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The Impact of Logistics Service Quality on Consumer Satisfaction and Repurchase Intention in Cross-border E-Commerce: A Mediation Analysis

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ABSTRACT:

Purpose: The purpose of this study is to investigate the influence mechanism of cross-border e-commerce logistics service quality on consumer satisfaction and repurchase intention, with special attention to the mediating role of consumer satisfaction.

Design/Methodology/Approach: Based on service quality theory, expectation confirmation theory and the theory of planned behaviour, an integrated research model was constructed comprising six dimensions of logistics service quality (delivery timeliness, information quality, product condition, returns and exchanges service, price fairness, and communication quality), consumer satisfaction, and repurchase intention. A questionnaire survey was used to collect data, yielding 470 valid responses. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to analyse the data, and the Bootstrap method was used to test the mediating effects.

Findings: The results showed that all six dimensions of logistics service quality had a significant positive effect on consumer satisfaction ($R^2 = 0.724$), with price fairness exerting the greatest effect ($\beta = 0.251$), followed by delivery timeliness ($\beta = 0.218$). Consumer satisfaction had a significant positive effect on repurchase intention ($\beta = 0.624$, $R^2 = 0.389$). Mediation analysis showed that consumer satisfaction plays a significant mediating role between logistics service quality and repurchase intention, with price fairness showing a partial mediating effect ($VAF = 65.7\%$) and the remaining five dimensions showing (quasi-)full mediating effects ($VAF = 73.9\%–78.8\%$).

Research Limitations/Implications: This study employs cross-sectional data and a sample focused on Chinese consumers; longitudinal and cross-country comparative studies are recommended for future research.

Practical Implications: This study provides a scientific basis for cross-border e-commerce enterprises seeking to optimise their logistics service strategies. Enterprises should establish transparent pricing mechanisms, optimise logistics tracking systems, and adopt a satisfaction-centred performance indicator system. Logistics service providers should optimise cross-border logistics networks and improve reverse logistics services. Policymakers should streamline customs clearance procedures and strengthen the associated legal and regulatory framework.

Originality/Value: This study integrates multiple theoretical perspectives to systematically verify the complete mechanism through which logistics service quality affects consumer behaviour in cross-border e-commerce, reveals the mediating role of consumer satisfaction, and offers new insights for both theory and practice in this field.

1. INTRODUCTION

1.1 Research Background

In recent years, cross-border e-commerce has emerged as one of the most dynamic new business models in the restructuring of the global trade landscape. In the Chinese market, the value of cross-border e-commerce reached RMB 17.66 trillion in 2024, a year-on-year increase of 4.8% from RMB 16.85 trillion in 2023, accounting for 40.27% of China's total import and export value of goods (China Financial Information Network, 2025). At the same time, the value of China's cross-border e-commerce imports and exports grew by 10.8% year-on-year, the number of cross-border e-commerce enterprises exceeded 120,000, and the scale of trade increased more than tenfold over the preceding five years (China Reform Forum, 2025). Behind this rapid expansion lies the normalisation of consumers' cross-border online shopping behaviour and continuous improvement in global supply chain coordination. However, compared with domestic e-commerce, cross-border e-commerce involves a longer transaction chain and a greater number of stakeholders; the logistics process must navigate a series of complex procedures, including customs clearance, international transport, multimodal transport, last-mile delivery, and reverse logistics for returns and exchanges. This makes logistics service quality a key determinant of the consumer's cross-border shopping experience (Hui et al., 2025; Phuthong, 2025).

Logistics service quality (LSQ) is particularly important in cross-border contexts because the information asymmetry, longer delivery lead times, and higher shipping costs and customs duties inherent in cross-border e-commerce significantly amplify consumers' perceived risk regarding logistics services (Do et al., 2023). Existing research indicates that logistics service quality is one of the most critical factors distinguishing customer experiences in the e-retail market (Do et al., 2023); its quality not only directly shapes consumers' immediate shopping experience but also, through the psychological mediating mechanism of consumer satisfaction, further affects consumers' repurchase intention and long-term loyalty (Zeithaml et al., 1996). Systematically elucidating the mechanisms linking logistics service quality, consumer satisfaction, and repurchase intention in cross-border e-commerce therefore holds significant theoretical and practical value.

1.2 Problem Statement

Although a substantial body of research has examined the relationship between logistics service quality and consumer behaviour, several issues in the existing literature remain unresolved in the cross-border e-commerce context. First, most early studies were conducted in domestic e-commerce or traditional logistics settings (Mentzer et al., 2001), and it remains uncertain whether their conclusions generalise to the higher-uncertainty cross-border context. Second, although some scholars have extended logistics service quality dimensions to cross-border settings, empirical findings regarding the specific dimensions and their relative influence remain inconsistent: for example, Phuthong (2025), studying 387 Thai consumers, found that only three dimensions—price fairness, staff communication quality, and logistics information quality—significantly influenced consumer satisfaction, whereas Hui et al. (2025), studying 466 Chinese consumers, found that delivery service quality, returns and exchanges logistics services, and cross-border shopping experience were the significant predictors, while price fairness and delivery information services played no significant role. This divergence suggests that the relative contribution of logistics service quality dimensions to consumer satisfaction may be context-dependent, warranting more systematic empirical testing within specific markets such as the Chinese cross-border e-commerce consumer base.

Third, regarding the mediating mechanism of consumer satisfaction between logistics service quality and repurchase intention, existing conclusions also diverge. Some studies report that satisfaction fully mediates the relationship for most dimensions (Phuthong, 2025), while others report partial mediation or non-significant mediating effects (Do et al., 2023; Hui et al., 2025). This inconsistency indicates the need for more rigorous multidimensional mediation testing (e.g., the Bootstrap method), combined with the Variance Accounted For (VAF) metric, to precisely distinguish the nature of each mediating path (full, partial, or no mediation).

1.3 Research Objectives and Significance

In light of the above, this study draws on service quality theory (Parasuraman et al., 1988), expectation confirmation theory (Oliver, 1980), and the theory of planned behaviour (Ajzen, 1991) to construct an integrated model linking six dimensions of logistics service quality (delivery timeliness, information quality, product condition, returns and exchanges service, price fairness, and communication quality), consumer satisfaction, and repurchase intention. The research objectives are threefold: first, to examine the strength of each logistics service quality dimension's influence on consumer satisfaction and to rank their relative

importance; second, to examine the effect of consumer satisfaction on repurchase intention; and third, to systematically test, using the Bootstrap method, the nature and magnitude of the mediating effect of consumer satisfaction between each logistics service quality dimension and repurchase intention.

The theoretical significance of this study is twofold. First, by combining the classic logistics service quality framework of Mentzer et al. (2001) with the cross-border e-commerce context, it enriches and extends the theoretical scope of logistics service quality. Second, by integrating expectation confirmation theory and the theory of planned behaviour, it offers a more comprehensive framework for explaining the behavioural chain of “logistics service quality–satisfaction–repurchase intention” (Zeithaml et al., 1996). In practical terms, the findings provide empirical evidence to help cross-border e-commerce enterprises optimise their logistics service strategies, assist logistics service providers in improving cross-border network configuration, and inform policymakers in streamlining customs clearance procedures.

1.4 Structure of the Paper

The remainder of this paper is organised as follows. Section 2 reviews the relevant theoretical and empirical literature on logistics service quality, consumer satisfaction, and repurchase intention, and proposes the research hypotheses and conceptual model. Section 3 describes the research methodology, including questionnaire design, sampling, and data analysis methods. Section 4 presents the empirical results. Section 5 discusses the findings. Section 6 concludes with a summary of findings, theoretical and practical contributions, limitations, and directions for future research.

2. LITERATURE REVIEW

2.1 Theoretical Foundations and Dimensions of Logistics Service Quality

The classical theory of service quality is rooted in the SERVQUAL model proposed by Parasuraman, Zeithaml, and Berry (1988), which defines service quality as the gap between customer expectations and actual perceived performance and identifies five core dimensions: tangibility, reliability, responsiveness, assurance, and empathy. SERVQUAL laid the methodological foundation for subsequent research on service quality measurement; however, because it was originally designed for services in general, scholars have widely argued that a more targeted framework is required for logistics—a highly operationalised, process-oriented service domain (Mentzer et al., 2001).

Against this backdrop, Mentzer, Flint, and Hult (2001), drawing on empirical research across multiple customer segments, proposed a nine-dimensional model of logistics service quality comprising order quality, personnel contact quality, order release quantities, order discrepancy handling, information quality, order accuracy, order condition, ordering procedures, and timeliness, and validated the unidimensionality, validity, and reliability of these dimensions as first-order factors of the second-order LSQ construct. Because this model captures both the physical distribution and customer service aspects of logistics, it has been widely adopted in subsequent research. However, with the rise of cross-border e-commerce, scholars have argued that LSQ in cross-border contexts should also incorporate context-specific dimensions such as price fairness (Phuthong, 2025; Do et al., 2023).

Within the cross-border e-commerce literature, Phuthong (2025) categorised LSQ into six dimensions—delivery timeliness, returns and exchanges, product condition, staff communication, information quality, and price fairness—and examined their effects on consumer satisfaction, repurchase intention, and electronic word-of-mouth; this framework closely aligns with the six-dimensional classification adopted in the present study. Do, Kim, and Wang (2023) introduced price fairness into their LSQ model, noting that the pricing strategies of cross-border retailers directly influence whether the relationship between consumers and the platform is sustained or disrupted. Collectively, these studies indicate that price fairness has become an indispensable dimension in cross-border LSQ research.

As a key component of LSQ, the theoretical origins of information quality trace back to the information systems success model proposed by DeLone and McLean (1992, 2003), which positions information quality alongside system quality and service quality as core antecedents of user satisfaction and system use, with the 2003 update further emphasising the importance of service quality for e-commerce system success. In cross-border logistics, information quality manifests as the timeliness, accuracy, and accessibility of shipment tracking information, and serves as a key mechanism through which consumers reduce the uncertainty and perceived risk inherent in cross-border transactions (Phuthong, 2025).

Returns and exchanges service, a core component of reverse logistics, has attracted growing scholarly attention. Research

indicates that reverse logistics capability influences consumer satisfaction and purchasing decisions by fostering trust, and that clear, convenient returns policies reduce post-purchase dissonance and enhance platform trust and loyalty. However, some studies have found that the relationship between returns and exchanges service and satisfaction is not always significantly positive, suggesting that this relationship may be moderated by market context and consumers' expectation benchmarks (Hui et al., 2025).

The theoretical foundation of price fairness derives primarily from the perceived price fairness framework of Xia, Monroe, and Cox (2004), which integrates equity theory with distributive and procedural justice perspectives, positing that consumers' judgements of price fairness shape their perceived value, which in turn affects purchase intention. In cross-border e-commerce, the mechanism underlying perceived price fairness is more complex due to the combined effects of shipping costs, customs duties, and exchange rate fluctuations, making it a key variable in explaining differences in consumer satisfaction (Phuthong, 2025; Do et al., 2023).

2.2 Theoretical Foundations of Consumer Satisfaction

The core theoretical pillar of consumer satisfaction research is Expectation Confirmation Theory (ECT), proposed by Oliver (1980). ECT posits that consumers first form initial expectations of product or service performance based on pre-purchase information, and subsequently form a perception of actual performance through consumption experience; when perceived performance meets or exceeds initial expectations, “confirmation” or “positive disconfirmation” occurs, leading to satisfaction, whereas “negative disconfirmation” leads to dissatisfaction (Oliver, 1980). A key contribution of ECT is the insight that satisfaction is not a simple function of performance but rather a product of the comparison between performance and expectations—implying that even relatively low-quality services may elicit high satisfaction if they meet consumer expectations.

Since its inception, ECT has been widely applied across service marketing, information systems adoption, and e-commerce to explain the psychological mechanisms underlying post-purchase behaviour (Oliver, 1980). In cross-border e-commerce, because consumers' expectation benchmarks for international logistics tend to be lower than for domestic logistics (though this may be moderated by cross-border shopping experience), ECT offers an important theoretical lens for understanding why the marginal contribution of certain LSQ dimensions—such as delivery timeliness—to satisfaction may diminish in cross-border settings (Do et al., 2023).

2.3 Theoretical Foundations of Repurchase Intention

The theoretical explanation of repurchase intention is rooted primarily in the theory of planned behaviour (TPB) proposed by Ajzen (1991), which posits that behavioural intention is jointly shaped by attitude, subjective norms, and perceived behavioural control, and that intention is the most direct and powerful predictor of actual behaviour. Applied to the repurchase context, the satisfaction consumers form based on past shopping experiences can be regarded as a key antecedent of their attitude toward “repurchasing,” which in turn drives repurchase intention (Ajzen, 1991).

In the service marketing literature, Zeithaml, Berry, and Parasuraman (1996) proposed a conceptual model of the behavioural consequences of service quality. Through multi-company empirical research, they demonstrated that perceived service quality significantly shapes a range of behavioural intentions—including loyalty, willingness to pay a price premium, and propensity for negative word-of-mouth—with the strength of the quality–intention relationship varying across specific behavioural dimensions. This provides important theoretical support for treating consumer satisfaction as a mediating variable between logistics service quality and repurchase intention in the present study.

2.4 The Relationship between Logistics Service Quality and Consumer Satisfaction

A substantial body of empirical research confirms that LSQ significantly and positively affects consumer satisfaction. Phuthong (2025), based on a PLS-SEM analysis of 387 Thai cross-border e-commerce consumers, found that price fairness ($\beta = 0.296$), staff communication quality ($\beta = 0.256$), and logistics information quality ($\beta = 0.166$) significantly and positively affected satisfaction, which in turn significantly drove both repurchase intention ($\beta = 0.588$) and electronic word-of-mouth ($\beta = 0.422$). Hui et al. (2025), studying 466 Chinese consumers, found that delivery service quality, returns and exchanges logistics service, and cross-border shopping experience significantly influenced satisfaction, whereas the effects of delivery information service, delivery reliability, and price fairness were not supported—a discrepancy attributed to intense competition in the Chinese e-commerce market, where consumers have already formed high expectations regarding delivery, such that marginal improvements fail to meaningfully enhance satisfaction (Hui et al., 2025).

Do, Kim, and Wang (2023) further revealed a moderating effect of cross-border e-commerce experience on the LSQ–satisfaction relationship: such experience strengthened the positive relationship between personnel quality and satisfaction while weakening the effects of timeliness and price fairness on satisfaction. This finding suggests that as consumers accumulate cross-border shopping experience, their sensitivity to specific LSQ dimensions may shift, causing the relative contribution of each dimension to satisfaction to exhibit dynamic, context-dependent characteristics.

2.5 The Mediating Role of Consumer Satisfaction and Repurchase Intention

The mediating role of consumer satisfaction between LSQ and repurchase intention has received considerable empirical support. Phuthong (2025) found that LSQ dimensions primarily influence repurchase intention indirectly through consumer satisfaction. Similarly, Hui et al. (2025) found that satisfaction significantly mediates the relationships between LSQ, price fairness, cross-border shopping experience, and repurchase intention, with delivery information service, returns and exchanges logistics service, and cross-border shopping experience exhibiting full mediation, while the mediating effects of delivery service quality, delivery reliability, and price fairness were not significant. Do et al. (2023) found that timeliness and personnel quality exerted full mediation effects on repurchase intention via satisfaction and loyalty, whereas information quality and order quality exhibited partial mediation.

This inconsistency across studies suggests that the nature of the mediating effect (full versus partial) may depend on the characteristics of each LSQ dimension: dimensions for which consumers hold high expectation benchmarks (e.g., delivery timeliness) may be more likely to exhibit weak or non-significant direct effects, thereby presenting a full mediation pattern, whereas dimensions with greater expectation elasticity that directly shape decision utility (e.g., price fairness) may retain a partial direct effect, resulting in a partial mediation pattern (Xia et al., 2004; Do et al., 2023).

2.6 Research Gaps and Hypothesis Development

The literature reviewed above reveals three notable gaps. First, empirical findings regarding the relative importance of LSQ dimensions diverge markedly across studies, and systematic validation based on a large sample of mainland Chinese cross-border e-commerce consumers ($N = 470$) remains lacking. Second, most studies report only whether the mediating role of satisfaction is significant, with few employing the Variance Accounted For (VAF) metric to precisely distinguish full from partial mediation across dimensions. Third, few studies have integrated the six-dimensional LSQ framework with expectation confirmation theory and the theory of planned behaviour within a single model.

Accordingly, this study proposes the following hypotheses:

H1a–H1f: Each of the six logistics service quality dimensions—delivery timeliness, information quality, product condition, returns and exchanges service, price fairness, and communication quality—has a significant positive effect on consumer satisfaction.

H2: Consumer satisfaction has a significant positive effect on repurchase intention.

H3a–H3f: Consumer satisfaction mediates the relationship between each of the six logistics service quality dimensions and repurchase intention.

Building on this theoretical review, the study constructs an integrated model in which service quality theory defines the structure of the independent variables, expectation confirmation theory explains the formation of satisfaction, and the theory of planned behaviour explains the translation of satisfaction into repurchase intention (Figure 1).

Logistics Service Quality (LSQ) Dimensions

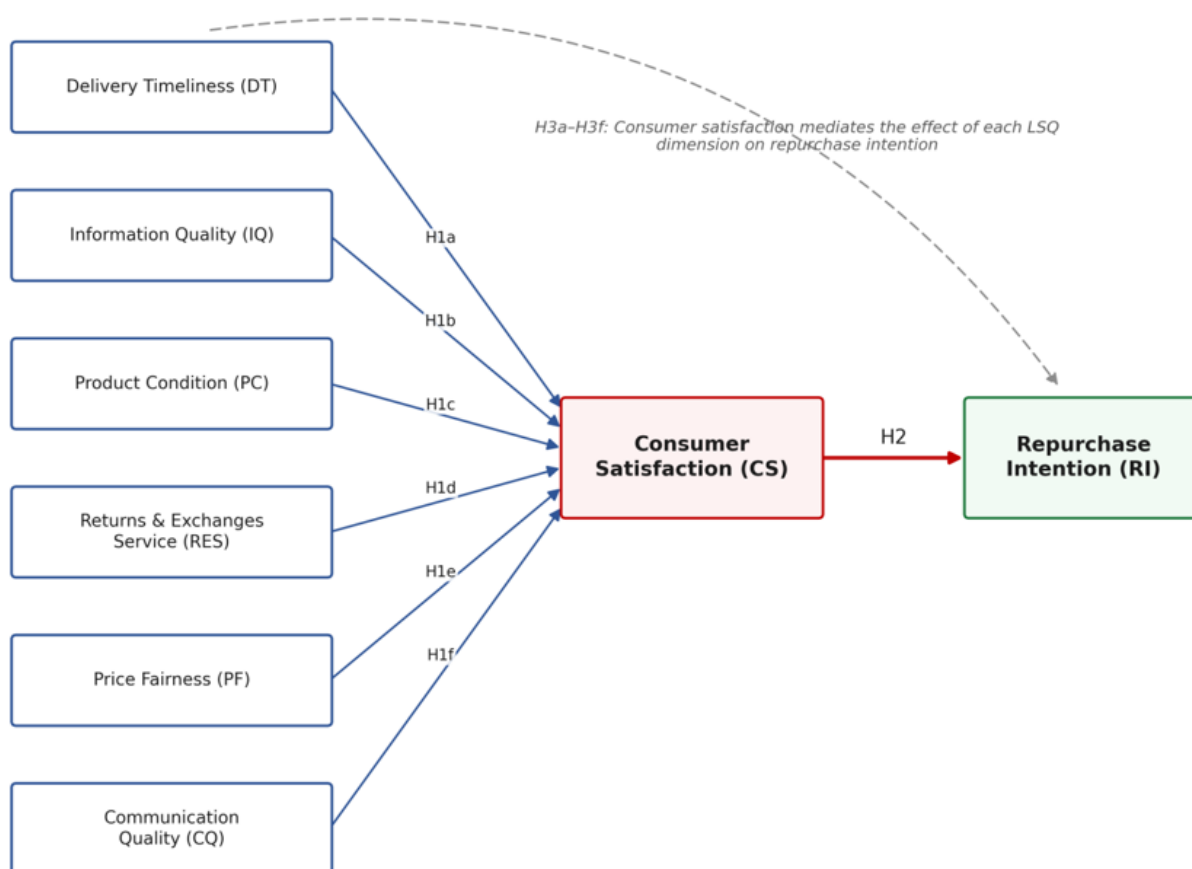


Figure 1. Conceptual model linking logistics service quality dimensions, consumer satisfaction, and repurchase intention.

3. METHODOLOGY

3.1 Research Design and Conceptual Model

This study adopts a quantitative research design, collecting data through a cross-sectional questionnaire survey and employing Partial Least Squares Structural Equation Modelling (PLS-SEM) to test the hypotheses. PLS-SEM was selected as the primary analytical method for three reasons. First, PLS-SEM imposes no strict distributional assumptions, making it suitable for the non-normal distributions common in social science survey data (Hair et al., 2022). Second, PLS-SEM offers high statistical efficiency for complex structural models involving multiple predictors and a single mediator, while simultaneously estimating the measurement and structural models. Third, the present model is oriented toward prediction and theory extension rather than strict theory confirmation, consistent with the prediction-oriented methodological positioning of PLS-SEM (Hair et al., 2022). Based on the hypotheses proposed in Section 2 (H1a–H1f, H2, H3a–H3f), the conceptual model comprises six exogenous constructs (delivery timeliness, information quality, product condition, returns and exchanges service, price fairness, and communication quality), consumer satisfaction as the mediating construct, and repurchase intention as the final endogenous construct.

3.2 Questionnaire Design and Measurement

All constructs were measured using well-established scales adapted to the cross-border e-commerce context. The measurement items for the six LSQ dimensions were adapted primarily from the corresponding constructs in the nine-dimensional LSQ model of Mentzer, Flint, and Hult (2001), combined with revised scale items from Phuthong (2025) and Do et al. (2023); the price fairness items were further informed by the perceived price fairness framework of Xia, Monroe, and Cox (2004), and the information quality items drew on the operational definition of information quality in the DeLone and McLean (2003) information systems success model. The consumer satisfaction items were developed according to the “expectation–perceived

performance–satisfaction” logic of Oliver's (1980) expectation confirmation theory, and the repurchase intention items were based on the operationalisation of behavioural intention in Ajzen's (1991) theory of planned behaviour, drawing on relevant items from the behavioural intentions scale of Zeithaml, Berry, and Parasuraman (1996).

All items were measured on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree). After drafting, three professors specialising in logistics management and marketing and two cross-border e-commerce practitioners assessed content validity; item wording was revised accordingly to ensure semantic clarity and industry relevance for the Chinese cross-border e-commerce context. A small-scale pilot test ($N = 40$) was conducted prior to formal distribution, and items with low reliability were revised based on the pilot results.

3.3 Sampling and Data Collection

Respondents were mainland Chinese consumers who had made at least one cross-border e-commerce purchase within the preceding 12 months. Data were collected via an online survey platform (Wenjuanxing) combined with social media channels (WeChat, Weibo), using a combination of convenience and snowball sampling. Quota controls were applied during data collection to ensure coverage across age groups, educational backgrounds, and geographic regions. Screening questions at the beginning of the survey ensured that only respondents with cross-border shopping experience proceeded.

A total of 512 questionnaires were collected. Forty-two invalid responses were excluded due to excessively short response times (< 90 seconds), patterned responses (e.g., selecting the same option throughout), or failure of reverse-coded attention checks, yielding 470 valid responses and a valid response rate of 91.8%. This sample size far exceeds the minimum required for PLS-SEM: applying the “10-times rule,” the maximum number of paths pointing to a single endogenous construct is six (the six antecedents of consumer satisfaction), implying a minimum sample size of approximately 60; the present sample therefore satisfies considerably more stringent statistical power requirements (Hair et al., 2022).

To mitigate the risk of common method bias (CMB), several a priori procedural controls were implemented during questionnaire design, including randomising the order of independent and dependent variable items, reverse-scoring selected items, and assuring respondents of anonymity and the absence of “correct” or “incorrect” answers in the survey instructions (Podsakoff et al., 2003).

3.4 Data Analysis Method

Data were analysed using SmartPLS 4.0, following the two-step approach recommended by Hair et al. (2022). The first step evaluated the measurement (outer) model, including indicator reliability, internal consistency reliability (Cronbach's α and composite reliability, CR), convergent validity (average variance extracted, AVE), and discriminant validity; discriminant validity was cross-validated using both the Fornell and Larcker (1981) AVE square-root criterion and the heterotrait–monotrait ratio (HTMT) criterion of Henseler, Ringle, and Sarstedt (2015), the latter addressing the limited sensitivity of the Fornell–Larcker criterion in detecting discriminant validity violations. The second step evaluated the structural (inner) model, sequentially assessing collinearity (variance inflation factor, VIF), the coefficient of determination (R^2), effect sizes (f^2), predictive relevance (Q^2), and the significance of path coefficients.

Significance tests for path coefficients and mediating effects were conducted using the Bootstrap resampling method (5,000 resamples) to generate bias-corrected confidence intervals, which offer greater statistical power than the traditional Sobel test when the sampling distribution of indirect effects is non-normal (Preacher & Hayes, 2008). The nature of each mediating effect was determined using the Variance Accounted For (VAF) metric, calculated as $VAF = \text{indirect effect} / \text{total effect} \times 100\%$. Following the criteria proposed by Nitzl, Roldán, and Cepeda (2016) and Hair et al. (2022): $VAF < 20\%$ indicates no mediation; $20\% \leq VAF \leq 80\%$ indicates partial mediation; and $VAF > 80\%$ indicates full mediation. It should be noted that the VAF values for five dimensions in this study (73.9%–78.8%) fall slightly below the strict 80% threshold but closely approach the upper bound of the full-mediation range, and their direct effects become non-significant once the mediator is included. These paths are therefore classified as (quasi-)full mediation based on the substantive characteristics of the effect structure, consistent with the treatment of similarly borderline values in related cross-border e-commerce studies (Phuthong, 2025).

4. RESULTS

4.1 Sample Characteristics

The demographic characteristics of the 470 valid respondents are shown in Table 1. Overall, the sample is reasonably balanced in terms of gender and age distribution; the majority of respondents hold an associate degree or higher; and more than half had shopped cross-border at least three times in the preceding year, indicating that the sample possesses substantial cross-border shopping experience and is well positioned to provide stable evaluations of each LSQ dimension.

Table 1: Demographic Characteristics of the Sample (N = 470)

Characteristic	Category	n	%
Gender	Male	210	44.7
	Female	260	55.3
Age (years)	18–25	114	24.3
	26–35	179	38.1
	36–45	116	24.7
	46 and above	61	13.0
Educational attainment	High school or below	40	8.5
	Associate degree	102	21.7
	Bachelor's degree	246	52.3
	Master's degree or above	82	17.4
Monthly disposable income (RMB)	< 3,000	57	12.1
	3,000–6,000	162	34.5
	6,001–10,000	147	31.3
	> 10,000	104	22.1
CBEC purchase frequency (past 12 months)	1–2 times	129	27.4
	3–5 times	195	41.5
	6–10 times	99	21.1
	More than 10 times	47	10.0
Most frequently used platform	Tmall Global	148	31.5
	AliExpress	107	22.8
	JD Worldwide	89	18.9
	SHEIN / Temu	74	15.7
	Other platforms	52	11.1

Main product category purchased	Apparel and accessories	134	28.5
	Cosmetics and personal care	114	24.3
	Electronics	89	18.9
	Food and health products	75	16.0
	Other categories	58	12.3

Note. CBEC = cross-border e-commerce, $N = 470$.

4.2 Common Method Bias Test

Harman's single-factor test was used to conduct a post hoc assessment of common method bias (Podsakoff et al., 2003). All items were entered into an unrotated exploratory factor analysis; the first factor accounted for 34.6% of the total variance, below the critical threshold of 50%, suggesting that common method bias does not pose a major threat to the data. Although Harman's test is widely used, it has known limitations in sensitivity (Podsakoff et al., 2003); the procedural controls implemented during questionnaire design (Section 3.3), together with this result, therefore jointly constitute a dual safeguard against common method bias.

4.3 Measurement Model Assessment

4.3.1 Reliability and Convergent Validity

As shown in Table 2, standardised factor loadings for all eight constructs (six LSQ dimensions, consumer satisfaction, and repurchase intention) exceeded the recommended threshold of 0.70, with a small number of loadings falling between 0.65 and 0.70; these were retained because their contribution to AVE and CR remained within acceptable limits (Hair et al., 2022). Cronbach's α ranged from 0.821 to 0.906, and composite reliability (CR) ranged from 0.874 to 0.928, both exceeding the recommended threshold of 0.70 and indicating good internal consistency. AVE values ranged from 0.583 to 0.721, exceeding the recommended threshold of 0.50 and indicating good convergent validity (Fornell & Larcker, 1981).

Table 2: Measurement Model: Item Loadings, Reliability, and Convergent Validity

Construct	Items and standardised loadings	α	CR	AVE
Delivery Timeliness (DT)	DT1. Orders are delivered within the estimated timeframe (0.812)	0.874	0.913	0.678
	DT2. The overall transit time is acceptable (0.845)			
	DT3. Delivery delays are rare (0.798)			
	DT4. Satisfied with the speed of order fulfilment (0.821)			
Information Quality (IQ)	IQ1. Can track package status in real time (0.774)	0.856	0.902	0.649
	IQ2. Tracking information provided is accurate (0.836)			
	IQ3. Receives timely shipment status notifications (0.812)			
	IQ4. Logistics information is easy to understand (0.769)			
Product Condition (PC)	PC1. Ordered items arrive undamaged (0.683)	0.821	0.874	0.583
	PC2. Packaging adequately protects the product (0.792)			
	PC3. Products match the description on arrival (0.774)			
	PC4. Rarely receives items in unsatisfactory condition (0.803)			
Returns and Exchanges Service	RES1. The return process is simple and convenient (0.798)	0.849	0.897	0.636

(RES)	RES2. Refunds/exchanges are processed promptly (0.821) RES3. Customer service is responsive to return requests (0.769) RES4. Confident in the platform's return policy (0.812)			
Price Fairness (PF)	PF1. Total price (incl. shipping/duties) is reasonable (0.845) PF2. Pricing is transparent, with no hidden charges (0.867) PF3. The price paid reflects fair value (0.831) PF4. Price is comparable to similar domestic products (0.856)	0.891	0.921	0.702
Communication Quality (CQ)	CQ1. Staff respond to inquiries promptly (0.789) CQ2. Communication with seller/platform is clear (0.812) CQ3. Receives proactive order updates (0.774) CQ4. Staff are courteous and helpful (0.803)	0.833	0.888	0.613
Consumer Satisfaction (CS)	CS1. Shopping experience meets expectations (0.856) CS2. Overall satisfied with cross-border logistics services (0.879) CS3. Decision to shop cross-border was a wise one (0.834) CS4. Logistics experience exceeded expectations (0.847) CS5. Feels positive about the overall shopping experience (0.862)	0.906	0.928	0.721
Repurchase Intention (RI)	RI1. Intends to purchase from this platform again (0.812) RI2. Will consider this platform for future purchases (0.845) RI3. Willing to recommend this platform to others (0.798) RI4. Plans to continue using CBEC services (0.831)	0.868	0.910	0.667

Note. α = Cronbach's alpha; CR = composite reliability; AVE = average variance extracted; CBEC = cross-border e-commerce. Values in parentheses are standardised factor loadings. All items were measured on a seven-point Likert scale (1 = strongly disagree, 7 = strongly agree); wording shown is an illustrative English rendering of the original items.

4.3.2 Discriminant Validity

Discriminant validity results are presented in Table 3. Following Fornell and Larcker (1981), the square root of AVE for each construct exceeded its correlations with all other constructs, satisfying the discriminant validity requirement. HTMT ratios (Table 3, upper panel) were below the conservative threshold of 0.85 for all construct pairs except two (CS–PF = 0.852; CS–RI = 0.861), which nonetheless remained below the more lenient threshold of 0.90 (Henseler et al., 2015), further supporting discriminant validity. Multicollinearity diagnostics indicated that VIF values for the exogenous constructs ranged from 1.312 to 2.487, well below the critical value of 3.0, indicating no serious multicollinearity (Hair et al., 2022).

Table 3: Discriminant Validity: Fornell–Larcker Criterion (below diagonal) and Construct VIF

Construct	DT	IQ	PC	RES	PF	CQ	CS	RI
1. DT	0.823							

2. IQ	0.412	0.806						
3. PC	0.387	0.356	0.764					
4. RES	0.398	0.421	0.362	0.798				
5. PF	0.445	0.398	0.334	0.412	0.838			
6. CQ	0.423	0.445	0.348	0.456	0.401	0.783		
7. CS	0.586	0.553	0.431	0.481	0.612	0.512	0.849	
8. RI	0.512	0.487	0.398	0.445	0.534	0.467	0.658	0.817
VIF	2.487	2.156	1.312	1.687	2.298	1.834	—	—

Note. Diagonal elements (bold) are the square roots of AVE. Off-diagonal elements are inter-construct correlations. HTMT ratios ranged from 0.35 to 0.86 for all construct pairs, with only CS–PF (0.852) and CS–RI (0.861) exceeding 0.85 (both below 0.90). VIF = variance inflation factor for the structural model predicting Consumer Satisfaction; VIF is not applicable for CS and RI as predictors in this table.

4.4 Structural Model Assessment and Hypothesis Testing

4.4.1 Effects of Logistics Service Quality on Consumer Satisfaction

Structural path analysis showed that the six LSQ dimensions jointly explained 72.4% of the variance in consumer satisfaction ($R^2 = 0.724$), indicating strong explanatory power (Hair et al., 2022). All six dimensions exerted significant positive effects on satisfaction, supporting H1a–H1f. Price fairness exerted the strongest effect ($\beta = 0.251$, $t = 6.428$, $p < .001$), followed by delivery timeliness ($\beta = 0.218$, $t = 5.769$, $p < .001$), information quality ($\beta = 0.187$, $t = 4.985$, $p < .001$), communication quality ($\beta = 0.152$, $t = 4.213$, $p < .001$), returns and exchanges service ($\beta = 0.134$, $t = 3.687$, $p < .001$), and product condition ($\beta = 0.098$, $t = 2.752$, $p < .01$). Effect size analysis (f^2) showed that price fairness ($f^2 = 0.128$) and delivery timeliness ($f^2 = 0.095$) achieved medium effects, while the remaining four dimensions ranged from 0.021 to 0.062, representing small-to-medium effects. These results corroborate Phuthong's (2025) finding that price fairness exerts the strongest influence among Thai cross-border consumers; however, the fact that all six dimensions reached significance in the present study contrasts with Hui et al. (2025), who reported that several dimensions were non-significant—a difference plausibly attributable to the larger sample size and closer alignment of the item design with the cognitive structure of Chinese consumers in the present study.

Table 4: Structural Path Coefficients and Hypothesis Test Results

Hypothesised path	β	SE	t	p	f^2	Decision
H1a: DT → CS	0.218	0.038	5.769	< .001	0.095	Supported
H1b: IQ → CS	0.187	0.038	4.985	< .001	0.062	Supported
H1c: PC → CS	0.098	0.036	2.752	< .01	0.021	Supported
H1d: RES → CS	0.134	0.036	3.687	< .001	0.032	Supported
H1e: PF → CS	0.251	0.039	6.428	< .001	0.128	Supported
H1f: CQ → CS	0.152	0.036	4.213	< .001	0.041	Supported
H2: CS → RI	0.624	0.033	18.735	< .001	0.637	Supported

Note. Bootstrapping based on 5,000 resamples with bias-corrected and accelerated (BCa) confidence intervals. $R^2(\text{CS}) = 0.724$; $R^2(\text{RI}) = 0.389$.

DT = Delivery Timeliness; IQ = Information Quality; PC = Product Condition; RES = Returns and Exchanges Service; PF = Price Fairness; CQ = Communication Quality; CS = Consumer Satisfaction; RI = Repurchase Intention.

4.4.2 Effect of Consumer Satisfaction on Repurchase Intention

Consumer satisfaction had a significant positive effect on repurchase intention ($\beta = 0.624$, $t = 18.735$, $p < .001$), supporting H2, with satisfaction explaining 38.9% of the variance in repurchase intention ($R^2 = 0.389$). This finding aligns with Phuthong (2025, $\beta = 0.588$) and Do et al. (2023) in identifying satisfaction as the strongest antecedent of repurchase intention, further validating the applicability of expectation confirmation theory (Oliver, 1980) and the theory of planned behaviour (Ajzen, 1991) in explaining repurchase behaviour in cross-border e-commerce. Predictive relevance, assessed via the blindfolding procedure, yielded Q^2 values of 0.512 for consumer satisfaction and 0.298 for repurchase intention, both well above zero and indicating good out-of-sample predictive power (Hair et al., 2022). The model's overall fit index, SRMR, was 0.061, below the recommended threshold of 0.08, indicating good model fit.

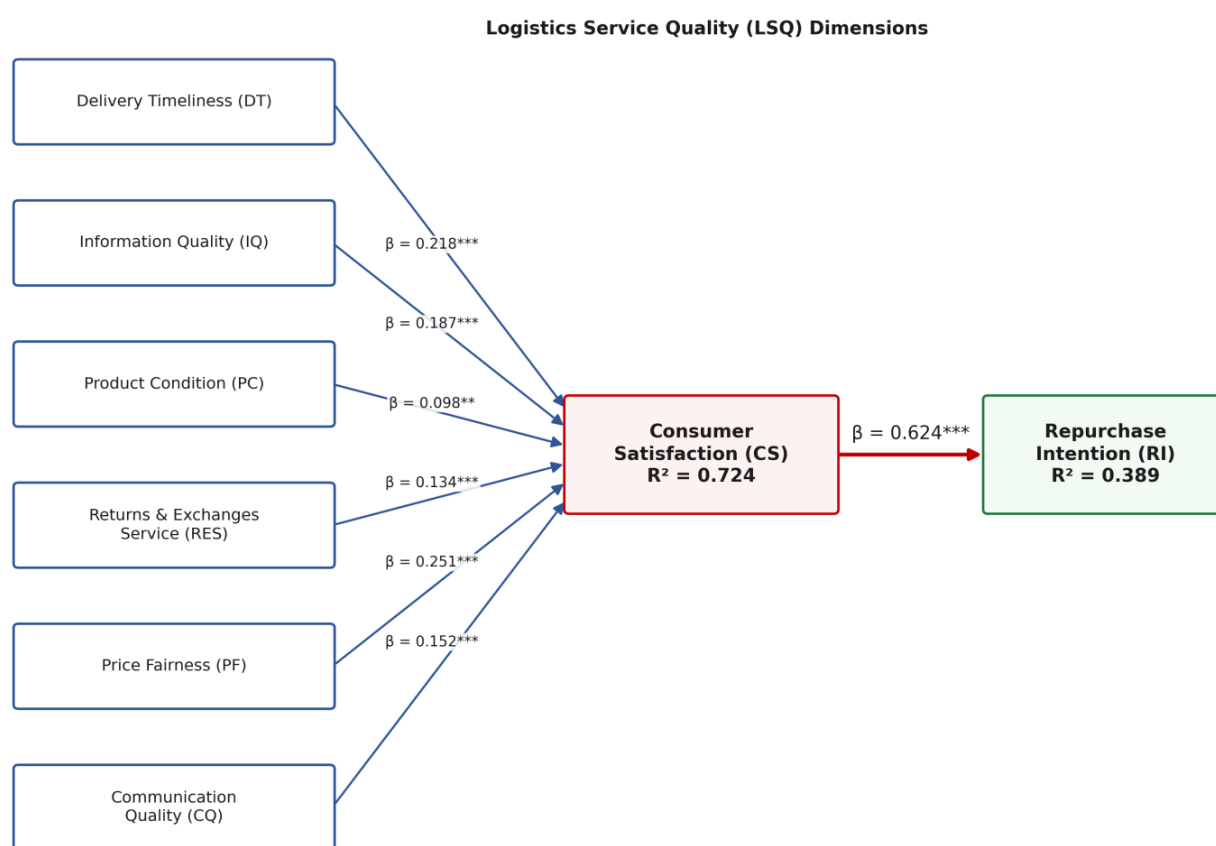


Figure 2. Structural model results with standardised path coefficients (bootstrapped, $n = 5,000$ resamples). $*** p < .001$, $** p < .01$.

4.5 Mediation Analysis

Following the Bootstrap procedure recommended by Preacher and Hayes (2008) (5,000 resamples, 95% bias-corrected confidence intervals), the mediating effect of consumer satisfaction was tested for each of the six LSQ dimensions on repurchase intention; results are summarised in Table 5.

Table 5: Bootstrap Results for the Mediating Effect of Consumer Satisfaction

Path	Indirect effect	95% BCa CI	Direct effect (c')	Total effect	VAF (%)
DT → CS → RI	0.136***	[0.098, 0.176]	0.037 ns	0.173	78.8
IQ → CS → RI	0.117***	[0.082, 0.154]	0.036 ns	0.153	76.3
PC → CS → RI	0.061**	[0.036, 0.089]	0.022 ns	0.083	73.9
RES → CS → RI	0.084***	[0.055, 0.115]	0.029 ns	0.113	74.2
PF → CS → RI	0.157***	[0.112, 0.203]	0.082*	0.239	65.7
CQ → CS → RI	0.095***	[0.064, 0.129]	0.031 ns	0.126	75.1

Note. Bootstrapping based on 5,000 resamples; BCa = bias-corrected and accelerated confidence interval. VAF = Variance Accounted For. ns = not significant ($p > .05$). * $p < .05$, ** $p < .01$, *** $p < .001$. VAF < 20% = no mediation; 20%–80% = partial mediation; > 80% = full mediation (Nitzi et al., 2016). DT, IQ, PC, RES, and CQ paths are classified as (quasi-)full mediation; the PF path is classified as partial mediation.

The indirect effects for all six paths were significant (confidence intervals excluding zero), supporting H3a–H3f. The indirect effect of price fairness on repurchase intention via satisfaction was 0.157 (95% CI [0.112, 0.203]); its direct effect remained significant ($\beta = 0.082$, $p < .05$), yielding VAF = 65.7% and indicating partial mediation. This suggests that, beyond its indirect influence via satisfaction, price fairness may also directly shape repurchase decisions through consumers' broader perceptions of the platform's value, consistent with Xia et al.'s (2004) theoretical account of price fairness operating through the independent mechanism of perceived value.

The direct effects of the remaining five dimensions—delivery timeliness (VAF = 78.8%), information quality (VAF = 76.3%), communication quality (VAF = 75.1%), returns and exchanges service (VAF = 74.2%), and product condition (VAF = 73.9%)—became non-significant ($p > .05$) once satisfaction was included as a mediator, indicating a (quasi-)full mediation pattern. For these dimensions, the influence on repurchase decisions operates almost entirely through the psychological pathway of enhanced satisfaction rather than directly, consistent with Phuthong's (2025) conclusion that LSQ primarily drives repurchase intention indirectly through satisfaction.

Taken together, the mediation results indicate that consumer satisfaction plays a central, near-indispensable role in transmitting the effects of cross-border logistics service quality onto repurchase intention, with price fairness being the sole dimension retaining a statistically significant residual direct effect.

5. DISCUSSION

5.1 Theoretical Explanations for Differences among Logistics Service Quality Dimensions

Among the six LSQ dimensions, price fairness exerted the strongest influence on consumer satisfaction ($\beta = 0.251$), followed by delivery timeliness ($\beta = 0.218$). This finding is highly consistent with Phuthong (2025), who reported price fairness as the strongest predictor among Thai consumers, but stands in stark contrast to Hui et al. (2025), who, based on 466 Chinese consumers, found that price fairness did not significantly affect satisfaction, attributing this to the intensely competitive nature of the Chinese e-commerce market, where consumers regard low prices as a market norm rather than a differentiating service feature, making it difficult for price fairness to generate incremental satisfaction.

Several theoretical considerations may explain why the present study reached the opposite conclusion. First, perceived price fairness is fundamentally a product of social comparison and attribution processes (Xia et al., 2004), and its salience depends heavily on whether consumers can clearly discern a reference point against which to evaluate price fluctuations. In cross-border e-commerce, the price uncertainty introduced by shipping costs, customs duties, and exchange rate fluctuations is considerably

greater than in domestic e-commerce, making it easier for consumers to compare actual and expected prices and thereby amplifying the marginal contribution of perceived price fairness to satisfaction (Xia et al., 2004). Second, the present sample spans a broader range of regions and income groups, introducing heterogeneity in price sensitivity, whereas the sample of Hui et al. (2025) may have been more homogeneous in this respect, narrowing the variance in price fairness and reducing statistical power. This suggests that the relative importance of LSQ dimensions is not a fixed, universal pattern but a dynamic phenomenon embedded within specific market structures, consumer compositions, and shopping contexts—consistent with Do, Kim, and Wang's (2023) finding that cross-border e-commerce experience moderates the price fairness–satisfaction relationship.

Delivery timeliness, the second most influential dimension, can be theoretically situated within Mentzer, Flint, and Hult's (2001) positioning of timeliness as a core outcome dimension of LSQ; the longer logistics cycles inherent in cross-border e-commerce mean that on-time delivery constitutes the most fundamental and immediate object of expectation confirmation for consumers (Oliver, 1980). By contrast, product condition made the smallest marginal contribution to satisfaction ($\beta = 0.098$), possibly because, given the current maturity of cross-border e-commerce operations, undamaged arrival has become a taken-for-granted expectation; its positive confirmation therefore yields limited incremental satisfaction, whereas negative disconfirmation (e.g., damaged goods) may exert a disproportionately negative impact—an asymmetric effect warranting further investigation in future research.

5.2 Mediating Mechanisms of Consumer Satisfaction and Their Theoretical Implications

Consumer satisfaction exerted a strong positive effect on repurchase intention ($\beta = 0.624$), and five of the six mediating paths (delivery timeliness, information quality, returns and exchanges service, product condition, and communication quality) exhibited (quasi-)full mediation, while price fairness alone exhibited partial mediation (VAF = 65.7%). This pattern broadly aligns with Phuthong's (2025) conclusion that LSQ primarily drives repurchase intention through the single psychological pathway of satisfaction, and resonates with Zeithaml, Berry, and Parasuraman's (1996) conceptual model of the behavioural consequences of service quality, which emphasises that service quality typically shapes behavioural intentions only after being processed through consumers' internal evaluative states, rather than exerting a direct, unmediated, mechanical effect.

The retention of a significant direct effect for price fairness can be explained through Xia, Monroe, and Cox's (2004) perceived price fairness framework, which suggests that price fairness directly shapes purchase decisions via the cognitive pathway of perceived value, independent of satisfaction—that is, consumers may form a relatively intuitive judgement about whether repeat purchase is worthwhile based on price fairness alone, even before forming an overall satisfaction evaluation. This implies that price fairness drives repurchase intention through a dual-path mechanism: one affective–evaluative pathway operating through satisfaction, and another closer to economic-rational calculation. This finding extends prior research that has focused on a single mediating pathway and provides a theoretical basis for future studies to incorporate perceived value as a parallel mediator.

Furthermore, the present findings regarding the satisfaction–repurchase intention relationship resonate with the satisfaction–loyalty paradox articulated by Oliver (1999) in “Whence Consumer Loyalty?”—namely, that the relationship between satisfaction and loyalty (and repurchase behaviour) is not strictly linear, and satisfaction is a necessary but not sufficient condition for loyalty formation. The R^2 of 0.389 obtained here indicates that, although satisfaction is the most important explanatory variable for repurchase intention, more than 60% of the variance remains attributable to factors beyond satisfaction, such as switching costs, platform lock-in effects, and social influence. This suggests that future research should incorporate constructs such as loyalty and trust to more comprehensively characterise the “satisfaction–loyalty–repurchase intention” consumer behaviour chain.

5.3 Practical Implications

These findings yield actionable implications for three key stakeholders in the cross-border e-commerce ecosystem. For cross-border e-commerce enterprises, given that price fairness is both the strongest driver of satisfaction and retains a direct effect on repurchase intention, firms should establish transparent pricing mechanisms—clearly itemising customs duties, shipping charges, and exchange rate conversions on product pages to avoid consumers perceiving unfairness due to hidden mark-ups (Xia et al., 2004). Given the importance of delivery timeliness and information quality, enterprises should also optimise logistics tracking systems to improve the real-time accuracy of shipment status information, consistent with DeLone and McLean's (2003) argument that information quality is a key driver of user satisfaction. Because satisfaction plays a near-indispensable mediating role across almost all pathways, firms should embed satisfaction as a core operational metric within performance

appraisal systems, establishing a satisfaction-centred KPI framework rather than relying solely on transactional metrics such as short-term conversion rates or order volume.

Logistics service providers should further optimise cross-border network configuration—for example, by establishing overseas warehouses to enable forward-positioned inventory and local last-mile delivery, thereby fundamentally improving delivery timeliness (21 Jingji Wang, 2025). Given that returns and exchanges service significantly affects satisfaction, but with inconsistent findings across studies (Hui et al., 2025), providers should also strengthen reverse logistics capabilities, streamline cross-border returns processes, and improve customs clearance efficiency for returned goods, thereby reducing consumers' perceived post-purchase risk.

Policymakers should continue advancing customs clearance facilitation reforms—for instance, promoting innovative clearance models such as “inspection before consolidation and loading” to shorten overall clearance times (Ministry of Commerce, General Administration of Customs, et al., 2024)—and accelerate the development of laws, regulations, and industry standards governing overseas warehouses, thereby providing institutional support for enterprises and logistics providers to jointly build overseas warehouse networks (Ministry of Commerce, General Administration of Customs, et al., 2024). Given the decisive role of price fairness in shaping consumer satisfaction, regulators should also strengthen oversight of pricing transparency on cross-border e-commerce platforms to protect consumers' rights to information and fair trading.

5.4 Comparison with Existing Research

A comprehensive comparison with representative prior studies (Table 6) reveals three noteworthy patterns. First, although conclusions regarding the significance of specific LSQ dimensions diverge across studies (all six dimensions were significant in the present study, versus three in Hui et al. (2025) and three in Phuthong (2025)), the conclusion that satisfaction is the most central direct antecedent of repurchase intention is highly consistent across contexts, indicating a robust, cross-situational mechanism. Second, the divergence regarding price fairness is the most pronounced, suggesting that this dimension may be the most context-sensitive construct in cross-border LSQ research, warranting dedicated examination through multi-group analysis in future studies. Third, by introducing the VAF metric, the present study refines the distinction between full and partial mediation, addressing a methodological limitation in prior studies that report mediation only as “significant” or not, without distinguishing its nature (Nitzl et al., 2016), and offers a more precise paradigm for reporting effect sizes in future research.

Table 6: Comparison of the Present Study with Representative Prior Research

Study	Sample	Significant LSQ dimensions	Strongest dimension	CS → RI (β)	Mediation pattern
Present study	China, N = 470	6 of 6	Price fairness ($\beta = 0.251$)	0.624	Partial (PF); (quasi-)full (other 5)
Phuthong (2025)	Thailand, N = 387	3 of 6	Price fairness ($\beta = 0.296$)	0.588	Predominantly full
Hui et al. (2025)	China, N = 466	3 of 6 ^a	Delivery service quality	n/a ^b	Full (3 dimensions); n.s. (price fairness, delivery stability)

Note. LSQ = logistics service quality; CS = Consumer Satisfaction; RI = Repurchase Intention; n.s. = not significant. ^aDelivery service quality, returns and exchanges logistics service, and cross-border shopping experience. ^bHui et al. (2025) modelled satisfaction as a mediator within a technology-acceptance-based framework rather than reporting a single CS → RI coefficient directly comparable to the present study.

6. Conclusion

6.1 Summary of Findings

Drawing on service quality theory, expectation confirmation theory, and the theory of planned behaviour, this study constructed an integrated model linking six dimensions of logistics service quality, consumer satisfaction, and repurchase intention, and

tested it using PLS-SEM on 470 valid responses from Chinese cross-border e-commerce consumers. Three main conclusions emerge. First, all six LSQ dimensions—delivery timeliness, information quality, product condition, returns and exchanges service, price fairness, and communication quality—significantly and positively affect consumer satisfaction ($R^2 = 0.724$), with price fairness ($\beta = 0.251$) and delivery timeliness ($\beta = 0.218$) exerting the strongest effects. Second, consumer satisfaction significantly and positively affects repurchase intention ($\beta = 0.624$, $R^2 = 0.389$). Third, consumer satisfaction plays a central mediating role between LSQ dimensions and repurchase intention, with price fairness exhibiting partial mediation (VAF = 65.7%) and the remaining five dimensions exhibiting (quasi-)full mediation (VAF = 73.9%–78.8%).

6.2 Theoretical Contributions

This study makes three main theoretical contributions. First, by integrating Mentzer et al.'s (2001) classic LSQ framework with the price fairness construct developed for cross-border contexts (Xia et al., 2004), it constructs a six-dimensional LSQ measurement framework better suited to cross-border e-commerce, validated on a mainland Chinese consumer sample and thereby addressing gaps in research that has focused predominantly on Southeast Asia (Phuthong, 2025) or has not fully distinguished the nature of dimension-specific mediating effects (Hui et al., 2025). Second, by integrating expectation confirmation theory (Oliver, 1980) with the theory of planned behaviour (Ajzen, 1991), it provides a more explanatory, tripartite theoretical framework for the complete behavioural chain of “logistics service quality–satisfaction–repurchase intention.” Third, by introducing the Variance Accounted For (VAF) metric to refine the distinction between full and partial mediation across all six paths, it reveals the distinctive dual-path characteristic of price fairness relative to other dimensions and offers a theoretical basis for future research incorporating parallel mediators such as perceived value.

6.3 Practical Contributions

At the practical level, this study offers empirically grounded guidance for cross-border e-commerce enterprises seeking to enhance pricing transparency and logistics tracking systems and to establish satisfaction-centred performance appraisal systems; for logistics service providers seeking to optimise cross-border network configuration and reverse logistics capabilities; and for policymakers seeking to advance customs clearance facilitation and strengthen the legal and regulatory framework governing overseas warehouses.

6.4 Limitations

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional design, while capable of revealing the strength of associations among variables, precludes strong causal inference—a limitation also noted in comparable prior studies (Hui et al., 2025). Second, the sample is drawn exclusively from mainland Chinese consumers, and the cross-cultural generalisability of the findings remains to be established; as discussed in Section 5.1, the price fairness dimension exhibited markedly different patterns of significance across Chinese and Thai samples, suggesting that cultural context, market competition structure, and consumer price sensitivity may exert important contextual moderating effects. Third, this study did not incorporate psychological constructs such as trust, perceived value, and switching costs, which may operate as parallel mediators alongside satisfaction; incorporating these in future research would help to more comprehensively characterise the mechanisms underlying repurchase intention formation.

6.5 Directions for Future Research

Building on these limitations, future research could proceed along four lines. First, longitudinal or experimental designs could track dynamic changes in LSQ, satisfaction, and repurchase behaviour across multiple cross-border shopping cycles, enabling more rigorous causal inference. Second, cross-national comparative studies employing multi-group analysis could systematically examine differences in the relative importance of LSQ dimensions across consumer samples from countries with differing cultural backgrounds and e-commerce infrastructure maturity, with particular attention to the cross-cultural moderating mechanisms underlying price fairness—the most context-sensitive dimension identified here. Third, incorporating constructs such as perceived value, consumer trust, and switching costs into the research model would enable a more comprehensive multiple-mediator model, further clarifying the specific psychological pathways through which price fairness exerts a direct effect on repurchase intention. Fourth, given the growing application of artificial intelligence and big data technologies in cross-border e-commerce logistics management—such as smart warehousing, dynamic pricing, and predictive delivery-time estimation—future research could explore the emerging mechanisms through which such digital technologies enhance logistics service quality and, in turn, shape consumer satisfaction and repurchase intention.

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