

Sustainable functioning of the passenger transport logistics system

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Abstract. The sustainable development of the transport logistics system (TLS) of passenger transportation in Russia is of great social importance for the mobility of the population. The purpose of the study is to check whether the course of the company JSC "FPC" for sustainable development, formulated in the strategy until 2030, is being implemented. The company has created a corporate quality system to improve the quality of services, ensure customer-oriented processes, and improve traffic safety. However, statistics show that the company's development is unstable, as the share of passenger traffic is small – 6,6% in 2012 and 5,5 % in 2019, and the volume decreased from 1421 to 1201 million people during this period. The majority of the population of the country chooses other modes of transport, because their need for mobility is not provided: the prices of railway tickets are high; also the travel time is significant, due to the low speeds of passenger trains. And the quality of the infrastructure (the state of the railway track and tracks) currently does not allow organizing high-speed movement of modern transport on the territory of the country; serious investments are needed to solve this problem.

1 Introduction

Sustainable development is development in which the needs of present generations are met without compromising the future generations to meet their own needs. This formulation first appeared in 1987 in the report "Our Common Future" [1]. A sustainable economy is an important element of sustainable development. The sustainable economy thrives on income from the rational use of natural, material, and human resources [2].

The modern concept of sustainable development includes three elements: social, economic and environmental. The sustainable development of the transport logistics system (TLS) of passenger transportation in Russia is of great social importance, primarily for the mobility of the population. Since the area of the country's territory is significant, the population is uneven, and the distances between the subjects are large.

A sustainable transport and logistics system for passenger transportation should be cost-effective, so it is necessary to minimize logistics costs. In [3], the authors propose an economic and mathematical model for reducing logistics costs in the framework of a client-oriented approach to investment planning.

Sustainability is stability: the ability of the transport and logistics system to maintain a stable level of service quality over a long period of time. Sustainability is also important in management. Only a stable system, including transport and logistics, is manageable [4]. In

[5], we summarized the problems that do not contribute to the sustainable development of the TLS of railway freight transport and we also proposed a process approach for effective management of Russian Railways processes based on GOSTR ISO 9000 series standards, which will ensure the achievement of the company's stated goal of reducing unproductive costs.

Since the sustainable development of the transport and logistics system of passenger transportation also contributes to the sustainable development of the country's economy, the topic of the study is relevant.

The object of the study is the TLS of the federal passenger company JSC "FPC", which provides long-distance passenger transportation services. The purpose of the study is to check whether the company is implementing the course for sustainable functioning, formulated in the development strategy until 2030.

Quality management technologies contribute to sustainable development, so the company's management is developing a Corporate quality Management System based on international standards ISO 9000 series. In accordance with the principle of customer orientation, the mission of JSC "FPC" is defined»: "WE improve the quality of life by making your trip as safe, affordable, and comfortable as possible." The quality policy and objectives have been approved, in particular, such as reducing the number of train delays; reducing the number of complaints about passenger service; achievement of the level of customer focus > 95%; implementation of the staff development plan; obtaining the ISO 9001 certificate of compliance for all types of activities of JSC " FPC " [6].

Indeed, the quality system allows us to ensure customer-oriented processes, increase the efficiency, reliability and safety of traffic on the basis of quality control of technological and business processes. A process approach is being implemented in managing the quality of FPC's business processes: passenger transportation, ticket sales, passenger service, baggage and cargo baggage transportation, repair and maintenance of rolling stock. The requirements for the quality of services are defined in the relevant regulatory documents and standards of the organization, some of them are shown in table 1.

Table 1. Quality regulatory documents and organization standards [7]

Regulatory documents	Internal standards	Internal documents
Order of the Ministry of Transport of the Russian Federation No. 473 of 19.12.2013 " On Approval of the Rules for the Carriage of Passengers, Baggage, and Cargo by Rail»	Service standard STO FPC 1.05.006.2015 "Passenger service in trains of the formation of JSC" FPC»	Code of Business Ethics of JSC "FPC" approved by the Board of Directors of JSC "FPC" in Minutes No. 8 of 14.12.2015.
Federal Law No. 16-FZ of February 9, 2007 " On Transport Security»	Service standard STO FPC 1.21.002-2013 "Requirements for the equipment of passenger cars with removable textile equipment»	"Rules on the ethics of social communication in the service of passengers with limited mobility on railway transport" (ORDER of JSC "Russian Railways" of August 27, 2013 N 1835r).

The Internal Control and Audit Center of JSC "FPC" controls the quality of services in trains and ticket sales points by conducting audits and developing corrective actions.

2 Methods

Theoretical research methods are based on a set of scientific ideas about sustainable development, logistics transport systems, and quality management. The methods of analyzing statistical data on passenger transportation, passenger traffic, and quality management approaches were used to identify problems in the logistics system of passenger transportation by rail in Russia.

3 Analysis of the logistics system of passenger transportation by rail

It should be noted that the implementation of the Corporate Quality Management System in JSC "FPC" has yielded positive results in the field of safety of railway passenger transportation services, so the number of accidents in the average of 8 years was 12,75 (Table 2). The causes of accidents in most cases on the railway are unsatisfactory technical conditions of the tracks.

Table 2. Passenger transportation and passenger traffic by rail in Russia [8,9]

Year	2012	2013	2014	2015	2016	2017	2018	2019
Passenger transportation, total million people	21370	19652	19558	19095	18645	18439	18113	17823
By railway	1421	1080	1076	1025	1040	1121	1160	1201
Relative share, %	6,6	5,5	5,5	5,3	5,5	6,0	6,4	6,7
Total passenger traffic, billion passenger-km	532,6	547,2	556,2	529,7	519,4	560,2	593,6	635,2
By railway	144,6	138,5	130,0	120,6	125,6	123,1	129,5	133,6
Relative share, %	27,6	25,3	23,4	22,7	24,2	21,9	21,8	21,0
Accident rate, number of accidents	1	17	15	15	12	14	10	18

Indicators of the functioning of the TLS are the volume of passenger traffic and passenger traffic, statistics from 2012 to 2019 according to Rosstat are shown in table 2.

As can be seen from Table 2, the volume of passenger traffic from 2012 to 2019 was constantly decreasing, from 21370 to 17823 million people, 1421 and 1201 million people were transported by rail, which accounted for 6/6% and 5,5 %, respectively, of the total number of passenger traffic.

The dependence of passenger traffic is non-linear, the minimum value was in 2016 – 519,4 billion passenger-km, the maximum in 2019 – 635,2 billion passenger-km The share of passenger traffic by rail was 27,6 and 21% of the total turnover.

These data do not indicate the stable functioning of the FPC TLS. It remains to be seen what the root of the problem is.

Let us compare prices for May holidays from Yekaterinburg to Moscow, St. Petersburg, Sochi, Kazan and Kaliningrad round-trip (Table 3).

Table 3. Ticket prices for the May holidays of 2021 [10]

round trip	Distance by railway, km	Average speed km-h	Trip time	Reserved seat, rubles	Compartment, rubles	First class, rubles	VIP, rubles
Yekaterinburg-Moscow	1417	47	27h.26min.-32h.53 min	5886	10670	17776	24149
Yekaterinburg-Saint Petersburg	1782	49,5	35h.10min.-36h.40 min	-	3900	5976	-
Yekaterinburg-Sochi	2077	31	58h.27min.-75h.36min.	5851	10445	21633	-
Yekaterinburg-Kazan	718	51,3	12h.52min.-15h.6min.	1982	4544	8935	14927

It becomes clear, from the data in table 3, why the share of passenger traffic is small, and the volume of passenger traffic is decreasing annually (see table 2). The majority of the country's population does not choose rail transport, as ticket prices are high - at the level of air tickets for the low coaster "Pobeda flights", the long travel time is due to the very low average speeds of passenger trains from 31 km/h to 51,3 km/h. For comparison, the train "Lastochka" overcomes the distance from Moscow to St. Petersburg at the average speed of 92 km/h, and the average speed of the high-speed "Sapsan" is about 172 km/h.

4 Conclusions

Thus, despite the increase in the quality of services provided on long-distance trains, JSC "FPC" cannot fully meet the needs of passengers in the quality of services, since the population's need for mobility is not met. The problem lies in the low quality of the infrastructure: the unsatisfactory technical condition of the railway tracks, which does not allow organizing high-speed movement of modern transport on the territory of the country. Therefore, serious investments in infrastructure are needed, as the lack of modern railway lines hinders the sustainable development of the TLS.

References

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