

Research on Service Quality of High-Speed Railway Passenger Station Based on Customer Experience

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Abstract. This article reviews the research results at home and abroad, analyzes the influencing factors of high-speed railway passenger station service quality, and establishes a service quality evaluation model for high-speed railway passenger stations based on customer experience. And an empirical analysis of the service quality of Beijing South Railway Station was conducted.

1. Research background and Significance

At present, China's "four vertical and four horizontal" high-speed railway network has been basically completed, "eight vertical and eight horizontal" high-speed railway network is under construction, in the context of China's railway is entering the era of high-speed railway, passengers as a rail transport service targets, their service needs and subjective perceptions have diversity and diversity. Based on the customer's own experience as a starting point, a targeted high-speed railway passenger station service quality evaluation system is established to scientifically and systematically evaluate the service quality of high-speed railway passenger stations.

2. Construction of Evaluation System for “High-Speed” Railway Passenger Stations

The evaluation system consists of the service quality attributes of high-speed railway passenger stations and their corresponding evaluation indicators. The five quality attributes of convenience, economy, comfort, safety, and civilization are used as the first-level evaluation indicators.

(1) The representative secondary evaluation indicators corresponding to the convenience are the number of ticket queuing at the ticket outlet (self-service ticketing machine), the number of passengers queued at the security check, the number of queues waiting for the toilet, the processing time of baggage consignment, and the balance of the ticket. The arrival of the train arrival forecast informs in a timely manner and the guiding identity is continuous and comprehensive.

(2) The representative secondary evaluation indicators for economical performance are the reasonableness of the price of baggage consignment deposits, the reasonableness of station catering business services, and the reasonableness of the station's Little Red Riding Hood service prices.

(3) The representative secondary evaluation index corresponding to comfort is the clean and sanitation of the waiting room, the cleanliness of the bathroom environment, the number of empty seats in the waiting room, and the continuous supply of hot and cold water.

(4) The representative secondary evaluation index corresponding to safety is the security inspection service specification, the service requirements of the ticket check-in and stop-in service, and the safety and security of passengers' personal and personal belongings.

(5) The representative secondary evaluation indicators corresponding to the civilization are the green channel, the love channel service, the barrier-free facility setup and application, the ticket service, the consignment storage service specification, the human information service specification, and the passenger complaint service specification.

3. Construction of Evaluation Model of “High-Speed” Railway Passenger Station Service Quality

The fuzzy comprehensive evaluation method is a comprehensive evaluation method based on fuzzy mathematics. The fuzzy comprehensive evaluation model mainly includes the following contents:

(1) Evaluation factors: In order to facilitate weight distribution and evaluation, evaluation factors can be divided into several categories according to the attributes of evaluation factors.

(2) Weight coefficient: The importance of the evaluation index in the evaluation system. The sum of the weights of all evaluation indicators at each level is 1.

(3) Average rating: The sum of all customer ratings divided by the total number of customers is the average.

(4) The weighted average evaluation value: It is obtained by multiplying the average evaluation value by the index weight coefficient.

(5) Comprehensive evaluation value: It is obtained by multiplying the weighted average evaluation value by the quantification grade coefficient, which is the final evaluation score.

The evaluation index weight coefficient vector A is multiplied by the customer satisfaction matrix B to obtain the fuzzy comprehensive evaluation weighted average mean vector C of the evaluated object. The formula is:

$$A \times B = (a_1 \ a_2 \ a_3) \times \begin{pmatrix} b_1 & b_2 & b_3 \\ b_4 & b_5 & b_6 \\ b_7 & b_8 & b_9 \end{pmatrix} = (c_1 \ c_2 \ c_3) = C \quad (1)$$

The weighted average evaluation value vector C is multiplied by a quantification scale factor to obtain a final comprehensive evaluation value X.

$$P = 5 \times c_1 + 4 \times c_2 + 3 \times c_3 + 2 \times c_4 + 1 \times c_5 = X \quad (2)$$

Based on the X value obtained from the above formula, the evaluation grade of the high-speed railway passenger station service quality based on the customer experience can be found by referring to the rating scale digitization standard table.

4. Empirical Analysis of Service Quality Evaluation of Beijing South Railway Station

The empirical analysis of the service quality of Beijing South Railway Station is divided into the following steps: First, field surveys to collect data; Second, select valid questionnaire for statistical; Third, use model for fuzzy comprehensive evaluation Fourth, analyze the evaluation results.

This paper selects the expert scoring method to determine the weight of the index. Field surveys obtained 54 questionnaires and 243 online questionnaires. We eliminated 19 invalid questionnaires to get 278 valid questionnaires. The total score of a single indicator is divided by the weight of the overall score to obtain a weight coefficient. The results of the survey are shown in Table 1:

The fuzzy evaluation model calculation formula combined with the passenger satisfaction survey results (A matrix is the index weight; B matrix is the corresponding index passenger satisfaction), the scores of the five quality attributes are obtained. The weight coefficient is assigned according to the expert scoring method. The final score of the service quality obtained by the weighted average method is:

$$X = 0.22 \times 3.015 + 0.16 \times 2.607 + 0.18 \times 3.062 + 0.25 \times 3.372 + 0.19 \times 3.246 = 3.091 \quad (3)$$

In summary, the overall rating of passengers for the service quality of Beijing South Railway Station is “good” level; among the five quality attributes, convenience, comfort, safety, and civilization have reached a “good” level, and the economy is “general” level.

Table.1 Passenger Satisfaction Survey Results Statistics

Quality attributes	Evaluation index	excellent	good	general	Pass	fail
Convenience(0.22)	Ticket queuing(0.183)	0.065	0.291	0.428	0.158	0.058
	Security queuing(0.183)	0.018	0.209	0.295	0.291	0.187
	Toilets waiting in line(0.145)	0.004	0.029	0.291	0.399	0.277
	Baggage check-in time(0.107)	0.036	0.370	0.543	0.047	0.004
	Train forecast informed(0.176)	0.047	0.374	0.396	0.133	0.050
	Sign comprehensive(0.206)	0.061	0.533	0.309	0.086	0.011
Economical(0.16)	Luggage storage price(0.317)	0.014	0.191	0.500	0.237	0.058
	Business service price (0.366)	0.000	0.061	0.248	0.446	0.245
	Station price(0.317)	0.007	0.191	0.543	0.219	0.040
Comfort(0.18)	Waiting room sanitation(0.279)	0.029	0.324	0.486	0.132	0.029
	Bathroom clean and tidy(0.308)	0.033	0.273	0.442	0.219	0.033
	Number of empty seats(0.203)	0.014	0.137	0.230	0.475	0.144
	Hot and cold water supply(0.210)	0.083	0.503	0.302	0.083	0.029
Safety(0.25)	Security service (0.333)	0.065	0.471	0.345	0.094	0.025
	Check-in service (0.303)	0.058	0.496	0.356	0.072	0.018
	Safety of passengers (0.364)	0.043	0.360	0.360	0.212	0.025
Civilized(0.19)	Green channel service(0.194)	0.054	0.468	0.360	0.111	0.007
	facility setup and use(0.223)	0.032	0.392	0.450	0.108	0.018
	Ticket service(0.165)	0.018	0.291	0.547	0.137	0.007
	Artificial service (0.204)	0.029	0.327	0.522	0.104	0.018
	Feedback service (0.214)	0.032	0.227	0.525	0.191	0.025

5. Evaluation Result Analysis

Most passengers choose the high-speed rail because it is cheaper than civil aviation. The service to Beijing South Railway Station is generally satisfactory, but there are some deficiencies. The specific issues are as follows:

(1) There was too little aisle to the waiting hall. From the transfer hall to the waiting hall, Beijing South Railway Station can only go up through the zigzag escalator.

(2) There are fewer ticket gates signs. After the passengers enter the waiting hall, there are no effective signs to guide the passengers to find the ticket gates.

(3) The distance between the ticket gates on both sides is not large, various shops occupy a lot of space.

(4) The number of service staff for the help desk is usually only one, it is difficult to ensure that the feedback service is timely and effective.

All in all, China's current high-speed railway service levels are already good, but there is still room for improvement so that high-speed rails will become an important part of people's daily travel.

6. Conclusion

On the basis of reading related literature, this article establishes the principle of the service quality evaluation system for high-speed railway passenger stations. Based on the five service quality attributes, it establishes an evaluation index system for high-speed railway passenger station service quality, and chooses a fuzzy comprehensive evaluation model for high speed railway station service quality. Taking Beijing South Railway Station as an example for empirical evaluation and analysis, the scientific and feasibility of the fuzzy comprehensive evaluation model of high-speed railway passenger station service quality was verified.

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