

Measuring Passenger's Perceptions of Taxi Service Quality with Weighted SERVPERF: a Case of Hangzhou, China

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Abstract: To have a good grasp of passenger's perceptions of taxi service quality, operators and regulators seek a proper method that can reflect passengers' opinions accurately. A weighted SERVPERF model was expressed to assess taxi service quality of Hangzhou City in China. All 22 items can be divided into five dimensions including tangibles, assurance, reliability, responsiveness, and empathy. Importance and performance scales of five dimensions were calculated. Authors found that assurance had highest points and responsiveness had lowest points in performance appraisal, reliability had highest points and empathy had lowest points in importance appraisal. Passenger's characteristics are unrelated with service quality evaluation indicate that there are not strong personalized demands of taxi passenger. Possible management actions are discussed in the context of a regulation environment.

Introduction

Earlier researches of taxi industry mainly focus on taxi quantity and price policies[1,2], literatures about measurement of taxi service quality were rarely reported except for a factor-loading weighted SERVQUAL [3]. Non-academic monitoring of taxi passengers' satisfaction is ongoing in several cities around the world. In Singapore, Shanghai, Hangzhou and Hongkong, taxi service quality is regularly observed, which contains vehicle's safety, reliability, cleanliness and driver's behaviors. Although most of them adopted similar indicators and did thorough investigation, no further research was carried out to confirm whether the attributes were actually related to the concerns and desires of passengers[4]. In the present paper, authors evaluate passenger's perceived service quality with SERVPERF to understand passenger's demands, wants and important factors for taxi service quality improving.

Parasuraman et al. (1994) conducted a series of studies aimed at defining and measuring service quality. For service providers, understanding customer expectation exactly is the most important step in defining and delivering the quality of service. They found that service quality perceived by customer involved the tangibles, responsiveness, assurance, empathy, and reliability dimensions[5]. In terms of evaluation methodology, a review of literature provides plenty of service quality evaluation scales. The most influential instrument was *SERVQUAL* model. The outcome was a 22- item scale that has received widespread application in research of service quality. The *SERVQUAL* instrument requires customers to rate their expectations and perceptions of service quality[6]. The robustness of the instrument was reinforced through numerous studies and application in various industries[7].

However, several studies also prompted debates concerning the application of *SERVQUAL*. Boulding *et al.* (1993) reject the value of an expectations-based *SERVQUAL* and concur that service quality is only influenced by perceptions[8]. Criticisms led to the development of a more parsimonious service quality measurement tool named *SERVPERF* [9]. In fact, the *SERVPERF* scale is an perceptual component of *SERVQUAL* and consists of 22 items thus excluding any consideration of expectations. David P. Paul (2003) performed a *SERVPERF* model in the American prosthetic dental industry, and showed that *SERVPERF* performed best[10]. Subsequently, *SERVPERF* has been used to measure services quality in different fields[11,12].

Research Methodology

Questionnaire design

We designed a questionnaire in several steps in light of the previous literature. Data were collected by means of a structured questionnaire comprising of four sections. Section one contained six questions pertaining to the respondent profile as gender, age, educational level, occupation, income and travel purpose. Sections two required respondents to evaluate the service components, in which only perception data were collected and analyzed. Specifically, Section two consisted of 22 performance items extracted from the original *SERVPERF*, and modified to fit into taxi service. All the items in Sections two were presented as statements on the questionnaire, with the same rating scale measured on a five-point Likert-type scale that varied from 1 = *strongly disagree* to 5 = *strongly agree*. Section three consisted of 22 importance items and measured on five-point Likert-type scale that varied from 1 = *strongly unimportant* to 5 = *strongly important*. In addition to the main scale addressing individual items, passengers were asked in Section four to provide an overall rating of total service quality and satisfaction level.

Sampling and survey procedure

In the subsequent formal survey, data were collected from taxi passengers of Hangzhou in China. The survey was administered over three days. Questionnaires were distributed to the passengers performed by twenty drivers and six registrars at three taxi stands. Data had been collected using the “personal contact” approach whereby “contact persons” (a registrar or taxi driver) have been approached personally, and the survey explained in detail. The final questionnaire was then handed personally to the ‘contact persons’. Participation was voluntary. A total of 300 questionnaires were distributed, and 230 complete responses were returned. The actual response rate was 76.67%.

Proposed calculation method

Taxi service has such characteristics as intangibility, perishability, inseparability, and heterogeneous. Therefore, we can use *SERVPERF* model to appraise performance of taxi service quality. According to the basic principle of *SERVPERF*, taxi service can be divided into n dimensions. For each dimension i ($i = 1, 2, \dots, n$), we can use formula (1) to calculate the performance of perceptions of taxi service.

$$SQ_i = \frac{1}{m} \sum_{j=1}^m \overline{PS}_{ij} \quad (1)$$

SQ_i is taxi service quality of dimension i , m is the number of item in each dimension, M is total number of each question item ($m \in M$), \overline{PS}_{ij} is mean of performance of taxi service quality of item j in dimension i , j items identifier.

When using the method of weighted performance evaluation, we consider the importance of each item. Weighted SQ_i is changed as formula (2).

$$SQ'_i = \frac{1}{m} \sum_{j=1}^m \overline{IS}_{ij} \cdot \overline{PS}_{ij} \quad (2)$$

SQ'_i is weighted taxi service quality of dimension i , \overline{IS}_{ij} is mean of importance of item j in dimension i .

Results and discussion

Reliability and validity

Reliability of each item is assessed using standardized Cronbach's alpha. The Cronbach's alpha of the formal questionnaire was found to be 0.92 for all perception-related items calculated by the statistical analysis software *SPSS16.0*. The Kaiser-Meyer-Olkin (*KMO*) measure of sampling adequacy was computed to quantify the degree of interrelations among the variables, and the results indicate an index of 0.90, a ‘meritorious’ sign of adequacy for factor analysis.

Exploratory factor analysis was performed with the maximum likelihood method followed by a varimax rotation via Principal Components Analysis. Twenty two items of the formal survey questionnaire were divided into five groups are labeled as tangibles, responsiveness, reliability, assurance, empathy, which is the same as the research of SERVPERF in other areas. Factor loadings of each group are given in Table 2. Factor 1 represent the working condition of vehicles and drivers, factor 2 represent specialized assurance service ability for passengers, factor 3 represent the intention of provide service for passengers, factor 4 represent passengers' confidence level for service quality, and factor 5 represent care degree for the passenger's personality needs.

Statistics and calculation

According to the data collected above and formula (2), we calculated the performance and importance score of each item and discussed those scores of each dimension. Table 2 indicates that the scales of taxi service importance range from 3.59 to 4.62. Of all 22 items, "driver's knowledge of routes" is considered the most important factor. This is to be expected, because driver's knowledge of routes decided travel time and cost of passenger more than other items. Conversely, respondents considered "driver's knowledge of recreation, shopping and tour sites" as least important attribute.

The scales of passenger evaluation to service performances range from 3.22 to 3.84. Generally, "Price tag displayed and charge metered" received the highest service performance level, while "driver's patiently attitude" showed lowest performance level. This would seem to suggest passengers are more content with facility-based services than those personally contact with driver.

Table 2 Factor loadings and scales of importance and performance

Dimensions	Content of Question Items		factor loadings	Performance		Importance	
	Item	Contents		mean	variance	mean	variance
Tangibles	1	Up-to-date and clean vehicle	0.73	3.74	0.74	3.73	0.83
	2	Visually license number, company name and	0.68	3.73	0.80	4.31	0.83
	3	Clean and comfortable inside taxi	0.76	3.43	0.83	4.46	0.71
	4	Well dressed and appear neat driver	0.61	3.37	0.68	4.06	0.88
	5	Complete facilities and equipments	0.66	3.49	0.74	4.05	0.91
Assurance	6	Driver's knowledge of routes	0.60	3.72	0.82	4.62	0.67
	9	Price tag displayed and charge metered	0.72	3.84	0.87	4.60	0.73
	12	Driver's fluent Mandarin and friendly	0.51	3.59	0.79	4.15	0.82
	18	Security facilities available	0.69	3.64	0.77	4.12	0.96
	22	Small change and receipt available	0.71	3.55	0.92	4.18	0.86
Responsiveness	8	Driver's patiently attitude	0.61	3.33	0.77	4.38	0.78
	10	Prompt complaints respond and lost luggage	0.72	3.44	0.77	4.28	0.93
	11	Provided booked-taxi and arrived at time	0.78	3.42	0.72	3.86	0.97
	21	Arrange reasonable route when passenger	0.78	3.40	0.89	4.34	0.82
Reliability	7	Driver's refusal or detour	0.61	3.22	0.98	4.55	0.80
	15	Driver's compliance with traffic rules	0.77	3.70	0.88	4.55	0.83
	16	No unethical competition or random pulling up	0.76	3.50	0.95	4.16	0.82
	17	No smoking, phoning and eating when driving	0.77	3.41	1.04	4.31	0.81
Empathy	13	Driver's fluent Mandarin and friendly	0.74	3.66	0.78	4.14	0.81
	14	Driver's knowledge of recreation, shopping and	0.55	3.59	0.76	3.59	0.92
	19	Warm service of the driver	0.80	3.43	0.84	4.21	0.84
	20	Drivers are honest and righteous	0.63	3.37	0.75	4.17	0.90

Once the weights of the performance are obtained, we can integrate the evaluation of each performance with its corresponding weight to obtain scores of the five dimensions shown in Table 3. For performance appraisal of taxi service quality, assurance has the highest score (3.668), and responsiveness has the lowest score (3.398). For importance appraisal, reliability has the highest score (4.393) and empathy has the lowest score (4.028). Then, total service quality can be calculated, and can be found that assurance had highest points (3.673) and responsiveness had lowest points (3.397). Therefore, responsiveness is the most important task for regulator to conduct operational process of taxi driver. If regulator and manager want to improve taxi passenger service,

they should improve the firstly.

Table 3 Scores of each dimension of service quality

Dimension	Performance	Importance	Service quality
Tangibles	3.552	4.122	3.549
Assurance	3.668	4.334	3.673
Responsiveness	3.398	4.215	3.397
Reliability	3.458	4.393	3.457
Empathy	3.513	4.028	3.509

Correlation analysis

The relative importance of the service attributes in determining customer satisfaction is implicit. Performance scales are viewed as effective indicators of service quality and customer satisfaction. This method differs from both the stated-importance approach, where customers provide explicit importance scales for the service dimensions in addition to the performance scale. Analysis the correlation between service quality and customer satisfaction with Pearson correlation coefficient, shown as Table 4, Passengers satisfaction and overall service quality are highly positive correlation, which is same as research conclusions in other areas.

At the same time, all dimensions of service quality exists significant positive correlation in table 4. There are higher positive correlation in reliability, assurance and empathy, the correlation between different dimensions of service quality and passenger satisfaction. It can explain the necessity of improving taxi passenger service quality theoretically.

Table 4 Correlation of service quality

Category	Total service quality	Satisfaction	Dimensions					
			Tangibles	Assurance	Responsiveness	Reliability	Empathy	
Total service quality	1	0.746**	0.423**	0.554**	0.503**	0.456**	0.508**	
Satisfaction	0.746**	1	0.345**	0.446**	0.494**	0.456**	0.450**	
Dimensions	Tangibles	0.423**	0.345**	1	0.517**	0.392**	0.346**	0.363**
	Assurance	0.554**	0.446**	0.517**	1	0.553**	0.536**	0.581**
	Responsive ness	0.503**	0.494**	0.392**	0.553**	1	0.613**	0.627**
	Reliability	0.456**	0.456**	0.346**	0.536**	0.613**	1	0.528**
	Empathy	0.508**	0.450**	0.363**	0.581**	0.627**	0.528**	1

** P values are statistically significant at 0.05 significance level (two-tail tests).

Generally, individual characteristics of passenger impact on assessment of service quality and satisfaction. But results in table 5 indicate that individual characteristics of taxi passenger such as gender, age, education, type of usage, income are not correlated with taxi service quality and satisfaction significantly ($P > 0.05$), except for occupation related with satisfaction. It can be explained as there have too much taxi service providers and passengers in the taxi market. Due to the lowest empathy scale of taxi passengers, we can summarize that there are not strong personalized demands of taxi service.

Table 5 Correlation of passenger characteristic

Category	Gender	Age	Education	Occupation	Type of usage	Monthly income
Total service quality	0.088	0.045	0.026	-0.073	-0.092	0.128
Satisfaction	0.100	-0.028	0.106	-0.171*	-0.125	0.036

* P values are statistically significant at 0.05 significance level (two-tail tests).

Conclusion

In this study, a weighted *SERVPERF* gave a prediction of service quality and satisfaction in taxi industry and showed reliability and validity. The *SERVPERF* scale and item were changed since the intention was to keep with the feature of taxi passenger. This approach would probably be suitable for further studies of taxi service quality. The Chinese version of the *SERVPERF* instrument was designed carefully, so it would be helpful if other researchers would employ it. It is found that performance of five dimensions of taxi service in Hangzhou has highest assurance scale

and lowest responsiveness scale, and importance of five dimensions has the highest reliability scale and the lowest empathy scale. The results indicate that the main task of taxi quality regulation should be the management of driving operations, and improved service quality can enhance satisfaction of taxi passenger. That characteristic of taxi passenger, total service quality and satisfaction was not significant correlation indicate that there are not strong personalized demands of taxi passenger. In principle various management actions of taxi industry could be taken to address service quality issues including taxi driver empowerment and training, improvements and working conditions.

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