

THE IMPACTS OF THE COVID-19 PANDEMIC ON PASSENGER RAILWAY TRANSPORTATION

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Abstract

The COVID-19 (coronavirus) pandemic upended the global economy. The pandemic has caused various economic and social changes in the world economy, and in particular in the organization of passenger railway transport. The most visible were the reductions in mobility in the transport sector in terms of global constraints, such as travel bans, quarantines, closures of various facilities and services, border restrictions, which led to a reduction in demand for transport services. The objective of the article is to analyze the effects of the pandemic on the passenger railway transport and outline the directions for increasing the competitiveness and resilience of transport in other future crises. The methodology used is based on statistical methods and comparative analysis in the research time period 2011 – 2021.

Keywords: railway transport, restrictions, pandemic, quality transport services, passengers

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Introduction

Railway transport is a fundamental type of transport in all industrially developed countries in Europe and around the world. Of particular importance is the role it plays for national transport systems in various aspects, the main ones of which include low consumption of energy and the fact that it is environmentally friendly (Dimitrov, 2019). Its development takes place in the conditions of severe competition with other types of transport, namely motor transport, air transport, river transport, sea transport and unconventional types of transport. This, in turn, leads to its perpetual perfection through continuous incorporation of new calculation and design methods, introduction of cutting-edge and innovative technology, as well as testing railway equipment with modern, up-to-date systems. The end goals include regular use of various railway systems within the member states and trouble-free transition from one-member state network to another.

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In March 2020 the world was blocked by the emergence of a virus identified as Sars.Cov-19. Transport was one of the multiple sectors severely affected by the pandemic and the one that faced the most serious complications in light of the crisis. The pandemic affected every country in Europe, leading to a huge drop in mobility, which in turn reflected directly on the demand for transport services in all types of transport. The restrictive measures which were imposed on both domestic and international traffic had an unfavorable effect on the transport sector. In particular, passenger railway transport was affected the most by the COVID-19 crisis, sustaining tremendous economic damage from the sharp drop in the number of passengers along all directions of the railway system as a result of the reduced mobility based on the imposed restrictions. All of these factors led to a collapse in both railway and infrastructure enterprises and had a severe impact on passenger transport as a result of delayed investments and blocked rail composition update projects. As many authors (Bakalova, 2018; Minkov, 2019; Nikolova, 2021; Tzvetkova, 2018) point out, railway transport represents the backbone of flexible and stable routes for mobility, and the current crisis has revealed the necessity to improve compatibility and coordination in Bulgaria's railway network. The COVID-19 pandemic has given railway transport a key position in terms of supplying transport services in the future.

The drop in the demand for passenger freights due to the transport-blocking measures and restrictions on movement imposed by national authorities has had a direct effect on the economy of railway transport through the partial or complete suspension of certain activities (Arnaudov, 2021).

A particularly hard blow was dealt to passenger transport where travel models were changed due to the following reasons:

- Mandatory quarantine at home in order to avoid contacts;
- Closed institutions, businesses, stores and public buildings;
- Grounded aircraft;
- Complete paralysis of public, political and social life.

Passenger transport suffered the most intense economic consequences from the pandemic due to the paralysis of public life and the economy. The consequences of blocking people's mobility had a catastrophic impact on the population's mobility, as well as the volume of work carried out in passenger kilometers.

The object of the present study is BDZ "Passenger Services", and the subject is the impact of the pandemic on the supply of passenger railway services, more specifically by examining the drop in the volume of carried out work.

The main research thesis of the present work is to use the analysis and evaluation of the pandemic's impact on passenger railway transport as a basis to determine the measures that need to be undertaken for its fast recovery. The possibilities for the future improvement of railway services after the end of the

pandemic, as well as the long-term and stable development of railway transport, will also be determined. Based on the formulated thesis, the following research objectives need to be achieved:

- Analyzing the state of BDZ “Passenger Services” before the pandemic;
- Studying the impact of the pandemic on the mobility of the country’s population;
- Conducting an empirical study for assessing and ranking the evaluation indicators of key elements;
- Drawing conclusions and making recommendations for creating and maintaining successful and stable passenger railway transport.

Analysing Passenger Railway Transport in Bulgaria during the 2011 – 2021 Period

The COVID-19 pandemic caused a severe economic shock which had a considerable negative impact on passenger freights in all types of transport, which in turn affected the economy of our country. The health crisis had an unprecedented impact on the entire transport sector and passenger railway freights in particular. The restrictions on movement imposed across the country during March, April and May 2020 because of the COVID-19 pandemic continued to have a negative effect on the financial results of BDZ “Passenger Services” in 2021 as well. Even after a large portion of the measures designed to limit the spread of COVID-19 were lifted in the summer of 2021, the number of transported passengers and the revenue from passenger freights respectively did not increase. The effect of the coronavirus on passenger freights is perceived as unprecedented, causing unparalleled economic and health crises whose duration is unclear and impossible to prognosticate. The main goal of the present analysis is to study the effects of the pandemic on the activities of the national carrier, assess the government’s measures against the fundamental risks, and outline specific measures which will have a strong effect on the recovery of BDZ “Passenger Services”.

The analysis of the available data from NSI for the number of passengers carried by railway transport has taken into account the fact that BDZ “Passenger Services” is the only carrier on the railway market in Bulgaria. Another peculiarity of studying passenger freights is the division of the analyzed period into two sub-periods – prior to the pandemic (2011 – 2019) and during the pandemic (2020 – 2021).

Analysing Passenger Railway Transport 2011 – 2019

A characteristic trait of passenger railway transport in Bulgaria is its extremely small share in the total volume of carried out work compared to motor transport. This is due to the specific features of the supply of transport services. The

systematic neglect and failure to modernize railway transport in Bulgaria over the last thirty years has prompted passengers to turn to other, alternative modes of transportation (personal cars and bus transport).

The study of the dynamic of passenger railway freights reveals a concerning trend related to the sharp drop in the volume of carried out work. One of the main reasons for that is the unfair competition with motor transport based on non-payment of the full costs of carrying out freights. As a result, railway transport is placed in a much less favorable position compared to motor transport. Another main reason is the extremely poor condition of the railway tracks, as well as the constant shortage of reliable rolling stock. Table 1 shows the data for the number of passengers carried by railway transport during the 2011 – 2019 period.

Table 1: Number of passengers carried by railway transport

Year	Transported passengers (in thousands)	Average distance (km)
2011	29 287	70,6
2012	26 508	70,8
2013	26 071	70,04
2014	24 627	69,11
2015	22 526	68,91
2016	21 434	68,02
2017	21 203	67,79
2018	21 379	69,20
2019	21 340	71,42

Source: NSI (2021).

As the table shows, the number of transported passengers during the aforementioned period is constantly dropping, with its levels remaining the same (21 million) over the last four years (NSI, 2021). The drop in 2019 (which is before the pandemic) in comparison to 2011 is approximately 40%. The drop in the number of passengers who use railway transport is due to multiple and varied reasons – limited number of trains, with large traffic intervals (poor condition of the infrastructure), lack of coordination between passengers and train traffic schedules, extremely low level of comfort during travel with the outdated rolling stock (the levels of comfort are different in the new “Desiro” trains).

The situation is identical in terms of the amount of work carried out in passenger kilometers. Table 2 shows the data for the work carried out by BDZ “Passenger Services” during the 2011 – 2019 period (NSI, 2021).

Table 2: Amount of work carried out in passenger kilometers

Year	Amount of carried out work (in millions)	Average distance (km)
2011	2 068	70,6
2012	1 876	70,8
2013	1 826	70,04
2014	1 702	69,1
2015	1 552	68,9
2016	1 458	68
2017	1 437	67,8
2018	1 479	69,2
2019	1 524	71,4

Source: NSI (2021).

The data from the table makes it clear that the dynamic of the changes in the amount of work carried out in the years prior to 2019 follows the same trend that is observed in the number of transported passengers. However, the drop in the amount of work carried out in 2019 in comparison to 2011 (the base year) is lower – 25% (BDZ, 2020a). This is mainly due to the fact that the average freight distance has remained the same over the years – approximately 70 km. Generally, there is a downward trend in the number of people who use railway transport; however, the distance they travel remains the same. Also noticeable is a curve refraction in 2019, with the levels of carried out work reaching their values from 2015. The same trend can be seen in the average freight distance which has even increased slightly in comparison to 2011.

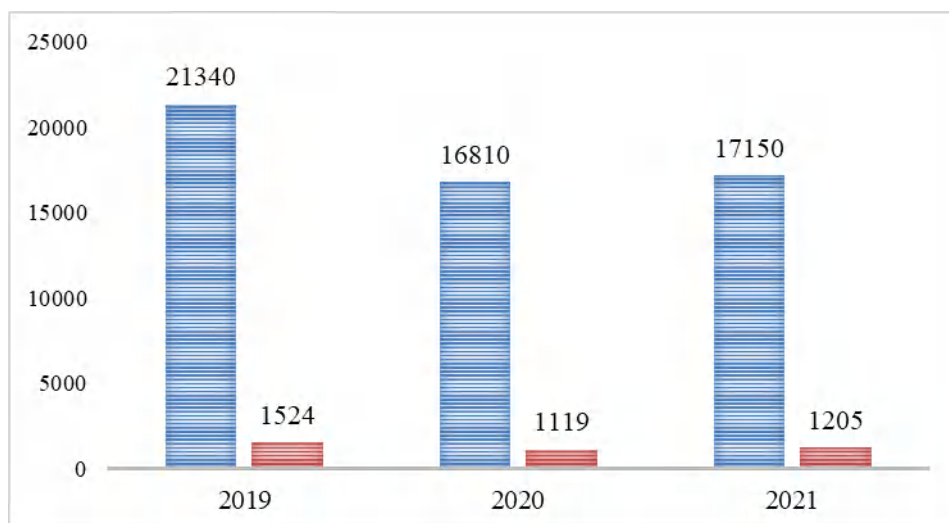
In summary, it can be concluded that a drop is observed in the number of transported passengers, as well as the amount of carried out work. Although we observe a curve refraction in a positive direction in 2019, the number of transported passengers tends to plateau (21 million) in the last 4 years.

Analyzing Passenger Railway Transport 2020 – 2021

The analysis of the data for the 2011 – 2019 period has shown a serious decline in the number of transported passengers (40%) and the volume of carried out work (25%) (NSI, 2022c). Something that stands out is the fact that the decline in the number of transported passengers (21 million) has stalled over the last 4 years. The data recorded for 2019 shows a very small rise in the number of transported passengers in comparison to 2018. The renewal of the rolling stock of BDZ “Passenger Services” was another contributing factor to the emerging

trend which was promising that 2020 would be a favorable year for passenger railway transport. In addition to reconstructing compartment cars and optimizing the train traffic schedule, 15 new locomotives from the Smartron series were purchased. All of these events were suggesting a successful year for railway transport. However, over the past two years the world changed with the emergence of COVID-19, which also affected all economic sectors. The emergence of the virus known as SARS CoV-2 (COVID-19) presented serious challenges for all types of transport and made the last two years unpredictable. Due to the imposed restrictions designed to limit the spread of the pandemic, our economy was affected negatively, with transport suffering the greatest losses. This is due to the fact that people's mobility was fundamentally limited, which led to drastic changes in the market of passenger railway freights.

Data from NSI and BDZ "Passenger Services" shows a drastic drop in the number of transported passengers and the amount of work carried out for 2020 as a result of the health crisis that emerged. The next chart illustrates the state of passenger freights during the examined period (NSI, 2021).



Source: NSI (2021).

Figure 1: Number of transported passengers in thousand and volume of carried out work in passenger kilometers in millions

On a yearly basis, the decline is 21%, but the most significant drop is observed in the second quarter of 2020 – over 37% compared to 2019 (Eurostat, 2021). Despite travel-related restrictions during the next two quarters, we observe a slight recovery in the number of transported passengers. In 2021 we already have

a rise in the number of transported passengers, as well as the volume of carried out work in passenger kilometers – 2% and 8% respectively. The levels from 2019 are expected to be reached as early as 2022 on the grounds of the stable upward trend in the number of transported passengers during each quarter of 2021 (BDZ, 2020a) and especially the emerging trend of a significant rise in liquid fuel prices during the first quarter of 2022.

Specific Measures for Overcoming the Consequences of the COVID Crisis and Increasing the Number of Transported Passengers and the Volume of Carried Out Work

Since the start of the pandemic in 2020, the Ministry of Transport has been working with the national carrier and the National Railway Infrastructure Company (NRIC) to protect the health and well-being of Bulgarian citizens. The specific actions that the government has taken in response to the health crisis are focused mainly in four priority areas:

- Limiting the spread of the virus through mandatory use of masks in station zones and aboard trains;
- Providing medicinal preparations and equipment for stations and wagon compartments;
- Financial support for transport enterprises and guaranteed preservation of jobs;
- Encouraging scientific research in the field of limiting the spread of the virus, measures for recovery of the sector, and guidelines for priority development of railway transport.

In order to counteract the COVID-19 pandemic, the first set of measures that were undertaken involved drawing up a joint action plan between BDZ “Passenger Services” and the National Railway Infrastructure Company regarding the increasingly complicated epidemic situation. The rolling stock started to be completely disinfected in engine-sheds and prior to departure from starting stations, and strict control was introduced for all locomotives and wagons entering through border stations. The next set of steps involved stopping the issuing of travel cards for pensioners and students in order to avoid congregations of people. Cards which were close to expiring received an automatic two-month extension. In addition to creating an assortment of activities and jobs that can be done remotely, technical provisioning was organized as well.

The possibilities for restoring railway transport after the two difficult years are at the basis of all plans of governmental and non-governmental organizations. The ecological potential of railway transport is one of the reasons why it takes central place and has such a strategic significance in Bulgarian and EU policies

for the development of the Trans-European Transport Network (TEN-T). The implementation of the measures for carrying out the so-called Green Pact puts the priority development of railway transport at the forefront (CM, 2021). At the same time, it holds key significance for people's mobility, as well as the integrated development of transport systems within the context of the policies for stable development and the European Green Deal.

Enterprises from the railway sector required urgent financial support in order to counteract the negative economic effects of the pandemic. Considering that the COVID-19 pandemic continues to affect the level of passenger railway freights, and in order to restore its regular operations, the Ministry of Transport and the railway carrier adopted measures to alleviate travel when observing epidemic requirements. The specific actions involve partially compensating revenue losses with possible stimuli tied to passenger transport grants. The restoration of the role of railway transport after the pandemic requires the adoption of certain specific measures (MTC, 2021) such as:

- Direct financial aid – granting immediate financial support to transport operators and carriers;
- Delaying and/or reducing some of the fees for access to the railway infrastructure. The goal is to minimize carriers' costs by securing financial stimuli for infrastructure managers, which in turn would reduce access fees;
- Reducing (delaying or removing wherever possible) taxes and other freight-related fees;
- Securing and guaranteeing loans for carrying out freight activity, which will help absorb part of the economic shock to the national carrier;
- Removing restaurant wagons and bistros from all train compositions to avoid congregations of people;
- Ticket sales will be done predominantly online through respective apps, thus minimizing physical sales;
- Guaranteeing fair and equal terms with motor transport for BDZ "Passenger Services" specifically, i.e. the announced emergency measures should apply to all types of transport.

The railway administration is also developing new additional rules to mitigate the severe consequences of the pandemic in the sector. These emergency measures are designed to guarantee the continued functioning of railway transport by reducing the risk of COVID-related bankruptcies in the sector which was seriously affected by the lack of demand for transport services. When it comes to the fair treatment of operators, these relief measures need to be implemented in a strictly neutral, economically justified and transparent way. Stable railway passenger transport plays a crucial role in achieving the goals in the field of green transition and ensuring the operational connectivity of Europe.

All of these measures need to be carried out in sync with train traffic whose operations should continue without changes in schedules, thus securing a reliable transport service for everyone who uses railway transport. It will take a great deal of support to popularize railway transport as the safest and most stable type of transport which plays a fundamental role in the future mobility system of society. The actions undertaken by the Ministry of Transport and BDZ “Passenger Services” aim to achieve a unified plan of action during emergency situations in the field of transport, with the end goal being better handling of not just the current pandemic, but future crises as well (CM, 2021).

Conclusion

On the whole, the development of passenger railway transport is a very good reflection of the state of the “Transport” sector, as well as the general economic development of our country during the examined period in some respects. The health crisis affected passenger mobility by limiting the capacity of vehicles, as well as the environment, which in turn led to positive effects in relation to climate changes.

Over the last two years passenger flows have been dwindling constantly, rendering passenger train traffic ineffective, which in turn has had a negative effect on the financial results of BDZ “Passenger Services”. The wider use of railway transport to satisfy the demand for more stable transport will be crucial to the recovery of passenger railway transport after the pandemic. This, in turn, will have a significant positive effect on pollution and energy consumption, thus contributing to the achievement of the ambitious goals to reduce emissions outlined in the European Green Pact.

It is for precisely this reason why railway transport will play a fundamental role in limiting the production of greenhouse gas emissions once the sector has recovered from the pandemic. In the context of these aspects, it is necessary to develop a new and stable paradigm for the development of green mobility which will respond to society’s needs in terms of future health, economic and social crises. Part of this paradigm involves a great deal of rethinking, as well as a conceptual reform, which the railway sector needs to undertake in order or continue improving the supply of transport services during future crises.

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