

Investigation and Study on Satisfaction of Railway Passenger Service Quality of Migrant Workers

Yi-Xuan ZHOU^{1,3,a}, Xiao-Ming YANG^{2,b}, Shu-Chen LI^{3,c}, Kai-Li WANG^{3,d},
Guang SONG^{3,e}, Kai ZHENG^{3,f,*}

¹ School of Economics & Management, Beijing Institute of Graphic Communication, Beijing 102600

² Market Monitoring and Evaluation Center, National Railway Administration of People's Republic of China, Beijing 100036

³ School of Economics & Management, Beijing JiaoTong University, Beijing 100044

^a15398319@bjtu.edu.cn, ^b5297391@qq.com, ^c15241129@bjtu.edu.cn,

^dsunshine_kelly92@163.com, ^esongguang@bjtu.edu.cn, ^fzhengkai@bjtu.edu.cn

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Abstract. Migrant passengers have become an important object of railway passenger service, but there are few researches on railway passenger service quality for migrant workers. This paper takes migrant passengers as an example, and designs a "satisfaction of railway passenger service satisfaction" questionnaire based on ticket purchase, arrival, departure and departure. Analysis migrant passengers age, number of trips, type of train, seating composition; application of fuzzy comprehensive evaluation method, calculate the degree of satisfaction, put forward suggestions for improvement, provides a basis for railway related departments to improve service quality for migrant passengers.

Introduction

The term "migrant passengers" referred to in this paper refers to migrant workers who work from their hometown to other places and accept railway transport of passengers services. According to the data, the total number of migrant workers in 2017 is about 290 million, the employment volume is huge, the mobility is strong[1]. Although migrant passengers have become an important object in railway transport of passengers services, there are few special results on railway transport of passengers service quality for migrant passengers.

In accordance with the relevant regulations of the National Railway Administration[2], this paper draws lessons from the EN 13816 standard[3] approved by the European Committee for Standardization and refers to the literature of TianZhiqiang[4-6] on the evaluation method of railway transport of passengers service quality,. the questionnaire and analysis method of "satisfaction degree of railway transport of passengers service" is designed for migrant passengers.

Questionnaire and Analysis Method

The questionnaire of this paper takes the migrant passenger as the investigation object, according to the four service links of migrant passengers, including purchasing tickets, drawing up at a station and waiting for train, the facilities and services in the vehicle, leaving the station, a total of 49 service quality indexes are set up, and the specific index names refer to Table 4-1.

Based on the reference of Hu Guihua and Wang Xuan[7], this paper applies statistical analysis method to analyze the composition of the age, the travel times, the class of trains and the seats of migrant workers. Referring to research results of GuoQianqian[8]and applying the fuzzy comprehensive evaluation method, the average satisfaction degree of railway passenger transport service quality and the satisfaction level of service link are calculated, which aims to provide the basis for railway departments to formulate policies for service of migrant workers.

See Table 2-1 for the criteria for determining the level of satisfaction with the railway transport of passengers service quality. It can be seen from the table that the satisfaction degree of each railway

passenger service quality index can be divided into five grades, and the criteria for each grade are as follows: very satisfactory (100), satisfactory (80), general satisfactory (60), unsatisfactory (40), very unsatisfactory (20).

Table 2-1: Evaluation criteria for satisfaction with the quality of service of railway transport of passenger

| | very satisfactory | satisfactory | general satisfactory | unsatisfactory | very unsatisfactory |
|----------------|-------------------|--------------|----------------------|----------------|---------------------|
| Value interval | 100-81 | 80-61 | 60-41 | 40-21 | 20-0 |
| Value standard | 100 | 80 | 60 | 40 | 20 |

The measurement method of the satisfaction level with the railway transport of passengers service quality is as follows.

Assuming that m is the serial number of the satisfaction index of railway passenger transport service, C_{mn} indicates the satisfaction level of the n th migrant passenger to the index m , then the average satisfaction level of the n th migrant passengers to the railway passenger transport service is $X_n = \frac{\sum_{m=1}^{49} C_{mn}}{49}$ (1), and the average satisfaction level of all the surveyed migrant passengers is $Y = \frac{\sum_{n=1}^{779} X_n}{779}$ (2).

Assuming that i is the serial number of the railway passenger service link, j is the index serial number in the link i of passenger transport service, indicating the level of satisfaction with the railway transport of passengers service quality in the link i , then the average satisfaction level with the railway transport of passengers service quality in the link i is $Z_i = \frac{\sum_j b_{ij}}{j}$ (3).

Composition of Type of Worker Passengers

The questionnaire of "satisfaction degree of railway transport of passengers service" was carried out from January 2017 to April 2017. The questionnaire was distributed on railway passenger stations and trains in China.

A total of 800 questionnaires were collected from migrant workers, of which 779 were valid. It needs to be explained that 231 valid questionnaires are collected from migrant passengers travelling on the high-speed train and 548 from migrant passengers travelling on the ordinary train.

Age Structure of Passengers

Fig. 3-1 shows the age composition of migrant workers participating in the survey. It can be seen from the figure that 2% of migrant workers are aged 16-18, 19% are aged 18-22, 41% are aged 22-30, and 28% are aged 30-45, 9% are aged 45-60, while 1% of migrant workers are over 60 years of age. This shows that migrant workers are mainly young and middle-aged passengers.

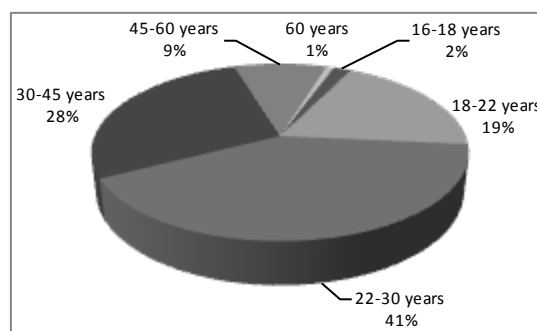


Fig. 3-1 Age structure of migrant passengers

Travel Times of Passengers

Fig. 3-2 describes the proportion of travel times of migrant passengers travelling by railway who participated in the survey. From the figure, we can see that 28% of the migrant passengers take the train 0-4 times/year, 32% of the migrant passengers take the train 5-9 times/year or 25% of the migrant passengers take the train 10-14 times/year, 9% of the migrant passengers take the train 15-19 times/year or 6% of the migrant passengers take the train more than 20 times a year. Thus it can be seen that the number of migrant passengers travelling by train is mainly 0-9 times per year.

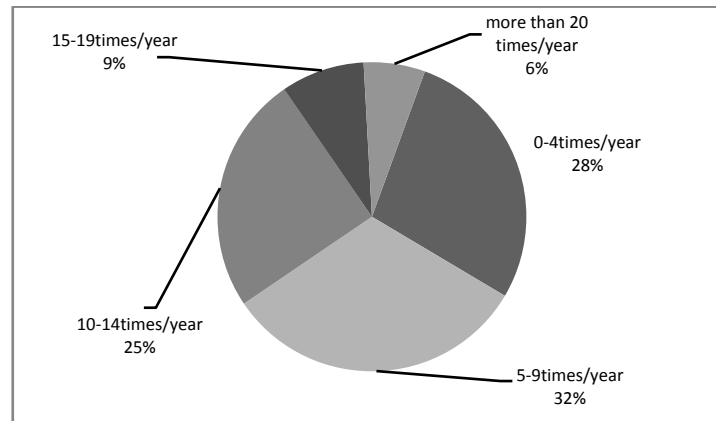


Fig. 3-2 Travel times of migrant passengers

Class of Train of Passenger

Among the survey subjects, the number of migrant workers travelling on the high-speed train (high speed train, bullet train and inter-city train) accounted for 30 percent, and that of migrant workers travelling on the ordinary train (freight liner, red ball, express trains and ordinary train) accounted for 70 percent. It can be seen that the travel of migrant passengers mainly on the ordinary train.

Seating Type of Passenger

Fig. 3-3 illustrates the proportion of seating type taken by migrant passengers who participated in the survey. As can be seen from the figure, among the subjects surveyed, the number of migrant workers travelling in the business seat is 1%, the number of migrant workers travelling in the first class seat is 3%, the number of migrant workers travelling in the second class seat is 26%, the number of migrant workers travelling in the soft sleeper is 7%, the number of migrant workers travelling in the tourist coach is 17%, the number of migrant workers travelling in the hard seat is 41%, the number of migrant workers travelling in no seat is 5%. It can be seen that the seating type commonly used by migrant workers is the second class seat of the high speed train and the hard seat of the ordinary train.

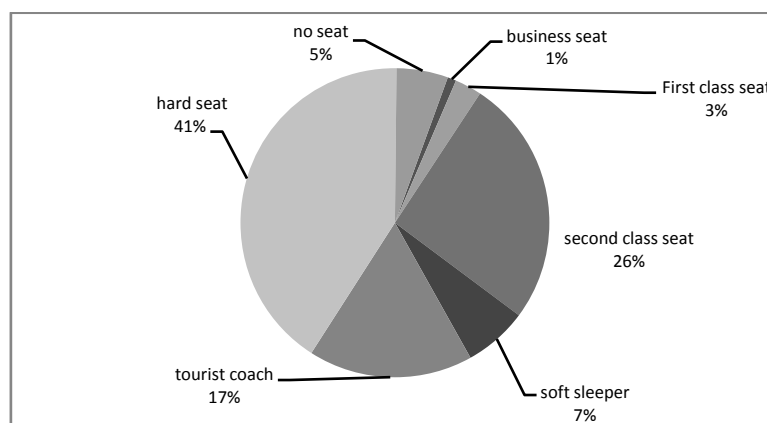


Fig.3-3 Seating type of migrant passenger

Level of Satisfaction of Migrant Passenger

Average Satisfaction Level

Table 4-1 Level of satisfaction of migrant passengers

| | Service link | Satisfaction level index | All trains | High speed train | Ordinary train |
|----|---|---|------------|------------------|----------------|
| 1 | Ticket purchasing | Ticketing purchase process on 12306 | 71.60 | 76.62 | 69.49 |
| 2 | | Ticketing information available on the 12306 | 72.76 | 77.06 | 70.95 |
| 3 | | Payment methods of tickets on 12306 | 75.53 | 77.75 | 74.60 |
| 4 | | Operation process of Station Self-service ticket Machine | 75.74 | 77.06 | 75.18 |
| 5 | | Number and location of self-service ticket machines at stations | 74.25 | 76.02 | 73.50 |
| 6 | | Ticketing information learned from the ticket office at the station | 70.73 | 73.42 | 69.60 |
| 7 | | Service attitude towards ticket sales staff at stations | 70.94 | 71.08 | 70.88 |
| 8 | | Time spent on buying tickets at the station | 69.17 | 71.00 | 68.39 |
| 9 | | Order of ticket purchasing area at stations | 70.63 | 71.95 | 70.07 |
| 10 | | Sanitation of ticket purchasing areas at stations | 71.42 | 74.55 | 70.11 |
| 11 | | Provide a variety of ticket types:Electronic tickets | 75.43 | 77.49 | 74.56 |
| 12 | | Train and travel information provided by the surface of ticket | 75.17 | 77.32 | 74.27 |
| 13 | drawing up at a station and waiting for the train | Waiting time for incoming ticket checking | 73.07 | 74.72 | 72.37 |
| 14 | | Service attitude of inbound ticket examiners | 74.40 | 76.71 | 73.43 |
| 15 | | Security information provided by security checkpoints | 73.61 | 76.10 | 72.55 |
| 16 | | Time required for security screening | 74.04 | 76.19 | 73.14 |
| 17 | | Service attitude of security inspectors | 74.40 | 76.02 | 73.72 |
| 18 | | Security inspection process | 75.25 | 76.80 | 74.6 |
| 19 | | Train and service information provided by station waiting area | 74.07 | 75.67 | 73.39 |
| 20 | | Toilet or washing facilities in the waiting area of a station | 71.17 | 73.51 | 70.18 |
| 21 | | Number of catering facilities at stations | 69.88 | 72.99 | 68.58 |
| 22 | | Types of goods sold at stations | 69.09 | 71.95 | 67.88 |
| 23 | | Rest facilities in the waiting area of the station | 70.24 | 72.90 | 69.12 |
| 24 | | Sanitation in the waiting area of the station | 71.66 | 74.29 | 70.55 |
| 25 | | Other services (drinking water, cultural entertainment, network services, etc.) provided in the waiting area of the station | 71.30 | 73.85 | 70.22 |
| 26 | | A cell phone or network signal in a station waiting area | 71.09 | 73.85 | 69.93 |
| 27 | | Safety and security in the waiting area (security, monitoring, fire protection, safety alert) | 73.02 | 74.98 | 72.19 |
| 28 | | Service attitude of the staff in the waiting area of the station | 73.40 | 75.06 | 72.70 |
| 29 | | Speed of ticket checking in the waiting area of the station | 73.56 | 73.77 | 73.47 |
| 30 | | Know the train time information from platform | 75.04 | 78.01 | 73.80 |
| 31 | | Find out exactly where the train stops on the platform | 75.25 | 76.71 | 74.64 |
| 32 | Facilities and services in the train | Luggage storage space in the train | 69.81 | 71.52 | 69.09 |
| 33 | | Train information provided in the train | 71.27 | 74.20 | 70.04 |
| 34 | | Safety and security in trains (security, surveillance, fire) | 72.07 | 73.59 | 71.42 |
| 35 | | Seats and spaces in the train | 70.19 | 71.26 | 69.74 |
| 36 | | Drinking water facilities provided by trains | 71.42 | 74.37 | 70.18 |
| 37 | | Toilet and washing facilities for trains | 70.24 | 73.25 | 68.98 |
| 38 | | Hygiene in the train | 70.40 | 73.85 | 68.94 |
| 39 | | Service attitude of train staff | 72.35 | 74.20 | 71.57 |
| 40 | | Frequency and quality of goods sold in the train | 68.40 | 72.38 | 66.72 |
| 41 | | Types of catering provided by train | 67.60 | 71.00 | 66.17 |
| 42 | | Running stability of the train | 75.07 | 77.84 | 73.91 |
| 43 | | The degree of quietness in the running of the Train | 72.81 | 75.32 | 71.75 |
| 44 | | Running punctuality of the train | 72.43 | 77.06 | 70.47 |
| 45 | | Cultural and recreational facilities (Audio, video, internet connection) provided on the train | 67.63 | 69.96 | 66.64 |
| 46 | | Magazines available on the train | 68.22 | 70.22 | 67.37 |
| 47 | Leaving the train | Speed of ticket checking out of station | 74.12 | 76.62 | 73.07 |
| 48 | | Train and traffic information at exit | 73.32 | 75.15 | 72.55 |
| 49 | | The convenience of train transfer in station | 74.76 | 77.40 | 73.65 |
| 50 | Average satisfaction level | | 72.22 | 74.58 | 71.23 |

Table 4-1 reveals the average satisfaction level of migrant passengers to the railway transport of passengers service quality in China. It can be seen from the table that the overall average satisfaction of migrant passengers to the railway transport of passengers service quality in China is 72.22, among which, the average satisfaction for high-speed trains is 74.58, and the average satisfaction for ordinary trains is 71.23. In addition, the satisfaction level of each service quality index of high-speed train is higher than that of ordinary train.

Further analysis, among all the migrant passengers who participated in the survey, the highest score is 75.74 of indicator 4 "Operation process of station self-service ticket machine", which is 3.52 higher than the average satisfaction level; the lowest score is 67.60 of indicator 41 "Type of catering offered by train", which is lower than the average satisfaction level by 4.62; and the disparity between them is 8.14, the difference of satisfaction level is significant.

Among the migrant passengers on the high-speed train, the highest score was 78.01 of indicator 30 "Know the train time information from platform", which was 3.43 higher than the average satisfaction level; the lowest score was 69.96 of indicator 45 "Cultural entertainment facilities provided by the train (such as audio and video, network connection)", which was lower than the average satisfaction level by 4.62; the disparity between them is 8.05.

Among the migrant passengers on the ordinary train, the highest score was 75.18 of indicator 4, "Operation process of station self-service ticket machine", which was 3.95 higher than the average satisfaction level, and the lowest score was 66.17 of indicator 41 "Type of catering offered by train", which was lower than the average satisfaction level by 5.06; the gap between them was 9.01, and the difference of satisfaction level is more significant.

Link Satisfaction

Table 4-2 displays the level of satisfaction of migrant passengers to the service links of railway transport of passengers in China. It can be seen from the table that the satisfaction level of migrant passengers to the service links of railway transport of passengers in China is higher than 70, as well as the ticketing service and platform waiting service link are higher than 75.

The migrant passengers travelling on the ordinary train is unsatisfied with the traditional ticketing service, the facilities and service in the train, the satisfaction level is lower than 70, which is the key link to improve the service quality.

Table 4-2 Satisfaction level of service links for migrant passengers

| Service link | All trains | High speed train | Ordinary train |
|---|------------|------------------|----------------|
| Traditional ticketing service Ticketing service | 73.98 | 76.90 | 72.74 |
| | 70.58 | 72.40 | 69.81 |
| | 75.30 | 77.41 | 74.42 |
| Inbound service Waiting service at the station Platform waiting service | 74.13 | 76.09 | 73.30 |
| | 72.21 | 74.43 | 71.28 |
| | 75.15 | 77.36 | 74.22 |
| Facilities in the train Services in the train Outbound service | 70.77 | 73.15 | 69.77 |
| | 70.56 | 73.50 | 69.33 |
| | 74.07 | 76.39 | 73.09 |

Indicators with the Lowest Level of Satisfaction

Table 4-3 announces the five most unsatisfactory indicators for migrant passengers who participate in the survey, focusing on the inbound waiting link and facilities service link in the train and the satisfaction level of the ordinary train is lower than that of the high-speed train.

Further analysis makes clear that migrant passengers travelling on high-speed trains and ordinary trains are not satisfied with the "cultural and entertainment facilities (such as audio and video, Internet connection) provided on the train." Migrant passengers on the ordinary train are not satisfied with the goods, caterings and magazines provided at the station and in the train.

Table 4-3: Indicators of lowest level of satisfaction for migrant passengers

| Service link | Satisfaction level index | All trains | High speed train | Ordinary train |
|---|---|------------|------------------|----------------|
| Drawing up at a station and waiting for the train | Types of goods sold at stations | 69.09 | 71.95 | 67.88 |
| Facility services on the train | Cultural and entertainment facilities (Audio, video, internet connection) provided on the train | 67.63 | 69.96 | 66.64 |
| | Magazines available on the train | 68.22 | 70.22 | 67.37 |
| | Frequency and quality of goods sold in the train | 68.40 | 72.38 | 66.72 |
| | Types of catering provided by train | 67.60 | 71.00 | 66.17 |

Analysis of Satisfaction Level of Migrant Passengers with Different Seats

Fig.4-4 indicates the satisfaction level with the railway transport of passenger's service quality for the different seats of migrant passengers, and it can be seen from the figure that the satisfaction level of migrant workers is also basically decreasing with the reduction in the rank of seats.

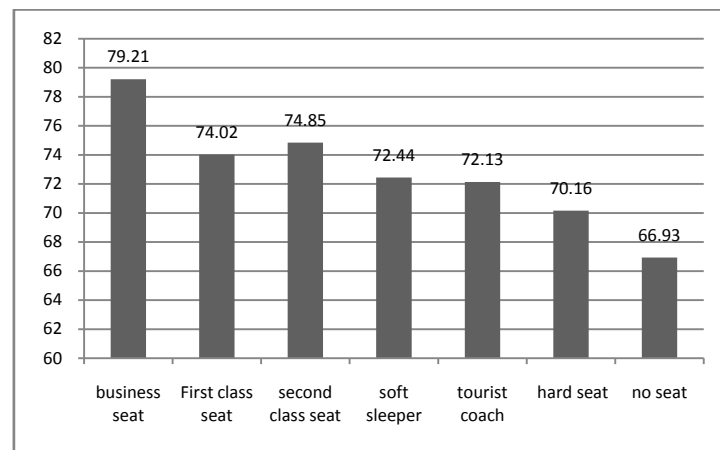


Fig. 4-4 Satisfaction level of migrant workers at different seats

Recommendations for Improvement

(1) Young and middle-aged people are the main group of migrant passengers, and 30% of migrant passengers choose to travel by high-speed train. It is suggested that railway departments develop special service policies for migrant passengers, such as adjusting fares at low peak periods to attract more migrant workers to take high-speed trains so as to facilitate their travel.

(2) The satisfaction of migrant passengers to the facilities and services of the ordinary train is less than 70, so it is suggested that the railway departments should improve the level of the facilities and the service quality of the train. At the same time, the satisfaction level of self-service ticket purchasing is generally higher than that of traditional ticket purchasing, indicating that migrant passengers have a good response to modern facilities, and it is suggested that railway departments should step up the modernization reform of traditional facilities.

(3) Migrant passengers are not satisfied with the goods and catering sold by railway stations and trains. It is advised that railway departments should formulate relevant policies in order to provide a wide range of catering and commodities. In addition, while meeting the material needs of migrant workers, they should also consider satisfying their spiritual demands.

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