

Service Quality of Express Terminal Logistics in Dongguan China Basis for Developing a New Model for Service Quality

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Abstract: In this study, the questionnaire was used to analyze the three groups of respondents (home delivery, self-service pick up container and post office) in Dongguan China terminal logistics from five dimensions (Tangibility, Reliability, Responsiveness, Assurance, and Empathy) in terms of their customer expectations of service quality and perceived service quality by quantitative analysis such as mean, ANOVA, and Pearson's correlation coefficient. Through the analysis, it was found that the three groups of respondents in Dongguan terminal logistics expected service quality and perceived service quality have no relationship, but there was a significant difference, among them, the gap in the Empathy dimension was the largest, followed by the Assurance dimension, the Reliability dimension, the Responsiveness dimension, and finally the Tangibility dimension has the smallest gap. The analysis of the results led to the proposal of the Dongguan terminal logistic service quality model, the larger the gap, the lower the customer satisfaction, and the greater the room for improvement. Finally, the conclusion dictated relevant suggestions, in order to achieve the purpose of improving service quality and enhance the core competitiveness of Dongguan terminal logistic enterprises.

Keywords: Expected service quality, Perceived service quality, Expected-perceived service quality gap, Tangibility, reliability, Responsiveness, Assurance, And empathy.

1. Introduction

1.1. Background of the Study

In response to market competition and the changing market environment, quality has become the primary differentiation of businesses as the global economy has become more integrated. According to Juran (1994), quality management has also steadily become one of the development strategies of businesses. Businesses are very concerned about continuously enhancing the quality of goods and services, and this is their ultimate goal. It is imperative that businesses adopt quality management, which is a qualitative shift in management (Nasim, Sikander, Tian, 2020 & Permana, 2021).

China's e-commerce sector has grown at an unparalleled rate in recent years, and has penetrated into all aspects of society, altering the way people live, work, and do business. As an emerging industry, the logistics industry has ushered in new opportunities for development, with rapid growth in business volume. China's express delivery industry has increased to 132.07 billion pieces in 2023, and the field of logistics has become "the 3rd source of profit" for China's development of the economy as a crucial element of the nation's economic expansion. In 2022, the State Council's General Office released the "the fourteenth five-year plan for the advancement of contemporary logistics", which establishes the pioneering, fundamental and strategic status of the field of logistics.

State Post Bureau of China (SPB) information statistics predicts that by the end of 2023, the world's first express delivery system in China, will increase in volume by =20.67 billion pieces, and the express delivery company's whole revenue will be above the scale and close to 280 billion yuan. Guangdong Province has ranked first in the country in terms of express business volume for 15 consecutive years,

accounting for 26.2% of the national share. Dongguan City, as the world's factory and the base of China's manufacturing industry, placed seventh out of 691 cities nationwide as to the amount of business using expedited delivery. As disclosed by the government information disclosure of Dongguan Postal Administration, the annual logistics business in 2023 totaled 343,032,000 pieces, and the establishment of 3,653 Terminal logistics was approved. One of the key economic pillars supporting Dongguan's economic growth is the field of logistics. Thus, it is of considerable research importance to improve the Dongguan logistics industry's service quality, which will increase the industry's core competitiveness.

The logistics industry is within the service industry category, because the degree of service quality directly affects logistics companies' financial performance and market competitiveness. According to Yao-Te (2021), the cost of terminal logistics distribution can reach 30% of the overall cost of logistics. As a result, the field of logistics has emerged as a critical phase in the expansion of the logistics and e-commerce sectors (Sugiyama, 2019).

Terminal logistics becomes the most important aspect of the entire logistics and distribution process only the "last kilometer" in communication with clients, and it is a kind of logistics activity that takes the end customer as the direct service object. From the perspective of the demand side, each of person in Dongguan is a consumer, which is a very large group, because each consumer has different consumer demands, and some customers focus more on the thoughtfulness of the service, while some focus more on the convenience of the service. Some customers prefer home delivery, while others prefer to put their goods in express cabinets or post stations due to time constraints. Therefore, even if the service is the same, various customers would perceive it differently.

Building high-quality terminal logistics services requires more than just meeting the demands of cost-effectiveness and efficiency, but also taking into account the needs of consumers " because quality comes from customer demand "(Juran, 2003). In the end, logistics companies strive for constant enhancement of service quality, and should be oriented about consumer demand, through the study of consumer concerns about the logistics service demand points to raise consumer satisfaction with the terminal's operations, which will increase their propensity to make another purchase.

However, as of now, there are problems such as unsound service system and imperfect development content in terminal logistics. Additionally, research on specialized logistics sectors like terminal logistics is very lacking (Jiang, 2021). If the solution is not sought as soon as possible, it will lay a larger hidden danger for the industry's overall future growth. Therefore, the study about terminal logistics services in Dongguan City has representative practical significance.

In summary, Dongguan logistics industry terminal logistics has an important economic research value, and the current academic research on terminal logistics is less, since client demand and the logistics enterprise's service quality are the construction's main priorities. Considering the aforementioned, the research evaluated the Dongguan Terminal Logistics Service Quality using SERVQUAL model. It was constructed to fit the Dongguan terminal logistics assessment of service quality and ongoing development of the new model to assist the industry in raising customer happiness and service quality, which will boost consumer loyalty and repurchase intent.

1.2. Statement of the Problem

The research assessed the Dongguan Terminal Logistics Service Quality using SERVQUAL model.

The research especially aimed to respond to the following queries.

(1) What are the types of Terminal Delivery in Dongguan China? (Home delivery, Self-service pick up container, Post office)

(2) What is the current level of the Expected Service Quality from five dimension (Tangibility; Reliability; Responsiveness; Assurance; and Empathy) based on SERVQUAL model In Dongguan China as assessed by the three groups of respondents (home delivery, self-service pickup container, post office)?

(3) Are their significant differences in the responses among the three (3) groups of respondents (home delivery, self-service pick up container, post office) on Expected- Service Quality in Dongguan China?

(4) What is the current level of the perceived Service Quality from five dimension (Tangibility; Reliability; Responsiveness; Assurance; and Empathy) based on SERVQUAL model In Dongguan China as assessed by the three groups of respondents (home delivery, self-service pickup container, post office)?

(5) Are there significant differences in the responses among the three (3) groups of respondents (home delivery, self-service pick up container, post office) on Perceived- Service Quality in Dongguan China?

(6) Is there a correlation between Expected-Service Quality and Perceived-Service Quality in Dongguan China from the perspective of the respondents?

(7) Based on the outcome of the study, what model for Service Quality can be proposed?

1.3. Hypotheses

At 0.05 level of significant difference the following null hypotheses were based.

H₀1: There are no significant differences in the responses among the three groups of respondents (home delivery, self-service pick up container, and post office) as to Expected-Service Quality.

H₀2: There are no significant differences in the responses among the three groups of respondents (home delivery, self-service pick up container, and post office) as to Perceived-Service Quality.

H₀3: There is no correlation between Expected-Service Quality and Perceived-Service Quality of Dongguan terminal logistics as assessed by three (3) groups of respondents.

1.4. Definition of Terms

To make this material easier to grasp, the following terms used in this study have been operationally defined.

Customer Satisfaction. A sort of client psychological feeling, that is, customers experience a certain product or service after the formation of the perception. This perception is a kind of strong subjective psychological experience, covering a comprehensive evaluation of products and services.

Terminal logistics. It is the logistical activity of the distribution chain and refers to the logistics that are provided directly to the client.

Service Quality. Quality is generally described as being up to typical, as much as specification and customer demand. When the product is a service, the customer will produce an assessment of the degree of service quality throughout customer experience.

Service Quality Gap. This is the discrepancy between a client's actual feelings and his expectations prior to obtaining a service.

Expected Service Quality. This is what customers expect to receive.

Perceived Service Quality. The perceived realism of service quality depends on the customer's background and preferences.

Service Quality Dimensions. It refers to the elements that have an effect on the clients' expectations for service quality and perceived performance.

Tangibility. This relates to the external vision of a company, including office space, advanced equipment, and the external image of employees.

Reliability. This relates to the ability of a business to Responsiveness. It refers to Providing customers with positive and prompt responses.

Assurance. This refers to the employee's distinct mannerisms and expertise, as well as their capacity to communicate confidence or trust to customers.

Empathy. A company's ability to provide customers with acts of kindness, as well as personalized service.

2. Theoretical Foundations and Theoretical Framework

2.1. Theoretical Foundations

In this research, The SERVQUAL Model and Customer Satisfaction Theory served as the foundational models for this investigation.

2.1.1. Customer Satisfaction Theory

The foundation of the customer-centered marketing

approach is the Customer Satisfaction Theory, which states that in order to gain the loyalty and happiness of customers, businesses should concentrate on their wants and expectations and provide them with high-quality goods and services. "Quality is the degree of excellence perceived by the recipient of the given good or service", wherein the main body of quality evaluation is "customer" and the enterprise is dependent on the "customer". Thus, the important part of enterprise management is also the "customer". The important external function of business management is to deliver high-quality goods and services to "customers" (Feigenbaum, 1951 & Juran, 1992).

Product and service quality are the two categories of quality. The quality of tangible things has long been established and there is a crucial connection and distinction between the two, as well as more specific technical specifications parameters to calculate. Although customer satisfaction is emphasized in the quality management process, the customer's evaluation of the factors used to establish the service's quality serves as the basis for that determination (Dan, & Li, 2023).

At the earliest, the University of Michigan Business School's Quality Research Center compiled the findings of theoretical studies and put forth the Fornell Model (1989), an econometric logic model made up of several elements such purchase price, post-purchase perception, and customer expectations. It is widely used in the field of quality management after the 1990s, and the "quality of service" proposed by ISO 9000:2000 has been widely used. The significance of the philosophy of customer satisfaction is demonstrated by the fact that "focusing on the customer" is the first of the eight quality management principles put out by ISO 9000:2000. Customer happiness is most significantly impacted by the perceived quality of consumers, according to Fornell's (1989) findings, as Xiang (2021) confirmed that customer satisfaction is positively impacted by customer expectations. Additionally, Xing & Qu (2023) noted that the most important factor influencing customer satisfaction is product quality.

In conclusion, it is clear that customer satisfaction and service quality research are intertwined, and that the customer perception-based service quality improvement model has research value.

2.1.2. SERVQUAL Model

Scholar PBZ developed the SERVQUAL model, which is primarily focused on the discrepancy between perception and expectation, to assess the quality of services. After years of validation and summarization, the five dimensions are finally determined. The use of a model, can assist businesses to understand the service situation felt by customers and be able to concretize the invisible feelings and present them visually through the data, which is conducive for enterprises to find their own deficiencies and improve their shortcomings to meet customer needs, minimize the discrepancy between expectations and experience, and improve the service quality. The data of the model is mainly collected through the form of questionnaires, which are randomly distributed to the customers, so that they can score according to the experience they feel and the experience they expect to get, and then organize the collected data to finally calculate the final score of the enterprise.

The advantages of this model have numerous applications because it can be used in different industries and through the comparison of different industries. It can comprehend the state of service quality in various industries today. It also

gauges service quality by comparing the experience and sentiments of the consumer, which enables the business to ascertain the true ideas of the customer and identify its weaknesses, which is conducive to the enterprise's precise improvement, so as to improve the quality of the service. The five dimensions of the model include multiple aspects of service quality, which makes the assessment more comprehensive. It is also very inclusive and can be combined with other models, as well as be flexibly applied to different scenarios. As a disadvantages, the model's customer survey process may be interfered by various factors, which may affect the evaluation results. Moreover, the dimensions of different industries have different focuses and need to be revised for different scenarios.

The SERVQUAL assessment scale is designed to look into the quality of the company's service. The scale is distributed in the form of a questionnaire to the customers of the company to be researched, and they are asked to score according to the level of satisfaction based on the service they experienced and the service they want to receive, with 1 indicating the lowest level of satisfaction and 5 the highest. Finally, the score of the service quality gap is the difference between the scores on the perceived experience and the expectations, which are computed accordingly.

The PBZ Portfolio's SERVQUAL is developed with five main dimensions (Parasuraman, et al., 1988). Tangibility refers to the outward look of buildings, machinery, staff, and correspondence materials. Examples include aesthetically pleasing marketing materials, professional-looking employees, and clean, well-maintained premises. Reliability on the other hand, is the capacity to deliver the promised service with accuracy and consistency. For instance, regularly satisfying customer expectations and providing goods or services on schedule. Next is responsiveness, or the readiness to assist clients and offer timely service. For instance, promptly responding to consumer questions, offering prompt support, and effectively resolving problems. Another is assurance, which is the expertise and civility of staff members, and their capacity to inspire confidence and trust. For instance, promptly responding to consumer questions, offering prompt support, and effectively resolving problems. Last is empathy which is giving customers considerate, tailored attention. For instance, spending time learning about the needs of the client, tailoring the service, and demonstrating a sincere concern for their satisfaction.

In terms of composition, there are two components to the SERVQUAL model, one is the customer real experience during the real enjoyment, and the other is the service expectation before the enjoyment of the service. The difference between expectation and actual experience is the specific evaluation of the indicator in different dimensions. When the gap between expectation and actual experience is small, the service quality is rated high.

The SERVQUAL scale is originally developed for the telephone repair, insurance, and retail banking industries, but has since been applied to the field of logistics, where the secondary indicators and service dimensions must be customized for the logistics industry.

This study introduced the SERVQUAL scale and the five dimensions for Dongguan terminal logistics, and used empirical evidence to demonstrate these five dimensions and secondary indicators, and arrived at a service quality model suitable for Dongguan terminal logistics.

2.2. Theoretical Framework

After analyzing the literature on the quality of domestic and international logistics services, and based on the customer satisfaction, SERVQUAL model, as well as combining the current situation of Dongguan terminal logistic service quality, the dimensions of the evaluation elements of customer-perceived service quality were selected. Then, data analysis methods such as mean, ANOVA analysis, and Pearson's correlation coefficient in SPSS27. Quantitative analyses were used to verify the reliability of the proposed five dimensions, evaluate the quality of Dongguan terminal logistic services from the gap of expectation-perception, analyze the evaluation of Dongguan terminal logistic service quality by customers who choose three pick-up modes (home delivery, self-service pick up container, and post office), and analyze their points of concern and needs. Finally, the needs of different customers from the five dimensions of the relevant recommendations were used to maximize the distribution of resources, and enhance the quality of terminal logistic services in Dongguan City as a continuous improvement model. The final goal was to enhance the quality of terminal logistic services in Dongguan and increase customer satisfaction and loyalty.

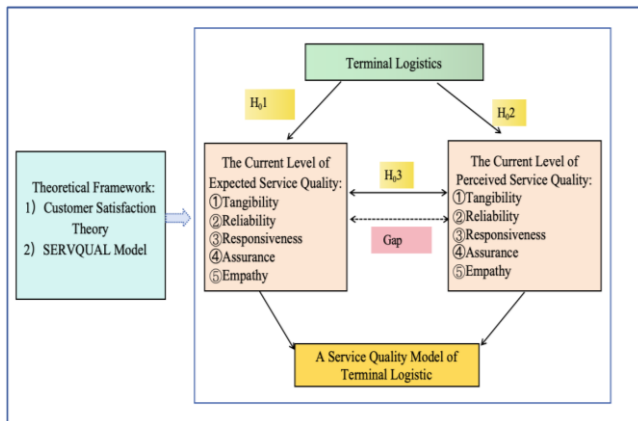


Figure 1. Theoretical Framework

3. Research Methodology

In this study, quantitative study methodologies were used. It mainly includes literature reading method, questionnaire survey method, reliability and validity analysis, mean, ANOVA analysis and Pearson correlation coefficient analysis.

Literature reading method was used to establish the theoretical foundation of the article, determine the five dimensions of the study (Tangibility, Reliability, Responsiveness, Assurance, Empathy) and the models used (Customer Satisfaction Theory, SERVQUAL Model). Next, the data collection of perceived-service quality satisfaction and expected-service quality of terminal logistic in Dongguan City was carried out by questionnaire star software. The research questionnaire was only one form of online questionnaire distribution, which can realize the rapid distribution, recovery, and data collection on the network. The entire questionnaire included two main areas:

First, the survey of basic personal information to get more objective and accurate findings and to prepare for this study.

The second part of the questionnaire was the thematic measurement section of the questionnaire. This section involved 5 evaluation dimensions and 28 questions. 5 questions were assigned to the dimension of tangibility, 8 to the dimension of reliability, 6 to the dimension of assurance,

5 to the dimension of responsiveness, and 4 to the dimension of empathy. A 5-point Likert scale served as the basis for every question, which assigned five items in the order of 1, 2, 3, 4, and 5: 1.01~1.80 for complete satisfaction (NS); 1.81 ~ 2.60 for less dissatisfaction (LS); 2.61 ~ 3.40 for moderate satisfaction (MS); 3.41 ~ 4.20 for satisfaction (S); and 4.21 ~ 5.00 for very satisfied (VS). This was a key part of the overall questionnaire, and clients were asked to rate each specific question based on their actual experience. According to the investigators' scores on the indicators, the quality of express service was then analyzed and evaluated.

In the questionnaire analysis process, SPSS27 software was used for data processing, which helped the researcher extracts information, make decisions and discover patterns from the data. ANOVA was used to analyze whether there is significant difference in the responses among the three (3) groups of respondents (home delivery, self-service pickup container, and post office) to the expected-service quality, and whether there is significant difference in the responses among the three (3) groups of respondents (home delivery, self-service pickup container, and post office) to the perceived-service quality. And Pearson's correlation coefficient was used to assess whether the Dongguan terminal logistic expected-perceived service quality is related. Drawing from the amalgamation of the earlier analysis, the corresponding suggestions and model for enhancing the Dongguan terminal logistics service quality are proposed.

4. Date Analysis and Results

This chapter detailed how the researcher collected and handled the data following acceptance of the initial UERC certificate of approval. Mean, ANOVA analysis, and Pearson correlation coefficient were included.

4.1. Types of Terminal Logistics

Table 1. Types of Terminal Delivery

Way of delivery	Frequency	Percent
Home delivery	275	33.25
Self-service pick up container	276	33.37
Post office	276	33.37
Total	827	100.00

The proportion of home delivery, self-service pick up container and post office were 33.25%, 33.37% and 33.37% respectively, which was moderately in a balanced state. The comparable proportion of customers choosing home delivery, self-service pick up container, and post office services reflected diverse pick-up needs among customers, with a preference for flexible and autonomous delivery options.

There was no unified standard about the classification of terminal logistic and this classification standard only applied to comparable big and midsize cities in Dongguan, China. The situation in each country was different, and the delivery of terminal logistics in urban and remote areas was not the same. Furthermore, no scholars have proposed a special study on this, because most scholars stood in the perspective of the field of logistics focusing on optimizing the terminal distribution network system, improving the efficiency of distribution by reducing the distribution and transportation distances, greatly reducing the distribution costs, and improving the customer satisfaction, aiming to minimize the cost of terminal logistics (Gao, Chu, & Cui, 2023).

4.2. Current Level of the Expected Service Quality in Dongguan China

Table 2. Current Expected Service Quality from the Tangibility Dimension

Dimension: Tangibility	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
A1: The location of stores is strategically positioned to enhance accessibility and convenience.	3.95	S	3.98	S	3.99	S	3.97	S
A2: The facilities are fully equipped and operate efficiently.	4.12	S	3.92	S	3.92	S	3.99	S
A3: The organization of shelves and products is orderly and systematic.	3.98	S	3.97	S	4.04	S	4.00	S
A4: The store environment maintains a high standard of cleanliness and spaciousness.	4.03	S	3.96	S	3.98	S	3.99	S
A5: The staff are consistently uniform, clean, and presentable.	4.04	S	4.04	S	3.98	S	4.02	S
Composite Mean	4.03	S	3.97	S	3.98	S	3.99	S

On Tangibility dimension, the expected service level value was 3.99, indicating that the customer's expectation level of terminal logistics in Dongguan was quite high, with A1 (The location of stores is strategically positioned to enhance accessibility and convenience) scored 3.97, A2 (The facilities are fully equipped and operate efficiently) scored 3.99, and A3 (The organization of shelves and products is orderly and systematic) scored 4.00, A4 (The store environment maintains a high standard of cleanliness and spaciousness) scored 3.99, A5 (The staff are consistently uniform, clean, and presentable) scored 4.02. Customers choosing home delivery expected the highest level of service A2 (The facilities are fully equipped and operate efficiently) with a score of 4.12, and the lowest expected level of service is A1 (The location of stores is strategically positioned to enhance accessibility and convenience) with a score of 3.95. Customers choosing self-service pick up container expect the highest level of service from A5 (The staff are consistently uniform, clean, and presentable) with a score of 4.04. The lowest expected level of service was A2 (The facilities are fully equipped and operate efficiently) with a score of 3.92. Customers choosing post office expected the highest level of service for A3 (The

organization of shelves and products is orderly and systematic), with a score of 4.04.

The lowest expected level of service for A2 (The facilities are fully equipped and operate efficiently), with a score of 3.92.

The analysis showed that because of the choice of home delivery, customers expected more efficient service but have no requirement for the location of the shop; Customers choosing self-service pick up container were more concerned about the uniform clothing and neatness of the staff, while post office were more concerned about the neatness of the shelves and goods, so that it is convenient to pick up the goods.

Many terminal logistic studies and applications focus on the goals of low cost and high service efficiency, while ignoring the service quality indicators of logistics image and branding. However, tangible services usually involve factors that customers can directly see or feel, such as distribution packaging, warehousing facilities and the appearance of the courier. These elements have a direct impact on the customer's perception, and in online shopping delivery, packaging aesthetics and safety become important factors (Ma, Yao, & Yang, 2021).

Table 3. Current Expected Service Quality from the Reliability Dimension

Dimension: Reliability	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
B1: The accuracy of services provided is consistently high.	4.00	S	4.01	S	3.98	S	4.00	S
B2: Logistics tracking information is updated on time.	4.01	S	3.98	S	4.00	S	4.00	S
B3: Records of services are kept with a high degree of accuracy.	4.02	S	3.96	S	3.91	S	3.96	S
B4: Couriers exhibit strong organizational skills and professional qualities essential for their role.	4.13	S	4.05	S	3.94	S	4.04	S
B5: Issues related to lost or damaged goods are resolved promptly, including compensation where necessary.	4.09	S	4.05	S	3.91	S	4.02	S
B6: Green and non-polluting packaging materials are utilized.	4.03	S	4.01	S	3.99	S	4.01	S
B7: There is trust in the identity and integrity of distribution personnel.	4.12	S	4.03	S	3.97	S	4.04	S
B8: Holiday products are delivered without any delays.	4.10	S	3.92	S	3.99	S	4.01	S
Composite Mean	4.06	S	4.00	S	3.96	S	4.01	S

In the Reliability dimension, the overall expected service level value is 4.01, in which the customer's expectation level

of Dongguan terminal logistics was quite high, much higher than the tangibility dimension, in which B4 (Couriers exhibit

strong organizational skills and professional qualities essential for their role) has the highest score of 4.04, and B3 (Records of services are kept with a high degree of accuracy) has the lowest score of 3.96. Customers choosing home delivery expected the highest level of service with B4 (Couriers exhibit strong organizational skills and professional qualities essential for their role), with a score of 4.13, the lowest expected service levels are B1 (The accuracy of services provided is consistently high), with a score of 4.00. Customers choosing self-service pick up container expected the highest level of service is B4 (Couriers exhibit strong organizational skills and professional qualities essential for their role) and B5 (Issues related to lost or damaged goods are resolved promptly, including compensation where necessary), with a score of 4.05. The lowest level of service expected is B8 (Holiday products are delivered without any delays) with a score of 3.92. Customers choosing post office expected the highest level of service was B2 (Logistics tracking information is updated on time), with a score of 4.00, and the lowest level of service expected is B3 (Records of services are kept with a high degree of accuracy) with a score of 3.91.

The analysis concluded that the higher overall expectation of choosing home delivery, with a total score of 4.06, customers were the who required higher quality of courier. Choosing self-service pick up container also put higher requirements on the professional quality of courier. Customers who choose to pick up the goods by post office were more concerned about whether the logistics tracking information is updated in a timely manner.

Reliability is the most important factor that customers value about a company. It is the signature of a company and relates to the core aspect of service quality (Lai, Jang, Peng, & Fang, 2022). The discrepancies between consumers' expectations and real experiences with logistics service reliability have been the subject of numerous research (e.g., on-time, intact, etc.), and how these gaps affect customer loyalty (Zhou, 2012). The customers also demand high professional quality of courier personnel. Famous companies in the industry (e.g., Shunfeng) were the ones that have come to win customers' trust by providing quality services and continuously strengthening their reliability.

Table 4. Current Expected Service Quality from the Responsiveness Dimension

Dimension: Responsiveness	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
C1: The service operates efficiently with minimal waiting times for customers.	4.11	S	4.07	S	4.03	S	4.07	S
C2: Notifications regarding the exact time of pickup and delivery are provided promptly.	4.13	S	4.00	S	3.90	S	4.01	S
C3: The process for handling returns is managed swiftly and effectively.	4.06	S	4.08	S	3.99	S	4.04	S
C4: Personnel demonstrate strong coordination and communication skills, addressing inquiries clearly and promptly.	4.05	S	4.04	S	4.01	S	4.03	S
C5: Staff interactions are warm, courteous, and motivated to assist customers effectively.	4.07	S	4.12	S	3.98	S	4.06	S
C6: Complaint channels and methods are easily accessible and convenient.	4.09	S	4.09	S	3.98	S	4.05	S
Composite Mean	4.08	S	4.07	S	3.98	S	4.04	S

On the Responsiveness dimension, the overall expected service level value is 4.04, in which the customer's expectation level of Dongguan terminal logistics is quite high, much higher than that of the tangibility and reliability dimensions, with C1 (The service operates efficiently with minimal waiting times for customers) has the highest score of 4.07, and C2 (Notifications regarding the exact time of pickup and delivery are provided promptly) has the lowest expectation score of 4.01. Home delivery customers expected the highest level of service is C2 (Notifications regarding the exact time of pickup and delivery are provided promptly), with the score of 4.13, The lowest expected service level is C4 (Personnel demonstrate strong co-ordination and communication skills, addressing inquiries clearly and promptly) with a score of 4.05. Customers choosing self-service pick up container expected the highest level of service is C5 (Staff interactions are warm, courteous, and motivated to assist customers effectively), with a score of 4.12, and the lowest expected service level is C2 (Notifications regarding the exact time of pickup and delivery are provided promptly), with a score of 4.00. Customers choosing post office expected the highest level of service in C1 (The service operates efficiently with minimal waiting times for customers) with a

score of 4.03, and the lowest level of service expected is C2 (Notifications regarding the exact time of pickup and delivery are provided promptly), with a score 3.90.

The analysis showed that because the overall expectation of choosing home delivery (4.08) was still higher than the other two groups (self-service pick up container 4.07, post office 3.98), customers were very concerned about the time of pick up and the convenience of waiting at home. Customers choosing self-service pick up container and post office did not have a strong demand for pick up time, but they were more concerned about the attitude of the staff and the queuing time for picking up.

In e-commerce and emerging same-city delivery models, there has been a steady rise in research on customer demand for delivery time and location flexibility. Existing research suggested that speed, time period, delivery date, and delivery cost are among the most important decision-making criteria for consumers' preference of logistics services (Nogueira, 2021). Gawor &Hoberg (2019) study analysed how customers evaluate the time and convenience of e-commerce delivery and suggested factors that customers prioritize when choosing a delivery service, with shortage of delivery time and location flexibility as key drivers. Kiba-Janiak (2021)

suggests to meet consumers' expectations for flexibility in home delivery delivery time and location. Schröder et. al. (2016) explored upcoming patterns in parcel delivery, highlighting increasing customer demand for fast and flexible

delivery services. The study suggested that logistics companies can significantly enhance the customer experience by optimizing delivery times and expanding the choice of delivery locations.

Table 5. Current Expected Service Quality from the Assurance Dimension

Dimension: Assurance	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
D1: Express packages are delivered accurately and without damage.	4.07	S	4.09	S	3.91	S	4.02	S
D2: Staff members are perceived as trustworthy.	4.06	S	4.00	S	3.95	S	4.00	S
D3: Courier tariff structures are transparent.	4.02	S	4.05	S	3.95	S	4.00	S
D4: A diverse range of secure payment methods is offered.	4.00	S	4.08	S	3.96	S	4.01	S
D5: Customer privacy is consistently protected and not compromised.	3.96	S	3.99	S	3.98	S	3.98	S
Composite Mean	4.02	S	4.04	S	3.95	S	4.00	S

On the Assurance dimension, the overall expected service level value is 4.00, with little difference in expectations. D1 (Express packages are delivered accurately and without damage) had the highest score of 4.02, D5 (Customer privacy is consistently protected and not compromised) expectation score was the lowest at 3.98. Customers choosing home delivery expected the highest level of service in D1 (Express packages are delivered accurately and without damage), with a score of 4.07, and expected the lowest level of service in D5 (Customer privacy is consistently protected and not compromised), with a score of 3.96. Customers choosing self-service pick up container expected the highest level of service in D1 (Express packages are delivered accurately and without damage) with a score of 4.09, The lowest level of service expected is D5 (Customer privacy is consistently protected and not compromised), with a score of 3.99. Customers choosing post office expected the highest level of service in D5 (Customer privacy is consistently protected and not compromised), with a score of 3.98, and the lowest expected level of service is D1 (Express packages are delivered accurately and without damage), with a score of 3.91.

Customers choosing home delivery and self-service pick up container were more concerned about accurate, damage-

free delivery of the courier and had lower expectations of privacy protection. Customers choosing post office, on the contrary were more concerned about privacy being protected and had lower expectations on accurate delivery.

Customer privacy is gradually becoming an important research topic in terminal logistics, especially in data-driven personalized services, smart terminal applications, and information sharing scenarios. In addition to having an impact on consumer happiness and trust, privacy protection also has an impact on logistics businesses' compliance and reputation (Tian, et. Al., 2021). One of the most stringent privacy laws in the world is the General Data Protection Regulation (GDPR), which was approved by the European Union in 2018, and is binding on all businesses in the EU, as well as international companies that process data on EU citizens. The California Consumer Privacy Act (CCPA) was passed by the state in 2020. The first comprehensive privacy law in China also introduced the Personal Information Protection Law of China (PIPL) in 2021. Following in the footsteps of the state, as intelligence and information technology advance, the logistics industry must likewise give privacy protection more consideration.

Table 6. Current Expected Service Quality from the Empathy Dimension

Dimension: Empathy	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
E1: Services are delivered in a manner that meets individualized customer needs, including timing and location.	4.11	S	4.00	S	3.98	S	4.03	S
E2: Self-service pickup operations are user-friendly and efficient.	4.06	S	4.08	S	3.96	S	4.03	S
E3: Store opening hours are convenient for all customers.	4.15	S	4.11	S	4.04	S	4.10	S
E4: The network coverage effectively supports customer pickup and courier delivery.	4.08	S	4.12	S	4.11	S	4.10	S
Composite Mean	4.10	S	4.07	S	4.02	S	4.06	S

On the Empathy dimension, the overall expected service level value was 4.06, and overall customer expectations were high. E4 (The network coverage effectively supports customer pickup and courier delivery) has the highest score of 4.10, and E1 (Services are delivered in a manner that meets individualized customer needs, including timing and location) and E2 (Self-service pickup operations are user-friendly and

efficient) have the lowest expectation score of 4.03. Customers choosing home delivery expected the highest level of service in E3 (Store opening hours are convenient for all customers) with a score of 4.15, and the lowest expected level of service in E2 (Self-service pickup operations are user-friendly and efficient) with a score of 4.06. The highest level of service expected by customers choosing self-service pick

up container is E4 (The network coverage effectively supports customer pickup and courier delivery) with a score of 4.12. The lowest expected service level is E1 (Services are delivered in a manner that meets individualized customer needs, including timing and location), with a score of 4.00. Customers choosing post office expected the highest level of service at E4 (The network coverage effectively supports customer pickup and courier delivery) with a score of 4.11, and the lowest expected level of service in E2 (Self-service pickup operations are user-friendly and the service level of customers who choose post office) with a score of 3.96.

From the analysis, it can be seen that the customers who choose home delivery had higher expectation on time, and the

customers who choose self-service pick up container and post office hoped that there were more business outlets and wider coverage, which were more convenient for customers to pick up the goods.

Yang et al. (2024) showed that empathy service in terminal logistic can enhance customer's emotional experience, which can make customers feel valued and reduce the impact of negative emotions such as waiting time and delivery problems. Empathy service also affects customer loyalty, Wang & Dong's (2023) study stated that if couriers show concern for customers' needs and emotions, customers will be more likely to develop trust and loyalty; and thus, continue to choose that service brand in the future.

Table 7. Current Expected Service Quality from the Overall Dimension

Dimension	Home delivery			Self-service pick up container			Post office			Overall Mean		
	Mean	Interpretation	Rank	Mean	Interpretation	Rank	Mean	Interpretation	Rank	Mean	Interpretation	Rank
Tangibility	4.03	S	4	3.97	S	5	3.98	S	3	3.99	S	5
Reliability	4.06	S	3	4.00	S	4	3.96	S	4	4.01	S	3
Responsiveness	4.08	S	2	4.07	S	1	3.98	S	2	4.04	S	2
Assurance	4.02	S	5	4.04	S	3	3.95	S	5	4.00	S	4
Empathy	4.10	S	1	4.07	S	1	4.02	S	1	4.06	S	1
Composite Mean	4.06	S		4.03	S		3.98	S		4.02	S	

In general, customers' expectations of Dongguan terminal logistics were all relatively high, with an overall expectation value of 4.02. Tangibility has the lowest score of 3.99, Reliability has a score of 4.01, Responsiveness has a score of 4.04, and Assurance has a score of 4.00. Empathy has the highest expectation score of 4.06, indicating that customers care more about the convenience of the time and place of delivery. The highest score for choosing home delivery is the empathy dimension with a score of 4.10, and the lowest is the assurance dimension with a score of 4.02. The highest expectation score for customers choosing self-service pick up container are the empathy dimension and responsiveness dimension, with a score of 4.07, and the lowest expectation score is for tangibility dimension with a score of 3.97. Customers choosing post office has the highest expectation score for empathy which is 4.02, and the lowest score is for assurance dimension which is 3.95.

From the analysis, it was seen that the expectation of customers who chose home delivery (4.06) was much higher than the customers who choose the other two types (4.03, 3.98). The highest expectation of all three groups of customers is the empathy dimension, and the customers of each type have higher expectation of this dimension. There is a higher demand for diversity in delivery types, times, and locations, and a desire to think from the perspective of the client.

The “last mile” of a package is very small in the overall transportation, but it was the segment with the strongest experience for logistics users (Filina-Dawidowicz & Kostrzewski, 2022). This was an important guarantee for the diversification of online shopping business and limits the future direction of online shopping. Given the quick development of online shopping and just-in-time delivery, meeting customers' needs for personalized delivery times and flexible locations not only helps to improve customer satisfaction, but also becomes a key factor in the competitiveness of logistics companies.

4.3. Significant Differences in the Response of the Three (3) Groups to the Expected-Service Quality

Since there were three groups of respondents, the ANOVA method was chosen. The ANOVA analysis and post-hoc test illustrate that there is a significant difference in Dongguan terminal logistics expected-service quality among the customers who chose home delivery, self-service pick up container, and post office, and the null hypothesis was rejected. Home delivery customers expected much more than the other two groups. All three groups expected the highest on the empathy dimension, but the lowest expected dimension was different.

Home delivery customers expected the highest-service quality, customers who choose self-service pick up containers had the second highest-service quality, and the lowest-service quality was expected by customers who choose post office pick up. For customers who choose home delivery, customers were allowed to inspect the shipment face-to-face to determine if there is any damage during transportation and receive the shipment upon confirmation. Home delivery can also provide the best experience for users, especially for special large packages or some fresh goods that require refrigeration (Yi & Shi, 2022). However, for courier service companies, the delivery targets are decentralized and often encounter the problem of not being able to receive the goods on time and safely. In addition, home delivery services are an invasion of privacy from a security point of view, and it is common for some lawless individuals to pretend to be couriers and hack into users. There was even theft of parcels, which can be lost because the delivery truck was left unattended while the courier goes upstairs to make the delivery, and delivery costs increase as couriers make repeated deliveries (Freitag & Kotzab, 2020). For choosing self-service pick up container, it reduces the communication part with the user, and also realizes the customer's demand for time freedom; thus, avoiding the isle of time between the two

sides, reducing the price and increasing the effectiveness of logistics distribution, but the self-service pick up container is limited by the size of the cabinet, which is not suitable for large items. They also require code scanning for pickup, which is too complicated for the elderly or those unfamiliar with smart kiosks. For customers who choose post office, the distribution of post office outlets is not as dense, so if you buy

more or more items, picking up will not be as convenient, and there are usually more parcels in post office, where there is mismanagement, and there may be a risk of loss or damage to the parcels. The advantage of post office pick up is that the courier does not need to deliver door-to-door, and the user does not need to wait for the courier at home, which saves time.

Table 8. Expected-Service Quality ANOVA Analysis

	Sum of Squares	df	Mean Square	F	Sig.	Interpretation	Decision
Between groups	.100	2	.050	18.564	.000	Significantly Different	Reject Null Hypothesis
Within groups	218	81	.003				
Total	.317	83					

Note: The level of significance is ≤ 0.05

Table 9. Expected-Service Quality Post-Hoc Tests of ANOVA

Groups	Groups Compared	Mean Difference	Standard Error	Sig.	Interpretation	Decision
Home delivery	Self-service pickup container	.029500*	.013854	.036	Significantly Different	Reject Null Hypothesis
	Post office	.083250*	.013854	.000		
Self-service pickup container	Home delivery	-.029500*	.013854	.036		
	Post office	.053750*	.013854	.000		
Post Office	Home delivery	-.083250*	.013854	.000		
	Self-service pickup container	-.053750*	.013854	.000		

Note: The level of significance is ≤ 0.05

4.4. Current Level of the Perceived Service Quality in Dongguan China

Table 10. Current Perceived Service Quality from the Tangibility Dimension

Dimension: Tangibility	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
A1: The location of stores is strategically positioned to enhance accessibility and convenience.	3.37	MS	3.38	MS	3.23	MS	3.33	MS
A2: The facilities are fully equipped and operate efficiently.	3.34	MS	3.42	S	3.22	MS	3.33	MS
A3: The organization of shelves and products is orderly and systematic.	3.40	S	3.39	MS	3.24	MS	3.34	MS
A4: The store environment maintains a high standard of cleanliness and spaciousness.	3.40	MS	3.43	S	3.27	MS	3.37	MS
A5: The staff are consistently uniform, clean, and presentable.	3.45	S	3.42	S	3.27	MS	3.38	MS
Composite Mean	3.39	MS	3.41	S	3.24	MS	3.35	MS

On the Tangibility dimension, the actual level of customer perception of Dongguan terminal logistics is only moderately satisfied, with a score of 3.35. With A5 (The staff are consistently uniform, clean, and presentable) scoring the highest at 3.38, A1 (The location of stores is strategically positioned to enhance accessibility and convenience) and A2 (The facilities are fully equipped and operate efficiently) were scoring tied for the lowest at only 3.33, indicating that customers were more satisfied with the image of the staff, but less satisfied with the location of stores and the facilities. Among the three groups of customers' perceived service level, the highest perceived service quality of customers choosing home delivery was A5 (The staff are consistently uniform, clean, and presentable), with a score of 3.45. The lowest perceived service level is A2 (The facilities are fully equipped and operate efficiently), with a score of 3.34. The highest perceived level of service for customers choosing the self-service pick up container is A4 (The store environment maintains a high standard of cleanliness and spaciousness)

with a score of 3.43, the lowest perceived level of service is A1 (The location of stores is strategically positioned to enhance accessibility and convenience) with a score of 3.38. The highest level of service perceived by customers choosing post office is A4 (The store environment maintains a high standard of cleanliness and spaciousness) with a score of 3.27, the lowest level of service perceived is A2 (The facilities are fully equipped and operate efficiently), with a score of 3.22.

The analysis showed that customers who choose home delivery and post office were not satisfied enough with the completeness of the facilities, and those who choose self-service pick up container were not satisfied enough with the distribution of the outlets. Customers choosing post offices had the lowest overall scores. Liu, Dan, & Ma (2020) showed that the reasonableness of the distribution of self-service pick up container facilities and post offices and the density of their distribution directly affect the customers' perception of the convenience of their use, and that the convenience of the

location is an important factor in the users' choice of the three different types of services. Customers generally tend to choose express containers that are closer to their residence or office, while they may choose home delivery or post office pick up if the express container deployment is farther away. When choosing courier services, customers are mainly concerned about the following aspects: first, the completeness

of facilities, including service efficiency, hardware modernization and ease of operation; and second, the geographical distribution and density of outlets, which determines the geographic convenience of services. The performance of different service forms in these aspects directly affects users' satisfaction and preferences.

Table 11. Current Perceived Service Quality from the Reliability Dimension

Dimension: Reliability	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
B1: The accuracy of services provided is consistently high.	3.27	MS	3.29	MS	3.32	MS	3.30	MS
B2: Logistics tracking information is updated on time.	3.40	MS	3.21	MS	3.25	MS	3.29	MS
B3: Records of services are kept with a high degree of accuracy.	3.29	MS	3.26	MS	3.37	MS	3.31	MS
B4: Couriers exhibit strong organizational skills and professional qualities essential for their role.	3.36	MS	3.32	MS	3.26	MS	3.31	MS
B5: Issues related to lost or damaged goods are resolved promptly, including compensation where necessary.	3.40	MS	3.28	MS	3.24	MS	3.31	MS
B6: Green and non-polluting packaging materials are utilized.	3.30	MS	3.23	MS	3.23	MS	3.25	MS
B7: There is trust in the identity and integrity of distribution personnel.	3.31	MS	3.28	MS	3.33	MS	3.31	MS
B8: Holiday products are delivered without any delays.	3.26	MS	3.21	MS	3.26	MS	3.24	MS
Composite Mean	3.32	MS	3.26	MS	3.28	MS	3.29	MS

Table 12. Current Perceived Service Quality from the Responsiveness Dimension

Dimension: Responsiveness	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
C1: The service operates efficiently with minimal waiting times for customers.	3.22	MS	3.32	MS	3.33	MS	3.29	MS
C2: Notifications regarding the exact time of pickup and delivery are provided promptly.	3.31	MS	3.33	MS	3.37	MS	3.34	MS
C3: The process for handling returns is managed swiftly and effectively.	3.28	MS	3.38	MS	3.32	MS	3.33	MS
C4: Personnel demonstrate strong coordination and communication skills, addressing inquiries clearly and promptly.	3.34	MS	3.39	MS	3.33	MS	3.35	MS
C5: Staff interactions are warm, courteous, and motivated to assist customers effectively.	3.34	MS	3.41	S	3.38	MS	3.38	MS
C6: Complaint channels and methods are easily accessible and convenient.	3.36	MS	3.41	S	3.31	MS	3.36	MS
Composite Mean	3.31	MS	3.37	MS	3.34	MS	3.34	MS

In the Reliability dimension, the customer's actual perceived score for Dongguan terminal logistics is 3.29, and the service quality is moderately satisfactory. B4 (Couriers exhibit strong organizational skills and professional qualities essential for their role) scored the highest at 3.31, and B8 (Holiday products are delivered without any delays) scored the lowest at 3.25, indicating that customers were more satisfied with the professional quality of courier personnel, but were not satisfied enough with the time of the delivery method. In the three groups of customer perception of service levels, the choice of home delivery customers perceives the highest quality of service is B2 (Logistics tracking information is updated on time), with the score of 3.40, the lowest perceived level of service is B8 (Holiday products are delivered without any delays) with a score of 3.26. The highest level of service perceived by customers choosing the self-service pick up container is B4 (Couriers exhibit strong

organizational skills and professional qualities essential for their role), and the lowest perceived service level is B2 (Logistics tracking information is updated on time) with a score of 3.21. The highest level of service perceived by customers choosing post office is B3 (Records of services are kept with a high degree of accuracy) with a score of 3.37, and the lowest level of service perceived is B6 (Green and non-polluting packaging materials are utilized) with a score of 3.23.

The analysis showed that customers choosing home delivery expect goods to be delivered in time even during holidays, while those choosing self-service pick up container had more concerns about tracking logistics information, and those choosing post office pick up were dissatisfied with the attitude of communication after goods were lost. Fu, Liu, Huang & Chen (2021) showed that timely delivery is the influence of home delivery customers' satisfaction, especially

during holidays, and high expectations of timeliness may affect the overall evaluation of logistics companies. Self-service pick up containers are favored for their convenience, but customers' demand for timely tracking of logistics information has also increased significantly. Transparent and accurate logistics information can reduce customer waiting time and improve service experience. Since post offices have more goods, the chances of loss and damage are higher, so customers are more sensitive to the management of parcels and service attitude, especially when there are problems such as lost or damaged goods. Therefore, the communication attitude of post office staff will directly affect customer satisfaction.

In the Responsiveness dimension, the actual score of customers' perception of Dongguan terminal logistics is 3.34, and the service quality is moderately satisfactory. C5 (Staff interactions are warm, courteous, and motivated to assist customers) has the highest score of 3.38, and C1 (The service operates efficiently with minimal waiting times for customers) has the lowest score of 3.29, indicating that customers are more satisfied with the attitude of the staff, but for those with longer waiting time were not satisfied with the efficiency of the service. Among the three groups of customers' perceived service levels, customers choosing home delivery has the highest score in C6 (Complaint channels and methods are easily accessible and convenient), with a score of 3.36, the one with the lowest score is C1 (The service operates efficiently with minimal waiting times for customers), with a score of 3.22. Customers choosing self-service pick up container had the highest perceived service levels at C5 (Staff interactions are warm, courteous, and motivated to assist

customers effectively) and C6 (Complaint channels and methods are easily accessible and convenient), with a score of 3.41, while the lowest level of perceived service is C1 (The service operates efficiently with minimal waiting times for customers) with a score of 3.32. The highest level of service perceived by customers choosing post office is C5 (Staff interactions are warm, courteous, and motivated to assist customers effectively) with a score of 3.38, and the lowest level of perceived service is C6 (Complaint channels and methods are easily accessible and convenient) with a score of 3.31.

The analysis showed that all three groups of customers believed that waiting time is too long and the efficiency of the service needs to be improved. Customers who chose post offices also felt that complaint channels and methods were not convenient enough. He (2021) found that the efficiency of home delivery and post offices significantly affected customers' pick-up satisfaction. Home delivery may affect user experience due to uncertainty in the arrival time of the delivery person and limited delivery efficiency, while post office pick up is limited by factors such as business hours, pick up waiting time, and parcel management efficiency. Current customer complaint channels mainly include telephone, online customer service, social media platforms, and self-service devices. Simplification of customer complaint process is an important factor to enhance customer satisfaction. Pei, Guo, Wu, Zhou & Yeh (2020) pointed out that overly cumbersome complaint process may increase the psychological burden of customers, which may lead to customer churn.

Table 13. Current Perceived Service Quality from the Assurance Dimension

Dimension: Assurance	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
D1: Express packages are delivered accurately and without damage.	3.32	MS	3.23	MS	3.26	MS	3.27	MS
D2: Staff members are perceived as trustworthy.	3.30	MS	3.27	MS	3.24	MS	3.27	MS
D3: Courier tariff structures are transparent.	3.21	MS	3.33	MS	3.26	MS	3.27	MS
D4: A diverse range of secure payment methods is offered.	3.30	MS	3.31	MS	3.21	MS	3.27	MS
D5: Customer privacy is consistently protected and not compromised.	3.27	MS	3.20	MS	3.32	MS	3.26	MS
Composite Mean	3.28	MS	3.27	MS	3.26	MS	3.27	MS

On the Assurance dimension, the actual score of customers' perception of Dongguan terminal logistics is 3.27, and the quality of service is moderately satisfactory. D4 (A diverse range of secure payment methods are offered) has the highest score of 3.27, and D5 (Customer privacy is consistently protected and not compromised) has the lowest actual score of 3.26, indicating that customers were more satisfied with the diverse range of secure payment methods, but were more dissatisfied with the compromise of privacy. Among the three groups of customers' perceived service levels, the highest perceived service quality for customers choosing home delivery is D1 (Express packages are delivered accurately and without damage), with a score of 3.32. The lowest perceived service level is D3 (Courier tariff structures are transparent) with a score of 3.21. Customers choosing self-service pick up container has the highest perceived level of service at D3 (Courier tariff structures are transparent) with a score of 3.33, while the lowest perceived level of service is at D5 (Customer

privacy is consistently protected and not compromised) with a score of 3.20. Customers choosing post office perceived the highest level of service at D5 (Customer privacy is consistently protected and not compromised) with a score of 3.32, and the lowest level of perceived service is D4 (A diverse range of secure payment methods is offered) with a score of 3.21.

The analysis showed that the three different groups had very different views on the assurance dimension, with customers who chose home delivery having problems with the fees charged, those who chose courier locker pick up being less than satisfied with the protection of privacy, and those who chose stage coach pick up being more concerned about the security of the payment method. Customer experience and trust are important factors that affected customer sticking with services. Therefore, logistics companies should focus on how to enhance customers' trust in logistics services while ensuring service quality. Research

in this area includes privacy protection, payment security, and service promise fulfillment to enhance customer trust (Jain, 2020).

Table 14. Current Perceived Service Quality from the Empathy Dimension

Dimension: Empathy	Home delivery		Self-service pick up container		Post office		Overall Mean	
	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation	Mean	Interpretation
E1: Services are delivered in a manner that meets individualized customer needs, including timing and location.	3.31	MS	3.24	MS	3.21	MS	3.25	MS
E2: Self-service pickup operations are user-friendly and efficient.	3.33	MS	3.14	MS	3.17	MS	3.21	MS
E3: Store opening hours are convenient for all customers.	3.29	MS	3.31	MS	3.21	MS	3.27	MS
E4: The network coverage effectively supports customer pickup and courier delivery.	3.32	MS	3.28	MS	3.28	MS	3.29	MS
Composite Mean	3.31	MS	3.24	MS	3.22	MS	3.26	MS

On the Empathy dimension, the actual perceived score of customers' terminal logistics in Dongguan is 3.26, and the service quality is moderately satisfactory. E4 (The network coverage effectively supports customer pickup and courier delivery) has the highest score of 3.29, and E2 (Self-service pickup operations are user-friendly and efficient) has the lowest actual score of 3.21, indicating more resistance to self-service pick up. Among the three groups of customers' perceived service levels, the highest perceived service quality for customers choosing home delivery is E2 (Self-service pick up operations are user-friendly and efficient) with a score of 3.33, the lowest perceived service level is E3 (Store opening hours are convenient for all customers) with a score of 3.29. Customers choosing self-service pick up container has the highest perceived level of service at E3 (Store opening hours are convenient for all customers) with a score of 3.31. The lowest perceived service level is E2 (Self-service pick up operations are user-friendly and efficient) with a score of 3.14. The highest level of service perceived by customers choosing post office was E4 (The network coverage effectively supports

customer pickup and courier delivery) with a score of 3.28, and the lowest level of service perceived is E2 (Self-service pickup operations are user-friendly and efficient) with a score of 3.17.

From the analysis, it can be seen that customers who chose home delivery and those who chose self-service pick up container came to completely opposite conclusions in Empathy. Customers who chose home delivery did not find the time convenient enough and were not concerned about the efficiency of self-service pick up, unlike those customers who chose self-service. Customers who chose pick up container were very dissatisfied with the convenience and efficiency of picking up their items, but were not concerned about the opening hours, because generally delivery cabinets were available for self-service 24 hours a day. Customers who chose post office were also dissatisfied with the efficiency of post office pick up. The study of pickup efficiency is one of the current research directions in the field of logistics, and all of them are mainly focused on path optimization, scheduling algorithms, information systems and intelligent hardware (Akkad & Bányai, 2020).

Table 15. Current Perceived Service Quality from the Overall Dimension

Dimension	Home delivery			Self-service pick up container			Post office			Overall Mean		
	Mean	Interpretation	Rank	Mean	Interpretation	Rank	Mean	Interpretation	Rank	Mean	Interpretation	Rank
Tangibility	3.39	MS	1	3.41	S	1	3.24	MS	4	3.35	MS	1
Reliability	3.32	MS	2	3.26	MS	4	3.28	MS	2	3.29	MS	3
Responsiveness	3.31	MS	4	3.37	MS	2	3.34	MS	1	3.34	MS	2
Assurance	3.28	MS	5	3.27	MS	3	3.26	MS	3	3.27	MS	4
Empathy	3.31	MS	3	3.24	MS	5	3.22	MS	5	3.26	MS	5
Composite Mean	3.32	MS		3.31	MS		3.27	MS		3.30	MS	

In general, customers were moderately satisfied with the perceived service level of Dongguan terminal logistics, with an overall perceived level of 3.30, which is much lower than the expected value of 4.02. Tangibility had the highest score of 3.35, Reliability had the score of 3.29, Responsiveness had the score of 3.34, Assurance had a score of 3.27, and Empathy had the lowest score of 3.26, with the highest and lowest scores being the opposite of the expected level of service. From the three groups, the highest score for choosing home delivery was for tangibility dimension with 3.39, and the lowest was for assurance with 3.28. The highest perceived score for customers choosing self-service pick up container

was for Tangibility dimension with 3.41, and the lowest perceived score is Empathy dimension with a score of 3.24. Customers choosing post office have the highest perception score was Responsiveness with a score of 3.34, and the lowest score was Empathy dimension with a score of 3.22.

No matter which group of customers, the analysis revealed that the perceived service level is lower than the expected service level. All three groups of customers were more satisfied with the Tangibility of Dongguan logistics industry, and were more satisfied with the image, service attitude and professional quality of the staff. The expectation of Empathy is the highest, but the actual perception of Empathy is the

lowest. Meidute-Kavaliauskienė (2020) explored the “last kilometre” logistics service in online retailing, particularly customers' expectations-perceptions of Empathy, the research pointed out that although customers were more satisfied with the image and service attitude of the courier, the perception of empathy was much lower than the expectation in responding to personalized needs and care. Scholars generally agree that the lack of empathy is a major problem in modern logistics services, and logistics companies need to make more efforts

to improve service personalization and customer care to reduce the discrepancy between expectations and reality (Xu, 2019).

4.5. Significant Differences in the Response of the Three Groups to the Perceived Service Quality

Table 16. Perceived Service Quality ANOVA Analysis

	Sum of Squares	df	Mean Square	F	Sig.	Interpretation	Decision
Between groups	.034	2	.017	4.154	.019	Significantly Different	Reject Null Hypothesis
Within groups	.332	81	.004				
Total	.366	83					

Note: The level of significance is ≤ 0.05

Table 17. Perceived Service Quality Post-Hoc Tests of ANOVA

Groups	Groups Compared	Mean Difference	Standard Error	Sig.	Interpretation	Decision
Home delivery	Self-service pickup container	.012214	.017101	.477	Not Significantly Different	Accept Null Hypothesis
	Post office	.047464*	.017101	.007	Significantly Different	Reject Null Hypothesis
Self-service pickup container	Home delivery	-.012214	.017101	.477	Not Significantly Different	Accept Null Hypothesis
	Post office	.035250*	.017101	.042	Significantly Different	Reject Null Hypothesis
Post Office	Home delivery	-.047464*	.017101	.007	Significantly Different	Reject Null Hypothesis
	Self-service pickup container	-.035250*	.017101	.042	Significantly Different	Reject Null Hypothesis

Note: The level of significance is ≤ 0.05

The response of the three (3) groups of respondents to the perceived service quality in Dongguan China was analyzed by ANOVA, and it was found that there was a significant difference, thereby rejecting the null hypothesis. However, through the post-hoc tests of ANOVA, it was found that there was no significant difference between the customer perceived service level of home delivery and the customer perceived service level of self-service pick up container, but there was a significant difference between the customer perceived service level of post office. The level of service perceived by customers of post office (3.27), which was much lower than the level of service perceived by customers of home delivery (3.32) and self-service pick up container (3.31).

Home delivery service can better meet the specific needs of customers due to its one-to-one characteristics. Self-service pick up container met the needs of modern customers in pursuit of personalization and independence due to its self-service characteristics. In contrast, post office pick up was affected by time, distance, service standardization and other factors, and lacked flexible personalized service, making it difficult to realize the improvement of personalized experience. Huo (2019) showed that the loyalty of post office customers was relatively low, and many of them will only choose the post office under specific circumstances, while home delivery and self-service pick up container modes had higher customer loyalty, and the customers may choose the post office only when they have no choice.

4.6. Correlation between Expected and Perceived Service Quality in Dongguan China

Table 18. Normality Test

	Shapiro-Wilk				Interpretation
	Mean	Statisticians	SF	Sig.	
Expected	4.020	.958	28	.316	Follow a Normal Distribution
Perceived	3.302	.975	28	.699	

Note: If the ‘Shapiro-Wilk’ P value is > 0.05 , the data are considered to follow a normal distribution.
If the ‘Shapiro-Wilk’ P value is ≤ 0.05 , the data is considered not to follow a normal distribution.

The expected and perceived values of Dongguan terminal logistics service quality belong to two pairs of paired samples, and before analyzing the correlation of the paired samples, a normality test is required, if, then the Pearson correlation coefficient is used, and if the overall values and differences of the two pairs of data do not obey a normal distribution, then the Spearman correlation coefficient is used. The sample size of this study is less than 50, Shapiro-Wilk test is used to test the normality of data. If Shapiro-Wilk P-value > 0.05 , then the overall value and difference of two pairs of data in this study obeys the normal distribution, and Pearson's correlation coefficient is used for correlation analysis. If the Shapiro-Wilk P value ≤ 0.05 , the overall values and differences of the two pairs of data in this study do not obey a normal distribution, and the correlation analysis is carried out using the Spearman correlation coefficient. The results showed that the two pairs of data Shapiro-Wilk P-value > 0.05 for expectation and perception in this study, the data obeyed

normal distribution, and the correlation test was conducted using Pearson's correlation coefficient.

Table 19. Pearson Correlation Coefficient Analysis of Expected & Perceived Service Quality

Correlation Between Variables		Pearson Correlation	Sig. (two-tailed)	Interpretation	Decision
Overall Relevance	Expected-Perceived	-.004	.983	Not Significant, Expected and Perceived do not Correlate	Accepted Null Hypothesis
Expected-Tangibility	Perceived-Tangibility	0.320	0.680	Not Significant	Accept Null Hypothesis
	Perceived-Reliability	.971*	0.029	Significant	Reject Null Hypothesis
	Perceived-Responsiveness	-0.92	0.080	Not Significant	Accept Null Hypothesis
	Perceived-Assurance	0.746	0.254	Not Significant	Accept Null Hypothesis
	Perceived-Empathy	0.937	0.063	Not Significant	Accept Null Hypothesis
Expected-Reliability	Perceived-Tangibility	0.767	0.233	Not Significant	Accept Null Hypothesis
	Perceived-Reliability	0.703	0.297	Not Significant	Accept Null Hypothesis
	Perceived-Responsiveness	-0.582	0.418	Not Significant	Accept Null Hypothesis
	Perceived-Assurance	.984*	0.016	Significant	Reject Null Hypothesis
	Perceived-Empathy	.982*	0.018	Significant	Reject Null Hypothesis
Expected-Responsiveness	Perceived-Tangibility	.972*	0.028	Significant	Reject Null Hypothesis
	Perceived-Reliability	0.317	0.683	Not Significant	Accept Null hypothesis
	Perceived-Responsiveness	-0.162	0.838	Not Significant	Accept Null hypothesis
	Perceived-Assurance	.962*	0.038	Significant	Reject Null Hypothesis
	Perceived-Empathy	0.797	0.203	Not Significant	Accept Null hypothesis
Expected-Assurance	Perceived-Tangibility	.992**	0.008	Significant	Reject Null hypothesis
	Perceived-Reliability	-0.045	0.955	Not Significant	Accept Null hypothesis
	Perceived-Responsiveness	0.203	0.797	Not Significant	Accept Null hypothesis
	Perceived-Assurance	0.800	0.200	Not Significant	Accept Null hypothesis
	Perceived-Empathy	0.527	0.473	Not Significant	Accept Null hypothesis
Expected-Empathy	Perceived-Tangibility	0.923	0.077	Not Significant	Accept Null hypothesis
	Perceived-Reliability	0.46	0.54	Not Significant	Accept Null hypothesis
	Perceived-Responsiveness	-0.313	0.687	Not Significant	Accept Null hypothesis
	Perceived-Assurance	.993**	0.007	Significant	Reject Null hypothesis
	Perceived-Empathy	0.881	0.119	Not Significant	Accept Null hypothesis

Note: Sig. ≤ 0.05, Significantly Correlated

According to the criteria for determining Pearson's correlation coefficient, the value of Pearson's correlation coefficient is -1 to 1. The greater the absolute value, the stronger the correlation between the two variables. If the p-value is less than 0.05, the correlation coefficient is considered significant. The Pearson correlation coefficient of this study is 0.004, Sig > 0.05, indicating that there was no correlation between the expected value and the perceived value of the quality of terminal logistics services in Dongguan. The p-value is 0.983, indicating that there was no significant relationship between these two sets of data, and null hypothesis was accepted. There is no correlation between expected service quality and perceived service quality of Dongguan terminal logistics as assessed by three groups of respondents. The study specifically examined the correlation between the five dimensions of expected service quality and perceived service quality. Among the 25 total correlations, only 7 were found to be significant, accounting for 28%, while 18 were not significant, accounting for 72%. Thus, the overall result showed that expected service quality and perceived service quality were generally not correlated.

In the terminal logistics industry, there are several factors that may lead to the lack of correlation between expected-perceived service quality: 1) Complexity of Terminal Logistics. Terminal logistics involves diverse service scenarios (home delivery, self-service pickup containers, post office). Different service methods may lead to inconsistency between customer expectations and perceptions (Ha, Akbari & Au, 2023). Among the three groups, customers who chose

home delivery had a much higher expectation (4.06) compared to those who chose other methods (4.03 and 3.98). However, in practice, couriers may not meet customer expectations due to time constraints, resulting in a gap between expectation and perception. 2) Individual Customer Demand Differences. Customers have different priorities and needs. Some prioritized delivery speed, while others focused more on service attitude. When customer expectations do not align with their perception of key service aspects, the correlation between expectation and perception may weaken. 3) Mismatch between Customer Expectations and Perception (PLB, 1985). As the analysis showed, the average customer expectation for service quality is 4.02, with the dimensions as follows: Tangibility is 3.99, Reliability is 4.01, Responsiveness is 4.04, Assurance is 4.00, and Empathy is 4.06. The average customer perception of service quality is 3.30, with Tangibility at 3.35, Reliability at 3.29, Responsiveness at 3.34, Assurance at 3.27, and Empathy at 3.26. Regardless of the dimension, customer expectations were higher than their actual experience. 4) Inconsistency between Customer Focus and Company Service Dimensions. As the previous analysis indicated, customers placed a high demand on diversified options for delivery method, time, and location, hoping that their needs were considered from their perspective. The highest expectation is for Empathy (4.06), but in perceived service quality, empathy has the lowest score (3.26). This lack of alignment between expectations and perception led to weak correlation. 5) Difference between Technological and Manual Services. In scenarios like self-

service container and post office pick-ups, customers had less interaction with staff, and the experience was more driven by systems or self-service devices. In these cases, "humanized service" may not be a priority for customers. However, for home delivery, customers placed higher demands on communication and the professionalism of couriers (appearance, attitude), leading to a weaker correlation between expectation and perceived service quality.

4.7. A Proposed Model for Dongguan Terminal Logistic Service Quality

In this study, the five aspects of Tangibility, Responsiveness, Reliability, Assurance and Empathy were analyzed by ANOVA to find that there were significant differences in the Dongguan terminal logistics' expected-service quality among the three groups of respondents (home delivery, self-service pick up containers and post offices), and there were significant difference in the Dongguan terminal logistics' perceived service quality among the three groups of respondents. Using Pearson's correlation coefficient analysis, it was discovered that there was no association of Dongguan terminal logistics expected-perceived service quality, therefore there was a discrepancy of the perceived-expected levels of service quality.

Considering the analysis above, the analytical model to enhance the Dongguan terminal logistics service quality was proposed, which were as follows: due to the complexity of terminal logistics and the different pick up needs of different customers, the population of the terminal logistics of home delivery, self-service pick up containers, and post office were categorized in three cases (according to the change of the situation, the classification can be transformed in different areas), because there was a need to understand the main concerns of the many demographic groups, to make targeted recommendations. This was followed by an analysis of the service quality from five dimensions to find out the gap between expected-perceived service quality—the bigger the gap of service quality, the lower the customer satisfaction—and make specific recommendations for the dimensions that have a bigger gap in the service quality that are more important to the customers. Finally, the goal of improving service quality and customer satisfaction was achieved.

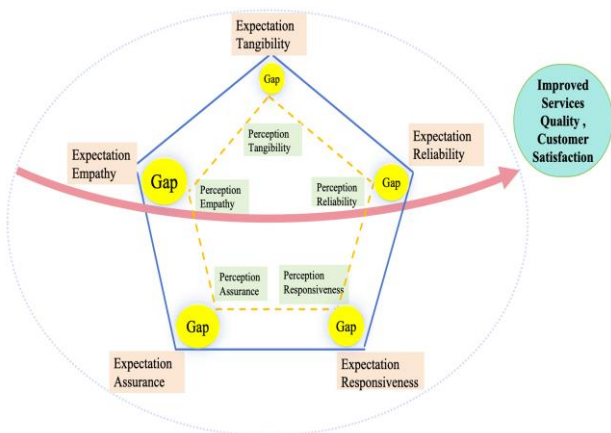


Figure 2. A Proposed Model for Dongguan Terminal Logistic Quality Service

5. Discussions

The study's implications and future research directions were likewise presented in this part.

5.1. Conclusions

In light of the findings, the study concluded the following:

5.1.1. Types of Terminal Delivery in Dongguan, China

Using frequency and percentage to group statistics of customers' pick-up methods in Dongguan terminal logistics, the analysis of the results showed that Dongguan terminal logistics has three types of pick-up methods, which are home delivery, self-service pick-up container, and post office. The percentages of home delivery, self-service pick up container and post office are moderate in a balanced state, with roughly equal numbers of customers choosing one of the three types of pick-ups, which means that pick up needs of different customers are different and customers prefer free and flexible delivery methods (Gao, Chu & Cui, 2023).

5.1.2. Current Level of the Expected-Service Quality in Dongguan, China

The analysis of Dongguan terminal logistics expected service quality using the mean value found that: the expected service quality of customers on Dongguan terminal logistics are all in the range of satisfaction, indicating that customers expected to obtain a higher level of service quality. Customers who chose home delivery had the highest expectation of service quality, while those who chose self-service pick up container had the second highest expectation of service quality, and those who chose post office had the lowest expectation of service quality.

Among them, the customer expectation service quality for choosing home delivery was in the satisfactory range, and the highest score for choosing home delivery was the empathy dimension, while the lowest was the assurance dimension. The customer expectation service quality for choosing self-service pick up container was in the satisfactory range, the highest expectation score were Empathy dimension and Responsiveness dimension, and the lowest expectation score was for Tangibility dimension. The customer choosing post office expectation service quality was also in the satisfactory range, customers choosing post office had the highest expectation score for Empathy, and the lowest score was for Assurance dimension.

5.1.3. Significant Differences in the Responses among the Three (3) Groups of Respondents on Expected Service Quality in Dongguan, China

According to the ANOVA results, there were significant differences among the three (3) groups of respondents who chose home delivery, self-service pick up container and post office expected service quality of terminal logistics in Dongguan City. Customers who chose home delivery had the highest expectations, then those who chose self-service pick up container, and those who chose post office had the lowest expectations. Customers who chose different pick-up methods paid attention to slightly different points on different dimensions.

Customers choosing home delivery had the highest expectations. In the Tangibility dimension, clients were more focused on the element of full facilities. In the Reliability dimension, customers had higher expectations regarding the identity and integrity of the delivery personnel. In the Responsiveness dimension, customers were very concerned about the pickup time and the convenience of waiting at home (Jamkhaneh et. al., 2022). In the Assurance dimension, selected customers cared more about accurate and damage-free delivery by courier. In the Empathy dimension, customers had higher expectations about the time it takes to

get to their door.

Customers who chose self-service pick up container had the next highest expectation. In Tangibility dimension, customers cared more about the uniformity and tidiness of the staff. In the Reliability dimension, customers had higher expectations for the professional quality of couriers. In the Responsiveness dimension, customers cared more about staff's attitude and waiting time in line. In the Assurance dimension, customers cared more about accurate and damage-free delivery of the courier. In the Empathy dimension, customers wanted more business outlets, which were more convenient for customers to pick up their goods, and they put higher expectations on timely updating of logistics tracking information.

Customers who chose post office expected the lowest service quality. In Tangibility dimension, customers were more concerned about the neatness of shelves and goods, and the convenience of picking up goods. In the Reliability dimension, customers put higher expectations on timely updating of logistics tracking information. In the Responsiveness dimension, there was a high expectation of staff attitude and waiting time in the queue. In the Assurance dimension, customers cared more about privacy security. In the Empathy dimension, customers expected more business outlets and more convenience in picking up their goods.

5.1.4. Current Level of the Perceived-Service Quality in Dongguan, China

The analysis of Dongguan terminal logistics' perceived-service quality using mean value analysis found that: the perceived- service quality of Dongguan terminal logistics was in the range of moderate satisfaction, and the perceived-service quality was lower than expected-service quality. Customers who chose home delivery had the highest perceived-service quality, followed by those who chose self-service pick up containers, and those who chose post offices had the lowest perceived-service quality.

Customers choosing home delivery were in a moderately satisfactory range of perceived service quality for Dongguan terminal logistics. The highest score for choosing home delivery was for Tangibility dimension, and the lowest was for Assurance. Customers choosing self-service pick up container were also in a moderately satisfactory range of perceived service quality for Dongguan terminal logistics, with the highest perceived score for Tangibility dimension, and the lowest perceived score is Empathy dimension. Perceived service quality of Customers choosing post office was in the range of moderate satisfaction, and the highest perception score for Dongguan terminal logistic perceived service quality was responsiveness, and the lowest score was Empathy dimension.

5.1.5. Significant Differences in the Responses among the Three (3) Groups of Respondents on Perceived Service Quality in Dongguan, China

According to the ANOVA results, there were significant differences in the Dongguan terminal logistics perceived-service quality among the three (3) groups of respondents for home delivery, self-service pick up container and post office. Among them, the difference in perceived service level between customers who chose home delivery and those who chose self-service pick up container was not significant, mainly due to the convenience of home delivery and the freedom of pick-up time at the courier cabinet (Huo, 2019). However, there was a significant difference between these two pick up methods (home delivery and self-service pick up

container) and the perceived service level of customers who chose post office pickup. The perceived service level of post-office pick-up customers was lower than the perceived service level of home delivery and self-service pick up container pick up customers. Customers choosing different pick-up methods had different points of dissatisfaction in perceived service.

Customers who chose home delivery had the highest level of perceived service. In the Tangibility dimension, customers were dissatisfied with the availability of facilities and equipment. In the Reliability dimension, customers were dissatisfied in the timely delivery of goods, especially in the delivery of goods on holidays (Jamkhaneh et al., 2022). In the Responsiveness dimension, customers were least satisfied with the efficient operation of the service and waiting time. In the Assurance dimension, customers were not satisfied enough with the cost of delivery and the transparency of the cost. In the Empathy dimension, customers were not satisfied enough with the business hours.

Customers who chose self-service pick up containers perceived the next highest level of service. In the Tangibility dimension, customers were dissatisfied with the distribution of outlets. In the Reliability dimension, customers were dissatisfied with the tracking of logistics information. In the Responsiveness dimension, customers were least satisfied with the efficient operation of the service and waiting time. In the Assurance dimension, customers thought that privacy was not well protected. In the Empathy dimension, customers perceived that the operation of pick-up was not efficient and humanized enough.

Customers who chose post office perceived the lowest level of service. In the Tangible dimension, customers were also dissatisfied with the availability and efficiency of equipment and facilities. In the Reliability dimension, customers were dissatisfied with the communication attitude of the courier company after the loss of goods. In the Responsiveness dimension, customers felt that the process of handling returns was not managed quickly and efficiently. In the Assurance dimension, customers felt that the payment method was not secure enough. In the Empathy dimension, customers believe that the pick-up operation was not efficient and humanized enough.

5.1.6. Correlation between Dongguan Expected Service Quality and Perceived-Service Quality

The Pearson Correlation Coefficient was used to analyze the Dongguan terminal logistics' expected service quality and perceived service quality, and the findings indicated that: the Dongguan terminal logistics' expected-perceived service quality were generally not correlated, but there was a gap between them, and the Empathy dimension was the highest in the expected-service quality and the lowest in the perceived-service quality. The main reasons were as follows: the complexity of the terminal logistic industry (Yingfei et. Al., 2022), the differences in customers' needs, the mismatch between customers' expectations and perceptions, and the incongruence between the dimensions that customers were concerned about and the dimensions that companies were concerned about in terms of their services.

5.1.7. A Proposed Model for Dongguan Terminal Logistics Service Quality

Considering the findings of the analysis, the Dongguan terminal logistics service quality model was constructed as shown in Figure 2, which analyzed the expected-perceived service quality of Dongguan terminal logistics through three groups of interviewees from five dimensions (Tangibility,

Reliability, Responsiveness, Empathy and Assurance), and it found out that the Dongguan terminal logistics perceived value was smaller than the expected value. It suggested that there were gaps in the Dongguan terminal logistics' service quality and that they need to be improved. From the model, it was evident that the biggest disparity exists in the Empathy dimension, followed by the Assurance dimension, Reliability dimension, Responsiveness dimension, and finally Tangibility dimension. This means that the greater disparity between expected-perceived service quality, the lower the satisfaction, and the more room for improvement (Lin et al., 2023).

5.2. Recommendations

Date was collected through the mean, ANOVA analysis, Pearson correlation coefficient analysis, among the three groups of respondents in Dongguan terminal terminal logistics (home delivery, self-service pick up container, post office) from the five dimensions (Tangibility, Responsiveness, Reliability, Assurance, Empathy). Regarding the analysis of the gap between expectations and perception service quality. It was found out that if the gap is bigger, the satisfaction is lower, and the greater the room for improvement. According to the research findings, the following suggestions were made:

5.2.1. As to the Types of Customers Choosing Different Pickup Methods

Logistics companies can innovate types of pick-up methods. For example, set up a mobile courier car in a specific time period and the peak period for the "tour delivery", especially in residential areas, office areas, where customers can always get packages from the mobile courier car. This approach can be used as a supplement to pick up container, and in the peak period, to reduce the pressure of the express cabinet. In residential areas or office areas, this can help introduce "neighborhood collection points" or "community cooperation stores", and convenience stores, kiosks and other cooperation, through the use of their idle space to collect express delivery. This approach can be convenient for customers to pick up their goods at any time, especially for office workers, students and other groups who are not at home during the day. Where conditions permit, use drones for end-of-pipe delivery, especially for small, lightweight parcel delivery in remote or inconveniently located areas. This approach can greatly shorten the delivery time and reduce the impact of traffic congestion on the delivery time frame.

Logistics companies can also provide more personalized service choices, such as combining the types of home delivery, self-service pick up container and post office pick up, in order to meet the various needs of different customers, and concurrently ensure the quality of the service of each delivery mode (Gajewska et. Al., 2020). There is also a need to guide customers to set reasonable expectations when choosing different terminal logistic methods (Uzir, 2021), to clearly understand the advantages and disadvantages of each delivery method and choose the service that best meets their needs, such as when the timeliness of home delivery is required to be high, choosing to avoid the post office pick up is less efficient.

Whether it is dynamic switching of delivery methods or diversified pick up locations, customers can more freely choose the appropriate pick-up method according to their own needs. The above-mentioned improvements and innovative programs can be gradually promoted in Dongguan's terminal logistic system to better fulfill the prerequisites of different

regions and different types of users: thus, significantly improving the quality of Dongguan's terminal logistic services.

5.2.2. As to the Current Higher Expectations of Service Quality in Dongguan, China

All three groups of customers have higher expectations of current Dongguan terminal logistics. Therefore, the establishment of customer expectations-oriented service structure and service standards for terminal logistics in Dongguan City, such as the establishment of a three-level service structure centered on customer demand should be considered, the first level is the basic service layer. This includes home delivery; self-service pick up container and post office pick up as the three basic services. There is also a need to ensure the coverage and service level of basic services, and provide each type of customer with a delivery method that meets basic needs. The second level is the personalized service layer. By providing value-added services for customers with higher needs, such as door-to-door delivery and cold chain delivery that are accurate to the hour, this can be achieved personalized services can provide high standard delivery solutions for urgent, valuable and temperature-controlled items. The third level is the value-added experience layer, which is on top of the basic and personalized services. It provides flexible combination services, such as "last 100 meters shared delivery", "mobile courier vehicle self-pickup", "intelligent drone delivery" etc., to further satisfy customers' needs for personalized and intelligent experiences. Establishing customer expectation-oriented service standards like time management standards, safety standards, service convenience standards, response speed standards, and green standards, can also help establishing a perfect service monitoring and continuous improvement mechanism is another way pay focusing on the diversified needs of customers, one can design flexible and efficient logistics systems and service standards to effectively meet the high expectations of customers and further enhance the service quality and competitiveness of Dongguan terminal logistics.

5.2.3. As to the Three Groups of Respondents who Differed in the Significance of Expected Service Quality of Dongguan Terminal Logistic

The results showed that there were significant differences in the expected-service quality by the three (3) groups of respondents for Dongguan terminal logistic. Customers who chose home delivery had the highest expectations, then those who chose self-service pick up container, and finally those who chose post office. Through the analysis of terminal logistic service quality in Dongguan, it was found that customers have different expectations and concerns about different logistics service modes (home delivery, self-service pick up container and post office). Based on the level of customer expectations and different concerns, the following improvements and suggestions are proposed:

Home delivery customers have high expectations for service efficiency, quality of couriers, accuracy, timeliness and convenience of pick up. Logistic companies can optimize delivery routes and use intelligent scheduling systems to reasonably arrange delivery time to ensure the timeliness and efficiency of delivery. They can also enhance professional training for couriers to improve their service awareness, communication skills and resilience to cope with customers' individual needs and unexpected situations.

Another is establishing a strict goods' management process

to reduce the occurrence of incorrect deliveries, to ensure accurate deliveries with the help of technologies such as code scanning confirmation and GPS positioning. Customers can also be provided with flexible delivery time options, such as evening delivery or weekend delivery, to increase the convenience of customer pick up.

Customers choosing self-service pick up containers were more concerned about the service quality of staff, the attitude and professionalism of couriers, this includes reasonable location and regular maintenance of self-service pick up containers to ensure normal operation of the facilities, to avoid congestion during peak periods or equipment failures affecting the user experience. There is also a need to focus on the professionalism of couriers, through the assessment and incentive mechanism to guide them to serve customers with a friendly and positive attitude, to reduce the friction points in the service (Tian, 2019). Another is to strengthen the service awareness of the backstage management and maintenance personnel to ensure timely response to customer problems and enhance users' service experience during self-service pick up. During self-service pick up container pickup process, especially for new clients, this will help customers get started quickly by providing instructions and video tutorials at the self-service pick up container or online platforms.

Customers choosing post offices were mainly concerned about the distribution of outlets, the convenience of picking up goods, the tidiness of shelves, the attitude of staff, and privacy protection, through big data analysis of the distribution areas where users are concentrated. There is a necessity to set up or optimize the layout of outlets to improve the coverage rate, so as to facilitate the pick-up of goods by customers. Standardized management of post offices to ensure cleanliness and neatness of shelves and environment to provide customers with a comfortable pickup experience, can also be implemented avoiding the exposure of personal information on parcel packaging and strengthening the information protection awareness of post office personnel to ensure customer privacy and security should be practiced as well. Regular training of post office staff on service attitudes and skills to enhance their professionalism, so as to enhance customers' trust and satisfaction may be done. Lastly is to add fast pick up channels during peak hours at post offices, or allow users to pick up goods in a staggered manner through the appointment pick up function, to cut down on the amount of time that customers must wait and improve the convenience of picking up goods.

5.2.4. As to the Current Low Perceptions of Service Quality in Dongguan, China

In reaction to the low perception of service quality by Dongguan terminal logistic customers, it is important to indicate that customers were dissatisfied with the Dongguan terminal logistics services quality. Terminal Logistic Enterprises need to establish a dynamic survey and feedback mechanism to understand the customer's real experience on terminal logistic services, identify specific pain point areas, find specific problems and provide targeted improvements. First, determine the survey objectives such as understanding customer satisfaction with delivery time, pick up convenience, service attitude, problem handling and other aspects. Design multi-dimensional questions, including delivery timeliness, pick up convenience, service attitude, problem solving ability, etc., in order to fully understand customer perception. Distribute questionnaires through SMS, APP push, email, etc., and automatically pop up the questionnaire at the end of each

service to increase the completion rate of customers. Collect survey data and classify statistics, and discover low-satisfaction segments and general problems through data analysis. Conduct quarterly or half-yearly surveys to form a trend report to propose improvement measures for problem areas and track improvement effects.

5.2.5. As to the Significance of Dongguan Terminal Logistic Perceived Service Quality among Three Groups' Respondents

There were significant differences in the terminal logistic perceived-service quality among the three groups of respondents, and relevant suggestions were made for the different concerns of the three groups of respondents on perceived service quality.

In terms of choosing home delivery, provide more delivery time slots for customers to choose from especially during morning and evening peak hours, weekends and holidays. At the same time, the option of "expedited delivery" can be added, so that customers can pay for faster delivery services according to their needs. Optimize costs without increasing the burden on customers, share costs more reasonably through cooperation, and provide users with member discounts, coupons and other benefits to alleviate the dissatisfaction caused by high delivery fees.

In terms of customers choosing self-service pick up containers, improve the transparency of logistics information, provide real-time logistics tracking system, so that customers can keep track of the status of parcels at any time, especially sending reminders before the parcels are about to arrive at the self-service pick up containers, and improve the customers' sense of control over the delivery process. Optimize the operating system of self-service pick up containers by adding fast operation methods, such as code scanning and one-time password pick up, so as to reduce the time for picking up parcels. Perform regular maintenance on self-service pick up containers to ensure normal operation and avoid the trouble caused by failures. Avoid obvious exposure of personal information in the outer packaging of self-service pick up container parcels, and strengthen privacy protection measures of self-service pick up containers, such as using password encryption system and hiding recipient information, in order to improve customers' sense of privacy and security.

In term of customers choosing post office, first, logistic companies can increase the density of post office outlets, especially set up more outlets in customer-concentrated areas to reduce the distance of customers' pick-ups, and set up more pick-up lanes in post offices in key areas to improve the efficiency of pickups during peak periods. Second, introduce a variety of payment methods, such as WeChat, Alipay, and swipe card, to enhance the convenience of payment, and provide payment e-invoice function to meet users' needs. Third, for the case of lost parcels, simplify the customer complaint process and set up a special customer service channel so that customers can quickly contact customer service personnel. At the same time, establish an efficient compensation process to ensure that customers can obtain timely and reasonable compensation after losing goods, and enhance customer trust. Fourth, ensure that post offices are neat and orderly, especially waiting areas and customer pick-up areas. Set up trash cans and keep shelves neat to create a good experience (Uvet, 2020). Fifth, post offices should work seamlessly with the logistics system to ensure that parcel information is updated in a timely manner and that customers are quickly notified when parcels arrive. Reserve resources in

advance during peak periods to ensure normal post office services during holidays and avoid delays in parcel collection due to insufficient manpower. Sixth, set up environmental-friendly packaging displays at post offices, promote recyclable packaging materials or provide recycling points for old packages to advocate environmental awareness (Wei, 2020) and enhance the overall image of the company.

5.2.6. In terms of Correlation (Gap) between Dongguan Expected and Perceived Service Quality

To address the discrepancy expected-perceived service quality, logistics companies need to give due consideration to improving customer satisfaction while reducing operating costs by balancing customer expectations and operating costs. Because it is inevitable that the client's perception is lower than the expectation, although the customer's feelings are always the first, but the blind pursuit to "fully meet" the customer's expectations will often lead to high operating costs all entail unsustainability. In terminal logistic service, balancing customer's expectation and enterprise's cost, as well as realizing the optimal allocation of resources, is a crucial point to getting better service quality and maintaining the competitiveness of the company. However, balancing customer expectations and enterprise costs is not an overnight solution, and requires enterprises to flexibly utilize service stratification, intelligent management, and reasonable pricing mechanisms. At the same time, by enhancing customer education, continuously collecting feedback and improving manpower efficiency, companies can optimize both customer satisfaction and cost-effectiveness while ensuring service quality. The government should also set clear service standards (Jiang, 2021) covering aspects such as delivery security, customer information protection, and charging rates, and regularly check and monitor implementation. This balanced strategy will not only contribute to the sustainable and healthy development of the enterprise, but will also enhance the trust and loyalty of customers to the enterprise, and win a broader competitive advantage in the market.

5.2.7. As to the Model's Five Dimensions

According to the results of the analysis of Dongguan terminal logistic service quality model, there were different degrees of gaps in the existing service quality in the five dimensions, and the customer's expectation of service quality was greater than the actual perceived service quality. This suggests that customers were dissatisfied with the service experience. The gaps were particularly significant in the dimensions of Empathy and Assurance. Service quality needs to be strengthened in each of the five dimensions of Empathy, Assurance, Reliability, Tangibility, and Responsiveness.

Customers were most satisfied on the Tangibility dimension, indicating that the current level of service has met their expectations, and a maintenance strategy should be adopted to ensure that the current level of quality is maintained regarding packaging, facilities, equipment, and environment. Regular maintenance and minor upgrades can be carried out to ensure that customer needs are consistently met without adding excessive costs.

Reliability dimension was ranked 3rd out of five dimensions in terms of customer satisfaction, however customer satisfaction with the Reliability dimension was low and there were many indicators for this dimension (involving various aspects such as consistency and accuracy of service); thus, continuous improvement strategies need to be employed. Reliability of services can be improved through process standardization, introduction of automated equipment, and

enhanced staff training to ensure that customers experience stable and consistent service quality.

Responsiveness dimension ranked second in customer satisfaction, indicating that customers were relatively satisfied but there is still room for further improvement, and it is more appropriate to adopt a continuous improvement strategy. Consideration can be given to enhancing staff training, rationally scheduling resources and optimizing processes to improve response speed, especially during peak periods, special hours and emergencies, while allowing customers to experience rapid and flexible service.

Assurance dimension of customer satisfaction was ranked 4th among the five dimensions, which was only in the state of basic satisfaction means that this aspect still needs to be improved, and the strategy of consolidation and improvement should be adopted. Improvements can be made through employee professionalism, transparency of customer service, and safety and security measures. For example, trust building training for employees, enhancing customers' sense of security and trust in order to gradually increase customer satisfaction with Assurance services.

The Empathy dimension had the largest gap and the lowest customer satisfaction among the five dimensions, so a focused enhancement strategy is recommended. Customer satisfaction can be improved by optimizing the customer service process, improving the communication skills of customer service personnel, and strengthening the attention and response to customers' individual needs. A customer feedback mechanism can be established to understand the emotional needs of customers, and humanization and personalization of services may be taken as the focus of improvement to enhance the sense of belonging and trust of customers.

5.2.8. For Future Research

The overall quality of terminal logistic services in Dongguan is at moderately satisfactory level, customer demand and the increasing competition in the industry indicate that there is still a lot of space for development. In logistics companies' efforts to improve service quality, the PDCA cycle provides a dynamic improvement framework that can be continuously optimized. Future research can explore how to embed the PDCA cycle more deeply into the management process of each service in terminal logistics (Meng, 2019). Total Quality Management (TQM) emphasizes quality improvement through full participation and total process control (Feigenbaum, 1951), which is particularly applicable to a service system such as logistics services, which involves multiple links and positions. Future research can explore how the TQM concept can be better integrated into quality control of terminal logistics services. The advancement of technology has provided new tools for the improvement of service quality in terminal logistics enterprises. Future studies may look into the combined application of the PDCA cycle and the TQM concept to construct an integrated framework suitable for the enhancement of the Dongguan terminal logistics' services quality. This framework will not only provide the dynamic optimization of the PDCA cycle, but also incorporate the total quality control of TQM; and thus, realize the systematic improvement of service quality.

5.3. Implications of the Study

5.3.1. Improving the quality level of Dongguan terminal logistic service provides theoretical guidance

By comparing customer expectations and actual perceptions of different delivery modes (home delivery, self-service pick up container, and post office pick up) in Dongguan terminal logistics services, this study revealed the differences in service quality of logistics services in five dimensions. It provided empirical evidence for Dongguan terminal logistic enterprises to enhance the terminal distribution services quality, which can help to improve the overall service level on the field of logistics.

5.3.2. Provide a new theoretical basis for terminal logistic service quality management research

This study used SERVQUAL Model in calculating the gap of expected-perceived service quality (Jamkhaneh et al., 2022) to construct and optimize the terminal logistics service quality model, and provide an important theoretical basis. Future researchers can gain comprehension of the connection between consumer demand and the actual service performance of firms, which in turn can result in the development of service quality assessment models adapted to different regions and industries.

5.3.3. Focusing on the needs of post-office pick-up customers and Empathy dimensions to inform policy development

This study found that the satisfaction of customers choosing post office pick up was the lowest among the three groups (home delivery, self-service pick up container and post office pickup). It was also found that customers had the highest expected-service quality but the lowest actual perceived-service quality on the Empathy dimension. These findings suggested that firms should not only focus on physical facilities and responsiveness when improving logistics services, but should also increase their understanding and responsibility for customer needs, enhance customer care and trust (Lin et al., 2023). These findings can be important guidance for both logistics companies and policy makers.

This study had some guidance for the development of Dongguan terminal logistics service quality, but the construction of the entire amount evaluation index system was based on the previous foundation. In fact, the actual situation of the factors influencing the satisfaction of terminal logistic service quality is very complex (Huma et al., 2020). Therefore, in the follow-up study, it is recommended to further improve and enrich the terminal logistics service quality assessment index system. In the empirical research part, only the field of logistics in Dongguan City was chosen as the subject of the study, and the finding illustrated the current situation of terminal logistics service quality in Dongguan City, as well as the direction for future improvement. This reason somehow restricts the applicability of the study to other regions and other logistics enterprises. Subsequent evaluation of terminal logistic service quality can be carried out in other regions to find out the commonalities and differences of terminal logistics service conditions between different regions, so as to facilitate mutual reference and complementary between logistics enterprise.

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References

- [1] Akkad, M. Z., & Bányai, T. (2020). Multi-objective approach for optimization of city logistics considering energy efficiency. *Sustainability*, 12(18), 7366.
- [2] Bailey, R. A. (2013). *Design of comparative experiments*. Cambridge University Press.
- [3] Bartlett, M. S. (1951). The effect of standardization on a chi-square approximation in factor analysis. *Biometrika*, 38(3/4), 337–344.
- [4] Brown, J. D. (2009, January). Principal components analysis and exploratory factor analysis—Definitions, differences and choices. *Shiken: JALT Testing & Evaluation SIG Newsletter*.
- [5] Cai, H. (2023). Research on service quality improvement of M logistics company with basic cost optimization. *Production Research*, 58(2).
- [6] Feigenbaum, A. V. (1951). Total quality control.
- [7] Fornell, C. (1990). The National Customer Satisfaction Barometer.
- [8] Fornell, C., et al. (1987). Defensive marketing strategy by customer complaint management: A theoretical analysis. *Journal of Marketing Research*.
- [9] Fornell, C., et al. (1988). A model for customer complaint management. *Marketing Science*.
- [10] Filina-Dawidowicz, L., & Kostrzewski, M. (2022). The complexity of logistics services at transshipment terminals. *Energies*, 15(4), 1435.
- [11] Freitag, M., & Kotzab, H. (2020). A concept for a consumer-centered sustainable last mile logistics. In *Dynamics in Logistics: Proceedings of the 7th International Conference LDIC 2020, Bremen, Germany (pp. 196–203)*. Springer International Publishing.
- [12] Gamze, A., & Tolga, K. H. (2021). Assessment of logistics service quality dimensions: A qualitative approach. *Journal of Shipping and Trade*, 6(1).
- [13] Gajewska, T., Zimon, D., Kaczor, G., & Madził, P. (2020). The impact of the level of customer satisfaction on the quality of e-commerce services. *International Journal of Productivity and Performance Management*, 69(4), 666–684.
- [14] Gao, M., Chu, J., & Cui, H. (2023). Optimization of logistics terminal distribution under the background of intelligent logistics. In *Eighth International Conference on Electromechanical Control Technology and Transportation (ICECTT 2023) (Vol. 12790, pp. 1496–1502)*. SPIE.
- [15] Gawor, T., & Hoberg, K. (2019). Customers' valuation of time and convenience in e-fulfillment. *International Journal of Physical Distribution & Logistics Management*, 49(1), 75–98.
- [16] Ghavamipoor, H., & Golpayegani, S. A. H. (2019). A reinforcement learning-based model for adaptive service quality management in e-commerce websites. *Business & Information Systems Engineering*, 62(3).
- [17] Grolus, H. (1997). *Service marketing management*. Shanghai: Fudan University Press.
- [18] Grolus, H., Jinglun, H., & Others. (2002). *Service management and marketing: Management strategies based on customer relationships (2nd ed.)*. Beijing: Electronic Industry Press.
- [19] Grönroos, C. (1990). *Service management and marketing*. Lexington, MA: Lexington Books.

- [20] Ha, N. T., Akbari, M., & Au, B. (2023). Last mile delivery in logistics and supply chain management: A bibliometric analysis and future directions. *Benchmarking: An International Journal*, 30(4), 1137–1170.
- [21] He, Y. (2021). Research on e-commerce logistics service quality evaluation based on sentiment analysis [Master's thesis, Nanjing University].
- [22] Huang, L. (2022). Reflections on the construction of total quality management system in enterprises. *Popular Standardization*, 11, 7–9.
- [23] Huma, S., Ahmed, W., Ikram, M., & Khawaja, M. I. (2020). The effect of logistics service quality on customer loyalty: Case of logistics service industry. *South Asian Journal of Business Studies*, 9(1), 43–61.
- [24] Ieva Meidute-Kavaliauskienė, A., Aranskis, M., & Litvinenko, M. (2020). Consumer satisfaction with the quality of logistics services. In *Contemporary Issues in Business, Management and Education 2013* (pp. 330–340).
- [25] Jain, G., Singh, H., Chaturvedi, K. R., & Rakesh, S. (2020). Blockchain in logistics industry: In fizza customer trust or not. *Journal of Enterprise Information Management*, 33(3), 541–558.
- [26] Joseph, M. (1994). Juran: The upcoming century of quality. *Quality Progress*, 27(8), 29.
- [27] Juran, J. (2003). *Juran Quality Management Handbook*. Beijing: Renmin University of China Press.
- [28] Jusufbašić, A., & Stević, Ž. (2023). Measuring logistics service quality using the SERVQUAL model. *Journal of Intelligent Management Decisions*, 2(1), 1–10.
- [29] Kanwal, N., Arif, S., & Xiaowen, T. (2020). Twenty years of research on total quality management in higher education: A systematic literature review. *Higher Education Quarterly*, 74(1).
- [30] Kaiser, H. F. (1970). A second generation little jiffy. *Psychometrika*, 35(4), 401–415.
- [31] Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and Psychological Measurement*, 34(1), 111–117.
- [32] Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31–36.
- [33] Karatzas, A., Papadopoulos, G., & Godsell, J. (2020). Servitization and the effect of training on service delivery system performance. *Production and Operations Management*, 29(5), 1101–1121.
- [34] Kiba-Janiak, M., et al. (2021). Sustainable last mile delivery on e-commerce market in cities from the perspective of various stakeholders: Literature review. *Sustainable Cities and Society*.
- [35] Kim, S. (2019). Research on "last kilometer" delivery of e-commerce logistics. *Modern Marketing (Lower)*, 1, 158.
- [36] Kock, N. (2020). *WarpPLS User Manual: Version 7.0*. Laredo, TX: ScriptWarp Systems.
- [37] Liliander, V. (1995). Comparison standards in perceived service quality.
- [38] Lin, X., Mamun, A. A., Yang, Q., & Masukujjaman, M. (2023). Examining the effect of logistics service quality on customer satisfaction and re-use intention. *PLoS ONE*, 18(5), e0286382.
- [39] Liu, M., Dan, B., & Ma, S. (2020). Optimal decision-making and coordination of fresh e-commerce supply chains considering preservation efforts and value-added services. *Chinese Journal of Management Science*, 28(8), 76–88.
- [40] Liu, Y. (2021). Research on evaluation indicator system of express logistics intelligent service under customer perspective [Master's thesis, Hangzhou University of Electronic Science and Technology].
- [41] Ma, P., Yao, N., & Yang, X. (2021). Service quality evaluation of terminal express delivery based on an integrated SERVQUAL-AHP-TOPSIS approach. *Mathematical Problems in Engineering*, 2021(1), 8883370.
- [42] Marcus, J. B. (2021). Digital strategy for consumer products [Doctoral dissertation, Massachusetts Institute of Technology].
- [43] Martilla, J. A., & James, J. C. (1977). Importance-performance analysis. *American Marketing Association*, 41(1), 77–79.
- [44] Meng, M. J. (2019). Improving service quality in book logistics enterprises based on the PDCA management method. *Logistics Technology*, 38(8), 25–27, 102.
- [45] Mentzer, J. T., Flint, D. J., & Kent, L. J. (1999). Developing a logistics service quality scale. *Journal of Business Logistics*, 20(1), 9–32.
- [46] Mentzer, J. T., Flint, D. J., & Hult, G. T. M. (2001). Logistics service quality as a segment-customized process. *Journal of Marketing*, 65(4), 82–104.
- [47] Juran, J. M. (1992). Juran on quality by design.
- [48] Nogueira, L., et al. (2021). Sustainable last-mile distribution in B2C e-commerce: Do consumers really care? *Cleaner and Responsible Consumption*.
- [49] Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1981). Quality count in service. *Business Horizons*, 57(Fall), 25–48.
- [50] 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(Fall), 41–50.
- [51] 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.
- [52] Peng, X., Prybutok, V., & Xie, H. (2020). Integration of supply chain management and quality management within a quality-focused organizational framework. *International Journal*.
- [53] Permana, A., Purba, H., & Rizkiyah, N. (2021). A systematic literature review of total quality management (TQM) implementation in the organization. *International Journal of Production Management and Engineering*, 9(1), 25–36.
- [54] Pei, X. L., Guo, J. N., Wu, T. J., Zhou, W. X., & Yeh, S. P. (2020). Does the effect of customer experience on customer satisfaction create a sustainable competitive advantage? A comparative study of different shopping situations. *Sustainability*, 12(18), 7436.
- [55] Setiono, B. A., & Hidayat, S. (2022). Influence of service quality with the dimensions of reliability, responsiveness, assurance, empathy, and tangibility on customer satisfaction. *International Journal of Economics, Business and Management Research*, 6(9), 330–341. Spearman, Charles(1904)."General intelligence objectively determined and measured".*American Journal of Psychology*.15(2):201–293.
- [56] Suhr, D. (2009). Principal component analysis vs. exploratory factor analysis. *SUGI 30 Proceedings*. Retrieved April 5, 2012.
- [57] Strandvik, T. (1996). Tolerance zones in perceived service quality.
- [58] Tian, Z. (2019). Research on service quality and enterprise management. *Human Resources*, (4), 13-14.
- [59] Uzir, M. U. H., AlHalbusi, H., Thurasamy, R., Hock, R. L. T., Aljaberi, M. A., Hasan, N., & Hamid, M. (2021). The effects of service quality, perceived value, and trust in home delivery service personnel on customer satisfaction: Evidence from a developing country. *Journal of Retailing and Consumer Services*, 63, 102721.

- [60] Uvet, H. (2020). Importance of logistics service quality in customer satisfaction: An empirical study. *Operations and Supply Chain Management: An International Journal*, 13(1), 1-10.
- [61] Wang, C. (2022). Research on the impact of fresh agricultural products logistics service quality on customer satisfaction. *Heilongjiang Grain*, 2022(7), 58-60.
- [62] Wang, L., & Dong, M. (2023). An entropy weight-TOPSIS based method for e-commerce logistics service quality evaluation. *Tehnički vjesnik*, 30(4), 1253-1256.
- [63] Wang, Z. (2023). Research on customer satisfaction of last mile logistics distribution of courier company. Dalian Jiaotong University.
- [64] Deming, W. E. (2003). *Deming on quality management* (Zhong Hanqing, Trans.). Haikou: Hainan Publishing House.
- [65] Wei, S. M. (2020). Research on the evaluation of campus express service quality from a low-carbon perspective. *Logistics Engineering and Management*, 42(6), 63-65.
- [66] Winkelhaus, S., Grosse, E. H., & Glock, C. H. (2022). Job satisfaction: An explorative study on work characteristics changes of employees in Intralogistics 4.0. *Journal of Business Logistics*, 43(3), 343-367.
- [67] Xiang, J. (2021). Research on the influencing factors of customer satisfaction in fresh food supermarkets under new retail mode. *Times Economy and Trade*, 18(12), 14-21.
- [68] Xing, D., & Qu, R. (2023). Research on customer satisfaction evaluation of imported cross-border e-commerce based on topic modeling and sentiment analysis. *Technology and Industry*, 23(1), 58-65.
- [69] Yan, H. (2021). Research and countermeasures for service quality improvement in China's express industry. *Commercial Exhibition Economy*, (7), 85-87.
- [70] Yang, Q., Wang, Z. S., Feng, K., & Tang, Q. Y. (2024). Investigating the crucial role of logistics service quality in customer satisfaction for fresh e-commerce: A mutually validating method based on SERVQUAL and service encounter theory. *Journal of Retailing and Consumer Services*, 81, 103940.
- [71] Yang, Y. (2023). Crowdsourcing logistics service quality evaluation based on customer satisfaction. Dalian Jiaotong University.
- [72] Yao, T., & Praewwanit, T. (2021). Customers' intention to adopt smart lockers in last-mile delivery service: A multi-theory perspective. *Journal of Retailing and Consumer Services*, 61, 256-265.
- [73] Yi, Y., & Shi, Y. (2022). Research on the improvement of fresh e-commerce logistics service quality under normalized pandemic conditions. *Journal of Jiangxi University of Finance and Economics*, (1), 65-75.
- [74] Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). The behavioral consequences of service quality. *Journal of Marketing*, 60(2), 31-46.
- [75] Zhang, M. (2023). Research on service quality evaluation of Deppon Express based on SERVPERF model. North University of China.
- [76] Zhou, Z. (2012). Research on service quality evaluation of logistics enterprises based on SERVQUAL and LSQ models. *Science and Technology Management Research*, 06.
- [77] Zhou, Z. (2012). Construction of service quality measurement scale for logistics enterprises and empirical research. *Technical Economy and Management Research*, 07.
- [78] Zhou, Z. (2010). Research on service quality evaluation system of graduate education based on SERVQUAL model. *Degree and Graduate Education*, 12.