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Influencing Factors of Community Logistics Service Satisfaction at Cainiao Station

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Abstract. The rise of e-commerce has led to the rapid development of community logistics in the last mile of end-to-end distribution. However, the rapidly developing community logistics also faces various management issues, especially the satisfaction of consumers with community logistics services. This article examines the factors influencing residents' satisfaction with community logistics from the perspective of consumers. Using questionnaire surveys, it collects data on residents' satisfaction with various services in the community logistics Cainiao station. Using multiple linear regression, it analyzes the impact of the five aspects of service (tangibility, reliability, responsiveness, and assurance are the three most significant indicators affecting community logistics satisfaction. This conclusion provides a reference for enterprises related to community logistics distribution to improve their logistics service quality and enhance customer satisfaction.

Keywords. Community logistics; Satisfaction; Cainiao Station; SERVQUAL model.

1. Introduction

The e-commerce market in China is consistently expanding, with online shopping having become the primary method of daily consumption for individuals. The logistics industry has rapidly developed in tandem with the increasing demand of e-commerce consumption mode [1]. The quality of logistics service directly impacts the consumer's choice of e-commerce consumption platform. The logistics services of e-commerce are increasingly becoming the main competitive field among various e-commerce platforms, especially in the community logistics at the end of logistics services. The quality of community service logistics directly influences the consumer experience and has a profound effect on their satisfaction with online shopping [2-4].

Community logistics refer to the logistical activities organized by groups of residents within a community to fulfill their daily needs. Its primary service targets are residents within the community, encompassing individuals or families, as well as different units (enterprises) [5]. Viewing community logistics from the standpoint of logistics, it is a rapidly emerging and developing type of logistics within the context of e-commerce. And from the perspective of service model, community logistics is enabled

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by modern information technology, establishing an "information highway" between consumers and suppliers.

The quality of community logistics services refers to the direct feelings customers have during the process of enjoying logistics services, and is a major factor affecting customer satisfaction [6]. It includes factors such as express delivery, packaging, personnel, and processes. Unlike general logistics services, the purpose of community logistics services is to meet the personalized and diverse shopping needs of community residents.

The research on logistics service quality evaluation methods and evaluation index systems has received a certain degree of attention in the academic community at home and abroad, and has formed a set of highly recognized measurement methods for logistics service quality, as well as diversified evaluation and analysis methods for logistics service quality. The construction and measurement of evaluation indicators are generally based on the SERVQUAL model proposed by PZB [7].

2. Construction of Indicator System for Influencing Factors

Based on previous research, combined with the logistics services provided by Cainiao Express, such as package collection, improved timeliness, and enhanced user experience, and drawing on the SERVQUAL model proposed by PZB (1988) [8], five representative primary indicators were constructed, including tangibility, reliability, responsiveness, assurance, and empathy. The relationship diagram is shown in Figure 1. Combining the content and characteristics of the logistics services provided by the community "Cainiao Station" and the specific content of the first-level indicators, the corresponding second-level indicators were reasonably adjusted, and an index system for evaluating the satisfaction of community logistics services provided by Cainiao Station was constructed, as shown in Table 1.



Figure 1. Relationship diagram of primary indicators of influencing factors.

The satisfaction index of community logistics services mainly consists of five aspects: tangibility, reliability, responsiveness, assurance, and empathy [9]. Among them, tangibility refers to the impact of the external image of community logistics on residents, mainly measured from five aspects: logistics service facilities of the community station, the appearance of service personnel, the attractiveness of facilities, the matching degree of facilities and services, and the cleanliness of the community station environment. Reliability refers to the ability of community logistics services to fulfill their service commitments with accuracy and reliability, mainly measured from five aspects: the efficiency of pickup notifications, the accuracy of item distribution, the rationality of the distribution and layout of relay stations, the flexibility of service time, and the timeliness

of service process information updates [10]. Responsiveness refers to the ability of community logistics services to meet residents' requests for mailing and picking up items in a relatively short period of time, mainly measured from four aspects: the active service awareness of the station, the waiting time for mailing and picking up items, the efficiency of handling claims issues, and the timeliness of advisory services [11]. Guarantee refers to that the community logistics service meets the requirements of residents in terms of express privacy protection, which is mainly measured from four aspects: integrity of express goods, transparency and rationality of charges, progressiveness of logistics system and security of personal information [12].

constituent elements	Influencing factors	Indicator Code	
Tangibility	logistics service facilities of the station	Al	
	the appearance of service personnel	A2	
	the attractiveness of facilities	A3	
	the matching degree of facilities and services	A4	
	the cleanliness of the station environment	A5	
	the efficiency of pickup notifications	B1	
	the accuracy of item distribution	<i>B2</i>	
Reliability	the rationality of the distribution and layout of relay stations	<i>B3</i>	
	the flexibility of service time	<i>B4</i>	
	the timeliness of service process information updates	B5	
	the active service awareness of the station	C1	
Description	the waiting time for mailing and picking up items	C2	
Responsiveness	the efficiency of handling claims issues	С3	
	the timeliness of advisory services	<i>C4</i>	
	integrity of express goods	DI	
A 2011000 0.0	transparency and rationality of charges	D2	
Assurance	progressiveness of logistics system	D3	
	security of personal information	D4	
	the diversity of courier services	E1	
Emmother	the effectiveness of communication with customers	E2	
Empathy	the level of respect for customers	E3	
	customer satisfaction with complaint handling	<i>E4</i>	
Customer satisfaction	I will consider using the community post service again		
	I will recommend my relatives and friends to use the community post service	Y	
	I am satisfied with the community post service		

Table 1. The index system of influencing factors of community logistics service satisfaction of Cainiao stations

Empathy refers to the ability of community logistics to provide personalized services that meet customer needs, measured mainly in terms of the diversity of courier services, the effectiveness of communication with customers, the level of respect for customers, and customer satisfaction with complaint handling. The secondary indicator scale evaluation is shown in Table 1.

3. Research Methods and Empirical Analysis

The SERVQUAL model is a quantitative method proposed based on the gap model of service quality, considering five indicators of service quality, and is an effective method to test the relationship between service quality and customer satisfaction. The paper proposes an indicator system of factors affecting community logistics service satisfaction based on the SERVQUAL evaluation model, and adopts the "Likert five-level scale method" to transform the indicator system into a questionnaire, and conducts a survey. The questionnaire is mainly divided into two parts: the first part is the personal information of the survey object, including five items. The second part is mainly composed of 22 logistics service quality indicator items, as shown in Table 1.It was launched through a network platform, and a total of 130 valid questionnaires were received.

3.1. Reliability and Validity Analysis

To ensure the credibility of the questionnaire survey data, the reliability analysis and testing of the questionnaire were conducted using the Cronbach's alpha method of SPSS software [13]. The test results are shown in Table 2. The closer the Cronbach's alpha value is to 1, the higher the credibility and internal consistency of the questionnaire data. It can be seen from Table 2 that the overall Cronbach's alpha coefficient is 0.951, and the Cronbach's alpha coefficients for each indicator are 0.709, 0.785, 0.745, 0.764, 0.773, and 0.701, indicating that the credibility of this questionnaire is high and the survey results are true and reliable.

Indicators	Cronbach's α coefficient	Overall Cronbach's α coefficient		
Tangibility	0.709			
Reliability	0.785			
Responsiveness	0.745	0.051		
Assurance	0.764	0.931		
Empathy	0.773			
Customer satisfaction	0.701			

Table	2.	Reliability	analysis
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Validity refers to the consistency between the survey objectives and survey results. The higher the validity, the higher the consistency [14]. To ensure the consistency between the survey objectives and survey results, it is necessary to conduct a validity analysis on the survey data. This article uses KMO and Bartett's sphericity test to measure the effectiveness of the overall scale validity. The validity analysis of the questionnaire was conducted using SPSS software, and the analysis results are shown in Table 3. The KMO value is 0.912, which is above 0.7, indicating that the survey has high validity. The Bartett's sphericity test result is 0.000, and its significance is lower than 0.001, indicating that there is a certain correlation between different scale variables.

K	0.912				
Bartlett's Test of Sphericity	Approximate Chi-squared value	1920.186			
	df	300			
	Р	0.000***			
Note: ***、 **、 * represent significance levels of 1%, 5%, and 10%, respectively					

Table 3. KMO test and Bartlett's test

3.2. Correlation Analysis

To explore the main factors affecting the satisfaction of community logistics Cainiao stations, Pearson coefficient was used to test the correlation and dependence between two distance-based variables. The correlation analysis was conducted on the customer satisfaction index system and the five influencing factors. The test results are shown in Table 4.

	Customer satisfaction	Responsiveness	siveness Tangibility Empathy		Reliability	Assurance	
Customer satisfaction	1	0.793	0.76	0.737	0.787	0.768	
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	
Responsiveness	0.793	1 0.856 0.853		0.754	0.819		
	(0.000***)	(0.000***) (0.000***) (0.000***)		(0.000***)	(0.000***)		
Tangibility	0.76 (0.000***)	0.856(0.000***)	856(0.000***) 1(0.000***) 0.855 (0.000***)		0.734 (0.000***)	0.881 (0.000***)	
Empathy	0.737 (0.000***)	0.853 (0.000***)	0.855 (0.000***)	1(0.000***)	0.749 (0.000***)	0.823 (0.000***)	
Reliability	0.787	0.754	0.734	0.749	1	0.739	
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	
Assurance	0.768	0.819	0.881	0.823	0.739	1	
	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	(0.000***)	
Note: ***, **, * represent significance levels of 1%. 5%, and 10%, respectively							

Table 4. Pearson correlation analysis

When the Pearson coefficient is above 0 and the confidence level is below 0.01, it indicates that there is a significant relationship between them [15]. All variables in the following table are below the 0.01 confidence level, indicating that the five indicators of community logistics service quality are positively correlated with customer satisfaction. This reflects the close relationship between community logistics service quality and customer satisfaction.

3.3. Multivariate Linear Regression Analysis

The above analysis verifies the reliability and validity of the questionnaire, and concludes the correlation between the five indicators and customer satisfaction. Therefore, the paper further analyzes the relationship between customer satisfaction and the five indicators using multiple linear regression analysis in SPSS software. Multiple regression analysis describes the influence of multiple independent variables on the dependent variable [16]. This article sets tangibility, reliability, responsiveness, assurance, and empathy as independent variables in the factors affecting customer

satisfaction in community logistics, and sets customer satisfaction as the dependent variable for regression analysis. The final regression constant of the equation is 0.296, the regression coefficient of responsiveness is 0.323, the regression coefficient of tangibility is 0.058, the regression coefficient of empathy is -0.044, the regression coefficient of reliability is 0.375, and the regression coefficient of assurance is 0.213. The multiple regression model of the factors affecting customer satisfaction in Cainiao logistics service is as follows:

$$Y = 0.296 + 0.323X_1 + 0.058X_2 - 0.044X_3 + 0.375X_4 + 0.213X_5.$$

Among them, Y in the regression equation represents the dependent variable, community logistics overall satisfaction, X_1 represents the independent variable, responsiveness, X_2 represents the independent variable, tangibility, X_3 represents the independent variable, empathy, X_4 represents the independent variable, reliability, X_5 represents the independent variable, assurance, and 0.296 is the constant term of the model. The specific parameters are shown in Table 5.

As shown in Table 5, the adjusted R^2 of the five indicators on customer satisfaction is 0.717, the adjusted R^2 of the five indicators on customer satisfaction is 0.717, indicating that the factors that affect community logistics service satisfaction included in the regression equation can explain 71.7% of the model, reflecting the high level of explanation of the model. This indicates that the independent variables can better explain the dependent variables. In the analysis of variance, the F value of the model is 66.276, and the significance level is 0.000, which is less than 0.05, indicating that there is a strong linear correlation between the five indicators and customer satisfaction, indicating that the model passes the significance test and is suitable for using linear regression model to analyze the correlation between the five indicators of community logistics Cainiao Station service and customer satisfaction.

	Unstandardized Sta Coefficients C		Standardized Coefficient	t	Р	VIF	R^2	R^2	F
	В	Standard Error	Beta	Ŀ	1	, 11	n	Adjust	1
constant	0.296	0.2	-	1.479	0.142	-	0.728	0.717	F=66.276 P=0.000***
Responsiveness	0.323	0.104	0.329	3.118	0.002***	5.061			
Tangibility	0.058	0.116	0.06	0.506	0.614	6.468			
Empathy	-0.044	0.097	-0.048	-0.455	0.650	5.025			
Reliability	0.375	0.076	0.379	4.928	0.000***	2.697			
Assurance	0.213	0.11	0.205	1.932	0.050*	5.142			
dependent variable: Customer satisfaction									
Note: ***、 **、 * represent significance levels of 1%, 5%, and 10%, respectively									

Table 5. Multiple linear regression analysis results

To further ensure the accuracy and reliability of the regression model, the multicollinearity of the model was tested. The VIF value represents the severity of multicollinearity and is used to test whether the model exhibits multicollinearity, that is, there is a highly correlated relationship between explanatory variables (VIF should be less than 10 or 5, strictly 5). If VIF appears inf, it indicates that the VIF value is infinite,

and it is recommended to check for multicollinearity [17].

As can be seen from Table 5, the VIF values of the five independent variables are all around or below the critical value of 5, indicating that there is no multicollinearity between the dependent variable and the independent variables, and the model is well constructed. Therefore, the multiple regression model constructed in this paper is reasonable.

In the multiple linear regression analysis, when P < 0.05, it indicates that the hypothesis is established and has good significance. In the analysis results shown in Table 5, the significance P values of the regression coefficients of tangibility and empathy are 0.614 and 0.650, respectively. Both of which are greater than 0.05, indicating that the relationship between customer satisfaction and tangibility and empathy is not significant. The significance P values of the regression coefficients of customer satisfaction and reliability, responsiveness, and assurance are all below 0.05, indicating that there is a significant positive relationship between customer satisfaction and reliability, responsiveness, and assurance.

4. Conclusion

In the above analysis, a model of factors affecting the satisfaction of community logistics Cainiao stations was constructed through the evaluation indicators proposed by PZB, exploring the relationship between each indicator and customer satisfaction. Multivariate linear regression analysis was used to verify the influence of tangibility, reliability, responsiveness, assurance, and empathy in community logistics services, providing a certain basis for improving community logistics satisfaction. According to the research data, reliability, responsiveness, and assurance are the three most significant indicators affecting community logistics satisfaction. Among the regression coefficients of all variables, the reliability coefficient is the largest, followed by responsiveness, and finally assurance. This indicates that residents have significant demands for reliability, responsiveness, and assurance in community logistics, and it is necessary to focus on improving these three aspects. Among them, residents' experience of convenience and reliability of express delivery is the most important, that is, whether the notification of pickup is timely, whether the distribution of stations is reasonable, whether the signs in the store are accurate, whether the time of pickup and delivery is flexible, and whether the goods are in good condition, which have the greatest impact on customer satisfaction.

Through the above quantitative analysis, it was found that tangibility and empathy cannot effectively affect customer satisfaction, but there are certain differences from the actual situation. The possible reasons can be attributed to the following three points: First, the insufficient sample size obtained from the recycling may make the research results less representative; second, due to the low quality of the data collected in the questionnaire, some deviations in the two dimensions of tangibility and empathy appear in the survey results; third, in reality, although the community logistics has a relatively complete system, in terms of providing services to customers, both software and hardware are not perfect, and customer complaints and other aspects of service fail to meet customer expectations. The above problems can be the direction for continuous research and improvement in the future.

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