

Managing the Quality of Passenger Service in Railway Transport Using Information Services

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Abstract—In the modern economy, railway transport must follow the path of innovative development, not only in the field of technology, but also in the field of service. To achieve this goal, it is necessary to solve problems, including the introduction of new modern technologies, digitalization of various management processes and the provision of services. The aim of the study is to assess the level of quality of service in long-distance trains in order to develop directions for improving their quality using information services. To achieve this goal in the course of the study, the following methods were used: methods of expert assessments, computational and analytical methods, the method of comparisons and analogies, questionnaire methods, quantitative and statistical methods. In the course of the study, the factors influencing the satisfaction of consumers with the quality of the provision of services in the railway transport were identified. Based on the identified factors, a social survey of consumers was conducted, as a result of which problem areas were identified and directions for improving the quality of service on long-distance trains using information services were formulated. As a result of the study, problematic aspects of passenger service were identified and the introduction of new informational ones was proposed, aimed at solving these specific problems.

Keywords—quality, passenger service, railway transport, service, digitalization

I. INTRODUCTION

Every day, thousands of people use the services of rail, making trips in local, long-distance and suburban traffic. All these trips must be regularly and efficiently organized, including passenger service. Railway transport companies increase their profitability by attracting additional customers and providing them with various services along the way. In accordance with the strategy for the development of railway transport in the Russian Federation until 2030 (approved on June 17, 2008 No. 877-r), the strategic task of the railway transport in Russia is to bring the level of safety and quality of transportation in line with the requirements of the population and the economy. It takes into account the best world standards

based on technical and technological development. One of the indicators of the quality of passenger service is the level of information support.

Obtaining the necessary effect from improving the quality of passenger service requires solving a set of tasks to improve the quality of the entire range of transport services provided to passengers.

II. METHODOLOGY

The works of Yu.I. Sokolov (2007), V.G. Galaburda (2009), Nosov A.L. (2014), Kopylova E.V., Kulikova E. B (2009), Persianova V.A. (2006) are devoted to the research of quality management of transport services and services in transport.

The works of the following scientists, Macheret D.A. (2018), Bubnova, G.V. (2019), Efimova, O.V. (2019), Elizariev Yu.V. (2007), Nosov A.L. (2016), Chernyshova I.A. (2011), Bagozzi R.P. (2005), Davison AC (2006), Karpunina E. (2020), Molchan, A. (2019), Tereshina, N. (2017), Podsorin, V. (2018), are devoted to the development of transport infrastructure. In addition, they discuss the problems of economic efficiency of management in the context of digitalization of economic and managerial processes in railway transport as one of the components contributing to improving the quality of service.

The increase in the level of service should be necessarily carried out in accordance with the development of transport infrastructure and with the principle of customer orientation in order to maximize the satisfaction of customers' needs for service while traveling on long-distance trains.

Therefore, the purpose of the study is to assess the level of quality of service in long-distance trains in order to develop directions for improving their quality using information services.

In the course of the research, such methods as: methods of expert assessments, computational and analytical, method of

comparisons and analogies, questionnaire methods, quantitative and statistical methods were applied.

The study was carried out in the following stages:

- Clarification of potentially interested groups in the issues under study and the specifics of quality management for the implementation of services in railway transport.
- Determination of factors influencing the quality of services and customer satisfaction in railway transport.
- Development of a questionnaire based on the identified factors for interviewing long-distance train passengers in order to identify customer satisfaction with the services provided on the railway transport.
- Conducting a survey of the target audience (consumers who travel on long-distance trains at least several times a year).
- Identification of problems in the field of quality of service, based on the results obtained in the course of social surveys.
- Analysis of the functionality of information services and mobile applications used by railway customers as one of the identified problem areas.
- Identification of ways to improve the quality of service on long-distance trains using information services.

The hypothesis of this study is that the modern possibilities of digitalization of various management processes contribute to improving the quality of services in railway transport with minimal costs.

III. RESULTS AND DISCUSSION

With regard to the concept of the quality of transport services for passengers, one should mean the totality of all the properties of the transportation process and the system of the passenger transportation process, which determine the satisfaction of passengers' needs in transportation and travel in accordance with the established standards (Galaburda V.G., 2009).

Service quality indicators are defined as a certain quantitative characteristic of one or more consumer characteristics of the service process, which reflect its quality (Nosov A.L., 2014). One of these indicators in transport is service.

In the future, the maintenance of passenger transportation by rail should become the foundation for the growth of profitability of commercial activities of transport companies and a mechanism for increasing demand for services provided (Kopylova E.V., Kulikova E. B, 2009).

After-sales service is a necessary element and ancillary service to improve the quality and best use of the main service. Customer services in transport increase passenger loyalty and satisfaction, and are aimed at gaining a competitive advantage for the company. Customer service implies an individual approach to the passenger (V. A. Persianova).

Companies that are committed to optimizing business processes and rational allocation of resources need a digital transformation of customer service.

Both consumers of services and companies providing services are interested in improving the quality of service in long-distance trains. Consumers are interested because they want their travels to be as comfortable as possible, and rail companies because they want to maximize profits with minimum costs. Accordingly, they are all stakeholders in the research being conducted.

The level of quality of services is influenced with many factors, including even the mood of the client himself. They are the sanitary condition of the car, the work of the conductors, the quality of bedding, the type of car, the quality of food services, as well as the correspondence of prices for services and the level of their quality.

Taking into account all the identified factors affecting the level of quality of service, a questionnaire was developed to identify the satisfaction of passengers with the services provided on the railway transport in long-distance trains.

As a result of a consumer survey, it was revealed that more than 90% of passengers are satisfied with food services on the trains, although 60% of those surveyed mostly take food with them, and on the train they buy at a minimum. Passengers also assess the level of personal safety and safety of things at a high level (90% of respondents are satisfied with the level of personal safety on trains). The work of the conductors is recognized as satisfactory by more than 96% of the respondents, and more than 85% are satisfied with the sanitary condition of the cars. The condition of the carriages and bedding is also rated at a high level. However, more than 75% of the respondents said that there is a lack of opportunities for communication with other passengers of the train, in particular, in matters of mutual assistance to each other regarding some little things forgotten at home (salt, charger, etc.) (Fig. 1, Fig. 2)



Fig. 1. Answers of respondents to the question “Are you interested in communicating with other passengers on the trip?”

The results of the study showed that 81.9% of consumers prefer to communicate with other passengers on a trip (Fig. 1), 51.6% forgot the little things they needed during the trip (Fig. 2).

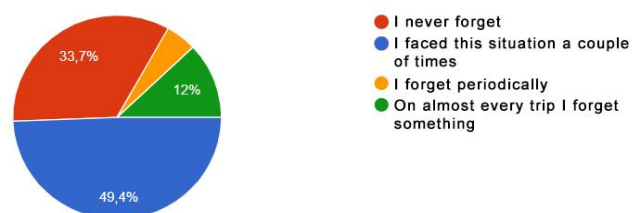


Fig. 2. Answers of respondents to the question “How often do you find yourself forgetting the necessary things at home (book, charger, salt)?”

Consequently, according to the survey, it follows that the ability to communicate with people of interest, provide mutual assistance, exchange of useful information will make the trip more comfortable for passengers on long-distance trains.

Further, in the course of the study, a comparative assessment of mobile applications was carried out with which you can buy tickets online for rail transport.

Nowadays, people more and more often use the Internet and mobile applications to obtain information about the services of companies and to buy products online including the transport product. Not always a person has the opportunity to use a computer to perform such manipulations, and then they can use a mobile phone. For the convenience of using various services, people download mobile applications on Google Play or the App Store. In 2019, people around the world installed 194 billion applications. Users spent \$ 101 billion in app stores in 2019, which is 75% more than in 2017. The time users spend in applications increased by 50% between 2017 and 2019 [9]. The modern generation uses smartphones not only as a means of communication, but also as an indispensable assistant in any business, be it work, study, payment for utility bills, buying groceries, planning a vacation and much more. The presence of a smartphone with downloaded applications, the subject matter he needs, simplifies many tasks and reduces the time to solve them.

Of course, the so-called travel applications also belong to business applications for everyday life. Those, with the help of which the client of the transport company can see the current timetable of transport, buy a ticket to the desired destination online, order additional services of the transport company, such as: food, drinks, meeting room, infotainment system on the way, mini- office, accompanying children, etc.

Now, you can buy tickets online for rail transport with more than ten mobile applications. Most of the applications mentioned below duplicate the functions of each other: "Railway tickets", "Railway tickets Online and Train Schedule in Russia", "Sapsan - train tickets online", "SAPSAN tickets and information about the train", "Yandex. Electric trains", "RZD tickets - Happy ticket", "RZD tickets - buy cheap railway tickets", "The last ticket of Russian Railways", "RZD for passengers train tickets", "Railway ticket office, RZD", "Suburb", "Railway tickets online", "Railway tickets with discounts".

All apps offer online ticketing services. However, in some, the client can view the schedule and buy a ticket, while in others, see seasonal promotions and sales of popular destinations. There are also mobile applications where customers can find answers to frequently asked questions. For example, such as "Can I get a discount ticket on the site?" or "Is it possible to carry animals on the Sapsan trains?" That is, the applications serve as a kind of reference for the future passenger. In some applications, it is possible to compare prices for train tickets, estimate the cost of train tickets for several months in advance. But, often when planning a trip, the client is forced to download and understand 3-5 applications in order to get answers to all his questions.

Now, most of the functions in the field of passenger rail transportation are provided with the mobile application "RZD for passengers". It was launched on February 25, 2016. This is the official application of "RZD" (Open Joint Stock-Company)

for purchasing tickets for long-distance trains without extra charges. Currently, the application does not provide an option to buy tickets for commuter trains. The developers write that this feature will appear later. Using the application, the client can buy a ticket for the desired train and get useful information about the services available at the stations.

To improve the quality of customer service in the mobile application, there is such a block as "My requests". It is divided into two parts:

- On Google Play, the app "RZD for passengers" has been downloaded more "Quick Question" - where customers can send a simple question on many simple topics. The answer to this question will come quickly, as the account manager can answer it.
- "Send request". The answer to the request will need to wait longer, since the request is sent to a specific department and a specialist draws up the answer. This detail of the mobile application is divided into sections: "Long distance travel", "Stations", "Unified Information and Service Center", "Suburban trains", "Website rzd.ru", "Passenger facilities" and "Routes and crossings". Clients can ask a question and get advice on each of the above topics.

The application "RZD for passengers" has been downloaded over 1,000,000 times, which undoubtedly shows its popularity. However, despite the presence of many functions and 7th place in the Top Free Apps, its rating is only 3.7 points, which is 1 point less than "tutu" (4.7 points on Google Play) - a similar application in terms of functionality. Most often, passengers use it to view the schedule and buy a train ticket. The above data allow us to conclude that the application "RZD for passengers" requires improvement. Reviews on Google Play show technical glitches in the app from time to time.

To identify the need for communication and mutual assistance of passengers on long-distance trains, a survey was conducted of the target audience (consumers who travel on long-distance trains at least several times a year). The research results are presented below:

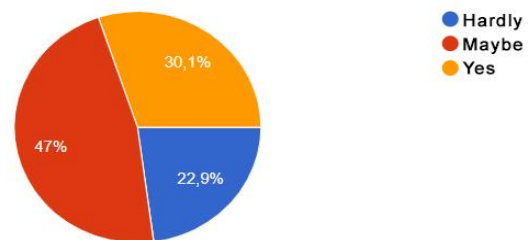


Fig. 3. Answers of respondents to the question "Would you use a service in which you could communicate with passengers of the train for mutual assistance or just communication?"

Based on a questionnaire survey of long-distance train passengers, it is proposed to introduce a messenger function in the application "RZD for passengers" in order to improve service for passengers within long-distance trips between passengers. This function will improve the quality of the railway passenger transportation service. Several hundred people, who are united with a 20–100 hour road in one community, will be able not only to communicate with each other, but also to be useful in a variety of circumstances. Some

of the passengers have forgotten their diabetes medication at home; someone has forgotten a phone charger. Someone goes to an unfamiliar city and does not know where to stay. Someone has finished reading a book taken from home and wants to exchange it for another, which was read by one of the passengers in the next carriage. Someone (let's say a lawyer by profession) is ready to give free advice on family law; someone urgently needs a doctor, and he is just going through 3 carriages, and someone needs basic human communication. It is simply impossible to list all situations.

By providing passengers with such a service (free for them), the company will make their journey more comfortable, which means that it itself will look more attractive in the eyes of customers, taking care of their social well-being. A similar service can be introduced as a pilot project on two or three medium-haul routes (Moscow - Novosibirsk, Moscow - Sochi). Whether or not to join this community, each passenger will be able to decide for himself before the trip, when buying a ticket, by checking or not checking the box next to the offer - "Include me in the chat of fellow travelers". If a passenger changes his mind during the trip and wants to join the community, then this can be easily done by going to the application. When buying a ticket, the application will be able to show in the "Train services" section whether the train of this number has a passenger chat.

During a trip over long distances, smartphone users may lose the Internet and mobile network, which may impede the chat of fellow travelers. But, this problem can be solved if we implement the "fellow travelers" function based on the "FireChat" application. This messenger allows you to exchange messages and at the same time not use a mobile network, but do with Wi-Fi, p2p connection and Bluetooth. The application creates a local network and thanks to this it works even when the user does not have an Internet connection. At the same time, "FireChat" allows you to transfer information much further than Wi-Fi and Bluetooth allow.

After completing the trip, you should not immediately delete the chat of "Fellow travelers", people should be given the opportunity to exchange personal contact information upon arrival, if someone has a desire - to do it. It is proposed to delete passenger chats after 24 hours after the end of the trip.

Taking into account the international experience of creating geo-positional chats for communication, it is worth noting the Place Chat geo-position messenger. All social networks and chats require you to first add a person as a friend, and then communicate with him. The developers set a goal to create a convenient and effective service that combines not only all information about places, but also the ability to communicate in relation to these places, that is, a kind of combination of Foursquare and a social network.

IV. CONCLUSION

Modern innovative information technologies make radical changes in the lives of ordinary people, the processes and technologies for the provision of various services are changing. It leads to an improvement in their quality. It is worth noting the fact that in the context of digitalization, approaches to ensuring the quality of passenger traffic, including information support, are also being modernized. One of the tasks of "RZD" (Open Joint Stock-Company) is to ensure the comfort of the transport service consumer on the trip. The introduction of

"Fellow travelers" service into the application "RZD for Passengers". is aimed at solving exactly this problem.

The introduction of the "Fellow travelers" chat into the menu of the application "RZD for Passengers" will improve the quality of passenger service due to two main factors:

- The ability to communicate with people of similar interests, provide mutual assistance, exchange of useful information will make the trip more comfortable for the passenger. Quality management is aimed at meeting customer requirements and striving to exceed their expectations. The conditions for staying on the train will become more comfortable due to mutual assistance and support of passengers, and the quality of customer service by the passenger company will indirectly increase.
- By reading and analyzing the general chat of passengers, specialists can take notes on customer satisfaction with the service on the train. For example, in some part of the train it is too hot, in some too warm; the conductor could be rude to someone; and some did not have enough cups. These are "trifles", and not everyone will write a complaint about this, but by chatting "Fellow travelers", a person can express their opinion when communicating with other passengers. Paying attention to the repeated remarks of passengers, employees of "RZD" (Open Joint Stock-Company) can draw a conclusion on what indicators of the quality of passenger traffic need to be worked on.

The development of the service does not require large expenses, but it will help passengers to spend their time on the trip more comfortable. It should be emphasized that improving the quality of service will help attract additional passenger traffic.

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