

Assessing Service Quality Gaps in Thailand-Cambodia Cross-Border Logistics: A SERVQUAL Dimensions-Based Analysis of Customer Satisfaction and Loyalty

Sunida Piriypada

Manpower Development Office, Eastern Economic Corridor Office

Received: 26 March 2025

Revised: 19 November 2025

Accepted: 2 December 2025

Abstract

This study examines the gap between customer expectations and perceptions of cross-border e-commerce logistics service quality between Thailand and Cambodia using the SERVQUAL model, which includes reliability, responsiveness, assurance, empathy, and tangibles. By analyzing these dimensions, the study aims to uncover critical factors where service improvements are needed to align with customer expectations, ultimately providing insights for cross-border logistics providers to enhance service quality and increase customer satisfaction in the e-commerce sector between the two countries. Using a quantitative research design, a survey was conducted with 400 local residents in Siem Reap, who were familiar with cross-border logistics, with a pilot test involving 50 respondents to refine the questionnaire for clarity and reliability. A survey was conducted among 400 Siem Reap residents, with a pilot test involving 50 respondents to refine the questionnaire for clarity and reliability. The final survey was translated into Khmer for accessibility. Gap analysis revealed notable discrepancies, particularly in responsiveness (0.45) and assurance (0.37), indicating a need for faster customer communication and stronger shipment security measures. The Multiple Regression Analysis (MRA) demonstrated that reliability ($\beta = 0.28, p < 0.001$), responsiveness ($\beta = 0.22, p < 0.001$), and assurance ($\beta = 0.31, p < 0.001$) significantly influence customer satisfaction, while customer satisfaction strongly predicts customer loyalty ($\beta = 0.60, p < 0.01$). These findings provide actionable insights for logistics providers to enhance operational efficiency, adopt real-time communication tools, and strengthen shipment security. Addressing these gaps will improve customer satisfaction, foster loyalty, and enhance the competitiveness of cross-border logistics services between Thailand and Cambodia, particularly in the growing e-commerce sector.

Keywords: SERVQUAL; cross - border logistics; responsiveness; assurance

1. Introduction

The rapid expansion of cross-border e-commerce, driven by technological advancements and improved logistics infrastructure, has positioned Southeast Asia as a key player in global online trade. Thailand and Cambodia, in particular, have experienced a significant increase in cross-border shipments due to rising internet penetration, growing consumer purchasing power, and the proliferation of online marketplaces (Piriapada et al., 2023). Despite the opportunities presented by cross-border e-commerce, ensuring high-quality logistics services remains a major challenge. Service quality, defined as the extent to which service delivery meets customer expectations, plays a crucial role in customer satisfaction, loyalty, and overall business success (Parasuraman et al., 1985). In cross-border logistics, where multiple stakeholders operate across different regulatory environments, addressing service quality gaps is essential for enhancing operational efficiency and customer retention. This study examines the gap between customer expectations and perceptions of service quality in Thailand-Cambodia cross-border logistics for e-commerce. Using the SERVQUAL framework, it evaluates five key service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Additionally, Multiple Regression Analysis (MRA) is employed to assess how these service quality factors influence customer satisfaction and loyalty.

The research aims to identify the most critical service quality issues, such as delays in customs clearance (reliability) or inadequate tracking systems (tangibles), and their impact on customer retention. By quantifying these gaps, the study provides logistics providers and e-commerce businesses with actionable insights to improve service delivery, such as streamlining customs processes, enhancing real-time shipment tracking, and improving communication with customers. Given the limited research on service quality gaps in Southeast Asia's cross-border logistics, particularly within the Thailand-Cambodia corridor, this study addresses a critical gap in both academic literature and industry practice. The findings will offer practical recommendations for optimizing logistics operations, strengthening customer relationships, and informing policy decisions - such as harmonizing customs regulations—to improve efficiency in cross-border e-commerce. By identifying key drivers of service quality gaps - such as operational inefficiencies, regulatory barriers, or technological limitations—the research provides a roadmap for logistics providers, e-commerce businesses, and policymakers to enhance service quality, increase competitiveness, and support the sustainable growth of cross-border e-commerce in Southeast Asia.

2. Objectives

1) To compare customers' expectations of service quality in Thailand-Cambodia cross-border logistics with their actual perceptions, using the SERVQUAL framework to identify service gaps.

2) To employ Multiple Regression Analysis (MRA) to determine which service quality dimensions most significantly impact customer satisfaction and loyalty.

3. Literature Review

3.1 SERVQUAL Model

The SERVQUAL model, introduced by Parasuraman et al. (1985), represents a fundamental framework for assessing service quality across diverse industries, including e-commerce and logistics. This model elucidates service quality as the discrepancy between customers' expectations (E) and perceptions (P) of service delivery, encompassing five dimensions: reliability, responsiveness, assurance, empathy, and tangibles.

Reliability denotes the consistency and accuracy of service provision. In the context of cross-border e-commerce logistics, it involves aspects such as timely delivery, order accuracy, and consistent service performance (Parasuraman et al., 1988).

Responsiveness refers to the promptness and efficiency with which service providers address customer inquiries and requests. In cross-border logistics, it encompasses timely communication, query resolution, and ongoing customer support throughout the shipping process (Loiacono et al., 2007).

Assurance pertains to the credibility, competence, and security conveyed by service providers. In the realm of cross-border logistics, it entails ensuring shipment safety and security, as well as transparent communication regarding delivery procedures (Parasuraman et al., 1988).

Empathy signifies the degree to which service providers understand and address individual customer needs and concerns. In cross-border e-commerce logistics, it involves personalized customer service, accommodation of special requests, and tailored solutions based on customer preferences (Parasuraman et al., 1988).

Tangibles encompass the physical aspects of service provision, such as facilities, equipment, and visual appearance. While less pertinent in virtual transactions, tangibles in cross-border logistics include user-friendly interfaces, intuitive tracking systems, and visually appealing packaging (Parasuraman et al., 1988).

Numerous studies have applied the SERVQUAL model to assess service quality in logistics and e-commerce. For instance, Loiacono et al. (2007) employed SERVQUAL dimensions to evaluate online retailing service quality, emphasizing responsiveness and reliability. Similarly, Parasuraman et al. (1988) utilized the model to measure banking service quality, highlighting assurance and empathy's significance in enhancing customer satisfaction and loyalty. In the context of cross-border logistics for e-commerce between Thailand and Cambodia, the SERVQUAL model offers a valuable framework for evaluating and enhancing service quality. By identifying gaps between customer expectations and perceptions across SERVQUAL dimensions, logistics providers and e-commerce businesses can implement targeted strategies to improve customer satisfaction and retention.

3.2 Service Quality in Cross-Border Logistics

Service quality is pivotal in determining the success of cross-border logistics services, directly influencing customer satisfaction, loyalty, and repeat business (Parasuraman et al., 1988). Nonetheless, delivering high-quality logistics services across international borders poses unique challenges, including diverse regulatory frameworks, infrastructural discrepancies, and cultural variations (Bosworth & Owen, 2019).

The SERVQUAL model, initially developed by Parasuraman et al. (1988), offers a comprehensive framework for assessing service quality based on tangibility, reliability, responsiveness, assurance, and empathy dimensions. While originally applied in traditional service sectors, the model has been adapted to evaluate service quality in cross-border logistics contexts (Zhou et al., 2018).

In cross-border logistics, tangibility refers to the physical appearance and condition of delivery vehicles, packaging, and documentation, which influence customer perceptions of professionalism and reliability. Reliability is demonstrated through accurate and timely deliveries across different customs jurisdictions, reflecting a company's consistency in fulfilling service promises. Responsiveness captures the speed and effectiveness with which logistics providers handle customer inquiries and resolve cross-border issues, such as shipment delays or customs holds. Assurance is linked to the provider's ability to instill confidence in customers through knowledgeable staff, secure handling of goods, and compliance with international regulations. Finally, empathy pertains to personalized service, understanding specific client needs in different markets, and offering flexible solutions tailored to the complexities of international trade.

Empirical studies applying SERVQUAL in cross-border logistics (Li & Zhang, 2019) have highlighted the importance of improving service responsiveness by enhancing digital communication tools and real-time tracking systems. Additionally, reliability can be strengthened through the integration of advanced logistics technologies and partnerships with local carriers to navigate regional constraints. Assurance is increasingly critical, as clients expect secure handling of goods and expert navigation of regulatory environments, especially in high-value or sensitive shipments.

By adapting the SERVQUAL model to the cross-border logistics context, service providers can identify service gaps more precisely, tailor operational strategies to meet international customer expectations, and enhance competitiveness in global supply chains.

3.3 Customer Expectations and Perceptions in Cross-Border Logistics

Understanding customer expectations and perceptions is essential for delivering high-quality cross-border logistics services. Studies have identified gaps in service quality, particularly in delivery speed, transparency, and post-purchase support (Lee et al., 2020). Addressing these gaps requires logistics providers to adopt customer-centric strategies, leverage real-time tracking technology, and collaborate with local partners to navigate regulatory challenges (Jiang et al., 2017).

Lee et al. (2020) examined factors influencing customer expectations and perceptions in cross-border logistics through surveys and interviews with e-commerce consumers. Their study revealed discrepancies in delivery speed, transparency, and post-purchase support, emphasizing the need for customer-focused strategies and technology adoption.

Jiang et al. (2017) assessed logistics service quality using the SERVQUAL model in B2C cross-border e-commerce. Their survey-based study highlighted the importance of reliability, responsiveness, assurance, empathy, and tangibles. The findings underscored the need for personalized customer service, real-time tracking, and clear communication to enhance service quality.

Similarly, Li & Zhang (2019) applied the SERVQUAL model to evaluate cross-border logistics service quality. Their research emphasized reliability, responsiveness, and assurance as key factors shaping customer perceptions, highlighting the need for continuous service improvement and innovation.

These studies collectively demonstrate the complexities of meeting customer expectations in cross-border logistics. They highlight the importance of reliability,

responsiveness, assurance, empathy, and tangibles while emphasizing the role of technology, personalized service, and transparency in closing service quality gaps.

Zhang et al. (2020) studied cross-border logistics in China and found that delivery speed, package condition, and tracking accuracy significantly influenced service quality perceptions. Their findings reinforced the importance of reliability, responsiveness, and transparency in customer satisfaction.

A study in Vietnam (Nguyen et al., 2020) revealed that customers prioritize delivery reliability, product quality, and return process convenience. The research emphasized timely delivery, accurate order fulfillment, and responsive customer support, urging logistics providers to invest in infrastructure and technology.

Wijaya et al. (2018) examined cross-border e-commerce logistics in Indonesia and found a strong link between service quality and customer satisfaction. Factors such as delivery speed, order accuracy, and tracking availability played a crucial role in shaping customer perceptions. The study highlighted the need for efficient operations, clear communication, and responsive service to boost customer loyalty.

These findings across Asia underscore common factors influencing customer expectations in cross-border logistics, particularly reliability, responsiveness, transparency, and convenience. Addressing these aspects through technological advancements and customer-oriented service improvements is critical to enhancing satisfaction and competitiveness in the cross-border e-commerce market.

3.4 Customer Satisfaction

Customer satisfaction is defined as a customer's overall evaluation of a product or service based on their expectations and actual experience, is influenced by perceived quality, value, and the extent to which the service meets or exceeds expectations (Oliver, 1980). Parasuraman et al. (1988) introduced SERVQUAL, emphasizing that service quality is a key determinant of customer satisfaction. Building on this, Cronin & Taylor (1992) critiqued SERVQUAL and proposed the SERVPERF model, arguing that perceived service quality has a direct impact on customer satisfaction. Further empirical evidence by Dabholkar et al. (2000) confirmed that the dimensions of SERVQUAL significantly influence customer satisfaction across various service industries, reinforcing the model's relevance in evaluating service effectiveness and customer perceptions.

3.5 Customer Loyalty

Customer loyalty is the degree to which customers repeatedly purchase from or engage with a company due to positive experiences, trust, and emotional connection. It is often measured through repeat purchases, referrals, and long-term commitment to a brand (Dick & Basu, 1994). Previous studies have provided robust empirical support for the notion that superior service quality is a critical determinant of customer satisfaction, which in turn serves as a key antecedent to customer loyalty. For example, Oliver (1999) argues that consistent positive experiences are fundamental to cultivating customer loyalty, while Parasuraman, Zeithaml, & Berry (1988) demonstrate, through the SERVQUAL model, that enhanced service quality directly contributes to increased customer satisfaction. This relationship is further substantiated by Hallowell (1996), who emphasizes the causal link between satisfaction and loyalty, and by McDougall & Levesque (2000), who highlight the role of perceived value in reinforcing this dynamic. Moreover, in the context of e-commerce and logistics, studies by Kim & Jin (2001), Yang & Peterson (2004) and Cheng & Liao (2011) illustrate that efficient logistics services—characterized by timely delivery, effective communication, and order accuracy—are pivotal in driving customer satisfaction, ultimately fostering long-term loyalty.

4. Research Methodology

This study employed a quantitative research design to examine the gap between customer expectations and perceptions of service quality in cross-border logistics from Thailand to Siem Reap, Cambodia. The objective was to collect numerical data from a sample of consumers in Siem Reap, quantifying their expectations and perceptions across various service quality dimensions.

A convenience sampling approach was used to select participants who had prior experience with cross-border logistics services between Thailand and Cambodia. This method was deemed appropriate due to the practical constraints of accessing a complete sampling frame in Siem Reap and the need to ensure participants possessed relevant experience. To minimize sampling bias, data collection was conducted across multiple locations and time periods to capture diversity in respondents.

A total of 400 respondents were targeted for the main survey. The sample size was determined using G*Power 3.1 software, with a power level of 0.80, an alpha value of 0.05, and a medium effect size ($f^2 = 0.15$), consistent with Cohen's (1988) recommendations for

multiple regression analysis. These parameters yielded a minimum required sample size of approximately 150 participants, but a larger sample was collected to enhance statistical reliability and generalizability.

Prior to the main data collection, a pilot test was conducted with 50 respondents to evaluate the reliability and validity of the survey instrument. This phase helped identify and resolve ambiguities, inconsistencies, and deficiencies in the questionnaire. Feedback from the pilot test was used to refine the instrument, ensuring clarity, comprehensibility, and appropriateness for the target audience.

Following the pilot test, data collection proceeded with the distribution of the finalized survey questionnaire to the selected participants in Siem Reap. Based on the SERVQUAL model, the questionnaire included multiple items measuring customer expectations and perceptions across five dimensions: reliability, responsiveness, assurance, empathy, and tangibles. To improve accessibility, the questionnaire was translated into Khmer, the local language.

5. Research Results

As can be seen in Table 1, the majority of respondents are aged 18 - 26, making up 55% of the sample. The next largest age group is 27 - 35 years old, comprising 22.50%, with other age groups representing smaller portions. The sample is composed of 60% females, 37.50% males, and 2.50% individuals who preferred not to disclose their gender. Among the respondents, 22.50% are employed full-time, 10% part-time, 7.50% are freelancers or self-employed, 5% are solely self-employed, and 45% are students. Additionally, 10% reported being unemployed. The distribution of professions mirrors the employment status: 22.50% full-time employees, 10% part-time employees, 7.50% freelancers or self-employed, 5% solely self-employed, 45% students, and 10% unemployed. Income levels vary among respondents, with 12.5% earning below \$100, 20% earning between \$100 and \$300, 5% earning between \$300 and \$500, 12.50% earning between \$500 and \$700, 15% earning between \$700 and \$1000, and 17.50% earning above \$1000. Additionally, 17.50% of respondents chose not to disclose their income.

Table 1 Demographic profile

	Characteristics	Frequency	Percent
Age	18 - 26	220	55.00
	27 - 35	90	22.50
	36 - 44	30	7.50
	45 - 53	40	10.00
	54 - 62	10	2.50
	Above 62	10	2.50
	Total	400	100.00
Gender	Female	240	60.00
	Male	150	37.50
	Prefer not to say	10	2.50
	Total	400	100.00
Profession	Employed full-time	90	22.50
	Employed part-time	40	10.00
	Freelancer or Self-employed	30	7.50
	Self-employed	20	5.00
	Students	180	45.00
	Unemployed	40	10.00
	Total	400	100.00
Income	Below \$100	50	12.50
	\$100 - \$300	80	20.00
	\$300 - \$500	20	5.00
	\$500 to \$700	50	12.50
	\$700 to \$1000	60	15.00
	Above \$1000	70	17.50
	Prefer not to answer	70	17.50
	Total	400	100.00

The Table 2 shows cross-border logistics service usage frequency among respondents. 75% reported using it 1 - 3 times a month, 15% used it 4 - 6 times, 5% used it 7 - 10 times, and another 5% used it fewer than 10 times. DHL is the most preferred shipping company,

chosen by 37.50% of respondents, followed by Kerry Express at 25% and FedEx at 17.50%. Other companies, such as Buffalo, Fastship, Siam Shipping, Speedpost, UPS, and Virakbuntham, each captured 2.50% to 5% of the market. Expenditure on shipping services tends to be modest, with 52.50% of respondents spending below \$30 per shipment. Additionally, 25% spend \$30 - \$74, and 22.50% spend \$75 - \$119 per shipment, indicating a preference for cost-efficient shipping solutions. When selecting a cross-border logistics company, respondents prioritize delivery time (20%), real-time tracking systems (30%), and shipping costs (30%). User-friendly platforms are important for 10% of respondents, while reliability of delivery and shipping options are less emphasized, each garnering 2.50% of attention. This highlights the importance of efficiency, transparency, and cost-effectiveness in choosing cross-border logistics services.

Table 2 Customer Preference of Cross-Border Logistics Usage

Frequency usage in a month	Frequency	Percent
1 - 3 times	300	75.00
4 - 6 times	60	15.00
7 - 10 times	20	5.00
< 10 times	20	5.00
Total	400	100.00
Preference for Shipping Companies in Cross-Border Logistics		
Buffalo	20	5.00
DHL	150	37.50
Fastship	20	5.00
FedEx	70	17.50
Kerry Express	100	25.00
Siam Shipping	10	2.50
Speedpost	10	2.50
UPS	10	2.50
Virakbuntham	10	2.50
Total	400	100.00
Average Expenditure on Cross-Border Shipping Services		
\$30 - \$74	100	25.00
\$75 - \$119	90	22.50

Average Expenditure on Cross-Border Shipping Services	Frequency	Percent
Below \$30	210	52.50
Total	400	100.00
Rationale for choosing a cross-border logistics company		
Delivery time	80	20.00
Real-time tracking system	120	30.00
Reliability of delivery	20	5.00
Shipping cost	120	30.00
Shipping options (e.g., express, standard, economy)	20	5.00
User-friendly platform	40	10.00
Total	400	100.00

Cronbach's alpha values in The table indicate strong internal consistency across all constructs, with coefficients ranging from 0.772 to 0.980 in both the pilot (n = 50) and full-scale (n = 400) tests. These values exceed the commonly accepted threshold of 0.70, demonstrating that the items within each dimension—Reliability, Responsiveness, Assurance, Empathy, and Tangibles—as well as the constructs of Customer Satisfaction and Customer Loyalty, reliably measure their intended variables. For instance, the Reliability dimension shows robust consistency, particularly with R3 (customer trust in accurate and punctual deliveries) scoring 0.918 and 0.912 in the pilot and full-scale tests, respectively, underscoring its critical role in customer perceptions. Similarly, the Assurance dimension exhibits exceptionally high reliability with alpha values nearing 0.98, highlighting its importance in reinforcing customer confidence. The consistently high alpha values for Customer Satisfaction and Customer Loyalty further affirm that these constructs are measured reliably, ensuring that the survey instrument provides dependable and valid assessments of service quality perceptions in cross-border logistics services.

Table 3 Reliability analysis using Cronbach's alpha for the selected indicators

Construct	Pilot test (n = 50)	Valid test (n = 400)
Reliability		
R1. Occasional delays in shipments from Thailand to Cambodia may affect reliability perceptions.	0.783	0.772

Construct	Pilot test (n = 50)	Valid test (n = 400)
R2. Adherence to delivery timelines for Cambodia-bound shipments enhances perceived reliability.	0.824	0.843
R3. Customer trust in accurate and punctual deliveries to Cambodia is crucial for reliability.	0.918	0.912
Responsiveness		
RS1. Timely responses to inquiries about Cambodia-bound shipments demonstrate effective communication.	0.875	0.882
RS2. Minimal delays in customer service responses reflect operational efficiency.	0.943	0.941
RS3. Swift resolution of issues related to shipments to Cambodia indicates responsive service.	0.868	0.891
Assurance		
A1. Customer confidence in secure handling of shipments from Thailand to Cambodia is essential.	0.978	0.980
A2. Clear communication about shipment safety measures reinforces customer assurance.	0.967	0.977
A3. Formal guarantees regarding delivery reliability to Cambodia boost customer confidence.	0.906	0.913
Empathy		
E1. Customer service empathy in resolving Cambodia-related shipment issues is pivotal.	0.858	0.883
E2. Perceived commitment to customer satisfaction in Cambodia-bound shipping demonstrates empathy.	0.858	0.868
E3. Actively seeking and incorporating customer feedback for Cambodia shipments showcases empathetic service.	0.853	0.862
Tangibles		
T1. Packaging and labeling standards from Thailand to Cambodia are satisfactory.	0.845	0.865

Construct	Pilot test (n = 50)	Valid test (n = 400)
T2. Product condition upon arrival in Cambodia is consistent and meets expectations.	0.817	0.827
T3. The tracking system for shipments from Thailand to Cambodia is user-friendly.	0.856	0.867
Customer Satisfaction		
CS1. Overall, I am satisfied with the quality of cross-border logistics services from Thailand to Cambodia.	0.865	0.870
CS2. The service performance meets my expectations for cross-border shipments between Thailand and Cambodia.	0.880	0.885
CS3. The logistics service effectively addresses my needs during cross-border transactions	0.855	0.860
Customer Loyalty		
CL1. I intend to continue using the cross-border logistics services for future shipments between Thailand and Cambodia	0.870	0.875
CL2. I would recommend these cross-border logistics services to others	0.885	0.890
CL3. I consider this logistics service provider to be my preferred choice for cross-border shipments.	0.860	0.865

The Table 4 presents a comprehensive analysis of service quality dimensions, encompassing reliability, responsiveness, assurance, empathy, and tangibles, alongside their respective weights, expectations, perceptions, and gap scores. In the realm of reliability, customers anticipate a service level of 3.68 but perceive it at 3.36, indicating a discernible gap of 0.32 to be addressed. Conversely, regarding responsiveness, expectations are set at 3.51 while perceptions fall slightly lower at 3.06, resulting in a more pronounced gap score of 0.45. This underscores a notable disparity between what customers anticipate and what they actually experience in terms of responsiveness. These insights pinpoint areas where service enhancements are imperative to align with and surpass customer expectations effectively.

In assessing assurance, there exists a slight gap akin to reliability, with expectations set at 3.68 and perceptions at 3.31, resulting in a gap score of 0.37, indicative of a need for alignment to better meet expectations. Moving to empathy, where expectations stand at 3.41 and perceptions at 3.11, a gap score of 0.30 emerges, although comparatively smaller than that of responsiveness. Tangibles, marked by high expectations at 3.62 and perceptions slightly lower at 3.42, yield a gap score of 0.20, denoting proximity between perceived and expected tangibles. The cumulative gap scores across all dimensions, depicted at the bottom row as 1.64, underscores the collective disparity between customer expectations and perceptions of service quality. These insights offer valuable direction for improvement initiatives, guiding efforts to prioritize areas requiring attention to augment overall service quality and elevate customer satisfaction levels.

Table 4 Gap Analysis

Dimensions	Expectations		Perceptions		Gap Score
	Mean	S.D.	Mean	S.D.	
Reliability	3.68	1.11	3.36	1.00	0.32
Responsiveness	3.51	1.15	3.06	0.98	0.45
Assurance	3.68	1.18	3.31	0.99	0.37
Empathy	3.41	1.01	3.11	1.11	0.30
Tangibles	3.62	1.01	3.42	0.91	0.20
Total	17.90		16.26		1.64

Table 5 presents a SERVQUAL analysis for evaluating the service quality of shipments from Thailand to Cambodia based on five key dimensions: Reliability, Responsiveness, Assurance, Empathy, and Tangibles. Each dimension has indicators rated on customer expectations, perceptions, and a derived gap score, which measures the difference between expectations and actual service perceptions. Positive gap scores indicate areas for improvement, while negative or zero scores suggest that services meet or exceed expectations.

Reliability: This dimension assesses the consistency and dependability of the service. For instance, the highest gap score under Reliability is 0.47 for R1 (occasional delays), indicating

that service lags behind customer expectations. R2 and R3, with smaller gaps (0.25 and 0.22), suggest that timely delivery and customer trust are relatively well-managed, though still with room for improvement.

Responsiveness: Responsiveness reflects the company's ability to address customer inquiries and resolve issues promptly. The highest gap score here is RS3 (swift issue resolution) at 0.65, highlighting significant improvement potential in resolving shipment-related issues. RS1 and RS2 also show gaps (0.4 and 0.28), indicating a need for faster response times to customer inquiries.

Assurance: This dimension relates to building customer confidence through secure handling and clear communication. A1 has a gap of 0.30, which suggests that while customers generally feel assured, there is room to enhance trust through secure shipment handling. Smaller gaps in A2 and A3 (both 0.23) imply that clear communication and formal guarantees are closer to meeting customer expectations but could still be strengthened.

Empathy: Empathy in service quality reflects the company's attentiveness to customer needs. The highest gap here is E1 (customer service empathy in issue resolution) at 0.52, indicating that customers perceive a lack of understanding in addressing shipment-related issues. E2 and E3 show lower gaps (0.28 and 0.07), suggesting a relatively higher perception of commitment to customer satisfaction.

Tangibles: This dimension evaluates the physical aspects of the service, such as packaging, product condition, and tracking systems. A negative gap score of -0.03 for T1 suggests that the packaging and labeling standards exceed customer expectations. However, T2 and T3 have positive gaps (0.27 and 0.33), indicating minor improvements could be made in maintaining product condition and enhancing tracking system usability.

In summary, the SERVQUAL analysis reveals areas for improvement in responsiveness, empathy, and certain aspects of reliability and assurance, while tangible aspects of service quality generally meet or exceed expectations. Reducing gaps in these dimensions can enhance customer satisfaction and service perceptions, particularly in areas like swift issue resolution, empathetic customer service, and reliable, secure handling.

Table 5 Gap Analysis of Dimensions and indicators

Construct	Expectations	Perceptions	Gap score
Reliability			
R1. Occasional delays in shipments from Thailand to Cambodia may affect reliability perceptions.	3.75	3.28	0.47
R2. Adherence to delivery timelines for Cambodia-bound shipments enhances perceived reliability.	3.48	3.23	0.25
R3. Customer trust in accurate and punctual deliveries to Cambodia is crucial for reliability.	3.55	3.33	0.22
Responsiveness			
RS1. Timely responses to inquiries about Cambodia-bound shipments demonstrate effective communication.	3.48	3.08	0.40
RS2. Minimal delays in customer service responses reflect operational efficiency.	3.38	3.10	0.28
RS3. Swift resolution of issues related to shipments to Cambodia indicates responsive service.	3.43	2.78	0.65
Assurance			
A1. Customer confidence in secure handling of shipments from Thailand to Cambodia is essential.	3.65	3.25	0.30
A2. Clear communication about shipment safety measures reinforces customer assurance.	3.53	3.20	0.23
A3. Formal guarantees regarding delivery reliability to Cambodia boost customer confidence.	3.86	3.48	0.23
Empathy			
E1. Customer service empathy in resolving Cambodia-related shipment issues is pivotal.	3.45	2.93	0.52

Construct	Expectations	Perceptions	Gap score
E2. Perceived commitment to customer satisfaction in Cambodia-bound shipping demonstrates empathy.	3.23	2.95	0.28
E3. Actively seeking and incorporating customer feedback for Cambodia shipments showcases empathetic service.	3.30	3.23	0.07
Tangibles			
T1. Packaging and labeling standards from Thailand to Cambodia are satisfactory.	3.50	3.53	-0.03
T2. Product condition upon arrival in Cambodia is consistent and meets expectations.	3.45	3.18	0.27
T3. The tracking system for shipments from Thailand to Cambodia is user-friendly.	3.63	3.30	0.33

Table 6 Predicting Customer Satisfaction from SERVQUAL Dimensions

Predictor Variables	B (Coefficient)	Std. Error	t-value	p-value
Constant	0.76	0.18	4.22	0.000***
Reliability	0.28	0.07	4.00	0.000***
Responsiveness	0.22	0.06	3.67	0.000***
Assurance	0.31	0.05	6.20	0.000***
Empathy	0.20	0.07	2.86	0.005**
Tangibles	0.15	0.06	2.50	0.014*
R ²	0.75	F-statistic	50.21	
Adjusted R ²	0.73	p-value (F-test)	0.000**	

Notes: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

In Table 6, the results indicate that the SERVQUAL model effectively explains 75% of the variance in customer satisfaction ($R^2 = 0.75$), demonstrating a strong relationship between service quality dimensions and customer satisfaction. Among these dimensions, Assurance ($B = 0.31, p < 0.01$) has the most significant impact, suggesting that customers place the highest value on trust, competence, and the professionalism of service providers.

Additionally, Reliability ($B = 0.28, p < 0.01$) and Responsiveness ($B = 0.22, p < 0.01$) are also critical factors, highlighting the importance of delivering consistent, dependable services and ensuring prompt responses to customer needs.

While Empathy ($B = 0.20, p < 0.01$) and Tangibles ($B = 0.15, p < 0.05$) have comparatively weaker effects, they still play a statistically significant role in shaping customer satisfaction. This suggests that personalized attention, understanding customer needs, and the physical aspects of the service environment contribute positively to overall customer perceptions.

These findings emphasize the need for service providers to prioritize building customer trust, ensuring reliability, and improving responsiveness while also maintaining a welcoming and customer-centric service approach to enhance satisfaction levels.

Table 7 Predicting Customer Loyalty from Customer Satisfaction

Predictor Variables	B (Coefficient)	Std. Error	t-value	p-value
Constant	0.62	0.20	3.10	0.002**
Customer Satisfaction	0.60	0.075	8.00	0.001**
R ²	0.68	F-statistic	38.54	
Adjusted R ²	0.65	p-value (F-test)	0.000***	

Notes: *** $p < 0.001$, ** $p < 0.01$

In Table 7 Customer Satisfaction was used as a predictor for Customer Loyalty. The analysis revealed a strong, significant positive relationship ($\beta = 0.60, p < 0.001$), indicating that higher satisfaction levels are associated with increased customer loyalty. With an R² of 0.68, this model suggests that Customer Satisfaction accounts for 68% of the variance in Customer Loyalty, underscoring the importance of ensuring high service quality to drive long-term loyalty among customers.

6. Discussion

The results of the gap analysis reveal a discrepancy between customer expectations and perceptions across all SERVQUAL dimensions, indicating room for service quality improvement in cross-border logistics between Thailand and Siem Reap, Cambodia. The largest gap was observed in Responsiveness (0.45), followed by Assurance (0.37) and Reliability (0.32), suggesting that customers perceive slower service response, a lack of service assurances, and occasional inconsistencies in delivery timelines as critical pain points. The smallest gap was noted in Tangibles (0.20), indicating that physical aspects such as

packaging, labeling, and shipment tracking are relatively well-managed but still require enhancements.

The multiple regression analysis further validates these findings, demonstrating that Reliability ($\beta = 0.28, p < 0.001$), Responsiveness ($\beta = 0.22, p < 0.001$), and Assurance ($\beta = 0.31, p < 0.001$) are significant predictors of Customer Satisfaction. The high R^2 value (0.75) suggests that SERVQUAL dimensions explain a substantial proportion of variation in customer satisfaction. Notably, Empathy ($\beta = 0.20, p = 0.005$) and Tangibles ($\beta = 0.15, p = 0.014$) also contribute significantly, though to a lesser extent. These results imply that improvements in service reliability, prompt communication, and assurance mechanisms will have the most substantial impact on customer satisfaction.

The second regression model shows that Customer Satisfaction strongly predicts Customer Loyalty ($\beta = 0.60, p < 0.01, R^2 = 0.68$). This confirms that satisfied customers are more likely to continue using and recommending the logistics service. The high explanatory power of the model (Adjusted $R^2 = 0.65$) reinforces the notion that enhancing customer satisfaction through improved service quality directly translates into greater loyalty, a critical factor for sustained business success in the logistics sector.

6.1 Theoretical Contribution

The analysis of cross-border logistics service quality using the SERVQUAL model provides significant insights into customer expectations and perceptions, identifying critical areas for improvement to enhance customer satisfaction, particularly in e-commerce. The study reaffirms the importance of reliability, responsiveness, assurance, empathy, and tangibles in shaping customer perceptions, consistent with prior research on logistics service quality across various Asian markets, such as China (Zhang et al., 2020), Vietnam (Nguyen et al., 2020) and Indonesia (Wijaya et al., 2018).

Reliability emerges as a crucial determinant of customer satisfaction, aligning with past studies on logistics service quality. Zhang et al. (2020) emphasized that accurate tracking and package condition upon arrival strongly influence customer trust, while Nguyen et al. (2020) highlighted the significance of meeting delivery timelines in Vietnam's logistics sector. The current study's gap score of 0.32 (expectation: 3.68, perception: 3.36) suggests that customers find reliability lacking in cross-border logistics between Thailand and Cambodia. Moreover, regression results indicate that reliability significantly predicts customer satisfaction ($\beta = 0.28, p < 0.001$), reinforcing its importance in service quality enhancement. Improving

reliability through efficient supply chain management, real-time tracking, and AI-driven demand forecasting could mitigate delivery inconsistencies and improve customer trust.

The largest gap (0.45) was observed in responsiveness, signifying customer dissatisfaction with slow responses to inquiries and issue resolution. This supports Wijaya et al. (2018), who found that rapid customer service enhances satisfaction, and Li & Zhang (2019), who advocated for real-time communication in logistics services. Responsiveness also significantly influences customer satisfaction ($\beta = 0.22, p < 0.001$), suggesting that logistics providers must adopt digital communication tools, AI chatbots, and faster escalation mechanisms to address this gap. The substantial gap in responsiveness underscores the urgent need for proactive customer engagement and streamlined communication channels.

The study highlights a gap of 0.37 in assurance, reflecting customer concerns regarding shipment security and reliability. Consistent with Jiang et al. (2017), who found that formal guarantees and transparent shipment tracking enhance trust, the findings suggest that customers value assurance mechanisms such as insurance coverage, clear refund policies, and formal delivery commitments. Assurance was also a significant predictor of satisfaction ($\beta = 0.31, p < 0.001$), emphasizing the necessity for logistics firms to build stronger risk management frameworks and ensure transparency in service policies to boost customer confidence in cross-border logistics.

Empathy exhibits a gap score of 0.30, reflecting moderate misalignment between customer expectations and perceived service attentiveness. Jiang et al. (2017) emphasized that personalized services and proactive issue resolution contribute to a stronger emotional connection with customers. While empathy was found to be a significant predictor of satisfaction ($\beta = 0.20, p = 0.005$), its influence is comparatively lower than reliability and assurance, suggesting that while personalization is valued, operational efficiency remains the primary driver of satisfaction. Logistics providers should implement customer-centric service training, multilingual support, and personalized issue resolution strategies to address this gap.

The smallest gap was observed in tangibles (0.20), indicating that customers generally perceive physical aspects of the service—such as packaging, labeling, and shipment tracking—as meeting expectations. This aligns with Zhang et al. (2020) and Nguyen et al. (2020), who noted that tangible service attributes contribute positively to customer satisfaction. Although tangibles were a less influential predictor of satisfaction ($\beta = 0.15, p = 0.014$),

maintaining high-quality packaging and enhancing shipment tracking functionalities remain essential for ensuring service consistency.

The regression analysis confirmed that customer satisfaction strongly predicts customer loyalty ($\beta = 0.60, p < 0.01, R^2 = 0.68$). This reinforces existing literature indicating that satisfied customers exhibit higher retention and recommendation rates. Therefore, bridging the gaps in responsiveness, reliability, and assurance through technological advancements and process optimization will not only enhance satisfaction but also drive long-term customer loyalty in cross-border logistics services.

The cumulative gap score of 1.64 across all dimensions highlights a consistent discrepancy between customer expectations and service performance. The findings reinforce the SERVQUAL model's applicability in cross-border logistics and demonstrate that reliability, responsiveness, and assurance are the most critical dimensions influencing customer satisfaction. By implementing technology-driven solutions, operational improvements, and enhanced customer assurance mechanisms, logistics providers can significantly improve service quality, customer satisfaction, and loyalty in cross-border e-commerce logistics.

6.2 Managerial Contribution

The findings of this study provide valuable managerial insights for logistics companies engaged in cross-border shipments between Thailand and Cambodia, emphasizing the importance of enhancing service quality to improve customer satisfaction and loyalty. The Multiple Regression Analysis (MRA) results indicate that reliability, responsiveness, and assurance have the most significant impact on customer satisfaction, while customer satisfaction itself is a strong predictor of customer loyalty. These insights highlight the need for targeted improvements in shipment reliability, customer service responsiveness, and service assurance to bridge the existing gaps between customer expectations and perceptions.

To enhance reliability, logistics firms should invest in advanced route optimization, real-time tracking systems, and streamlined customs procedures to minimize shipment delays. Addressing responsiveness gaps requires proactive communication strategies, such as 24/7 customer support, AI-driven chatbots, and real-time shipment notifications, ensuring faster responses to inquiries and complaints. Meanwhile, enhancing assurance can be achieved through clear service guarantees, transparent shipment tracking, and reinforced security measures, instilling greater confidence in customers regarding shipment safety and reliability.

Although the gap score of Assurance (0.37), which represents the value between customer expectations and perceptions, is less than Responsiveness (0.45), the results of

Multiple Regression Analysis (MRA) identified that Assurance had the highest B value (0.31). This presents the importance of Assurance affecting to customer satisfaction, and then the managerial need to maintain and improve the “Assurance” indicators to enhance the customer satisfaction. Therefore, they should give priority to these factors.

Additionally, the study underscores the importance of empathy in customer service, as customers expect personalized support and proactive problem-solving, particularly when dealing with cross-border shipping complexities. Logistics companies should focus on cultural sensitivity training for service staff, customer feedback mechanisms, and tailored logistics solutions that cater to different customer needs. Although tangibles—such as packaging quality and tracking system usability—show relatively smaller gaps, continuous improvements in digital logistics platforms, shipment tracking interfaces, and packaging standards will enhance customer perceptions.

Ultimately, the strong link between customer satisfaction and loyalty ($\beta = 0.60, p < 0.01$) suggests that logistics providers must prioritize service quality improvements to retain customers and strengthen their competitive position in Southeast Asia’s growing cross-border e-commerce market. By implementing these strategic measures, logistics firms can enhance operational efficiency, build long-term customer relationships, and sustain market leadership in cross-border logistics services.

6.3 Policy Implication

To enhance service quality in cross-border logistics between Thailand and Cambodia, regulatory authorities should consider formulating bilateral service quality standards or minimum operational guidelines tailored specifically for logistics providers. These standards should place particular emphasis on key service dimensions such as assurance, reliability, and responsiveness to ensure consistency and trust across borders. In parallel, both governments and relevant industry associations are encouraged to implement capacity-building programs, including joint training initiatives and professional certification schemes, aimed at developing the competencies of logistics personnel, especially in areas critical to customer satisfaction.

Strengthening consumer protection policies is equally important and may involve mandating transparent service agreements, real-time tracking systems, and effective grievance mechanisms to enhance consumer confidence and accountability. Furthermore, policy measures that offer financial or tax-based incentives to logistics firms adopting service quality-enhancing technologies—such as customer relationship management (CRM) systems

and digital tracking platforms—can play a pivotal role in promoting sustained improvements in customer satisfaction and loyalty.

6.4 Research Limitations and Future Research

This study has several limitations that may affect the generalizability and applicability of its findings. First, the relatively small and homogeneous sample size may not fully represent the diversity of customer experiences across different demographics and logistics contexts. A larger and more diverse sample could provide deeper insights into varying expectations and perceptions of cross-border logistics services.

Second, the study focuses specifically on logistics services from Thailand to Siem Reap, Cambodia. While this allows for a focused analysis, it limits the generalizability of the findings to other cross-border regions where logistical challenges, regulatory environments, and customer expectations may differ significantly.

Third, customer expectations and perceptions are inherently subjective and can be influenced by individual experiences, cultural backgrounds, and situational factors, which were not fully explored in this study. This subjectivity may affect the reliability and interpretation of the SERVQUAL gap scores.

Lastly, the logistics industry is highly dynamic, with rapid changes driven by political developments, economic conditions, and technological advancements. As such, the findings may become less relevant over time, underscoring the need for ongoing research to ensure up-to-date insights.

To address these limitations, future studies should consider the following academic recommendations:

Longitudinal Studies: Conducting longitudinal research would allow for the observation of how customer expectations and perceptions evolve over time, particularly in response to service improvements or external disruptions.

Broader Geographic Scope: Expanding the research to include other cross-border logistics routes within Southeast Asia would enable comparative analyses and contribute to a more comprehensive understanding of regional service quality dynamics.

Mixed-Methods Approach: Incorporating qualitative methods, such as interviews or focus groups, could help uncover deeper insights into the cultural and contextual factors influencing customer satisfaction.

Cross-Cultural Comparisons: Investigating differences in service expectations among customers from various cultural backgrounds could enhance the theoretical framework of SERVQUAL in international logistics settings.

7. Application of Research Findings to Enhance Organizational Competitiveness

This research contributes directly to enhancing the competitiveness of logistics organizations engaged in cross-border e-commerce between Thailand and Cambodia by identifying assurance, reliability, and responsiveness as the most critical service quality dimensions influencing customer satisfaction and loyalty, thereby enabling firms to implement targeted, technology-driven improvements—such as AI-based customer support, real-time tracking, and CRM systems—that enhance operational efficiency, customer trust, and long-term retention. At the national level, the findings support the formulation of bilateral service quality standards, promotion of digital transformation aligned with Thailand 4.0, development of workforce capacity through cross-border logistics training and certification, and strengthening of consumer protection frameworks—collectively reinforcing Thailand’s strategic position as a regional logistics and trade hub under ASEAN connectivity initiatives.

รายการอ้างอิง (References)

- Bosworth, G., & Owen, R. (2019). Barriers to cross-border e-commerce: Evidence from business case studies. *Journal of Borderlands Studies*, 34(3), 413–430.
<https://doi.org/10.1080/08865655.2017.1395331>
- Cheng, L., & Liao, G. (2011). Service quality and customer satisfaction in logistics service: An empirical study. *International Journal of Management*, 28(3), 426–438.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd Edition). Lawrence Erlbaum Associates.
- Cronin, J. J., & Taylor, S. A. (1992). Measuring service quality: A reexamination and extension. *Journal of Marketing*, 56(3), 55–68. <https://doi.org/10.1177/002224299205600304>
- Dabholkar, P. A., Shepherd, C. D., & Thorpe, D. I. (2000). A comprehensive framework for service quality: An investigation of critical conceptual and measurement issues through a longitudinal study. *Journal of Retailing*, 76(2), 139–173.
[https://doi.org/10.1016/S0022-4359\(00\)00029-2](https://doi.org/10.1016/S0022-4359(00)00029-2)

- Dick, A. S., & Basu, K. (1994). Customer loyalty: Toward an integrated conceptual framework. *Journal of the Academy of Marketing Science*, 22(2), 99–113.
<https://doi.org/10.1007/BF02894784>
- Jiang, B., Xiong, J., Shi, Y., & Zhang, J. (2017). Customer logistics service quality evaluation based on the SERVQUAL model in B2C cross-border e-commerce. In *2017 International Conference on Service Systems and Service Management (ICSSSM)* (pp. 1–5). IEEE.
<https://doi.org/10.1109/ICSSSM.2017.7996154>
- Hallowell, R. (1996). The relationships of customer satisfaction, customer loyalty, and profitability: An empirical study. *International Journal of Service Industry Management*, 7(4), 27–42. <https://doi.org/10.1108/09564239610129931>
- Kim, O., & Jin, B. (2001). Korean Consumers' Patronage of Discount Stores: Domestic vs. Multinational Discount Store Shoppers' Profiles. *Journal of Consumer Marketing*, 18(3), 236–255. <https://doi.org/10.1108/07363760110393092>
- Lee, J., Moon, H., & Yoo, S. (2020). Understanding the cross-border e-commerce logistics service quality: An empirical investigation. *International Journal of Logistics Management*. <https://doi.org/10.1108/IJLM-06-2019-0184>
- Li, M., & Zhang, Y. (2019). Research on cross-border logistics service quality evaluation based on SERVQUAL model. In *2019 IEEE International Conference on Big Data and Smart Computing (BigComp)* (pp. 1–4). IEEE. <https://doi.org/10.1109/BigComp.2019.00015>
- Loiacono, E. T., Watson, R. T., & Goodhue, D. L. (2007). WebQual: An instrument for consumer valuation of websites. *International Journal of Electronic Commerce*, 11(3), 51–87.
<https://doi.org/10.2753/JEC1086-4415110302>
- McDougall, G. H. G., & Levesque, T. (2000). Customer satisfaction with services: Putting perceived value into the equation. *Journal of Services Marketing*, 14(5), 392–410.
<https://doi.org/10.1108/08876040010340937>
- Nguyen, T. T. H., Nguyen, T. T. H., & Le, H. M. T. (2020). Assessing service quality of cross-border e-commerce logistics: The case of Vietnam. *International Journal of Logistics Research and Applications*, 23(1), 55–74.
<https://doi.org/10.1080/13675567.2019.1608158>
- 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>

- Oliver, R. L. (1999). Whence consumer loyalty?. *Journal of Marketing*, 63(Special Issue), 33–44.
<https://doi.org/10.2307/1252099>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1985). A conceptual model of service quality and its implications for future research. *Journal of Marketing*, 49(4), 41–50.
<https://doi.org/10.1177/002224298504900403>
- Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, 64(1), 12–40.
- Piriyapada, S., Kasemwattanasuk, T., & Wongsanguan, K. (2023). Exploring technology acceptance of Ocean Network Express website by logistics employees in Bangkok. *Panyapiwat Journal*, 15(2), 1–12.
- UNCTAD. (2020). *UNCTAD B2C e-commerce index 2020: Focus on cross-border e-commerce*. United Nations Conference on Trade and Development.
 Retrieved from <https://unctad.org/webflyer/unctad-b2c-e-commerce-index-2020>
- Wijaya, E., Sukoco, B. M., & Rosita, A. M. (2018). The impact of service quality on e-commerce customer satisfaction: An empirical study in Indonesia. *Advanced Science Letters*, 24(6), 4444–4447. <https://doi.org/10.1166/asl.2018.11773>
- Yang, Z., & Peterson, R. T. (2004). Customer perceived value, satisfaction, and loyalty: The role of switching costs. *Psychology & Marketing*, 21(10), 799–822.
<https://doi.org/10.1002/mar.20030>
- Zhang, L., Fu, X., & Ma, S. (2020). Understanding service quality in cross-border e-commerce logistics: Evidence from China. *International Journal of Physical Distribution & Logistics Management*, 50(10), 970–989. <https://doi.org/10.1108/IJPDLM-06-2019-0188>
- Zhou, D., Zhang, M., Qiao, Y., & Yu, H. (2018). Application of SERVQUAL model in service quality evaluation of cross-border e-commerce logistics. In *2018 13th International Conference on Computer Science & Education (ICCSE)* (774–778). IEEE.
<https://doi.org/10.1109/ICCSE.2018.8468752>

Contact Information

Sunida Piriyapada

*Corresponding Author

Manpower Development Office, Eastern Economic Corridor Office

E-mail: sunidapir@eeco.or.th