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# Unpacking the Key Drivers of University Students' Satisfaction and Loyalty Towards Logistics Services in Zhanjiang, China

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## Abstract

**Purpose:** This paper investigates the key factors influencing university students' satisfaction and loyalty in using logistics services in Zhanjiang, China. The conceptual framework presents the causal relationships among operational quality, information quality, personnel contact quality, service ordering procedure, price satisfaction, customer satisfaction, and customer loyalty. **Research design, data, and methodology:** Researchers used a quantitative approach to administer a survey to 500 students from Zhanjiang University of Science and Technology in China. Non-probability sampling techniques were judgmental sampling, quota sampling, and convenience sampling for data collection. Both online and offline distribution methods were employed to disseminate the questionnaires. Data analysis was conducted using Structural Equation Modeling and Confirmatory Factor Analysis, encompassing model fit, reliability, and structural validity assessments. **Results:** The findings demonstrate that operational quality, information quality, personnel contact quality, and service ordering procedure exert a significant impact on customer satisfaction, which in turn serves as a mediating variable affecting the relationship between these factors and customer loyalty. **Conclusions:** The statistical data proposes that logistics service providers should increase their investment in factors that influence satisfaction and loyalty and optimize and elevate the quality of these corresponding factors to enhance customer satisfaction and loyalty.

**Keywords:** Operational Quality, Information Quality, Customer Satisfaction, Customer Loyalty, Logistics Services

**JEL Classification Code:** E44, F31, F37, G15

## 1. Introduction

The Chinese express delivery industry's revenue has surged, escalating 29.7% from 51.61 billion yuan in 2017 to 192.76 billion yuan by 2023. This growth surge is a testament to the sector's economic impetus. The e-commerce upsurge has amplified demand for delivery services, with government investments in logistics infrastructure, such as highways, railways, and aviation networks, underpinning industry expansion. Technological advancements, including automated sorting and intelligent tracking, have significantly improved service delivery, contributing to the industry's explosive growth and economic impact.

Zhanjiang, a major city in Guangdong Province, has made significant strides in logistics, aligning with the national "Belt and Road" initiative. The city's strategic integration into the Guangdong-Hong Kong-Macao Greater Bay Area and the development of logistics parks like the Haitan Logistics Industrial Park aims to establish it as a regional logistics hub. In 2023, Zhanjiang's express delivery business revenue reached 19.293 billion yuan, marking a 5.65% increase and a 10.2% rise in business volume despite a 4.2% decrease in average revenue per piece, indicating heightened competitive dynamics.

China's logistics sector has expanded in size and advanced in service models and technological innovation between 2017 and 2023. The express delivery business volume is projected to reach 108.5 billion pieces annually by 2021, with international parcels showing a 55.1% year-over-year increase (Wu, 2023). Technological innovation, particularly the application of AI, big data, and IoT, has been pivotal in enhancing operational efficiencies and service

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quality. The sector's proactive approach to new service models and integration with e-commerce and manufacturing industries has broadened its market reach and customer base (iResearch Consulting Group, 2018).

Zhanjiang's logistics industry has rapidly adopted technological innovation, focusing on improving operational efficiency and service standards. The municipal government's supportive policies, including financial and land support, have fostered an environment conducive to industry growth and competitiveness (Zhanjiang Municipal People's Government, 2023).

China's logistics sector, despite significant growth, grapples with notable challenges that impede sustainability and innovation, such as poor information exchange and limited cooperation (Liu et al., 2019, 2021). High operational costs, delays, and bureaucracy plague inland logistics, necessitating improved service quality and competitiveness to satisfy escalating customer demands and maintain satisfaction (Kuo et al., 2020). The sector's struggle with organizational efficiency and the lack of technological innovation and ecological chain skills are further exacerbated by intense market competition (Liu et al., 2021).

The expansion of China's economy and container traffic has heightened the need for supply chain preferences, relationship management, financial management, and infrastructure improvements, all directly and indirectly affecting consumer satisfaction and loyalty (Seo & Ahn, 2019). High logistics costs, compounded by personnel, expertise, infrastructure, and data quality deficiencies, pose significant challenges to the sector's efficiency and customer relations (Gong et al., 2019).

Communication gaps between suppliers and customers have led to diminished trust and business volume, underscoring the need for stronger connections to enhance supply chain efficiency (Butt et al., 2020). Obstacles to green innovation, such as the struggle to meet green logistics demands and the impact of company culture, size, age, and ownership on financial success, necessitate adaptation to customer demands and an increase in green innovation capacity (Chu et al., 2019).

The study investigates the factors influencing the loyalty and satisfaction of Zhanjiang University of Science and Technology students with logistics services. It will first identify existing problems in current logistics services by examining students' unique needs and expectations. The research will then propose a theoretical framework to examine the variables affecting student loyalty and satisfaction, offering strategies to enhance logistics services.

The study will employ questionnaires and data analysis to understand the elements impacting students' loyalty and satisfaction with logistics services. The goal is to provide logistics service providers with insights to improve service quality, meet student demands, and bolster loyalty and satisfaction. The study categorizes influencing factors into six key areas and posits a framework encompassing seven integral characteristics, including loyalty and satisfaction.

This study is significant in manifold ways. It offers actionable insights to logistics providers, enriches academic understanding, and supports the logistics sector's contribution to economic vitality. It underscores the importance of customer-centric strategies for business sustainability and market competitiveness, advocating for innovation and quality improvement in logistics services.

## 2. Literature Review

### 2.1 Operational Quality

As defined by Lin et al. (2023), operational quality in logistics is the efficacy of services provided by logistics firms across operational stages, marked by precision, responsiveness, and reliability. It is integral to consumer satisfaction and encompasses service dimensions that ensure safe and timely delivery, as Juga et al. (2010) and Gupta et al. (2023) noted. The concept also involves the retailer's ability to meet consumer demands, reflecting logistics performance, according to Sorkun et al. (2020).

Yazdanparast et al. (2010) and Kersten and Koch (2010) highlight logistics' technical and procedural aspects, including order accuracy and efficiency. Tian et al. (2010) emphasize the role of IT and transportation infrastructure in achieving operational excellence, while Chen (2008) underscores the significance of a high-quality customer process for end-user satisfaction. Zhang et al. (2024) encapsulate the breadth of operational quality, from packaging to distribution.

**H1:** Operational quality has a significant impact on customer satisfaction.

### 2.2 Information Quality

As articulated by Sutrisno et al. (2019), logistics information quality hinges on the precision, punctuality, and exhaustiveness of the data logistics providers offer clients. Hafez et al. (2021) emphasize that this quality is gauged by the information's adequacy and clarity, timeliness, accessibility, and comprehensibility. Putra et al. (2020) extend this to the data's role in fulfilling supply chain needs and bolstering customer satisfaction and performance.

Rita et al. (2019) aligns with this definition, focusing on the transmission's accuracy, timeliness, and comprehensiveness. Wu et al. (2022) consider information quality as the extent to which information satisfies user needs, highlighting attributes like timeliness, accuracy, consistency, reliability, and understandability. Luisa Dos Santos Vieira et

al. (2013) equate information quality with data accuracy, timeliness, completeness, and reliability in logistics services. Jain et al. (2017) echo this, adding dependability and consistency to the criteria.

**H2:** Information quality has a significant impact on customer satisfaction.

## 2.3 Personnel Contact Quality

In logistics, Personnel Contact Quality is pivotal, denoting the standard of interaction between clients and service representatives, as characterized by Uvet (2020) and Zailani et al. (2018). This quality hinges on the representative's experience, empathy, issue-resolution proactivity, and interactive approach. Michalski and Montes-Botella (2022) and Lee and Kim (2008) regard this concept as encompassing the service level provided by logistics personnel who directly engage with clients, including their understanding of client needs, problem-solving acumen, and product knowledge.

Personnel Contact Quality is a determinant of customer satisfaction and loyalty, as posited by Wang et al. (2019) and Uvet et al. (2023), and involves the attitudes, expertise, and communication proficiency of logistics staff. Li et al. (2019) and Chen et al. (2023) extend this to the internal company dynamics, emphasizing the impact of employee interaction quality on customer response. The term also covers the precision and effectiveness of client-staff communication, as defined by Ali and Kaur (2018). Kawa and Zdrenka (2024) include customer service and response time as integral components of this quality.

**H3:** Personnel contact quality has a significant impact on customer satisfaction.

## 2.4 Service Ordering Procedure

As described by Bienstock and Royne (2010), logistics service ordering procedures involve a series of activities, including order processing, cargo transportation, and warehouse management facilitated by IT tools provided by logistics service providers. These procedures should embody efficiency, reliability, and flexibility to meet customer needs and typically include information quality, order process, quantity management, response speed, and customer care (Banomyong & Supatn, 2011).

The order service process is defined by the comprehensive sequence from order placement to completion, covering information quality, ordering procedures, personnel contact, product availability, timeliness, accuracy, discrepancy resolution, and complaint handling (Gizaw et al., 2021). The service ordering procedure also involves contract agreement and execution between the logistics service provider and the client (Kalubanga & Namagembe, 2022). Dobroszek et al. (2019) and Ahmed et al. (2021) define the service ordering procedure as the mechanism by which clients submit service requests and providers fulfill these requests according to client demands.

**H4:** Service ordering procedure has a significant impact on customer satisfaction.

## 2.5 Customer Satisfaction

As Akıl and Ungan (2021) posit, customer satisfaction reflects the extent of a client's contentment with a business's offerings, encompassing products, services, and expertise. Hu et al. (2022) note that customer satisfaction with shipping and logistical support can influence perceptions of an online business's value. Singh (2023) and Cotarelo et al. (2021) view satisfaction as a function of service performance against explicit and implicit customer expectations and as a cumulative evaluation of specific transactions or shopping experiences.

Lagin et al. (2022) emphasizes customer satisfaction as a key metric in logistics efficacy, particularly in last-mile delivery, involving a broad spectrum of factors like distribution costs and service quality. Bouzaabia et al. (2013) define it within retail logistics as the alignment between consumers' perceptions and expectations of logistical services throughout the purchase process. Lim et al. (2021) describe customer satisfaction in logistics as a complex, non-linear indicator influenced by delivery time, price, product quality, packaging, error management, service personnel quality, and data integrity.

**H5:** Customer satisfaction has a significant impact on customer loyalty.

## 2.6 Price Satisfaction

Price satisfaction, as defined by Grant and Philipp (2018), reflects consumers' contentment with the pricing of purchased products, rooted in their subjective assessments of "price fairness." Justavino-Castillo et al. (2023) view it as customers' perceptions of the value derived from service offerings, evaluating the reasonableness and fairness of service pricing. Leong et al. (2022) describe it as a subjective evaluation and the associated emotions regarding the price, including the rationality of price differences.

Price satisfaction is pivotal for customer retention, as noted by Vlachos (2021), and is linked to the consumer's perception of value for money, as articulated by Nguyen Thi and Nguyen Thi Thu (2022) and Sorkun (2019). Hu et al. (2022) and Kaswengi and Lambey-Checchin (2019) emphasize that price satisfaction is the degree of happiness or dissatisfaction with the cost of goods or services, influenced by the customer's valuation of the product's

worth. Daugherty et al. (2019) and Ngah et al. (2023) concur, defining price satisfaction as consumer contentment with the cost of goods or services.

**H6:** Price satisfaction has a significant impact on customer loyalty.

### 2.7 Customer Loyalty

In logistics, Huma et al. (2019) define client loyalty as an enduring commitment to repeat transactions, paired with a positive stance and continuous support. Zaato et al. (2023) view it as the degree of patronage and endorsement from clients, marked by contentment, repeat purchasing, and referral inclinations. Mofokeng (2021) and Vilkaite-Vaitone and Skackauskiene (2020) describe customer loyalty as an affinity for specific logistics services, prompting a preference for certain providers and sustained use of their services. Pellathy et al. (2018) and Lyu et al. (2019) regard long-term patronage and trust as indicators of high satisfaction with a company's customer service and logistics proficiency.

Lan et al. (2016) considers the likelihood and frequency of repeat purchases as measures of customer loyalty, reflective of overall satisfaction and brand support. Politis et al. (2014) and Fernandes et al. (2018) extend this to include steadfast brand preference, resistance to competitors, and a propensity for recommendations in B2B contexts tied to satisfaction with supply chain management and logistics service quality.

## 3. Research Methods and Materials

### 3.1 Research Framework

The researcher crafted a refined theoretical model by employing three core postulates and amalgamating insights from three pivotal studies. The conceptualization leveraged three seminal theories: the SERVQUAL Model introduced by Parasuraman et al. (1985), Kano's Model by Kano (1984) (Mikulić, 2007), and the American Customer Satisfaction Index (ACSI) formulated by Fornell et al. (1996). Integrating these frameworks with a thorough literature review, a framework for examining customer satisfaction and loyalty in logistics services was conceived, as depicted in Figure 1.

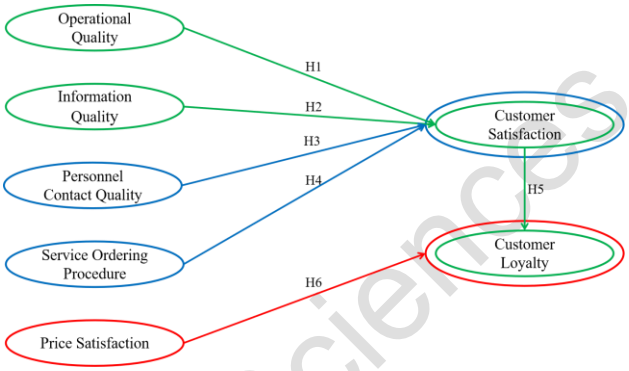


**Figure 1:** Conceptual Framework

**H1:** Operational quality has a significant impact on customer satisfaction.

**H2:** Information quality has a significant impact on customer satisfaction.

**H3:** Personnel contact quality has a significant impact on customer satisfaction.

**H4:** Service ordering procedure has a significant impact on customer satisfaction.

**H5:** Customer satisfaction has a significant impact on customer loyalty.

**H6:** Price satisfaction has a significant impact on customer loyalty.

### 3.2 Research Methodology

This study employs a non-probabilistic quantitative and empirical analytical approach, disseminating surveys through an online questionnaire platform to the target demographic (Chen & Hirschheim, 2004). The target population comprises students from four distinct majors at Zhanjiang University of Science and Technology. We analyzed the feedback data to explore the factors influencing customer loyalty and satisfaction in Zhanjiang's logistics services.

This study questionnaire is divided into three sections. The first section consists of screening questions. The second section pertains to demographic inquiries, including gender, age, academic year, and the basic conditions of using logistics services. The third section utilizes a 5-point Likert scale for all variables, measuring the six hypotheses of this study. The scale ranges from (1) Strongly Disagree to (5) Strongly Agree. Prior to the large-scale survey, a pilot test was conducted on 30 respondents. The questionnaire used for the pilot test received favorable scores from experts on the Index of Item-Objective Congruence (IOC).

### 3.3 Population and Sample Size

Utilizing Cronbach's Alpha method, the questionnaire of this study passed tests for validity and reliability (Vaske et al., 2017). Researchers distributed the questionnaire to the target respondents and received 500 acceptable responses. We analyzed these feedback data using statistical tests in SPSS and AMOS. To test the accuracy and validity of convergence, we employed Confirmatory Factor Analysis (CFA). These measures verified the fit of this study's conceptual framework and ensured the model's validity and reliability. Based on these efforts, researchers examined the causal relationships between variables using Structural Equation Modeling (SEM).

### 3.4 Sampling Technique

Researchers utilized non-probabilistic sampling techniques, specifically judgment sampling and quota sampling, to select students from four majors at Zhanjiang University of Science and Technology for the survey. The questionnaires were distributed via an online platform. Table 1 illustrates the detailed sampling methodology employed in this study.

**Table 1:** Sample Units and Sample Size

| Four Selected Majors | Population Size | Proportional Sample Size |
|---|---|---|
| Internet of Things Engineering | 365 | 178 |
| Product Design | 306 | 149 |
| International Business | 190 | 93 |
| Project Cost | 163 | 80 |
| **Total** | **1024** | **500** |

**Source:** Constructed by author

## 4. Results and Discussion

### 4.1 Demographic Information

The demographic segment of the study's descriptive statistics examined a diverse set of characteristics, including gender, age, academic standing, preferred courier services, and weekly usage rates, amassing a dataset from 500 survey participants. As detailed in Table 2, the respondents' demographic profiles and behavioral patterns were delineated. A succinct academic synthesis of the findings is as follows: The gender ratio skewed slightly towards female participants, with 60.4% of the responses from females and 39.6% from males. The age distribution revealed that the majority of the sample, 58.8%, were aged 22-23, while 37.0% were in the 20-21 age bracket, and a minimal 4.2% were over 23 years old. Regarding the academic year, 56.0% of participants were in their third year, second-year students accounted for 25.2%, first-year students for 12.4%, and fourth-year students for 6.4%. The preferences for courier companies were also identified, with JINGDONG leading at 25.0%, closely followed by SHUNFENG at 21.6%, and EMS and JITU at 13.6% and 12.2%, respectively. Regarding service frequency, 53.2% of respondents used courier services 1-2 times weekly, 35.0% used them 3-4 times, and 7.8% reported using them more than six times weekly.

**Table 2:** Demographic Profile

| Demographic and General Data (N=500) | | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 198 | 39.6% |
| | Female | 302 | 60.4% |
| **Age** | 20-21 years old | 185 | 37.0% |
| | 22-23 years old | 294 | 58.8% |
| | Above 23 years old | 21 | 4.2% |
| **Academic year** | Year 1 | 62 | 12.4% |
| | Year 2 | 126 | 25.2% |
| | Year 3 | 280 | 56.0% |
| | Year 4 | 32 | 6.4% |
| **Most commonly used express delivery companies** | SHUNFENG | 108 | 21.6% |
| | JINGDONG | 125 | 25.0% |
| | ZHONGTONG | 32 | 6.4% |
| | SHENTONG | 40 | 8.0% |
| | YUANTONG | 25 | 5.0% |
| | YUNDA | 38 | 7.6% |
| | EMS | 68 | 13.6% |
| | JITU | 61 | 12.2% |
| | Others | 3 | 0.6% |
| **Use express delivery services per week** | 1-2 times | 266 | 53.2% |
| | 3-4 times | 175 | 35.0% |
| | 5--6 times | 20 | 4.0% |
| | more than 6 times | 39 | 7.8% |

### 4.2 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) can be regarded as a pivotal preliminary step in Structural Equation Modeling (SEM) (Hair et al., 2020). The reliability and validity of constructs can be assessed through CFA (Knekta et al., 2019). Convergent validity is statistically measured through Cronbach's Alpha for reliability, factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR) (Fornell & Larcker, 1981). Factor loadings above 0.50 are highly significant (Hancock & Mueller, 2013). In this study, all individual item factor loadings exceeded 0.70, ranging from 0.718 to 0.820, as illustrated in Table 3. A CR value of 0.70 or above and an AVE value greater than or equal to 0.50 are recommended (Bagozzi & Yi, 1988; Hinkin, 1998). In Table 3, all estimates are significant, with CR values exceeding the threshold of 0.7 and AVE values surpassing 0.5. Cronbach's alpha is a technique used to evaluate the internal consistency of items. A Cronbach's alpha value of 0.7 or higher indicates acceptable reliability (Hinkin, 1998). As shown in Table 3, all Cronbach's Alpha values surpass 0.7.

**Table 3:** Confirmatory Factor Analysis Result, Composite Reliability (CR) and Average Variance Extracted (AVE)

| Variables | Source of Questionnaire (Measurement Indicator) | No. of Item | Cronbach's Alpha | Factors Loading | CR | AVE |
|---|---|---|---|---|---|---|
| Operational Quality (OQ) | Gupta et al. (2023) | 5 | 0.897 | 0.759-0.819 | 0.897 | 0.635 |
| Information Quality (IQ) | Gupta et al. (2023) | 5 | 0.898 | 0.785-0.814 | 0.898 | 0.639 |
| Personnel Contact Quality (PCQ) | Zailani et al. (2018) | 5 | 0.871 | 0.730-0.781 | 0.872 | 0.576 |
| Service Ordering Procedure (SOP) | Zailani et al. (2018) | 5 | 0.896 | 0.776-0.811 | 0.897 | 0.634 |
| Price Satisfaction (PS) | Vlachos (2021) | 5 | 0.898 | 0.778-0.820 | 0.898 | 0.639 |
| Customer Satisfaction (CS) | Gupta et al. (2023) | 5 | 0.883 | 0.754-0.794 | 0.883 | 0.601 |
| Customer Loyalty (CL) | Gupta et al. (2023) | 4 | 0.847 | 0.718-0.818 | 0.847 | 0.580 |

Fit indices in Table 4 measure the model's adequacy. The indices used for measurement include CMIN/DF, GFI, AGFI, NFI, CFI, TLI, and RMSEA, with all statistical values of the CFA exceeding acceptable thresholds, thereby substantiating the measurement model's fit.

**Table 4:** Goodness of Fit for Measurement Model

| Fit Index | Acceptable Criteria | Statistical Values |
|---|---|---|
| **CMIN/DF** | < 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012) | 600.472/506 or 1.187 |
| **GFI** | ≥ 0.85 (Sica & Ghisi, 2007) | 0.935 |
| **AGFI** | ≥ 0.80 (Sica & Ghisi, 2007) | 0.923 |
| **NFI** | ≥ 0.80 (Wu & Wang, 2006) | 0.939 |
| **CFI** | ≥ 0.80 (Bentler, 1990) | 0.990 |
| **TLI** | ≥ 0.80 (Sharma et al., 2005) | 0.989 |
| **RMSEA** | < 0.08 (Pedroso et al., 2016) | 0.019 |
| **Model Summary** | | **Acceptable Model Fit** |

**Remark:** CMIN/DF = the ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index, and RMSEA = root mean square error of approximation

The discriminant validity presented in Table 5 appears satisfactory. All variables' AVE square root values are larger than their inter-construct correlations, thus making them significant.

**Table 5:** Discriminant Validity

| | OQ | IQ | PCQ | SOP | PS | CS | CL |
|---|---|---|---|---|---|---|---|
| **OQ** | **0.797** | | | | | | |
| **IQ** | 0.250 | **0.799** | | | | | |
| **PCQ** | 0.157 | 0.207 | **0.759** | | | | |
| **SOP** | 0.200 | 0.228 | 0.279 | **0.796** | | | |
| **PS** | 0.263 | 0.235 | 0.210 | 0.201 | **0.799** | | |
| **CS** | 0.361 | 0.371 | 0.333 | 0.303 | 0.281 | **0.775** | |
| **CL** | 0.241 | 0.285 | 0.215 | 0.190 | 0.331 | 0.419 | **0.762** |

**Note:** The diagonally listed value is the AVE square roots of the variables
**Source:** Created by the author.

## 4.3 Structural Equation Model (SEM)

Indicative of a good fit (Nur et al., 2022). The Goodness of Fit Index (GFI) suggests a minimum threshold of 0.85 (Wang et al., 2020). The Adjusted Goodness of Fit Index (AGFI) is deemed acceptable with values of 0.80 or higher (Al-Ghmadi et al., 2021). The Normed Fit Index (NFI), an incremental fit index, should exceed 0.80 to be considered adequate (Yaşlioğlu & Toplu Yaşlioğlu, 2020). The Comparative Fit Index (CFI) is ideal, with a value of 0.80 or higher (van Laar et al., 2021). The Tucker-Lewis Index (TLI) should be 0.80 or above, signifying a good fit (Cai et al., 2023). The Root Mean Square Error of Approximation (RMSEA) values below 0.08 represent a good fit (Savalei et al., 2023). The researchers used SPSS and AMOS version 26 for the model's SEM calculations. The fit index results for this study presented a good fit. CMIN/df = 610.720/511 or 1.195, GFI = 0.934, AGFI = 0.923, NFI = 0.938, CFI = 0.989, TLI = 0.988 and RMSEA = 0.020. Table 6 demonstrates these values.

**Table 6:** Goodness of Fit for Structural Model

| Fit Index | Acceptable Criteria | Statistical Values |
|---|---|---|
| **CMIN/DF** | < 5.00 (Al-Mamary & Shamsuddin, 2015; Awang, 2012) | 610.720/511 or 1.195 |
| **GFI** | ≥ 0.85 (Sica & Ghisi, 2007) | 0.934 |
| **AGFI** | ≥ 0.80 (Sica & Ghisi, 2007) | 0.923 |
| **NFI** | ≥ 0.80 (Wu & Wang, 2006) | 0.938 |
| **CFI** | ≥ 0.80 (Bentler, 1990) | 0.989 |
| **TLI** | ≥ 0.80 (Sharma et al., 2005) | 0.988 |
| **RMSEA** | < 0.08 (Pedroso et al., 2016) | 0.020 |
| **Model Summary** | | **Acceptable Model Fit** |

**Remark:** CMIN/DF = the ratio of the chi-square value to degree of freedom, GFI = goodness-of-fit index, AGFI = adjusted goodness-of-fit index, NFI = normalized fit index, CFI = comparative fit index, TLI = Tucker Lewis index and RMSEA = root mean square error of approximation

## 4.4 Research Hypothesis Testing Result

Researchers computed the significance of the research model based on the regression weights and R2 variance for each variable. Table 7 presents the computational outcomes, which substantiate all hypotheses of this study. Operational Quality exerts a significant influence on Customer Satisfaction (β=0.230), as does Information Quality (β=0.231) and Personnel Contact Quality (β=0.232). The Service Ordering Procedure also impacts Customer Satisfaction (β=0.130), and Customer Satisfaction, in turn,

significantly impacts Customer Loyalty (β=0.416). Additionally, Price Satisfaction is found to affect Customer Loyalty (β=0.232).

**Table 7:** Hypothesis Results of the Structural Equation Modeling

| Hypothesis | (β) | t-value | Result |
|---|---|---|---|
| H1: OQ→CS | 0.230 | 5.649*** | Supported |
| H2: IQ→CS | 0.231 | 5.412*** | Supported |
| H3: PCQ→CS | 0.232 | 4.688*** | Supported |
| H4: SOP→CS | 0.130 | 3.076* | Supported |
| H5: CS→CL | 0.416 | 7.907*** | Supported |
| H6: PS→CL | 0.232 | 5.328*** | Supported |

**Note:** *** p<0.001, * p<0.05
**Source:** Created by the author

The data in Table 7 comprehensively analyze the structural model hypotheses, providing empirical evidence to support the relationships between the variables under investigation. The results are as follows:

Hypothesis 1 (H1) proposed a significant relationship between Operational Quality (OQ) and Customer Satisfaction (CS). The path analysis yielded a standardized path coefficient (β) of 0.230, which is statistically significant with a T-value of 5.649 ($p < .001$). This result supports the hypothesis, indicating that higher levels of operational quality are positively associated with increased customer satisfaction.

Hypothesis 2 (H2) suggested that Information Quality (IQ) significantly influences Customer Satisfaction (CS). The data revealed a path coefficient of $\beta = 0.231$, significant at a T-value of 5.412 ($p < .001$). This finding underscores the importance of information quality in shaping customer satisfaction.

Hypothesis 3 (H3) examined the impact of Personnel Contact Quality (PCQ) on Customer Satisfaction (CS). The analysis produced a path coefficient of $\beta = 0.232$, significant with a T-value of 4.688 ($p < .001$). This outcome confirms the hypothesis, demonstrating the substantial role of personnel contact quality in enhancing customer satisfaction.

Hypothesis 4 (H4) posited that Service Ordering Procedure (SOP) affects Customer Satisfaction (CS). The path coefficient was $\beta = 0.130$, which is statistically significant with a T-value of 3.076 ($p < .05$). Although the effect size is smaller than other paths, it is still a noteworthy contributor to customer satisfaction.

Hypothesis 5 (H5) predicted that Customer Satisfaction (CS) would significantly influence Customer Loyalty (CL). This was the most strongly supported hypothesis, with a path coefficient of $\beta = 0.416$ and a T-value of 7.907 ($p < .001$). The result indicates that satisfied customers are highly likely to exhibit loyalty behaviors.

Lastly, Hypothesis 6 (H6) proposed that Price Satisfaction (PS) would have a significant impact on Customer Loyalty (CL). The analysis supported this with a path coefficient of $\beta = 0.232$ and a T-value of 5.328 ($p < .001$), indicating that how customers perceive the price of the value received significantly affects their loyalty.

## 5. Conclusion and Recommendation

### 5.1 Conclusion and Discussion

This empirical investigation serves as a case study focused on delineating the determinants influencing the contentment and allegiance of logistics services among Zhanjiang University students in China who interact substantially with such services. Grounded in extant literature and theoretical underpinnings, this research posits independent variables for examining satisfaction and loyalty in logistics services, drawing from three foundational model theories: the American Customer Satisfaction Index Model (ACSI), the Service Quality (SERVQUAL) Model, and the Kano Model. Unearthing the salient impact factors can facilitate logistics enterprises' pursuit of service quality enhancement, thereby augmenting consumer satisfaction and loyalty.

The research questions were meticulously crafted to realize the study's aims and construct the research's conceptual scaffold. Adopting a quantitative research methodology, this inquiry utilized a questionnaire to gather data from Zhanjiang University of Science and Technology's student body. Subsequent application of factor and correlation regression analysis on the amassed data unveiled the causative ties among the variables and the study's outcomes. The pivotal factors discerned from the findings offer a theoretical foundation for logistics firms to refine their service quality, guiding strategic adjustments and market strategy formulation and theoretically underpinning the evolution of smart and green logistics technologies.

The study's revelations posit that personnel contact quality (PCQ) is the paramount factor influencing student satisfaction with logistics services, with information quality (IQ) closely following. In terms of swaying customer loyalty (CL) for students availing logistics services, customer satisfaction (CS) emerges as the most substantial factor, followed by price satisfaction (PS). Moreover, Customer Loyalty (CL) is also indirectly influenced by elements such as Personnel Contact Quality (PCQ). These conclusions resonate with prior research by scholars like Ellitan (2023), Christian et al. (2023), and Zhang et al. (2024).

University students constitute a significant cohort of logistics service consumers, with their satisfaction and loyalty being pivotal benchmarks for service quality assessment. By pinpointing and ameliorating the critical factors that bear on satisfaction and loyalty, logistics service providers can significantly bolster the contentment and allegiance of university students, thus cultivating a stellar market reputation and a solid consumer foundation.

### 5.2 Recommendation

The data initially highlights the critical need for Logistics Service Providers to prioritize the enhancement of Operational and Information Quality. It is imperative for these providers to channel resources into streamlining operational mechanisms, ensuring the efficiency and dependability of services. In tandem, a concerted effort must be made to bolster Information Quality, guaranteeing that students receive punctual and precise order status updates via intuitive digital interfaces.

Moreover, the significance of Personnel Contact Quality as a determinant of service satisfaction mandates that logistics entities prioritize staff development. This involves equipping personnel with the requisite communication techniques and customer service competencies to deliver a bespoke and reactive service encounter.

Policymakers have a clear mandate to champion the codification and simplification of logistics service platforms. Furthermore, in light of the notable sway of Price Satisfaction on Customer Loyalty, policymakers might explore fiscal stimuli for logistics entities that propose competitive pricing frameworks, potentially in the form of tax incentives or subsidies targeted at student clientele.

Academic Institutions could forge partnerships with logistics enterprises to curate internship and research opportunities, equipping students with practical sector insights while cultivating a knowledgeable consumer cadre for the industry.

Ultimately, these strategic recommendations are crafted to foster a mutually beneficial dynamic among service providers, policymakers, and educational entities. Through concerted efforts to refine operational and informational caliber, demystify service ordering protocols, and present competitive pricing strategies, each stakeholder can synergistically amplify student gratification and cultivate a dedicated consumer cohort adept at engaging with and shaping the dynamic logistics industry.

### 5.3 Limitation and Further Study

This dissertation recognizes its limitations despite its thorough analysis of logistics services and student satisfaction in Zhanjiang, China. The study's urban focus and student-centric sampling may not reflect broader markets or consumer sentiments. Its cross-sectional nature also overlooks the temporal changes in satisfaction and loyalty.

Future research can go beyond these bounds through longitudinal studies that trace satisfaction and loyalty over time. Cross-regional or demographic studies could determine the universality of the findings. The logistics sector's technological shifts offer a frontier for exploring new services' impacts on consumer dynamics. Qualitative approaches could unearth deeper consumer insights while combining theories could provide a holistic view of consumer behavior.

The study's limitations are thus a springboard for deeper inquiry, aiming to enrich understanding and strategic development in the logistics sector.

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