Research on Service Quality Evaluation System Oriented to E-commerce Reverse Logistics

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Abstract

In order to effectively evaluate the reverse logistics service quality of E-commerce enterprises, based on the development needs of B2C E-commerce enterprises, this article takes JD supermarket as the research object, combines actual research and literature reading, establishes an initial evaluation index system for reverse logistics service quality, and then based on The Likert 5-level scale and principal component analysis screened the indicators, and finally established an evaluation system of 21 indicators in 5 dimensions, and finally calculated the weights of different indicators. In order to further evaluate the quality of reverse logistics services, the theoretical and model foundations are laid.

Keywords

Evaluation Index; Service Quality; Analytic Hierarchy Process.

1. Introduction

At present, with the rapid development of my country's E-commerce and logistics, the modern logistics and distribution service express industry has also developed rapidly. The situation in the E-commerce industry where there is only forward logistics and no reverse logistics has changed. The rapid development of the industry calls for E-commerce logistics to become more perfect. With the continuous progress of the logistics field, enterprises are paying more and more attention to the service and quality requirements of reverse logistics, and consumers are also beginning to understand and pay attention to the quality of reverse logistics products and services. The establishment of a reverse logistics service quality index system can establish and improve the reverse logistics service quality evaluation mechanism, and at the same time can scientifically evaluate the problems and deficiencies in the reverse logistics service quality, and then promote the development of reverse logistics services in a better development direction.

JD Logistics Group is a logistics service company under China JD Group, which can provide integrated warehousing and distribution integrated logistics solutions for small and medium-sized enterprises. JD Supermarket is a well-known company in the B2C field. With the help of JD Logistics, it can provide customers with a full range of warehousing and distribution, express delivery, cold chain, large parts, cloud logistics and other services. Constructing the reverse logistics service quality evaluation system of JD Supermarket has good reference significance for the same type of B2C E-commerce enterprises. On the one hand, it can evaluate the reverse logistics service quality of JD Supermarket's returned goods, find the weak links in the reverse service, and provide a reference for improving the reverse logistics service quality. On the other hand, it can also provide references for other B2C E-commerce companies to increase consumption. The user experience and satisfaction of the users have improved the competitiveness of B2C E-commerce companies.

In summary, this article takes JD supermarket as the research object, combines actual research and literature reading, establishes an initial evaluation index system for reverse logistics service quality, and then selects the indicators based on Likert's 5-level scale and principal

component analysis. Finally, an evaluation system of 21 indicators in 5 dimensions is established, and the weights of different indicators are finally calculated. In order to further evaluate the quality of reverse logistics services, the theoretical and model foundations are laid.

2. JD Supermarket Reverse Logistics

Reverse logistics is a logistics activity generated by the movement of goods from downstream to upstream in the supply chain. It is a new type of logistics strategic system resulting from the continuous improvement and development of the logistics system. It mainly includes two aspects of waste recycling and return. Reverse logistics is mainly used to make up for the recovery, return and recycling of waste products that are difficult to solve in traditional logistics. The objects of reverse logistics freight can be products, but also product packaging. Reverse logistics focuses on products that are no longer needed or products that are no longer used, and obtain economic benefits through recycling, reuse, and remanufacturing. This is another trend in the relationship between freight transport and urban residents, and it is also related to waste management and citizens' use of products. Activities related to recycling, reuse and disposal.

This article takes JD Logistics Group as the analysis object. JD Logistics Group is the only company in the world that has six major logistics service networks under China JD Group. Established in 2017, through a well-designed integrated warehousing and distribution logistics network across the country, it provides small and medium-sized enterprises with integrated warehousing and distribution integrated logistics solutions, which can provide customers with a full range of warehousing and distribution, express delivery, and cold chain. Large parts, cloud logistics and other services.

After JD Supermarket returns to the warehouse, the goods are divided into three categories according to certain standards. One is the products on sale, which are in good condition and can be directly repaid to the JD warehouse; the second is the off-shelf product, which is not on sale; third This is a product on sale, and the customer has no reason to return it. The products of the latter two categories are sent to the supplier through logistics after the manufacturer agrees to receive it. The supplier performs secondary sorting according to its own standards, and the supplier arranges the products according to a fixed proportion to deduct the payment, which is a virtuous cycle.

3. Construction of Index System based on Analytic Hierarchy Process

3.1. Index System Construction

According to the previous representative literature, the evaluation indicators of logistics service quality in previous studies (E-commerce) are summarized. According to the expert analysis method, the design of the evaluation service system structure for E-commerce reverse logistics includes five first-level indicators, namely communication quality, information quality, return quality, convenience, and empathy quality.

①Communication quality refers to the ability of customer service personnel to respond promptly to customer questions and answers, respond friendly to the return request, and whether they can actively inquire about the customer's return and exchange requirements and satisfaction. This article divides the communication quality into five indicators: timeliness of communication, communication attitude, communication channels, complaint handling, and communication initiative.

②Informative. For B2C E-commerce, ensuring the quality of information is the most important and basic standard. Information quality means that JD Supermarket can provide customers with complete, accurate, reliable, instant and fast logistics information. This paper retains the information quality dimension in the LSQ model, and the indicators are respectively set as four

indicators of completeness of logistics information, reliability of logistics information, immediacy of logistics information, and timeliness of refund information.

③ Convenience. Due to the virtual nature of E-commerce shopping, consumer experience is gradually included in decision-making factors by managers, and service convenience is an important part of consumer experience. For return reverse logistics services, the convenience of the return process refers to the simplification of the return flow process and procedures by the merchants, so that consumers perceive the convenience of the entire return process. This article mainly measures the efficiency of the return process and whether the merchant tries to provide customers with convenience.

④ Empathy. Empathy means that in the process of return flow service, companies and service personnel can provide customers with care and consideration, consider customer needs, understand customer needs and meet customer needs, attach importance to customer interests and provide customers with personalized services. On the basis of reference materials, this article divides empathy into personalized service, system and customer service actively reminding the return time, merchants' priority for customer benefits, error processing time in the return process, exclusive privileges for members, and appropriate return visits six indicators of the mechanism.

⑤The quality of return processing. Handling returns well can help B2C E-commerce companies enhance customer satisfaction, improve customer experience, and increase customer loyalty. The quality of return processing in this article is combined with the reverse logistics process of JD Supermarket, including six dimensions of rationality of return policy, response speed of return processing, diversity of return methods, reliability of return promise, reasonable return cost, and reasonable return conditions.

3.2. Index Adjustment

Table 1. CITC index and Cronbach's Alpha coefficient

variable	Item	CITC	Deleted Cronbach's Alpha value	Cronbach's Alpha
Communication quality	GT1	0.922	0.935	0.955
	GT2	0.933	0.933	
	GT3	0.906	0.939	
	GT4	0.829	0.953	
	GT5	0.789	0.958	
Informative	XX1	0.873	0.900	0.931
	XX2	0.881	0.896	
	XX3	0.897	0.891	
	XX4	0.717	0.948	
Return processing quality	TH1	0.812	0.903	0.922
	TH2	0.786	0.907	
	TH3	0.787	0.908	
	TH4	0.352	0.922	
	TH5	0.816	0.901	
	TH6	0.798	0.905	
Convenience	BL1	0.738		0.847
	BL2	0.737		
Empathy quality	YQ1	0.958	0.933	0.957
	YQ2	0.941	0.936	
	YQ3	0.885	0.891	
	YQ4	0.831	0.842	
	YQ5	0.473	0.954	
	YQ6	0.752	0.965	

In the pre-testing stage, based on the dimensions and indicators in the reverse logistics service quality system, the 23 evaluation indicators in the reverse logistics service scale are measured using Likert's 5-level scale. Distributing through two forms of paper-based online questionnaires on the spot. A total of 150 questionnaires were issued during the pre-test, and 132 were returned, of which 112 were valid questionnaires. Use spss19.0 to analyze the data, and the results are shown in Table 1. It can be seen that, except for TH4 and YQ5, the CITC values of the other 21 items are all greater than 0.5, and Cronbach's α values are all greater than 0.8, satisfying the criterion of greater than 0.7. After deleting a certain item, the Cronbach's α value does not increase significantly, indicating that the data There is good reliability, so items TH4 and YQ5 are deleted.

After excluding items, the validity of 21 item samples is analyzed, and KMO and Bartlett's sphere test are used to test first. The analysis results show that the KMO value is greater than 0.9, greater than the acceptable reference value of 0.7, and the P value of Bartlett's sphericity test is 0, indicating that the sample can be subjected to factor analysis.

3.3. Factor Analysis

This article uses principal component analysis and factor orthogonal rotation in exploratory factor analysis. The principal component analysis method was used to analyze the factors of 21 items in the scale, and 21 stable items were extracted using the standard of factor feature value greater than 1. On this basis, the 21 factors are analyzed and classified by second-order factors, and a total of 5 main factors are extracted, which can explain about 84.291% of the information of the original structure. The explanation of the total variance and rotation matrix is shown in Table 2. From Table 2 to explain the total variance table, 5 factors can be extracted, and the results are consistent with the number of latent variables in the theoretical model. The data obtained by the questionnaire fits well with the theoretical model, which shows that the research in this paper is feasible.

Table 2. Cumulative variance explained

Element	Initial eigenvalue			Extract the sum of squares			Rotated sum of squares		
	total	variance %	accumulation %	total	variance %	accumulation %	total	variance %	accumulation %
1	11.358	54.087	54.087	11.358	54.087	54.087	4.605	21.929	21.929
2	2.115	10.073	64.160	2.115	10.073	64.160	4.463	21.251	43.180
3	1.846	8.791	72.951	1.846	8.791	72.951	3.782	18.011	61.192
4	1.340	6.382	79.333	1.340	6.382	79.333	2.956	14.074	75.266
5	1.041	4.958	84.291	1.041	4.958	84.291	1.85	9.025	84.291

Table 3 uses the maximum variance method to orthogonally rotate the factors. After 6 iterations of convergence, a more satisfactory component matrix is obtained. Combined with the meaning of the indicators represented by each item, the five main factors are "return service quality" and "information". "Sexuality", "Quality of Communication Service", "Empathy" and "Convenience".

After the pre-test, through the reliability and validity analysis of the pre-test data, the feasibility of the questionnaire can basically be determined, and the exploratory factor analysis results are consistent with the dimensions of the initial index system, so the service quality of the reverse logistics of E-commerce For evaluation, an indicator system consisting of 5 dimensions and 21 indicators can be established, as shown in Table 4.

Table 3. Rotation component matrix

	Ingredients				
	1	2	3	4	5
GT1			0.731		
GT2			0.746		
GT3			0.825		
GT4			0.707		
GT5			0.752		
XX1		0.668			
XX2		0.688			
XX3		0.798			
XX4		0.815			
TH1	0.882				
TH2	0.859				
TH3	0.850				
TH4	0.841				
TH5	0.803				
YQ1				0.903	
YQ2				0.876	
YQ3				0.852	
YQ4				0.818	
YQ5				0.742	
BL1					0.882
BL2					0.917

Table 4. Evaluation System

Dimension	Index	Dimension	Index	Dimension	Index
Communicative	Timeliness of communication	Informative	Availability	Return processing quality	Policy rationality
	Communication quality		reliability		Processing response speed
	Communication channel		Immediacy		Way diversity
	Handling of complaints		Timeliness		Return speed
	Communication initiative				Reasonable cost
Convenience	Convenience of the return process	Empathy quality	Personalized service		
			Reminder of return time		
			Merchants prioritize customers		
	Convenient pick-up time		Member exclusive privileges		
			Error handling in the return process		

3.4. Determination of the Index Weight of the Evaluation Model

The methods of using questionnaire data to determine weights include factor analysis, linear regression and so on. According to the basic principle of the analytic hierarchy process, according to the characteristic indexes in the hierarchical structure, pairwise comparison and quantification constitute the corresponding judgment matrix. The eigenvector method is used to determine the weight value of each index. The results are shown in Table 5.

Table 5. Index system weight

Dimension	Dimensional weight	Dimension	Dimensional weight
Communication quality	0.201	Timeliness of communication	0.195
		Communication attitude	0.202
		Communication channel	0.197
		Handling of complaints	0.202
		Communication initiative	0.204
Informative	0.212	Availability of logistics information	0.255
		Logistics information reliability	0.263
		Logistics information	0.244
		Timeliness of logistics information	0.238
Return processing quality	0.220	Reasonable return policy	0.191
		Response speed of return processing	0.193
		Variety of return methods	0.222
		Return speed	0.183
		Reasonable return cost	0.211
Convenience	0.177	Convenience of the return process	0.509
		Convenience of pickup time	0.491
Empathy quality	0.190	Personalized service	0.211
		Reminder of return time	0.211
		Merchants prioritize customers	0.199
		Member exclusive privileges	0.199
		Error handling in the return process	0.180

4. Conclusion

This article takes JD supermarket as the research object, combines actual research and literature reading, establishes an initial evaluation index system for reverse logistics service quality, and then selects the indicators based on Likert's 5-level scale and principal component analysis, and finally establishes 5 An evaluation system of 21 indicators in three dimensions, and finally the weights of different indicators are calculated. The results show that among the five first-level indicators, the quality of return processing occupies a greater weight, thereby laying a theoretical and model basis for further evaluating the quality of reverse logistics services.

Acknowledgments

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