

INFLUENCE OF THE COVID-19 PANDEMIC ON THE DEVELOPMENT OF THE RAILWAY TRANSPORT IN BULGARIA

Georgi Dimitrov¹
e-mail: g.dimitrov@unwe.bg

Abstract

The freight railway transport has got an important role in the national transport system, carrying out the movement of goods on medium length and long distances, where the passenger railway transport not only fulfils the purely commercial transportation side but it also has a social function supplying to the population access to social transportation services. In the current research is analysed the development of the freight and passenger railway carriage in Bulgaria for the period of 2011 – 2020. The period reviewed starts with the years of recovery of the economy of the country from the worldwide financial-economic crisis and ends with the entering into the crisis caused by the COVID-19 pandemic. The main goal of the study is to follow the trends of the development of the freight and passenger railway transport and to determine how the occurrence of the COVID-19 pandemic affected the railway transportation activities.

Keywords: rail freight, rail transport of passengers, railway carriers, transport market, Covid-19 pandemic

JEL: O18, R41

Introduction

In the current conditions and levels of development of the technics and technologies only the railway transport can widely use electricity as fuel. Almost the entire of the railway networks of the developed countries are electrified, on the territory of Bulgaria 71.26% of the railways are electrified.

The railway transport is a main part of the national transportation system and its development is of a major importance for Bulgaria in the context of the Green Deal and the efforts of the European Union for decarbonisation of the economy.

Due to the liberalisation of the transport market the monopoly of the “Bulgarian National Railways” was removed and the access of private railway carriers was allowed. Currently there are 15 carriers functioning, one is with a license for

¹ Chief Assist. Prof., PhD, Department of Transport and Energy Economics, University of National and World Economy

passenger transportation and 14 own licenses for performing of freight railway transports.

The period analysed 2011 – 2020 includes the time after the world financial and economic crisis and ends with the entering of the world crisis caused by COVID-19. The duration of the period (10 years) allows us to highlight the main trends in the development of railway transport and to trace how the pandemic of COVID-19 has affected these trends.

Freight transport by rail

Statistics on the amount of freight transported by rail in domestic and international transport are presented in Table 1. The data shows that for the period under review more than two thirds of the quantities of freight transported by rail were transported by domestic transport. The share of international transports in the total amount of freight transported by rail varies from 29.22% in 2011 to 39.50% in 2020, with the lowest share in 2014 – 24.32%, and the highest in 2019 and 2020, respectively 33.82% and 39.50% (Infostat, 2022).

Table 1: Quantities of freight transported by rail for the period 2011 – 2020 (thousand tons)

Years Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Domestic transport	10016,3	8953,4	10152,0	10360,7	10296,0	9677,1	11374,1	10405,8	9893,4	9906,2
International transport	4135,7	3516,4	3386,9	3330,2	4339,1	4548,7	4655,8	4390,2	5054,7	6467,4
Transported goods – total	14152,0	12469,8	13538,9	13690,9	14635,1	14225,8	16029,9	14796,0	14948,1	16373,6

Source: NSI (2021a).

In 2012 there was a decrease in the transported quantities of goods by 1 682,2 thousand tons, which is equivalent to a decrease of 11.89% compared to the beginning of 2011. After 2012, there is a period of stabilization and a slight increase in the amount of freight transported, reaching 16 373,6 thousand tons in 2020.

The total amount of freight transported by rail for the period under review has increased from 14 152 thousand tons in 2011 to 16 373,6 thousand tons in

2020. For the period under review, the freight transported increased by 2 221,6 thousand tons, which is equates to an increase of 15.70% compared to 2011 (NSI, 2021a).

Table 2 presents data on the work performed by rail freight transport for the period 2011 – 2020. Over two thirds of the total amount of the work performed by rail transport on the territory of the country for the period under review was carried out during domestic transport.

Table 2: Work performed by freight railway transport for the period 2011 – 2020 (million tkm)

Years Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Domestic transport	2237,1	2011,3	2376,2	2557,0	2514,1	2364,3	2788,8	2685,9	2524,2	2803,8
International transport	1054,1	896,3	869,8	882,2	1135,7	1069,4	1142,2	1138,2	1377,4	1699,0
Work performed – total	3291,2	2907,6	3246,0	3439,2	3649,8	3433,7	3931,0	3824,2	3901,6	4502,8

Source: NSI (2021a).

The amount of work performed by rail freight transport decreased significantly in 2012 and from 3291,2 million tkm in 2011 reached 2 907,6 million tkm, which is equivalent to a decrease of 11.66%. In the period 2013 – 2020 there is a gradual increase in the work performed by railway transport, reaching 4 502,8 million tkm by 2020. The total amount of work performed for the period under review has increased by 1 211,6 million tkm, which is an increase of 36.81% compared to the beginning of 2011 (NSI, 2021b). As there are no significant changes in the average transport distance per tonne of freight, the significant fluctuations in the amount of transport work performed during the period can be explained by significant changes in quantities of freight transported by rail.

In Table 3 below data is presented on the quantities of goods transported and the transport work performed by rail as a percentage of the total quantity of goods transported and the work performed in the national transport system. The data shows that the share of rail transport in the total amount of freight transported by the national transport system initially decreased from 13.97% in 2011 to 11.23% in 2013, and then stabilized and even increased slightly, reaching 15.49% in 2019, followed by a new decline to 14.48% by 2020.

Table 3: Ratio of the quantities of transported goods and work performed by rail to the total amount of transported goods and work performed in the national transport system for the period 2011 – 2020 (%)

Indicators \ Years	Years									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Transported goods - %	13,97	11,63	11,23	11,95	11,66	11,44	11,73	12,68	15,49	14,48
Performed work - %	7,40	7,18	8,97	10,36	9,66	8,26	9,24	11,62	15,09	12,02

Source: NSI (2021b) and calculations of the author.

During the period under review, the railway transport has increased its share in the total amount of freight transported by 0.51%. This trend of increasing the share of railway transport of freight transported in the national system is positive, but the growth is very unsatisfactory, given that the use of railway freight transport is strongly encouraged by the European Union due to its economic and ecological characteristics.

Regarding the participation of railway transport in the total amount of work performed in the transport system of the country, there are serious fluctuations. From 7.40% in 2011 it decreased to 7.18% in 2012, after which an uneven increase began, reaching 15.09% by 2019, followed by a serious decline in 2020, reaching levels of 12.02%.

The decrease at the beginning of the considered period is due to the decrease in the quantities of goods transported. Since 2012 there has been a trend of uneven increase in the percentage share of railway transport in the total amount of work performed in the country's transport system.

For the period under review the share of railway freight transport in the total amount of transport work performed increased by 4.58% although the quantities of freight transported for the same period have increased by only 0.51%. This is due to the extremely sharp decline in maritime transport activity (Nikolova, 2019) which in the first half of the period constantly reduced its share in the work performed in the national transport system and at the end of the reviewed period it had an insignificant part.

Table 4 presents data on the changes in the average transport distance per ton of freight transported by rail on the territory of the country in the realization of domestic and international transportations.

Table 4: Changes in the average transport distance per tonne of freight for railway transport for the period 2011 – 2020 (km)

Years Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Domestic transport	223,3	224,6	234,1	246,8	244,2	244,3	245,2	258,2	255,1	283,0
International transport	254,9	254,9	256,8	264,9	261,7	235,1	245,3	259,3	272,5	262,7
Total:	232,6	233,2	239,8	251,2	249,4	241,4	245,2	258,5	261,0	275,1

Source: NSI (2021a) and calculations of the author.

The average transport distance per ton of freight for railway transport varies within 232,6 km reported in 2011 to 275,1 km in 2020. For the period under review, the average transport distance per ton of freight, despite fluctuations, increased by 42.5 km.

Table 5 presents data on the train kilometers travelled, the performed transport work in gross ton-kilometers and the collected infrastructure fees from the licensed freight railway carriers for 2019 and 2020. By comparing the data on the use of railway infrastructure for 2019 and 2020 it stands out how the crisis caused by COVID-19 in its beginning affected the activities of licensed railway carriers performing freight transport services. In the total amount of realized train kilometers travelled and gross ton-kilometers in conducting freight transport there is an increase for 2020 by 4.27% and 7.01% respectively compared to the crisis year 2019. Despite the increase in the realized transport activity, due to the reduction of the infrastructure fees, a decrease of the revenues from the transition fees realized by State-Owned enterprise NRIC (National Railway Infrastructure Company) was registered in the amount of 10.12% compared to 2019.

Table 5: Freight transports performed by railway carriers, expressed in train kilometers and gross ton-kilometers and the revenues from infrastructure fees for 2019 and 2020 realized by them

Years		2019			2020		
Indicators	Train kilometers	Gross ton-kilometers /thousands/	Infrastructure charges /BGN/	Train kilometers	Gross ton-kilometers /thousands/	Infrastructure charges /BGN/	
Carriers							
BDZ – Tovarni prevozi EOOD	4620268	4882837	15757430	5071855	5335385	14542040	
Bulmarket Rail Cargo EOOD	797919	824320	2691280	950118	1049178	2866080	
BJK AD	1051297	962317	3228130	614926	587213	1663940	
TBD Tovarni prevozi EAD	659536	616017	2049390	587413	540935	1553960	
Rail Cargo Carrier Bulgaria EOOD	409815	374502	1538560	516715	587480	1530820	
Pimk Rail EAD	398754	488439	1150150	562889	580800	1494070	
DB Cargo Bulgaria EOOD	448918	491481	1534400	475863	564623	1494170	
TSV	42854	9448	57480	35382	7263	38080	
Port Rail Ltd.	40891	6103	47570	9710	1137	8570	
Mini Maritsa East EAD	491	106	650	6720	8107	21120	
Express Service OOD.	1377	204	1600	2150	261	1960	
Gastrade AD	2107	1090	4390	1255	475	1880	
DMV Cargo Rail EOOD	111	8	110	851	58	640	
Cargo Trans Wagon Bulgaria AD	32	4	40	115	8	90	
Total:	8474370	8656876	28061180	8835962	9262923	25217380	

Source: DP “NKZHI” (2020).

Of the first eight carriers performing the main part of the freight transport activity in railway transport in 2020, only “BJK“ (Public limited company) AD, “TBD Tovarni Prevozi” LTD and “TSV” registered a decrease in the number of realized train kilometers travelled and gross ton-kilometers compared to 2019. In terms of paid infrastructure fees, a decrease for 2020 compared to 2019 is registered for all major carriers, except for “Bulmarket Rail Cargo EOOD” LTD

and “Pimk Rail EAD” LTD, which pay 6.50% and 29.90% more, respectively (DP “NKZHI”, 2020).

In conclusion, the following main illations for the development of freight railway transport in Bulgaria can be made for the period 2011 – 2020:

- More than two thirds of the transported quantities of goods and the transport activity performed by the railway transport is carried out during the performance of internal communications.
- At the beginning of the period reviewed, the quantities of transported goods and the amount of transport work performed decreased. After 2013 the quantities of goods and the performed transport activity began to increase gradually and by 2020 they are respectively by 15.70% and 36.81% higher than the initial year 2011.
- The share of freight railway transport in the total amount of freight transported in the national transport system has increased by 0.51% during the period considered.
- The increase in the percentage share of work performed by railway transport to the total amount of work performed in the transport system is due to the aggravated state of Bulgarian maritime transport not due to improved indicators of railway transport.
- The average transport distance per ton of freight transported by rail increased by 42.5 kilometers during the period considered.
- By 2020 there are 14 railway carriers with a freight license but only 7-8 of them actually operate and perform significant activities.
- More than half of the transported quantities of goods and the performed transport activity in the freight railway transport are carried out by “BDZ-Tovarni Prevozi EOOD” LTD.
- Despite the increasing number of licensed railway carriers this does not lead to the attraction of additional freight to railway transport.
- Transport of passengers by rail

The transport of passengers by rail on the territory of Bulgaria is carried out by the company “BDZ – Passenger Transport EOOD” LTD, which is the only railway carrier with a license for passenger transport.

Table 6 presents data on the number of passengers carried by domestic and international rail for the period 2011 – 2020. The data shows that the main part of the transported passengers have travelled by domestic transport and the share of international transport in the total number of transported passengers is insignificant. The share of international transport in the total number of passengers carried by rail initially decreased from 1.32% in the initial 2011 down to 1.08% in 2015, after which the trend reversed and the share of international transport increased to 4,94% in 2019 (NSI, 2021c). Since the beginning of the last year

of the period under review (2020) the global crisis caused by the COVID-19 has begun and this affects the share of international transports by rail, which decreased to 1.79%.

Table 6: Passengers carried by rail for the period 2011 – 2020 (thousand passengers)

Years Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Domestic transport	28920,3	26173,8	25727,3	24325,2	22284,0	20910,7	20411,3	20534,1	20285,0	16509,5
International transport	387,9	349,4	344,2	302,1	242,3	522,9	791,9	803,6	1054,5	300,9
Transported passengers – total	29308,2	26523,2	26071,5	24627,3	22526,3	21433,6	21203,2	21337,7	21339,5	16810,4

Source: NSI (2021c).

Throughout the whole period under review, there has been a downward trend in the total number of passengers transported by rail. In the first half of the period there was a significant decrease in the number of people who travelled by rail, which in 2015 was 22 526,3 thousand passengers, which is equivalent to a decrease of 23.14% compared to the initial year of 2011, when there were 29 308,2 thousand passengers transported.

After 2015, the reduction in the total number of transported passengers is slowing down, and for 2018 and 2019 there is even a slight increase, followed by a serious decline in 2020. The last year of the period under review coincides with the beginning of the COVID-19 pandemic, when restrictive measures were introduced limiting the movement and travel of the population. In 2020 a total of 16 810,4 thousand passengers were transported, which is equates to a decrease of 21.22% compared to the previous 2019 (NSI, 2021b).

The total number of passengers carried decreased from 29 308,2 thousand passengers in 2011 to 16 810,4 thousand passengers in 2020. During the period reviewed, the number of passengers carried by railway transport decreased by 12 497,8 thousand, which is equal to a decrease of 42.64%.

Table 7 presents data on the work performed by passenger railway transport for the period 2011 – 2020.

Table 7: Work performed by passenger rail transport for the period 2011 – 2020 (million pkm)

Years Indicators	2011	2012	2013	2014	2015	2016	2017	2018	2020	2020
	Domestic transport	2032,0	1847,8	1795,3	1682,9	1538,3	1440,5	1416,0	1457,6	1495,4
International transport	35,5	28,2	30,5	19,4	13,8	17,4	21,5	21,8	28,4	6,9
Work performed – total	2067,5	1876,0	1825,8	1702,3	1552,1	1457,9	1437,5	1479,4	1523,8	1119,3

Source: NSI (2021c).

For each year of the period under review, almost the entire volume of transport activity was realized in domestic transport and international transport has a negligible share (less than 2%). The total volume of work performed by passenger railway transport at the beginning of the period decreased significantly but after 2016 it stabilized and even increased slightly (Arnaudov, 2018). For 2020 there is a significant decrease compared to the previous 2019, respectively from 1 523,8 million pkm to 1 119,3 million pkm, which is equivalent to a decrease of 26.55%.

The volume of work performed decreased by 948.2 million pkm from 2 067,5 million pkm in 2011 to 1 119,3 million pkm in 2020, which equates to a decrease of 45.86%. As there are no significant changes in the average transport distance traveled by one passenger, the significant reduction in the volume of transport work performed can be explained by the reduction in the number of passengers carried.

It can be summarized that for the considered period 2011 – 2020 the total number of transported passengers had decreased by 42.64% and the performed transport activity had decreased by 45.86%, as the decrease only for 2020 compared to the previous 2019 is 21.22% and 26.55% respectively.

In Table 8 is presented data on the number of passengers carried and the transport work performed by rail as a percentage of the total number of passengers carried and the work performed in the national transport system. The data shows that the share of railway transport in the total number of passengers carried in the national transport system initially decreased from 3.66% in 2011 to 2.83% in 2017 and then stabilized and even slightly increased, reaching 3.28% in 2020. For the period under review railway transport has reduced its share of total freight by 0.38%. This tendency to reduce the share of rail transport in passengers carried in the national transport system is negative given that the use of railway transport

is encouraged by the European Union due to its environmental characteristics (Tsonevska, 2021).

The share of passenger railway transport in the total amount of transport work performed at the beginning of the period decreased from 11.07% in 2011 to 8.43% in 2017, then stabilized for 2018 – 2019 and in the last 2020 increases significantly to 14.12% (Minkov, 2019).

For the period 2011 – 2020 the share of passenger railway transport in the total amount of transport work increased by a total of 3.05% although for the same period the share of the number of transported passengers decreased by 0.38%. This is due to the extremely sharp decline in passenger air transport activity which has been severely affected by the global crisis caused by COVID-19.

Table 8: Ratio of the number of transported passengers and work performed by railway transport to the total number of transported passengers and work performed in the national transport system for the period 2011 – 2020 (%)

Indicators \ Years	Years									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Transported passengers – %	3,66	3,49	3,60	3,48	3,15	2,99	2,83	2,96	2,89	3,28
Performed work – %	11,07	10,83	10,58	9,33	8,38	7,81	8,43	8,71	8,46	14,12

Source: NSI (2021b) and calculations of the author.

Table 9 presents data on the changes in the average transport distance of a passenger transported by rail on the territory of the country in the accomplishment of domestic and international transport.

Table 9: Changes in the average transport distance per passenger in railway transport for the period 2011 – 2020 (km)

Indicators \ Years	Years									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Domestic transport	70,3	70,6	69,8	69,2	69,1	68,9	69,4	70,9	73,7	67,4
International transport	91,5	80,7	88,6	64,2	56,9	33,3	27,2	27,1	26,9	22,9
Total:	70,5	70,7	70,1	69,1	68,9	68,0	67,8	69,3	71,4	66,5

Source: NSI (2021c) and calculations of the author.

The average transport distance per passenger in rail transport varies within 66.5 km reported in 2020 to 71.4 km in 2019. For the period under review, the average transport distance per passenger is relatively constant and despite slight fluctuations decreased by only 4 km respectively by 70.5 km in 2011 at 66.5 km. in 2020.

The only railway carrier that offers passenger transport services on the transport market in Bulgaria is “BDZ – Passenger Transport EOOD” LTD. The company registered a decrease in the natural measures of its transport activity respectively from 21117723 train kilometers and 4 374 615 gross ton-kilometers in 2019 to 20 755 600 train kilometers and 4 362 107 gross ton-kilometers in 2020. In the realized train kilometers there is a decrease of 1.71% for 2020 compared to the pre-crisis year 2019, and the gross ton-kilometers decreased by 0.29%. The paid infrastructure fees decreased for 2020 compared to the previous 2019 in the amount of 4,916,320 BGN (from 27,616,040 BGN to 22,699,720 BGN), equal to a decrease of 17.80% (DP “NKZHI”, 2020).

In the realized train kilometers and gross ton-kilometers the decrease for 2020 compared to 2019 is insignificant but in the paid infrastructure fees there is a significant decrease. This can be explained by the reduction during this period of the amount of infrastructure charges by the State Enterprise National Railway Infrastructure Company (MTITS, 2017).

During the two years under review “BDZ – Passenger Transport EOOD” LTD is the leading railway carrier in terms of realized train kilometers and the amount of paid fees for the use of railway infrastructure, accounting for over 70% of total train kilometers realized on the railway network and nearly 50% of the infrastructure fees paid by all carriers.

In conclusion, the following main illations can be made for the development of the passenger railway transport in Bulgaria for the period 2011 – 2020:

- Less than 5% of the transported passengers and 2% of the transport activity performed by rail are carried out in the conduct of international communication.
- Throughout the whole period under review, the trend is of a decrease in the total number of transported passengers and work performed by passenger railway transport, as the decrease compared to the initial year is 42.64% and 26.55%, respectively.
- The share of passenger railway transport in the total number of passengers carried in the national transport system has decreased by 0.38% over the period considered.
- The increase in the percentage of work performed by rail to the total amount of work performed in the national transport system is due to the aggravated

condition of passenger air transport which was severely affected by the crisis caused by COVID-19.

- The average transport distance per passenger carried by rail decreased by 4.0 km during the period considered.
- By 2020, only one railway carrier in Bulgaria has a license for passenger transport and holds 100% of the market (Gatovski, 2022).
- “BDZ – Passenger Transport EOOD” LTD is the leading railway carrier in Bulgaria in terms of realized train kilometers and the amount of paid fees for the use of the railway infrastructure of the country.

Conclusion

In conclusion of the study, it can be summarised that the COVID-19 pandemic has had a relatively small impact on the development of railway freight transport. Following the beginning of the pandemic the railway freight has increased in volume as the population oversupplies with goods and products and the railway transport was not affected by the severe restrictive measures in early 2020 when COVID-19 spread across Europe.

The number of passengers carried by rail has decreased since the beginning of the pandemic but the decline is significantly smaller than that of air and road passenger transport. This proves the strong social function of passenger railway transport with a large proportion of rail passengers having no other alternative transport and even after the start of the COVID-19 pandemic they have continued to use public transport.

Bulgaria’s railway transport is a fundamental component of the national transport system and its development and modernization are crucial both for the recovery of the country’s economy from the crisis caused by COVID-19 and in the context of the Green Deal and the European Union’s efforts to decarbonisation of Member States’ economies.

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