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An Empirical Study on China's Express Service Quality Based on Refined Servqual Model: A Case in Yangtze River Delta

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Abstract: This article aims to refine the traditional SERVQUAL model and promote a more suitable one to evaluate China's express service quality. As the current indicators and dimensions in traditional SERVQUAL model hardly evaluate the China's express quality properly, the refined model which is more compatible to China's express status in Yangtze River Delta, would solve this problem. With Likert Scale, we deliver questionnaires and apply principal component analysis to reevaluate 22 indicators of conditional SERVQUAL model. This study later combines two traditional dimensions-empathy and assurance-into a new dimension named credibility, retains three previous dimensions of the model: Reliability, tangible, responsiveness and adds a new dimension called accessibility. Meanwhile, the article performs reliability test, validity test and dimension test to the refined model which all have reasonable results.

Key words: Chinese express service quality, SERVQUAL model, principal component analysis, likert scale

INTRODUCTION

Chinese express industry has developed rapidly in recent years. Even in the context of global economic slowdown, Chinese express industry retains an incredible development in 2012: the business volume reached 5.69 billion by national-scale express enterprises with a year-on-year growth of 54.8%; moreover, the business income reached 105.53 billion yuan with an increase of 39.2%.

Express service quality has become an essential factor in the increasingly fierce competition of the express industry. According to PIMS research report, the enterprises that provide good services could obtain up to 8% of commercial profits (Gale, 1992) as well as achieve a market share higher than the average share (Buzzell and Gale, 1987) and average profitability (Phillips *et al.*, 1983). When it comes to the study of Service Quality Evaluation, PZB (Parasuraman *et al.*, 1985), a combination of researchers studying service quality in the United States, proposed SERVQUAL scale. In the academic world in China, however, most scholars try to explore the service quality from a macro perspective. Yan (2001) conducted service quality analysis with market structure theory of industrial organization theory analysis of the quality of service. Xue *et al.* (2006) analyzed from the view of industrial economics and Li (2006) analyzed the present situation of China's express delivery market. Other

scholars also study the service quality of the express industry from a microscopic view: Zhuo *et al.* (2008) made the first attempt to introduce SERVQUAL model to an international express enterprise-FedEx. Through empirical research to explore the factors that enhance the service quality, Zhuo's study was to some degree groundbreaking.

However, the dimensions and the validity of the SERVQUAL model in current studies are lacking in verification. Moreover, data samples limited applications from their conclusions. Therefore, to obtain the more reasonable evaluation dimensions, this paper applies service quality (SERVQUAL) model to China's express industry and seek a more appropriate and applicable method for the assessment of service quality.

SERVQUAL MODEL

SERVQUAL measures the gap between customer expectations and experience. The basic assumption of the measurement was that customers can evaluate a firm's service quality by comparing their perceptions with their expectations. By the early 1990s, the authors had refined the model to the useful acronym RATER. Here the five major dimensions are shown as follows:

- **Reliability:** Ability to perform the promised service dependably and accurately

- **Assurance:** Knowledge and courtesy of employees and their ability to inspire trust and confidence
- **Tangibles:** Physical facilities, equipment and appearance of personnel
- **Empathy:** Caring, individualized attention the firm provides its customers
- **Responsiveness:** Willingness to help customers and provide prompt service

With EXCEL and SPSS 17.0, we found that the original five dimensions could hardly be very appropriate to explain the current situation of service in China's express industry. This paper introduces another dimension, accessibility, into the previous SERVQUAL model which turns out to be six dimensions in total. Accessibility refers to the degree that how easily consumers can contact or get in touch with the staff of express enterprises and whether it is convenient to obtain timely information or whether it is easy to fulfill the demand for services. In this way, we acquired a new six-dimension SERVQUAL evaluation system to evaluate the service quality of China's express industry.

METHODOLOGY

Present study transferred all the original negative issues into positive ones in SERVQUAL scale with reference to the relevant literatures and refined questionnaire of PZB. In this study, we designed a questionnaire covering 6 major dimensions and 22 indicators. For convenience, we applied five-point Likert scale (1) Strongly disagree, (2) Do not agree (3)

Uncertain, (4) Agree; To make the questionnaires more practical and to obtain more reliable data, we modified some of the original questions of several indicators. The refined express industry service quality system is shown in Table1.

As China's express industry has an early start in Yangtze River Delta and is highly developed currently with relatively mature service type, the subjects of our questionnaires are mainly the express consumers in Yangtze River Delta. The questionnaires were distributed by paper distribution, mail and online questionnaires. We sent 300 questionnaires totally, in which 250 questionnaires were sent via internet and mail (202 of them were returned and 159 of them were valid) and 50 were distributed by paper questionnaires (50 were returned and 48 of them were valid). Therefore, our survey received 252 questionnaires and 207 of them were valid with the effective rate of 82.14%.

By statistical methods such as descriptive statistic, paired t-test, principal component analysis, our paper analyzed and improved reliability, validity and dimensions of indicators in the original SERVQUAL model.

DATA ANALYSIS AND TESTING

To reflect the representativeness of the data collected, we analyzed the basic information of 207 questionnaires respondents. The results indicated that both genders of respondents are roughly balanced. Besides, we found that the age of respondents mostly ranges from 20 to 29 which indicates that young groups are the main customers of express service. The education

Table 1: Indicators of express industry service quality

Dimensions	Second grade indicators	
Tangibles	A1	Express companies have modern facilities and good environment
	A2	Transport apparatus are advanced and fast
	A3	Staff's uniforms have a logo of their company and they wear a card of their own
Reliability	A4	Express companies are able to complete the delivery service accurately
	A5	No loss of mails during the delivery
	A6	No damage of mails in halfway
	A7	Mails can be delivered fast and on time
	A8	Receipt and send of mails are accurate with correctly recorded waybill
Responsive-ness	A9	Convenient to track and inquire the mails
	A10	Receive or send mails with a short time waiting in line
	A11	Express staff are willing to help customers in a timely manner
Assurance	A12	Express companies have good images; customers trust the express companies and fell comfortable
	A13	The express service staff have high professional levels
	A14	Staff have friendly attitudes and good manners
	A15	Service personnel is worthy of trust by customers
Empathy	A16	Express enterprises give priority to the interests of customers
	A17	Attach great importance to customer's problems
	A18	Reasonably handle customer complaints and other issues
	A19	Enterprises and service personnel provide customers personalized attention and services
Accessibility	A20	Timely provision of door-to-door delivery service
	A21	Service hot line and relevant service website are convenient and available
	A22	Customers have good communication with express staff

Table 2: Paired samples test

		Paired differences			95% confidence interval of the differential				
		Mean	Std. Deviation	Std. Error mean	Lower	Upper	t	df	Sig.
Pair 1	Expected-perceived quality	1.0868E0	1.9325E-1	4.2171E-2	9.9884E-1	1.1748E0	25.77	20	0.000

Table 3: Results of reliability analysis

Reliability statistics		
Cronbach's alpha	Cronbach's alpha based on standardized items	Term
0.911	0.912	22

Table 4: Validity of test results

KMO and Bartlett's Test		
Kaiser-meyer-olkin measure of sampling adequacy		
		0.889
Bartlett's test of sphericity	Approx. Chi-Square	2009.329
	df	231.000
	Sig.	0.000

of respondents covers different levels in which junior school and undergraduate accounting for 94.20%. Moreover, the frequency of express use is mostly once or twice per month, indicating a relatively high frequency by Chinese consumers. With paired T-test to samples, we eventually obtain results in Table 2.

The table above showed that the significance probability of the two-tailed T-test is less than 0.001. Thus we recognize that there is a significant difference between customer expectations and perception of service quality. Therefore, GAP theory model of PZB is feasible to measure the quality of express service.

Reliability analysis: Reliability here refers to the ability of a scale to perform and maintain its functions in routine circumstances, as well as hostile or unexpected circumstances. In order to test the reliability of the new model, we usually apply Cronbach's coefficient to test it. Generally, if Cronbach's coefficient is greater than 0.9, the scale is considered to have a high internal reliability.

Table 3 shows the reliability analysis of customers' perceived service quality data. The Cronbach's alpha coefficient is 0.911 and Cronbach's alpha coefficient based on standardized items is 0.912 which are both higher than 0.9, indicating our questionnaires have a high internal consistency.

Validity analysis: Validity is defined as the extent to which the instrument measures what it purports to measure. Here we mainly applied KMO (Kaiser-Meyer-Loki) and Bartlett's sphericity test to determine whether these variables are suitable for factor analysis. Results are shown in Table 4.

The results showed that the scale significance level is 0.000. Therefore, we considered that there is significant

difference between the correlation matrix and the unit matrix. Meanwhile, the KMO value is 0.889 which is greater than 0.5. According to KMO metric given by Kaiser, this result demonstrates that the validity of original variables is relatively high which is suitable for factor analysis.

Dimensional analysis: In this study, we use Principal Component Analysis (PCA) to conduct variance maximization orthogonal rotation. With SPSS 17.0, we found that the cumulative variance contribution rate of male factor is 61.858%.

In addition, as Tracey *et al.* (1999) view that, unless an indicator is greater than 0.5 in one factors loading and other indicators are less than 0.4, we should delete the indicator.

The results from Rotated component matrix indicated that A3, A11 and A22 did not meet the requirements of the filter criteria, so we deleted them.

Conducting the same component analysis again after the deletion, we found that the accumulated variance contribution rate reached 65.816% as shown in Table 5. Here the dimensions we obtained meet the requirement of the filter criteria as is shown in Table 6.

From the Table 6, we found that A1 and A2 are indicators of the third principal component dimension; A4-A8 are indicators of the second principal component dimension; A9 and A10 are indicators of the dimension's indicators. In order to fourth dimension while A12-A19 are indicators of the first dimension; A20 and A21 are fifth principal component retain consistence of the traditional SERVQUAL scale, we entitled the principal components 2, 3 and 4 as reliability, tangibles and responsiveness. Principal component 1 is a combination of assurance and empathy which in this paper we named it "credibility". Moreover, we entitle the fifth dimension "accessibility" which is a new name different from the original SERVQUAL model. In sum, this paper improved the previous five dimensions of the traditional SERVQUAL model by combining two old dimensions into a new one.

In addition, as is shown in Fig. 1, we put five refined SERVQUAL dimensions and their correlated secondary indicators into a figure with the validity of each indicator. In this way, we were able to reveal the applicability of the improved model. Figure 1 indicates that the score of each secondary indicator is higher than 0.6 which is

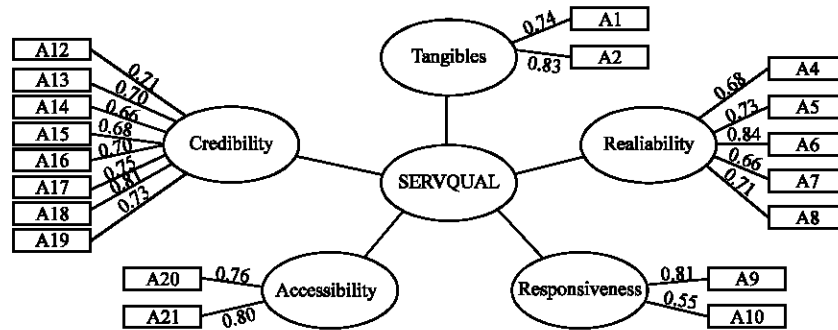


Fig. 1: New SERVQUAL dimensions and factor loading of secondary indicators

Table 5: Explained total variance by factor analysis

Component	Total variance explained								
	Initial eigenvalues			Extraction sums of squared loadings			Rotation sums of squared loadings		
	Total	Variance (%)	Cumu-lative (%)	Total	Variance (%)	Cumu-lative (%)	Total	Variance (%)	Cumu-lative (%)
1	6.992	36.801	36.801	6.992	36.801	36.801	4.708	24.780	24.780
2	2.167	11.403	48.204	2.167	11.403	48.204	3.298	17.359	42.138
3	1.256	6.610	54.814	1.256	6.610	54.814	1.600	8.420	50.558
4	1.082	5.696	60.510	1.082	5.696	60.510	1.470	7.735	58.293
5	1.008	5.306	65.816	1.008	5.306	65.816	1.429	7.523	65.816
6	0.804	4.234	70.050						
...
19	0.191	1.005	100.000						

Extraction method: Principal component analysis

Table 6: Rotated component matrix

	Component										
	1	2	3	4	5	A12	0.707	0.127	0.014	0.167	0.082
A1	0.256	0.259	0.736	0.103	-0.142	A13	0.698	0.256	0.035	0.185	0.154
A2	0.129	0.192	0.832	0.110	0.182	A14	0.659	0.247	-0.010	0.266	0.203
A4	0.094	0.679	0.257	0.114	0.087	A15	0.675	0.284	-0.015	0.290	0.058
A5	0.154	0.733	0.176	0.161	-0.082	A16	0.757	0.004	0.125	0.115	0.089
A6	0.245	0.841	0.018	-0.075	0.027	A17	0.755	0.054	0.269	-0.072	0.033
A7	0.285	0.663	0.112	0.101	0.122	A18	0.806	0.089	0.207	-0.069	0.082
A8	0.024	0.711	0.072	0.224	0.094	A19	0.732	0.239	0.104	0.039	0.153
A9	0.153	0.183	0.268	0.813	0.055	A20	0.279	0.282	0.170	-0.175	0.760
A10	0.315	0.366	-0.036	0.548	0.096	A21	0.216	-0.065	-0.077	0.330	0.796

recommended by relevant literatures. This result illustrates that indicators of each dimension has relatively high differentiation validity.

CONCLUSION

With the empirical analysis through a questionnaire survey, we applied SERVQUAL model to service quality of China’s express industry, specifically to service quality in the Yangtze River Delta region. Then we obtained a more appropriate SERVQUAL model based on improving several dimensions. Meanwhile, this paper verified the reliability, validity and dimensions of the new model and the results were satisfying.

However, as differences exist between diverse service industries, it is unwise for us either to copy

completely or to neglect totally the traditional SERVQUAL model (Carman, 1990; Zhao *et al.*, 2002).

The improved model retained reliability, tangibles, responsiveness as three dimensions, added the dimension of accessibility and combined assurance and empathy into a new dimension named credibility. Meanwhile, this paper revised some of secondary indicators under each dimension taking the characteristics of express industry into account.

There are still some limitations in our refined model. First, as the data mainly collected from customers in Yangtze River Delta, the result may not contribute a general reference to other parts of China. Secondly, since the limit of research funds, the samples for the analysis are not very large. All these confrontations need to be solved in the future.

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