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Customer Satisfaction toward Logistic Service Quality: A Comprehensive Analysis of Key Factors and Strategic Implications

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Abstract

Logistics Service Quality (LSQ) plays a vital role in enhancing supply chain efficiency, customer satisfaction, and competitive advantage. This study investigates customer satisfaction with logistics services in Malaysia, focusing on three key dimensions: delivery cost, information quality, and timeliness. Grounded in the Expectancy-Disconfirmation Theory, the research explores the impact of these factors in the context of Malaysia's rapidly expanding e-commerce sector. A quantitative, causal research design was adopted, utilizing an online questionnaire to collect data from Malaysian online shoppers through convenience sampling with 152 respondents in total. Multiple regression analysis was used to examine the relationships among variables. The results indicate that information quality and delivery cost significantly and positively influence customer satisfaction, while timeliness does not show a significant effect. These findings underscore the importance of accurate information and competitive delivery pricing in enhancing customer experience. Despite limitations related to sample size, funding, and respondent diversity, the study offers valuable insights for improving logistics service quality in Malaysia. Future research with broader samples and refined methodologies can further deepen the understanding of consumer satisfaction in the logistics sector.

Keywords: Logistics Service Quality, Customer Satisfaction, Delivery Cost, Information Quality, Timeliness.

Introduction

The E-commerce revenue in Malaysia is on track to reach RM1.65 trillion in 2025 after Malaysia's e-commerce revenue surpassed RM1 trillion in 2021 (Ministry of Communications, 2025). With 27.4 million active internet users (80%) and a high mobile phone penetration rate (84.2%) in the previous year, Malaysia has a high rate of e-commerce adoption. The

previous year also saw 39.9 million mobile connections and 28 million social media users nationwide (Privacy Shield, 2025).

The demand for logistics services is rising as Malaysia's e-commerce industry continues to flourish, which in turn is driving the growth of the logistics market. However, increased industrial competitiveness is an inevitable result of this rise. With so many logistics companies in Malaysia, maintaining client loyalty becomes quite difficult. As emphasized by the findings of Akıl and Ungan (2022), Mangiaracina et al. (2019), and Luzhanska et al. (2021), achieving optimal customer satisfaction—particularly in areas such as timeliness, delivery cost, and service reliability—is essential to maintaining competitiveness in the logistics sector.

According to Lin et al. (2023), logistics service quality (LSQ) refers to how well a logistics provider meets or surpasses the expectations of its clients. Crucial elements like speed, delivery cost, and information quality are necessary to meet these expectations (Sutrisno et al., 2019). Research indicates that raising the calibre of logistics services leads to increased client retention, loyalty, and happiness (Ogunnowo & Sule, 2021).

The connection between customer happiness and the quality of logistics services has been well studied. Research indicates that the quality of logistics services has a major impact on customer satisfaction, which in turn influences customer loyalty and intentions to repurchase (Hu et al., 2022; Kawa & Szczepańska, 2021; Restuputri et al., 2021). Poor handling techniques can significantly lower customer satisfaction and perceived service quality. These include mishandling, tampering, or delaying package deliveries. (Bahamdain et al., 2022; Choi et al., 2019). According to real-world complaints, Malaysian logistics companies like Shopee Express, J&T Express, and Ninja Van are particularly affected by problems like delayed deliveries, impolite conduct, a lack of tracking updates, disregard for delivery instructions, and even package theft (Facebook Post, 2024).

In logistics, timeliness is the capacity to provide products or services within predetermined time constraints, which is essential for satisfying client demands and guaranteeing service effectiveness. The importance of logistics service quality is well acknowledged (Zailani et al., 2018; Shan et al., 2022; Akıl & Ungan, 2022). According to Bernama (2019), 43% of Malaysian e-commerce buyers are dissatisfied with their delivery experiences, indicating that punctuality is still a major problem in the country. Average delivery times in Malaysia are 5.8 days longer than the regional average of 3.8 days. In Malaysia's logistics industry, "not on time" deliveries—which include processing, storage, or transportation delays—are a frequent grievance (Mangiaracina et al., 2019; Sudan & Taggar, 2021; Trustpilot, 2024).

Customer satisfaction is greatly impacted by the quality of the information used in logistics. Consumers rely on timely, reliable, and consistent information to control expectations and make choices. Confusion, distrust, and discontent are caused by poor information quality, such as inaccurate tracking, erratic updates, or delayed notifications (Chang et al., 2019; Mustafa et al., 2020). These problems have the potential to impair corporate operations, interfere with customer planning, and undermine trust in the logistics supplier. Customers may become less loyal as a result, and suppliers run the danger of losing clients. Delivering high-quality information must be a top priority for logistics organisations in order to preserve customer pleasure and trust, particularly when it comes to online purchasing.

In logistics, delivery costs—including unforeseen and hidden fees—have a big influence on consumer satisfaction. Additional charges including handling fees, surcharges, delays, and damages might raise overall costs and lower service reliability (Kanike, 2023; Manapul et al., 2022). Customers in Malaysia have expressed dissatisfaction over delivery workers manipulating fees and making them pick up packages even though they paid for delivery (City-Link Express Review, 2022; J&T Express Review, 2021). These problems highlight how important it is to be open, equitable, and quick to address consumer grievances in order to preserve confidence and happiness in the logistics industry.

Motivated by Malaysia's rapid e-commerce growth, escalating last-mile costs, and persistent consumer concerns about tracking transparency, this study seeks to identify which LSQ levers most effectively raise satisfaction under resource constraints. Maximizing customer satisfaction in the Malaysian logistics sector requires a nuanced understanding of the elements that shape customer perception, loyalty, and service retention. Key service dimensions—such as timeliness, information accuracy, and cost transparency—are pivotal in a highly competitive e-commerce landscape. By addressing operational inefficiencies and aligning service delivery with customer expectations, logistics providers can foster lasting trust and gain a sustainable competitive edge. This study therefore aims to investigate how these critical logistics service quality dimensions' influence customer satisfaction and loyalty in Malaysia's rapidly evolving digital marketplace.

Literature Review

Expectancy-Disconfirmation Theory (EDT)

In 1980, Richard L. Oliver developed Expectancy-Disconfirmation Theory (Oliver, 1980). It holds that customer satisfaction is a function of expectations, perceived performance, and disconfirmation of beliefs. Expectancy confirmation is when customer satisfaction comes from comparing the perceptions of different customers with those received. For example, if a customer expects a movie to be good because it has done well in the past, then they will feel increased confirmation when this movie is better than expected. Negative disconfirmation occurs when performance falls short of the customer's expectations, leading to anger and a sense of wrong treatment.

Within service quality, EDT stresses the importance of timeliness, information quality and delivery cost. For instance, when a package arrives earlier than scheduled, this results in positive disconfirmation to enhance satisfaction. On the other hand, if it's delayed then this would cause negative disconfirmation as well as dissatisfaction (Richu et al., 2022). EDT emphasizes the dual nature of satisfaction, which is affected by both subjective perceptions and objective performance. It underscores how necessary it may be to manage customer expectations effectively for logistic providers to do well in marketing their services to all the world's users (Rashid & Rasheed, 2024).

Strategically, EDT guides logistics providers by ensuring that service and customer expectations are properly aligned; by formulating realistic service agreements; and by guaranteeing consistent provision. On the other hand, delivery times will not only cause enormous expense but damage your reputation far more quickly than satisfied customers could ever build up in 20 years (Solomon-Adeyemi, 2023).

Customer Satisfaction

Customer Satisfaction is to what extent the expectations of customers on the product or service they get are satisfied, even exceeded, including the feelings, evaluations, and perception of their overall experience (Teshome et al., 2020; Bungatang & Reynel 2021). Factors influencing customer satisfaction include such things as product quality, service giving convenience, price, and customer support. Meeting expectations gives one a sense of positive experience which exceeds all others (Haralayya, 2021; Ali et al., 2021). Consistency in delivering quality experiences is critical to maintain long-term satisfaction (Gao & Fan, 2021; Rane et al., 2023). Besides, customer satisfaction is vitally important for generating loyalty and customer retention: happy customers buy more often and are likely to recommend the brand (Rane et al., 2023). Businesses gauge satisfaction through such things as surveys and feedback analysis to spot areas for improvement (Kitsios et al., 2021).

Research has explored various industries to identify factors influencing customer satisfaction. In logistics, customer satisfaction is determined by timely delivery, accuracy, reliability, responsiveness and flexibility (Świtała et al., 2019). Technological advances such as GPS tracking and real-time monitoring have improved transparency and efficiency, and consequently customer satisfaction (Garg et al., 2021). Multicultural studies emphasize that services need to be customized in view of the cultural differences in customers' expectations (Fan et al., 2023; Vakulenko et al., 2022). Increasing levels of satisfaction through feedback and effective service recovery strategies is of further significance (Ramirez, 2024; Van et al., 2019). These results imply that service quality, state-of-the-art technology, and cultural sensitivity are crucial to establishing customer loyalty and gaining a competitive edge.

Timeliness

Timeliness in logistics refers to the delivery of goods or services in a timely and efficient manner. This implies keeping delivery schedules, ensuring on-time delivery transportation and so on. It is a basic concept of service quality and has an impact on customer satisfaction and loyalty. Timeliness requires the coordination of many different functions within logistics such as order coding, monitoring order quantities during shipment, transportation techniques, delivery, and the task is often supported by such technologies as real time tracking (which not only tracks where a package is, but also provides an encyclopedic an inventory of potential obstacles facing it) or route optimization (Rahmat et al., 2019; Vu et al., 2020; Özcan et al, 2023). Key performance indicators (KPIs) like on-time delivery rates and transit time variability poll the timeliness performance (Gauffin, 2020). Timeliness can enhance customer trust, satisfaction guarantees and perceived dependability. In the market, it distinguishes logistics providers by giving them a competitive edge over others, meanwhile within supply chains it has become increasingly important for pending new orders to be filled promptly and in good condition (Michalski & Montes-Botella, 2022). In addition, automatic identification systems and last mile delivery solutions offer further improvements for timeliness (Bayraktar et al., 2020).

Research has analyzed causes of timeliness issues as seen from the perspectives of diverse stakeholders like transportation, inventory strategies like just-in-time (JIT), and supplier reliability (Cortes-Murcia et al., 2022). Metrics amenable to the evaluation of timely delivery are measures such as lead time management, the time taken between orders or demand signals coming in to suppliers' goods showing up on customers' plant floors and order cycle

times (Mienye & Sun, 2021). Various recent studies remind us that on time deliveries are closely linked to customer satisfaction levels among recipients while influencing their brand loyalty and respect with suppliers accordingly (Uvet, 2020; Phan Tan & Le, 2023). From a strategic point of view, timeliness is for logistics providers viewed as both a competitive tool capable of saving them money on delivery in addition to speed (Akıl & Ungan, 2022). Based on the discussion, first hypothesis is developed.
H1: Timeliness positively affects customer satisfaction in logistics services quality.

Information Quality
Poor information quality in logistics amounts to inadequate details, inappropriate items, incompetent information, inconsistency, undeniable, and hard to find information. High information quality can bring about mutual trust, transparency, and good decisions (Vasić et al., 2021; Khan et al., 2019). Accurate, complete and relevant information serves the needs of customers. All such information harmonized across channels and quickly accessible via many platforms makes the overall experience better for users (Fosso Wamba et al., 2019; Cheng et al., 2020; Dedeoglu, 2019; Hossain et al., 2020; Kang & Namkung, 2019). High-quality information promotes operational efficiency and customer satisfaction. A clear message enables customers to plan, solving clients' issues quickly helps maintain trust (Lim et al., 2021). Being right about these items builds bonds with users and gives a certain edge in business.

Claims in previous research that information quality is crucial to customer satisfaction and system efficiency (Alkaf et al., 2021). Studies have shown that accurate information is necessary for building customer trust, and complete information can make customers satisfied with their choices (Chang et al., 2019; Vakulenko et al., 2019). Relevant, personally tailored data enhances the service experience. Consistent information in all channels is needed for uniform customer experience (Yun, et al., 2019; Rane et al., 2023). Accessible information across a variety of platforms helps build customer satisfaction (Kankam et al., 2023). High-quality information also supports better operational efficiency and decision-making. Therefore, a hypothesis is formed as:
H2: Information quality positively affects customer satisfaction in logistics services quality.

Delivery Cost
The cost of delivery includes all costs caused by moving goods from point of origin to destination, both transportation and handling fees, as well as packaging costs, fuel surcharges customs duty (Vasić et al. (2021). It is vital for logistics providers through careful cost management to ensure that they remain competitive and profitable, particularly given today's sensitive market pricing regime (Sharma 2020). Meanwhile computer software such as optimisation models for routing and GPS tracking help in minimising fuel use, improving vehicle management efficiency generally (Salhieh et al. (2021). Delivery cost has a major impact on customers' purchasing decisions and satisfaction. Customers consider both price and level of service when they choose a mode of shipment. Seen in relation to service quality, delivery cost includes item speed, item accuracy and customer service attitude (Chen et al. 2019).

Research indicates that while customers do seek cost effective delivery services, they also seek high standards of service quality (Neger & Uddin 2020). Factors that affect delivery costs

include mode of transport, distance, size of consignment, fuel costs and the legal environment (Gao et al. 2019).High delivery costs can deter people from buying, SoftBank has tried free shipping schemes so as to encourage an increase in transactions (Ali & Bhasin, 2019). Examples of cost management strategies include route optimization, inventory management, collaboration with third-party logistics service providers (Sukmana et al., 2022; Zheng & Sun 2023). Dynamic pricing and added value services can bring supply chain costs more in line with customer value perceptions. As a result, third hypothesis can be formed as below.
H3: Delivery costs positively affects customer satisfaction in logistics services quality.

Research Framework
Based on the above discussion, the research framework is presented in Figure 1.

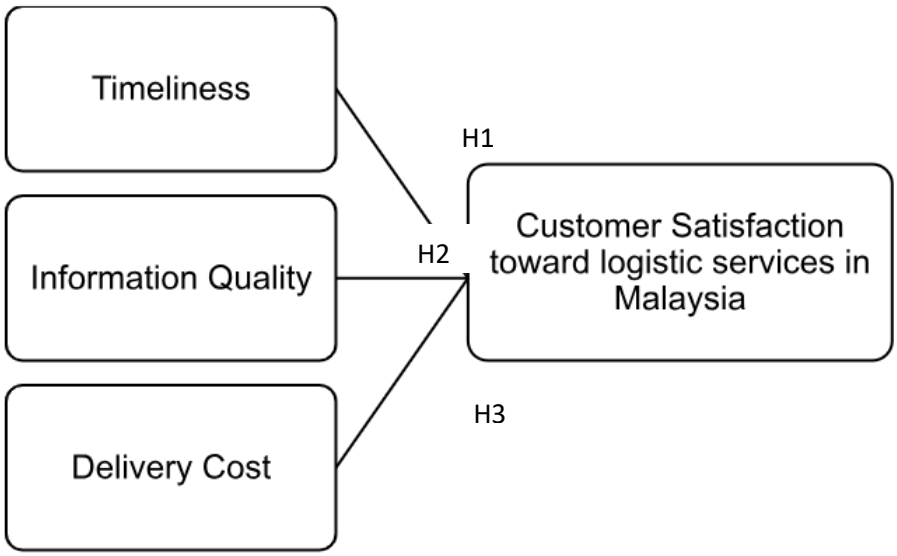

Figure 1: Research Framework

Methodology
This research uses quantitative research and causal research design to investigate the relationship between independent variables (timeliness, information quality, and delivery cost) and the dependent variable (consumer satisfaction towards logistics service in Malaysia). Quantitative research is simply a means of collecting numerical data to level customer satisfaction with logistics services. Primary data was collected through an online questionnaire. The sample group were Malaysian citizens aged over eighteen who have been engaging in online shopping for at least two years. This survey included screening questions, demographic questions, questions on the independent variables (timeliness, information quality and delivery cost), and questions on the dependent variable (customer satisfaction). The population consists of Malaysian people who have made online purchases in the past two years and are at least 18 years old (see Table 1). In total, 152 data were collected.

This survey used nonprobability sampling, specifically, convenience sampling is used. Convenience sampling entails which respondents are selected subjectively or by chance at the researcher's convenience to those who happen to be around. Researcher applied Structural Equation Modelling- Partial Least squares (SEM-PLS) to perform both measurement and structural analysis model. The study uses constructs for timeliness, information quality, delivery cost, and customer satisfaction, each measured with multiple items on a 5-point Likert scale.

Table 1
Demographic profiles of respondents

Variable	Classification	Frequency	Percentage (%)
Gender	Male	84	55.3
	Female	68	44.7
Age (screening question)	18-23 years old	98	64.5
	24-30 years old	45	29.6
	31-39 years old	8	5.3
	41-49 years old	1	0.7
	Above 50 years old	0	0
Ethnicity	Malay	24	15.8
	Chinese	120	78.9
	Indian	7	4.6
	Others	1	0.7
Have you ever purchased online in the past 2 years? (screening question)	Yes	152	100.0
	No	0	0
Employment	Employed	50	32.9
	Unemployed	2	1.3
	Retired	0	0
	Housewife	0	0
	Student	100	65.8

Data Analysis and Findings

Measurement Model Analysis

When assessing the measurement model, it is essential to evaluate both convergent and discriminant validity, as outlined by Hair et al. (2017). According to their guidelines, acceptable thresholds include item loadings of at least 0.7, an average variance extracted (AVE) of 0.5 or higher, and a composite reliability (CR) of no less than 0.7. The results of this study reveal that all items surpassed the 0.7 loading benchmark, while the AVE and CR values for all constructs exceeded the required 0.5 and 0.7 thresholds, respectively, thereby confirming convergent validity (refer to Table 2). Discriminant validity was rigorously evaluated using the Heterotrait–Monotrait (HTMT) ratio, following the criteria proposed by Henseler et al. (2015), which recommend that HTMT values remain below 0.85 (Kline, 1999). As shown in Table 3, all HTMT values were indeed below 0.85, providing strong support for discriminant validity. Overall, these assessments affirm the reliability and robustness of the measurement model.

Table 2
Assessment of construct reliability and convergent validity

Latent Variable	Item	Loading	AVE	Cronbach Alpha	CR
Timeliness	T1	0.915	0.823	0.932	0.968
(Akıl and Ünğan, 2022)	T2	0.904			
	T3	0.911			
Information Quality	IQ1	0.900	0.802	0.916	0.936
(Vasić et al., 2021)	IQ2	0.887			
	IQ3	0.856			
Delivery Cost	DC1	0.893	0.775	0.920	0.942
(Vasić et al., 2021)	DC2	0.875			
	DC3	0.860			
Customer Satisfaction	CS1	0.923	0.809	0.912	0.930
(Cao et al. 2018)	CS2	0.901			
	CS3	0.922			

Table 3
Assessment of discriminant validity using the HTMT criterion

	1	**2**	**3**	**4**
1.T				
2.IQ	.562			
3.DC	.769	.437		
4.CS	.820	.618	.845	

Note: Timeliness (T), Information Quality (IQ), Delivery Cost (DC) and Customer Satisfaction (CS)

Structural Model Analysis

A structural model analysis was employed to examine the relationships among the study variables. Hypotheses were evaluated using the bootstrapping method with 5,000 resamples, following the recommendation by Hair et al. (2017). The findings supported several proposed hypotheses. Timeliness (T) exhibited an insignificant influence on the customer satisfaction towards logistics service quality, with a path coefficient of $\beta = 0.134$ and a significance level of $p > 0.05$, thus rejecting H1. On the other hand, Information Quality (IQ) had a significant effect on customer satisfaction towards logistics service quality ($\beta = 0.256$, $p < 0.01$), confirming H2. Delivery Costs (DC) also demonstrated a positive impact on customer satisfaction towards logistics service quality ($\beta = 0.335$, $p < 0.01$), supporting H3. Overall, the proposed model accounted for 52.8% of the variance in e-wallet adoption, indicating a moderate level of explanatory power (refer to Table 4).

Table 4
Assessment of structural model with bootstrapping procedure

Hypothesis and Path	**Std. Beta**	**Std. Error**	**t-value**	**p-value**	**Decision**	**Effect Size**
H1: T → CS	0.134	0.102	1.311	0.742	Not Supported	No
H2: IQ → CS	0.256	0.090	2.834***	0.005	Supported	Small
H3: DC → CS	0.334	0.083	4.054***	0.001	Supported	Medium

Note: **Significant at p < .050 (one-tailed test); *** Significant at p < .001(one-tailed test).

Discussion and Implications

This study aims to explore the factors influencing customer satisfaction in logistics service quality, with timeliness being one of the variables examined. The analytical findings reveal that the hypothesis (H1) was not supported. This indicates that timeliness does not significantly influence customer satisfaction in logistics service quality. Furthermore, this finding contrasts with the results of Chang et al. (2019), who found that timeliness positively and significantly impacts customer satisfaction in logistics service quality and is considered a key factor affecting customer perceptions. Timeliness, while traditionally regarded as a crucial factor in logistics service quality, was found to have an insignificant impact on customer satisfaction in this study. This finding challenges previous research, such as Chang et al. (2019), which emphasized the importance of timely deliveries in shaping customer perceptions. One possible explanation for this result is that customer expectations regarding delivery speed may vary significantly based on the type of product or service. For example, customers ordering essential or perishable goods may prioritize fast deliveries, while those purchasing non-urgent items may be more concerned about other service attributes, such as reliability or communication. Additionally, minor delays may not necessarily lead to dissatisfaction if customers receive proper notifications and updates regarding their shipments. In this case, effective communication may help mitigate any negative effects of delayed deliveries, making timeliness a less critical factor in determining overall customer satisfaction.

Another reason why timeliness may not significantly influence customer satisfaction is that customers may have adjusted their expectations based on industry standards and previous experiences. For instance, in industries where delays are common due to external factors such as customs clearance, traffic congestion, or supply chain disruptions, customers may already anticipate potential delays and, therefore, place less emphasis on delivery speed. Furthermore, some customers may prioritize receiving their orders in good condition rather than simply receiving them quickly. This suggests that logistics providers should not focus solely on reducing delivery times but also on ensuring transparency, proactive communication, and product quality upon arrival. While timeliness may not be the most decisive factor in this study, companies should still aim to optimize delivery performance, particularly for time-sensitive shipments, to maintain a competitive advantage in the logistics sector.

H2 was found to be acceptable and supported by the analysis conducted in this research. In other words, the use of high-quality information positively and significantly influences customer satisfaction toward logistics service quality. As the authors demonstrate that information quality enhances technology adoption and customer satisfaction in logistics services, this finding is aligned with Frazelle (2020). To achieve exceptional customer satisfaction in logistics service quality, information quality must prioritize accuracy, timeliness, and relevance. According to the results, there was a significant effect of information quality on customer satisfaction toward logistics service quality. Information quality levels should be considered critical for customer retention and satisfaction during technology adoption. Information quality emerged as a significant factor influencing customer satisfaction toward logistics service quality. In today's digital age, customers expect real-time, accurate, and transparent information regarding their shipments. High-quality information allows customers to make informed decisions, manage their expectations, and

reduce uncertainty regarding their orders. When logistics providers ensure that customers receive timely and precise updates on shipping status, estimated delivery times, and potential delays, they foster trust and enhance customer satisfaction. This finding aligns with Frazelle (2020), who argued that information quality plays a critical role in logistics service performance. Clear and accurate communication can significantly impact the overall experience, making customers feel more in control of their orders. Poor information quality, on the other hand, can lead to confusion, frustration, and dissatisfaction, even if the logistics process itself is efficient.

Furthermore, information quality is not just about providing tracking updates; it also includes clear pricing structures, delivery policies, and customer service responsiveness. Customers value transparency, and when they receive misleading or incomplete information, they may perceive the service as unreliable. For example, if a logistics company provides an estimated delivery date without considering possible disruptions, customers may feel disappointed if their order arrives later than expected. Additionally, the availability of responsive customer service channels where customers can easily obtain accurate information further enhances satisfaction. Companies that invest in advanced tracking systems, automated notifications, and efficient customer support can strengthen customer trust and loyalty. Given its strong influence on satisfaction, logistics providers should prioritize information accuracy and accessibility as part of their service improvement strategies.

Finally, this study's results provide credence to and support H3. This indicates that delivery costs positively influence customer satisfaction toward logistics service quality. The findings also align with those of Chen et al. (2019). One factor affecting customer satisfaction toward logistics service quality is delivery costs, which have a positive impact on customer perceptions. To maintain high levels of customer satisfaction in logistics service quality, it is essential to focus on maintaining or reducing delivery costs. Delivery costs were also found to have a significant impact on customer satisfaction toward logistics service quality. Customers assess logistics services not only based on efficiency and reliability but also in relation to the costs they incur. If delivery charges are perceived as fair and reasonable compared to the level of service provided, customers are more likely to be satisfied. On the contrary, high or unexpected costs can result in dissatisfaction, even if the logistics process itself runs smoothly. This finding aligns with Chen et al. (2019), who highlighted that competitive pricing plays a key role in shaping customer perceptions. Companies that offer transparent pricing structures, discounts, or cost-effective shipping options tend to gain a competitive advantage in the market. Additionally, customers may be willing to pay higher delivery fees if they receive premium services such as expedited shipping or enhanced tracking features.

Moreover, cost transparency plays a crucial role in managing customer expectations. Hidden charges or unclear pricing structures can lead to dissatisfaction, as customers may feel misled or overcharged. When customers understand the breakdown of delivery fees and are given options that suit their budget, they are more likely to perceive the service as valuable. Another important factor is cost-effectiveness; logistics companies that optimize their supply chain processes to reduce operational expenses can pass those savings on to customers, making their services more attractive. In a highly competitive market, companies that balance affordability with service quality will likely retain customer loyalty. Therefore, logistics

providers should strive to maintain fair and transparent pricing while ensuring that the service quality justifies the cost.

Conclusion and Recommendations for Future Studies

In conclusion, this study explored the factors influencing customer satisfaction toward logistics service quality, focusing on timeliness, information quality, and delivery cost. The findings revealed that while timeliness did not significantly impact customer satisfaction, information quality and delivery cost were found to be critical determinants. These results underscore the importance of accurate, timely, and transparent information, as well as fair and competitive delivery costs, in shaping customer perceptions and satisfaction. Despite its limitations regarding respondent diversity, funding constraints, and sample size, the study provides valuable insights into improving logistics service quality. Future research addressing these limitations can further enhance the understanding of customer satisfaction in the logistics sector.

Future research should aim to include a more diverse group of respondents to enhance the generalizability of the findings. This study primarily gathered data from a specific geographic region or demographic group, which may not fully capture the varied perspectives of logistics service customers in different cultural, economic, or regional settings. Expanding the respondent pool to include individuals from various backgrounds can provide a more comprehensive understanding of customer satisfaction determinants. Additionally, logistics service expectations may differ based on industry sectors, business sizes, and consumer preferences, making it essential to analyze a wider audience. A diverse respondent base can also help identify unique challenges and preferences that may not be apparent in a limited sample. Future studies should consider adopting multi-regional or cross-country data collection approaches to ensure a broader and more representative sample, ultimately leading to more robust and widely applicable conclusions.

To improve the depth and scope of future research, securing adequate sponsorship and funding is crucial. Financial limitations in this study restricted the ability to conduct extensive data collection and apply advanced analytical techniques. With sufficient funding, researchers can invest in more comprehensive surveys, employ sophisticated statistical tools, and incorporate additional variables that may influence customer satisfaction, such as environmental sustainability or emerging technological innovations in logistics services. Funding can also support larger-scale studies involving multiple locations, allowing for cross-regional comparisons that enhance the reliability of findings. Collaborations with logistics companies, government agencies, or academic institutions can provide the necessary financial support and access to relevant data sources. Additionally, grants and corporate sponsorships can enable researchers to explore new areas of logistics service quality, ultimately leading to a more in-depth understanding of customer satisfaction factors and better industry applications.

Increasing the sample size is essential for improving the statistical reliability and generalizability of future research findings. This study's relatively small sample size may have limited the accuracy of identifying trends and relationships within the data. A larger sample would provide more representative insights, allowing researchers to draw more definitive conclusions about customer satisfaction factors in logistics service quality. Expanding the

sample can also help uncover subgroup differences, such as variations in preferences among different customer segments, business types, or geographical locations. Future studies should aim to collect data from a wider population, possibly through online surveys, partnerships with logistics firms, or broader industry collaborations. A well-distributed and adequately sized sample will enhance the credibility of the findings and ensure that the results are applicable to a larger audience, thereby improving the practical relevance of the research in the logistics sector.

In conclusion, this study advances the literature in three ways. First, it extends Expectancy–Disconfirmation Theory to the logistics service quality domain in Malaysia's e-commerce setting by explicitly modelling how expectations and perceived performance on delivery cost, information quality, and timeliness drive confirmation or disconfirmation and, ultimately, satisfaction. Second, it provides comparative, model-based evidence using multiple regression that information quality and delivery cost exert stronger effects on satisfaction than timeliness, challenging speed-centric assumptions that dominate last-mile discourse. Third, it translates these findings into actionable guidance for managers: prioritise end-to-end data integrity, real-time order visibility and proactive notifications, alongside transparent, customer-centred pricing and bundling, before pursuing marginal transit-time gains. Collectively, the study refines theory for an emerging-market context, informs managerial prioritisation under budget constraints, and establishes a baseline for future, broader probability-based investigations.

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