom.
- Harter, A., Stich, L., & Spann, M. (2025). The effect of delivery time on repurchase behavior in quick commerce. *Journal of Service Research*, 28(2), 211-227. <https://doi.org/10.1177/10946705241236961>
- Henseler, J., Dijkstra, T. K., Sarstedt, M., Ringle, C. M., Diamantopoulos, A., Straub, D. W., Ketchen, D. J., Hair, J. F., Hult, G. T. M., & Calantone, R. J. (2014). Common Beliefs and Reality About PLS. *Organizational Research Methods*, 17(2), 182-209. <https://doi.org/10.1177/1094428114526928>
- Jahani, H., Jain, R., & Ivanov, D. (2023). Data science and big data analytics: a systematic review of methodologies used in the supply chain and logistics research. *Annals of Operations Research*, 1-58. <https://doi.org/10.1007/s10479-023-05390-7>
- John, B., Jai, J., Sarah, T., & Kumar, V. (2021). *Retail's need for speed: Unlocking value in omnichannel delivery*. Retrieved May 14th from <https://www.mckinsey.com/industries/retail/our-insights/retails-need-for-speed-unlocking-value-in-omnichannel-delivery>
- Khoa, B. T., & Huynh, T. T. (2023). How Does Anxiety Affect the Relationship between the Customer and the Omnichannel Systems? *Journal of Theoretical and Applied Electronic Commerce Research*, 18(1), 130-149. <https://doi.org/10.3390/jtaer18010007>
- Khoa, B. T., & Huynh, T. T. (2024). Small and Medium Enterprises' Digital Transformation Intention based on the Trade-off Theory: Role of Perceived Benefit and Perceived Privacy Disclosure Risk. 2024 5th International Conference on Data Analytics for Business and Industry (ICDABI),
- Khoa, B. T., Nguyen, T. D., & Nguyen, V. T.-T. (2020). Factors affecting Customer Relationship and the Repurchase Intention of Designed Fashion Products. *Journal of Distribution Science*, 18(2), 198-204. <https://doi.org/10.15722/jds.18.2.202002.17>
- Lee, Y.-O., & Kim, M. (2008). The effect of logistics service quality on customer satisfaction and repurchase intention: focusing on company size as a moderator. *Journal of International Logistics and Trade*, 6(1), 55-73.
- Marisa, B. (2024). *Preparing for 2024 supply chain challenges and priorities*. Supply Chain Management Review. Retrieved March 19th from https://www.scmr.com/article/preparing_for_2024_supply_chain_challenges_and_priorities
- Miao, M., Jalees, T., Zaman, S. I., Khan, S., Hanif, N.-u.-A., & Javed, M. K. (2022). The influence of e-customer satisfaction, e-trust and perceived value on consumer's repurchase intention in B2C e-commerce segment. *Asia Pacific Journal of Marketing and Logistics*, 34(10), 2184-2206. <https://doi.org/10.1108/APJML-03-2021-0221>
- Oliver, R. L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of marketing research*, 17(4), 460-469. <https://doi.org/10.1177/002224378001700405>
- Phan Tan, L., & Le, T.-H. (2023). The influence of perceived price and quality of delivery on online repeat purchase intention: The evidence from Vietnamese purchasers. *Cogent Business & Management*, 10(1), 2173838. <https://doi.org/10.1080/23311975.2023.2173838>
- PwC. (2025). *2025 digital trends in operations survey*. Retrieved May 18th from <https://www.pwc.com/us/en/services/consulting/business-transformation/digital-supply-chain-survey.html>
- Rashid, D. A., & Rasheed, D. R. (2024). Logistics service quality and product satisfaction in e-commerce. *Sage Open*, 14(1), 21582440231224250. <https://doi.org/10.1177/21582440231224250>
- Rita, P., Oliveira, T., & Farisa, A. (2019). The impact of e-service quality and customer satisfaction on customer behavior in online shopping. *Heliyon*, 5(10).

- <https://doi.org/10.1016/j.heliyon.2019.e02690>
- Savastano, M., Anagnoste, S., Biclesanu, I., & Amendola, C. (2024). The impact of e-commerce platforms' quality on customer satisfaction and repurchase intention in post COVID-19 settings. *The TQM Journal*. <https://doi.org/10.1108/TQM-04-2024-0143>
- Sayem, S., Islam, A., Uddin, M. R., & Promy, J. S. (2025). Determinants of e-commerce customer satisfaction: mediating role of IT innovation acceptance. *International Journal of Quality & Reliability Management*, 42(1), 86-106. <https://doi.org/10.1108/IJQRM-10-2023-0332>
- Teo, S. C., Cheng, K. M., & Chow, M. M. (2025). Unlocking repurchase intentions in e-commerce platforms: the impact of e-service quality and gender. *Cogent Business & Management*, 12(1), 2471535. <https://doi.org/10.1080/23311975.2025.2471535>
- Tran, A. V., & Khoa, B. T. (2025). Generation Z Customers' Online Outbound Tourism Booking Intention in Vietnam: Extending the Technology Acceptance Model with Intercultural Competence. *GeoJournal of Tourism and Geosites*, 60(2 supplement), 1119-1127. <https://doi.org/10.30892/gtg.602spl09-1485>
- Van, T. (2025). Vietnam's e-commerce market surpasses \$25 billion in 2024. V. I. R. u. t. M. o. Finance. <https://vir.com.vn/vietnams-e-commerce-market-surpasses-25-billion-in-2024-120262.html>
- Wang, C., Ahmad, S. F., Ayassrah, A. Y. B. A., Awwad, E. M., Irshad, M., Ali, Y. A., Al-Razgan, M., Khan, Y., & Han, H. (2023). An empirical evaluation of technology acceptance model for Artificial Intelligence in E-commerce. *Heliyon*, 9(8). <https://doi.org/10.1016/j.heliyon.2023.e18349>
- Yi, M., Chen, M., & Yang, J. (2024). Understanding the self-perceived customer experience and repurchase intention in live streaming shopping: evidence from China. *Humanities and Social Sciences Communications*, 11(1), 1-13. <https://doi.org/10.1057/s41599-024-02690-6>
- Zhang, Y., Yuan, Y., & Su, J. (2024). Systematic investigation of the logistics service quality of cross-border e-commerce: a mixed-methods perspective. *Asia Pacific Journal of Marketing and Logistics*, 36(3), 549-564. <https://doi.org/10.1108/APJML-03-2023-0203>