Empirical Study of Express Logistics Service Quality –A Survey of Changdao County Express Sector

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Abstract. This study investigates the express logistics service quality in Changdao County by scales developed according to SERVQUAL and LSQ theoretical models. By exploratory factor analysis, the service quality scale yields five factors including *reliability*, *protection*, *security*, *empathy* and *perception*. Then, according to the differences between customers' expected and perceived values, this paper evaluates the express logistics service quality, and finds that customers place difference emphasis on the constructs, and the expected values are significantly different from the perceived ones. Finally, the implications of the research findings and suggestions are discussed.

Introduction

With the increase of market offerings of express delivery companies, logistics quality excellence has become an important source of competitive advantage. As of the first half of 2013, Chinese online retailing market scale reached 7542 billion RMB, online shopping customers reached 2.77 billion, national express service companies above designated size volume totaled 38.4 billion, an increase of 60.6% [1]. However, the overall satisfaction of 2012 online express service is only 39.8% [2]. In the pursuit of competitiveness, express companies are aware of the importance to identify the demands of customers. Traditionally, managers have paid much attention to moving and delivering parcels. But express logistics services can be leveraged to create more values for both companies and customers.

There are many definitions and descriptions of how logistics creates customer satisfaction, and scales developed have been used to qualify service performance [3-6]. Many researchers have adopted the service quality questionnaires known as SERVQUAL that pertain to the issues of service quality [7].

As announced by Taobao.com in 2012, the purchasing power of online shopping in counties and towns is higher than that in urban cities. As for Changdao County of Yantai City in Shandong Province, the average expenditure of online shopping was 6702.12 RMB, ranking the first among the counties of Shandong province [8].

The purpose of this research is to investigate the express logistics service quality in Changdao County by scales developed according to SERVQUAL and LSQ models. The results may enhance the knowledge about the customers and provide more information on the gap between customers' expectations and perceptions, which may be the sources of express logistics excellence.

Research Design

Changdao County is located on an island in Yantai City of Shandong Province, and its express sector is growing exponentially. However, the customer satisfactions are very low. As many researches studied customers of express sector in large cities, demands of those in counties are neglected. During this study, Changdao's business environment was becoming increasingly competitive as customers were given diversified choices in express service providers. Thus, the

conclusions drawn in this research may help express companies improve the measurement and management of their logistics customer service in order to compete more effectively.

The study was accomplished by conducting a questionnaire survey. The first step was an effort to understand the logistics service quality needs of the customers of express companies in Changdao by interviews. Then, dimensions of the scale specific for this particular island county were developed, and survey instrument items were derived. Followed by modifications and a pre-testing, the scale of Changdao express logistics service quality was constructed, including reliability, responsiveness, flexibility, perception and empathy (25 items). All items used a standard 5-point Likert-type scale ranging from strongly disagree (1) to strongly agree (5).

The research team member distributed 220 questionnaires to the customers of express logistics providers in Changdao County. Finally, 181 questionnaires were collected and 137 were valid, representing the effective rate of 62.3%.

Of the respondents, 73 of the respondents were male (53.3%) and 64 were female (46.7%). The majority of respondents (41.6%) were of the age between 21 and 29. 26.4% of the respondents used the service of Shentong, 26.0% used Yuantong, 13.0% used YunDa, and 12.0% used EMS.

Empirical analyses

Exploratory factor analysis. First, the value of the KMO measure test is 0.916, P value of Bartlett spherical test is .000, showing that the sample data are suitable for factor analysis. The Cronach's alpha coefficient for each contract is higher than 0.800, and the total Crobach's alpha coefficient reaches 0.959, representing acceptable reliability.

Principle component analysis (PCA) with Varimax rotation is used. Items with factor loadings of less than 0.500, or items that do not load any factor or load on different factors are eliminated. Eigenvalue for all factors should be higher than 1. After deleting two items, five factors are extracted with the cumulative explained variance of 74.193%, and are conceptualized as *empathy*, *reliability*, *perception*, *protection* and *security* (As shown in Table 1).

Table 1 Results of exploratory factor analysis

Factor name	Range of factor loading	Eigenvalue	The cumulative explained variance (%)	Crobach's alpha
Empathy(6 items)	0.673-0.892	12.761	19.653	0.918
Reliability (7 items)	0.558-0.788	2.117	37.884	0.922
Perception (5 items)	0.697-0.803	1.553	54.899	0.928
Protection (3 items)	0.609-0.829	1.075	65.186	0.811
Security(2 items)	0.821-0.830	1.043	74.193	0.801

Weight determination. Based on factor analysis, we further determined the weights of each construct. First, 87 customers were selected to score the importance of express logistics service quality ranging from 1 to 5, then the mean of each construct was obtained. The result was: *Reliability*(4.616)> *Protection*(4.554)>*Security*(4.458)>*Empathy*(4.265)>*Perception*(4.170). Finally, multiplication scale method was used to determine the weights of the dimension [9] (As shown in Table 2).

Factor loading in the rotated factor loading matrix was selected to decide the specific weight of each item. The normalized processing was used to make $\sum_{i}^{m} W_i = 1$ for the factor loading of specific item.

Evaluation of express logistics service quality

Data analysis. According to the formal express service quality rating system of Changdao County, a total of 300 questionnaires were issued once again. Later, 236 questionnaires were got and 199 questionnaires were valid (the effective rate of 66.3%).

Through the sample data analysis, the means of expected and perceived values are got (as shown in Table 2). The least five differences are u_{19}, u_{12}, u_{21}, u_{20} and u_3, while the top five differences are u_{10}, u_{18}, u_5, u_6 and u_{15}, indicating the problems by express companies now.

Table 2 Express customer expected-perceived values

Dimension	Weight (W_y)	Specific index	Weight (W_{ye})	Mean of expected value	Mean of perceived value	Difference	Sort order
Reliability (Y_1)	0.335	u_1 Timely arrival reminding	0.169	4.640	3.920	-0.720	12
		u_2 Sending(receiving) timeliness	0.152	4.547	3.867	-0.680	10
		u_3 Sending(receiving) accuracy	0.151	4.587	4.053	-0.534	5
		u_4 Updating information timely	0.141	4.440	3.787	-0.653	9
		u_5 Express processing when the weather doesn't allow navigation of the ship	0.134	4.347	3.480	-0.867	21
		u_6 Shipping express protection	0.134	4.573	3.720	-0.853	20
		u_7 Error handling capacity	0.120	4.600	3.773	-0.827	18
Protection (Y_2)	0.248	u_8 Claims timely and reasonable	0.380	4.520	3.707	-0.813	17
		u_7 Complaint handling	0.340	4.413	3.653	-0.760	15
		u_{10} Reasonable price (land and water transportation)	0.280	4.760	3.707	-1.053	23
Security (Y_3)	0.183	u_{11} Personal information security	0.503	4.533	3.987	-0.546	6
		u_{12} Social service security	0.497	4.333	4.067	-0.266	2
Empathy (Y_4)	0.135	u_{13} Providing door-to-door service	0.199	4.080	3.284	-0.796	16
		u_{14} Personalized care	0.174	4.000	3.267	-0.733	13
		u_{15} Active willingness to help customers	0.172	4.227	3.390	-0.837	19
		u_{16} Diversity in distribution	0.154	4.160	3.453	-0.707	11
		u_{17} Focusing on clients' interests	0.151	4.213	3.467	-0.746	14
		u_{18} Understanding customer needs	0.150	4.253	3.373	-0.880	22
Perception (Y_5)	0.099	u_{19} Staff image	0.212	3.680	3.587	-0.093	1
		u_{20} The staff service attitude	0.206	4.413	3.880	-0.533	4
		u_{21} Office facilities in good condition	0.203	3.907	3.467	-0.440	3
		u_{22} The staff knowledge level	0.195	4.293	3.680	-0.613	7
		u_{23} Standardization of employee jobs	0.184	4.480	3.867	-0.613	8

Service quality calculation. According to the above data analysis and SERVQUAL model, the average customer expectations (*ACE*) and average customer perceptions (*ACP*) are calculated. Then, the score of express logistics service quality (*ELSQ*) is calculated. The results are as followed.

$$ACE = \sum_{y=1}^{n} W_y \sum_{e=1}^{t} W_{ye} \overline{Q}_e = 4.432. \tag{1}$$

$$ACP = \sum_{y=1}^{n} W_y \sum_{e=1}^{t} W_{ye} \overline{G}_e = 3.750. \tag{2}$$

$$ELSQ = \sum_{y=1}^{n} W_y \sum_{e=1}^{t} W_{ye} \left(\overline{G}_e - \overline{Q}_e \right) = -0.682. \tag{3}$$

Where W_y means the weight for each construct; W_{ye} means the weight for each item of each construct; n means number of constructs; t means number of specific items.

Results analysis

Generally speaking, the mean of customer expectations is 4.432, but that of perceptions is 3.750. Total score of actual express logistics service quality was -0.682, less than 0.000. By means of paired sample T test about expectation and perception values, the result shows a significant difference ($sig.<0.05$). It means that there is a big gap between the customers' expectations and perceptions, which leads to customer dissatisfaction. (As shown in Table 3)

Table 3 The paired samples T test

Expectation — Perception	Paired difference					t	df	Sig. (bilateral)
	Mean value	Standard deviation	Standard error of the mean	The difference of the 95% confidence interval				
				Lower limit	Upper limit			
	0.646	0.205	0.091	0.392	0.900	7.063	4	0.002

The result shows as followed: Y_3 (*Security*)$>Y_5$ (*Perception*)$>Y_1$ (*Reliability*)$>Y_4$ (*Empathy*)$>Y_2$ (*Protection*). Among them, the biggest difference is reflected in Y_2 (*Protection*). Changdao County is located on an island, and the water transportation is the weakness of the logistics service. From interviews, we learn that customers are dissatisfied with additional charge. Problems in the protection and management of marine section were the main reason resulting in such a considerable gap in Y_1 (*Reliability*), on the one hand, parcels couldn't be well packed in order to avoid moist, damage and pollution, on the other hand, express providers couldn't make plans in time to avoid such problems of delays caused by wind or fog. Meanwhile, the minimum differences are reflected in Y_3 (*Security*) and Y_5 (*Perception*), which indicates that customers are generally satisfied with the two dimensions, mainly reflected in u_{12}, u_{19}, u_{20} and u_{21}; Y_4 (*Empathy*) which ranked fourth on the difference, indicating that customers were not satisfied with it. By interviews with customers, the main complaints come from the less customized services provided by the companies, for example, they don't provide door-to-door services.

Conclusion

Three helpful conclusions could be drawn from this study. First, service quality scale of express logistics providers in Changdao County is conceptualized as five constructs: *reliability, protection, security, empathy* and *perception*. Second, the weight of each constructs is determined as followed: *Reliability>Protection>Security>Empathy>Perception*. Third, the empirical results show that the expected values of customers are significantly different from the perceived values, showing that customers are not satisfied with the service quality of express logistics providers in Changdao.

Based on the above conclusions, the express logistics quality is a complex concept that addresses these five components, which demands a great deal of attention and efforts from companies. This study also finds that express logistics quality is a process where customers' perceptions begin to form and develop from the order placement to service completion, and they may place difference emphasis on the service quality. Therefore, it is imperative for express providers to identify and assess the weights their customers place on the constructs. Furthermore, they should pay more attention to the weakness such as the shipping link, claims and freight, lack of door-to-door

service and customer complaints.

Two important study limitations should be presented. First, the scale developed in this study may need further testing. Second, the sample in this study was drawn from Changdao County, thus, the conclusions inferred may not be generalized to other regions.

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