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Research on Service Quality Evaluation of Highland Railway Passenger Station based on Kano Model

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Abstract

In order to improve the service quality of the plateau railway passenger station, this paper takes Lhasa as an example, uses the questionnaire survey method and random spot check method to obtain the data station accounts provided by the train passengers, and determines the factors affecting the service quality of the plateau railway, the corresponding strategic priorities and countermeasures according to the application analysis of the Kano two-dimensional quality model.

Keywords

Highland Rail Passenger Station; Quality of Service; Evaluation Indicators; Carnot 2D Quality Model.

1. Introduction

The Plateau Railway operated in the Tibet Autonomous Region has become the first choice for passengers entering and leaving Tibet in the Comprehensive Transport System of Tibet with its safety, economy, comfort and unique travel scenery. With the substantial increase in the number of tourists and the improvement of the quality of life of passengers, the efficiency of hardware facilities, software supporting services and operation organization of the Plateau Railway Passenger Station has been greatly challenged by the comfort and convenience required for train travel from the previous pursuit of safety and punctuality to the comfort and convenience required for current travel, as well as the increase in the number of travel trips. Therefore, it is of great practical significance to reasonably evaluate the quality of passenger service and meet passenger demand in a timely manner, which can increase passenger flow, improve passenger transport efficiency, improve the quality of railway passenger service, and can adapt to the needs of railway passenger transport quality improvement and development, and meet passengers' expectations for a better travel experience. Based on the above challenges, this paper analyzes the relevant results in conjunction with the Kano model by means of questionnaire surveys of train passengers at the Plateau Railway Passenger Station in Lhasa City, and proposes corresponding countermeasures to improve the quality of passenger services at the station based on the analysis results.

2. Basic Problems of Highland Railway Passenger Terminals

2.1 The Service Population Is Fixed

Take the Plateau Railway Passenger Station in Lhasa, Tibet Autonomous Region as an example: during the peak tourist season and China's traditional festivals, the crowds entering and leaving the passenger station are mostly passengers and pilgrims; and during the off-season, the crowds entering and leaving the station are mainly migrant workers and business travelers from Tibet, due to high altitude, long distance and other reasons, so that the passenger station service personnel are relatively fixed.

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2.2 Ticketing is more Traditional

At present, although the traditional manual window ticketing method in the mainland has not all been replaced by mobile phone software and automatic ticket window, there are very few people who need to buy tickets at the population window, and in the ticketing hall of the Lhasa Bus Station, it can still be seen that there are many people who buy tickets at the population window, most of whom are Tibetan elderly and students who enter the information for the pre-travel student CARD inspection.

2.3 The Facilities and Services of the Station Still Need to Be Improved

The role of the Plateau Railway Passenger Station is not only to sell tickets and transport passengers from this station to the destination through the Qinghai-Tibet Railway and other lines, the passenger station should meet the passengers' waiting for the arrival of the train, such as food, shopping and other commercial services, as well as the transportation mode under the multimodal transport to or from the passenger station, and at this point, there is still a big gap between the Lhasa Passenger Service Station and the same level of stations in the mainland, and it still needs to be reasonably improved.

3. Empirical Study on Railway Passenger Stations in Lhasa

3.1 Research Ideas

Table 1. Service quality evaluation indicators of plateau railway passenger stations

Target layer	Indicator layer I	Indicator Layer II	Indicator Layer III
Service quality evaluation index of plateau railway passenger station$M_n(n = A, B, C)$	Hardware facility A	Ticket collection facilityA_1	Automatic ticket collection machine ticket collection efficiencyA_{11}
			Manual window ticket collection efficiencyA_{12}
		Living service facilitiesA_2	Bathroom facility performanceA_{21}
			Network signal qualityA_{22}
			Smoking area performanceA_{23}
			Oxygen supply facility performanceA_{24}
			Catering, shopping facility performanceA_{25}
		Waiting service facilitiesA_3	Number of seats and comfortA_{31}
			Service facilities for vulnerable populationsA_{32}
	Software Companion Service B	Guidance InformationB_1	Indicates that the signs are appropriateB_{11}
			Broadcast information is timelyB_{12}
		Considerate serviceB_2	Manual guidanceB_{21}
			Green channelB_{22}
		Multilingual serviceB_3	Bilingual between Tibetan and ChineseB_{31}
			Tibetan, Chinese and EnglishB_{32}
		SanitationB_4	The floor is tidyB_{41}
			Clean up in a timely mannerB_{42}
	Operations Organization Management C	Efficiency in and out of the stationC_1	Pit stop queuing timeC_{11}
			Outbound queuing timeC_{12}
			Manual entry and exit station efficiencyC_{13}
			Swipe ID card in and out of the station efficiencyC_{14}
		Refund and change efficiencC_2	Network servicesC_{21}
			Equipped with a dedicated windowC_{22}
		SafeC_3	Personal safetyC_{31}
			Device securityC_{32}

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Based on the questionnaire survey method and random spot check method to obtain the data provided by train passengers, and then use the Kano two-dimensional quality model to analyze and classify the obtained data, the index factors affecting the service quality of the plateau railway passenger station are obtained. The evaluation indicators of the questionnaire are divided into three categories: hardware facilities, software supporting services and operation organization management, and 25 sub-indicators are differentiated, as shown in Table 1. According to the requirements of the Kano questionnaire survey, the author asked questions about each indicator from both positive and negative aspects (see Table 2), and this article sets the answer to the five options of "very satisfied", "satisfied", "indifferent", "unsatisfactory" and "very dissatisfied", combined with the likert five-level scale to quantify the answer data, so that the cross-analysis is carried out later according to the evaluation table of Kano's two-dimensional quality model (see Table 3), and then the type attribution of each quality element is obtained.

Table 2. Kano questionnaire question examples

Evaluation metrics	Issue	Answer options				
		Very satisfied	Satisfied	Doesn't matter	Dissatisfied	Very dissatisfied
System stability	How do you feel about the good quality of the network signal?	5	4	3	2	1
	How do you feel about the good quality of the network signal?	1	2	3	4	5

Table 3. Kano classification evaluation table

Evaluation indicators		Reverse issue				
		Very satisfied	Satisfied	Doesn't matter	Dissatisfied	Very dissatisfied
Positive questions	Very satisfied	Q	A	A	A	O
	Satisfied	R	I	I	I	M
	Doesn't matter	R	I	I	I	M
	Dissatisfied	R	I	I	I	M
	Very dissatisfied	R	R	R	R	Q

Note: O indicates the desired quality; M indicates the necessary quality; A indicates the attractive quality; I represents the undifferentiated mass; R indicates the reverse quality; and Q indicates the result

3.2 Collection and Processing of Data

The location of the questionnaire survey was located at the Lhasa Railway Passenger Station, a total of 327 questionnaires were distributed, the number of valid questionnaires recovered was 283, and 19 invalid data questionnaires were excluded, the questionnaire recovery rate was 86.5%, and the questionnaire effectiveness rate was 93.2%, exceeding the survey preset. Among them, male respondents accounted for 53.92%, and female respondents accounted for 46.08%; Age is 18~28 accounted for 25.94%, age is 28~48 accounted for 31.74%, age is located in 48~68 accounted for 34.27%, the sum of the three has reached 91.95%; migrant workers, unit personnel accounted for 24.51%, tourists accounted for 47.55%, worshippers accounted for 12.54%. In this paper, the data

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were tested for reliability and validity using pass software, and the alpha coefficient of Cronbach's was 0.7923, and the validity KMO value was 0.835, indicating that the questionnaire was reliable.

4. Kano Survey Results Analysis

4.1 Kano Survey Results of Service Evaluation

According to the Kano evaluation table, the cross-classification function of spss software is used to calculate the frequency of each evaluation index in the Kano quality element type, and on this basis, according to the Kano model classification method, the quality element type with the largest frequency is selected as the category attribution of the evaluation index, and the results are shown in Table 4. Through the analysis of the satisfaction impact index and the dissatisfaction impact index of each quality factor, the method determines the degree of influence of these quality factors on user satisfaction, so as to determine which factors will be more conducive to improving user satisfaction. It is calculated as Better = (A + O) / (A + O + M + I), Worse = (-1) × (O + M) / (A + O + M + I), according to the formula to calculate the Better and Worse values of each evaluation indicator, see Table 4.

Table 4. Kano survey results for highland railway service quality evaluation

Evaluation indicators	A	O	M	I	Type	Better	worse
A_{11}	89	42	127	25	M	0.462898	-0.597173
A_{12}	73	39	152	19	M	0.395760	-0.674912
A_{21}	45	52	176	10	M	0.342756	-0.805654
A_{22}	19	160	66	38	O	0.632509	-0.798587
A_{23}	107	90	21	65	A	0.696113	-0.392226
A_{24}	173	65	23	22	A	0.840989	-0.310954
A_{25}	34	127	101	21	O	0.568905	-0.805654
A_{31}	56	85	32	110	I	0.498233	-0.413428
A_{32}	131	62	59	31	A	0.681979	-0.427562
B_{11}	52	38	66	127	I	0.318021	-0.367491
B_{12}	43	78	105	57	M	0.427562	-0.646643
B_{21}	85	76	93	29	M	0.568905	-0.597173
B_{22}	71	82	101	29	M	0.540636	-0.646643
B_{31}	86	42	123	32	M	0.452297	-0.583039
B_{32}	51	43	62	127	I	0.332155	-0.371025
B_{41}	68	59	125	31	M	0.448763	-0.650177
B_{42}	59	79	105	40	M	0.487633	-0.650177
C_{11}	95	106	53	29	O	0.710247	-0.561837
C_{12}	113	86	43	41	A	0.703180	-0.455830
C_{13}	77	63	118	25	M	0.494700	-0.639576
C_{14}	96	112	48	27	O	0.734982	-0.565371
C_{21}	127	75	46	35	A	0.713781	-0.427562
C_{22}	81	109	62	31	O	0.671378	-0.604240
C31	46	37	126	74	M	0.293286	-0.575972
C32	55	29	134	65	M	0.296820	-0.575972

Note: The data of the columns A, O, M, and I are the frequency of occurrence of such quality of service elements, and the data of the columns of Better and Worse are calculated decimal values.

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4.2 Kano 2D Quality Analysis

The Kano model takes the maximum value of the frequency as the attribution category of the evaluation index of this element, and the categories in Table 5 are the results of Kano's classification, including 5 expected evaluation indicators: that is, the performance of smoking areas, the performance of oxygen supply facilities, the service facilities for vulnerable groups, outbound queuing time, network services; 5 charm evaluation indicators: network signal quality, diet, shopping facility performance, inbound queuing time, ID card in and out of the station efficiency, equipped with special windows; 12 necessary evaluation indicators: automatic ticket machine ticket collection efficiency, Manual window ticket collection efficiency, toilet facility performance, timely broadcast information, manual guidance, green channel, Tibetan and Chinese bilingual, clean ground, timely cleaning, manual entry and exit station efficiency, personal safety, equipment safety; 3 undifferentiated evaluation indicators, the number and comfort of seats, appropriate indication signs, Tibetan, Chinese and English trilingual.

The Better value is a positive number, indicating that if the quality element is satisfied, user satisfaction will be greatly improved; the value of Worse is a negative number, and its absolute value indicates that if a quality element is not satisfied, user satisfaction will drop significantly. Based on the Better-Worse values of 25 quality elements, with the value of Better as the abscissa, the absolute value of Woolse as the ordinate, and the average of the two indicators of all the mass elements as the origin, the evaluation index elements are plotted in a four-quadrant chart, as shown in Figure 1.

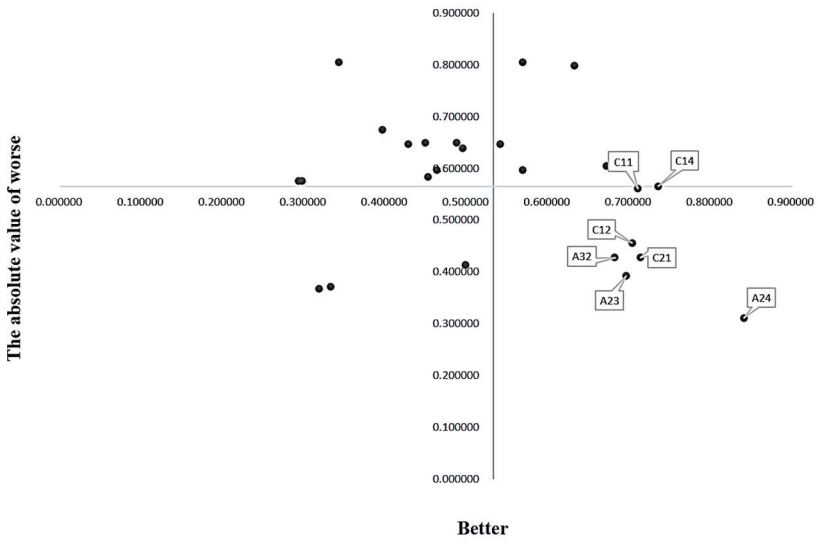

Figure 1. Four-quadrant chart of the Better - Worse index

The coefficient value of The first quadrant Bet is high, and the absolute value of the Worse coefficient is also high, indicating that these elements distributed in the first quadrant deserve the attention of the highland railway passenger service station, whether it is to improve the satisfaction of passengers or to prevent passenger dissatisfaction. The calculation results show that there are 5 quality elements in this quadrant, and improving these quality factors will help to improve the quality of service at passenger terminals. The coefficient value of Better in the second quadrant is low, and the absolute value of the Worse coefficient is high, indicating that the 10 quality elements distributed in this quadrant, although not effectively improving passenger satisfaction, can effectively prevent the occurrence of passenger dissatisfaction. The third quadrant, Better, has a low coefficient value and an absolute value of the Worse coefficient, indicating that these elements can neither improve passenger satisfaction nor prevent passenger dissatisfaction. The availability of the three quality elements distributed in the third quadrant has little impact on user satisfaction and belongs to the undifferentiated quality. The high coefficient values for the fourth quadrant Better and the low

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absolute value for the Worse coefficient indicate that these factors can greatly improve passenger satisfaction, but they cannot prevent passenger dissatisfaction from occurring. There are 5 elements that belong to the charm evaluation index, 2 elements belong to the expected charm evaluation index, and the highland passenger service station should focus on the above 7 elements.

5. Recommendations

At present, lhasa passenger station can improve related services in seven aspects: smoking area performance, oxygen supply facility performance, service facilities for vulnerable people, inbound queuing time, outbound queuing time, id card entry and exit efficiency, and network services, so as to achieve the purpose of improving the service quality of plateau railway passenger station. At the same time, the necessary evaluation indicators are the basis for users based on high evaluation, and once they are missing, they will lead to a significant decline in passenger evaluation of passenger quality services, so some of the necessary infrastructure must not be lost while improving.

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