

State of Play in Romania`s Road Infrastructure – A Comparative Analysis

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Abstract: Road transport is the most important mode of transportation in the EU, followed by sea and rail. Therefore, the road infrastructure network can be considered the backbone or the primary enabler of trade and mobility in an EU country. This year we celebrate 100 years since the creation of Great Romania, a country in which the cities, towns, villages, and its citizens are still not adequately connected by a modern network or motorways and roads as a symbol of unity. As Ionel I.C. Brătianu used to say "the roads make a country". Our paper aims at portraying the state of play in road infrastructure in Romania, as compared to some relevant countries from the Soviet bloc (Bulgaria, the Czech Republic, Hungary and Poland). We based our research on the statistics provided by Eurostat, the OECD, and on the positions of the primary stakeholders.

Keywords: carbon emissions, road, transports, accidents, motorways

JEL Classification: L92, N70, O18, R4

1. Introduction

The beginnings of road transportation on the territory of nowadays Romania are lost in the mists of time. However, the Romans built a good and stable roads network during the reign of Emperor Trajan to enable the conquest and afterwards to better connect Dacia to the empire.

The Middle Ages was a "dark" time for the roads in the Romanian principalities. With some exceptions, the voivodes did not place a high accent on building or at least properly maintaining the existing roads network. Between the 15th and 19th centuries, roadworks were conducted only with the approval of the Ottoman Empire, the Turks being afraid that a good road infrastructure would enable their enemies to move armies against them (DRDPBV, 2018). However, Pach (1980) argues that before the circumnavigation of Africa, the world trade was carried out mostly on the terrestrial corridors. Thus, some of the flows of goods from the Far East, even from Cathay (China) used to reach the consumers from Western Europe via a corridor that included the Black Sea and the Romanian principalities and Transylvania. Brăila, Cetatea Albă, Chilia, Rucăr, Târgoviște, Tîrgușor, and so forth were important trade hubs towards Poland and Hungary. Pach (1980) also underlines that even after the fall of Constantinople, and of the commercial cities of Caffa (former name of Feodosiya, a town in Crimea), Chilia, and Cetatea Albă (in 1484), during the Ottoman domination, there was a continuance of the spice supply from Wallachia to Transylvania in the second half of the 15th century. "All this tends to support the view that the expansion of the Ottoman Turks did not block the traditional Levantine trade routes."

The enforcement of the Organic Regulation in Wallachia (1831) and Moldavia (1932) marked the renaissance of road infrastructure works in the two Romanian principalities. The first roads, mostly gravel and bridges were built during the rule of Grigore Ghica in Moldavia and Barbu Știrbei in Wallachia (1849-1856). In 1849, a department of public works was established in both Moldavia and Wallachia that merged after the unification of the principalities under the Ministry of Agriculture, Trade and Public Works (DRDPBV, 2018).

In 1915 was the first attempt to upgrade the roads in the Romanian United Principalities, by applying a hot tar surface treatment on 2 kilometres on the route between Bucharest and Ploiești. The first real modernisation of the Romanian roads started in 1931 on the routes connecting Bucharest –Brasov – Sibiu, Cluj, Oradea, Bucharest-Giurgiu, Bucharest Oltenița and Ploiești Buzău. In 1937 started an upgrading campaign consisting of light treatments on approximately 1.200 kilometres of gravel roads. After the World War II, Romania had only 1.182 kilometres of modernised roads out of 11.960 total kilometres of national roads (IPTANA, 2018).

Developing transportation infrastructure represents an essential requirement to facilitate the implementation of development strategies in our country, enhancing thus the mobility of goods and people and the integration of the regional growth poles to the European transportation network, fighting thus the isolation of the underdeveloped regions and local and regional development.

During the communist era, Romanian roads network continued the modernisation process. From 1.182 kilometres of modernised roads at the end of World War II (see Table 1), in 1955 it reached 2.913 kilometres, an increase of 146% in one decade. Between 1960 and 1970, our country upgraded another 3.908 kilometres of national roads. The first Romanian highway of 96 kilometres was built in around five years between 1967 and 1972. Unfortunately, highway building was not a priority of the communist regime. By 1989, Romania had only 113 kilometres of highway, while the other analysed countries from the Soviet bloc had more, even if smaller as surface had more, namely Bulgaria (273 km), the Czech Republic (357 km) and Hungary (267 km).

Table 1. The network of public roads after the enforcement of the Organic Regulation in Romanian principalities and Romania

Year	National Roads				
	Total (km)	Upgraded	Semi-upgraded	Gravel Roads	Dirt roads
1897	3.137	-	-	2.891	245
1915	4.162	-	-	3.873	289
1930	12.785	446	-	11.818	521
1939	13.850	1.791	-	11.904	155
1955	9.238	2.913	-	6.315	55
1960	10.575	5.147	362	5.407	19
1970	12.921	9.055	1.703	2.163	-
1977	14.689	10.982	2.868	756	-

Source: DRDPBV, 2018

The years 2002-2004 marked the revival of motorways building in Romania that culminated with the inauguration of a sector of 97.3 kilometres between Bucharest and Constanta, the total length of motorways reaching thus 228 kilometres. By 2008, in a period characterised by a very dynamic economic activity, our country managed to add only 53 km, extending its highway network to 281 km.

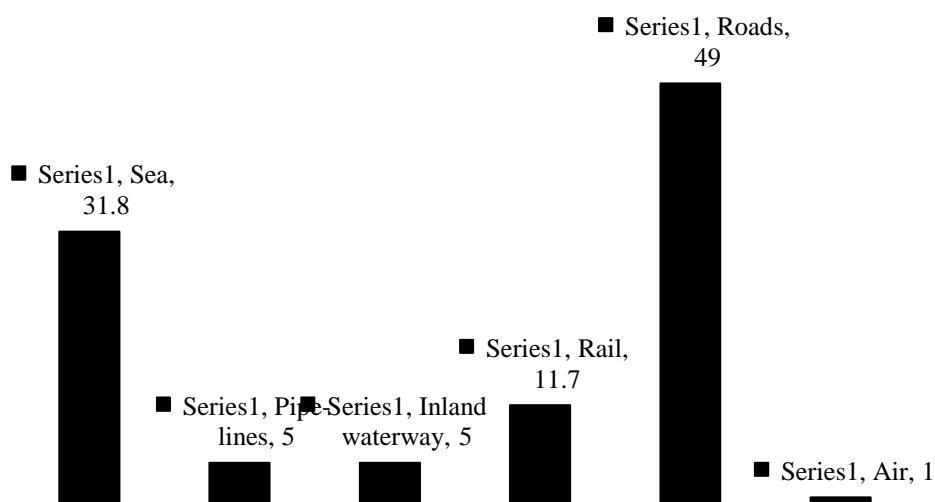
The Transportation General Master Plan (TGMP) adopted by the Government Decision no 666 (ironic in a way) from September 14th, 2016 is the strategic document that provides, among others, road infrastructure investments (motorways, express roads, rails, waterways) for the following 15 years. To implement the ones regarding road transportation, Romania needs around 13 billion euro and has available only a third of the amount. For the period between 2020 and 2030, only 50% of the funds could be identified.

According to the TGMP, in the mentioned period, Romania aims at finalising 11 motorways, 19 express roads, to upgrade existing ones and build new ring roads, a very ambitious goal considering the developments after 1989, and the quality of road transport infrastructure. In Romania, a bit over 50% of the national roads network qualifies as being in the proper technical state as regards the running surface; 30% as average and 20% in dangerous condition. Also, over 60% of the total network exceeded the exploitation duration. Popescu and Fistung (2015) argue that Romania's transport infrastructure has a poor quality, regardless the transport mode.

At present, almost 90% of the national roads network is one-lane, and that reflects in the number of accidents (Chart 6) that is the second highest in the EU (APIA, 2016). In the Global Competitiveness Report 2016-2017, Romania ranked 128 out of 138 countries regarding the quality of roads, behind Chad, Sierra Leone, Benin, and better among others than Mozambique, Ukraine and Madagascar (WEF, 2016). In the EU, we are the last form this standpoint.

Currently, road transport has the highest share in all the transportation modes in the EU (see Chart 1). According to the statistics of the European Union Road Federation (ERF, 2017), in the EU, out of total freight, the road has a share of 49% followed by sea (31.8%), rail (11.7%), and inland waterway (5%). Between 2000 and 2014, its share in inland transport modal split grew by 3.6% from 69.4 to 71.9, while rail decreased by 8.1%.

Chart 1: Goods transport by mode in EU 28, 2014 (% of *tkm*)



Source: ERF, 2017

One of the advantages is the fact that roads can reach in locations that are inaccessible for other means of transportation, facilitating thus good connections especially on short to average distances. The high share of road in total freight comes with a plethora of adverse effects on the environment and quality of people`s lives due to traffic congestion, accidents, carbon emissions and so forth.

Traffic congestions, accidents, and carbon emissions can be reduced in an optimised modal split transport that values the natural advantages of our national territory. According to Paulino et al. (2018) in 2013, the transportation sector produced 22% of the total emissions of greenhouse gases and was responsible for 32% of the final energy consumption. About 82% of the estimated total of 6465 billion kilometres travelled in Europe is accountable to road transport, namely passenger cars, motorcycles, and buses, which has been growing considerably.”

Almost 30 years after the Revolution, Romania still has not found the right combination of proper management, resources allocation and probably the most essential, broad political will to score points from this perspective in the competitive environment that is the EU.

2. Comparative analysis

2.1. Length of roads infrastructure

According to the database of Eurostat, in 1989, the length of total state roads in Romania was 10,070 kilometres, ranking the fourth in the Soviet bloc after the Czech Republic, Hungary (smaller countries surface-wise) and Poland in our selection. Between 1989 and 2006, on the eve of accession in the EU, Romania expanded its state roads by 56%, while Bulgaria by 547% (Chart 1). In the pre-accession period, Hungary increased its state roads network by only 6% and the other Visegrád (V4) countries diminished it drastically, namely Poland by 59% and the Czech Republic by 89%. However, before joining the EU, Poland, the Czech Republic and Hungary increased their networks of motorways by 60% (148 km), 45.10% (161 km) and 103% (275 km) respectively (Chart 2). In the pre-accession period, Romania only managed to build 115 km of highway. Meanwhile, Bulgaria built 121 km. Popescu and Fistung (2015) show that in the pre-accession period, Romanian authorities developed a large number of strategies aiming to address the critical condition of transport infrastructure, the last one being approved in 2015 as we mentioned above. The authors identified several weaknesses of the transport system in our country, namely the absence of a master plan for transport infrastructure, the bad management in the public institutions in charge with EU funds absorption; the low level of multimodal transport.

Romania`s regional importance is emphasised by Shepherd and Wilson (2007) who argue that “an ambitious but feasible road upgrade program in Europe and Central Asia has great potential to boost intra-regional trade—by as much as 50%. Moreover, it is possible for the region to reap a large proportion of the overall gains by focusing attention on just three countries which are important transit corridors but exhibit significant limitations regarding infrastructure quality: Albania, Hungary and Romania. Such a concentrated program of road upgrading would come at a significantly reduced cost (perhaps 40%) compared with attaining the same level of road quality on a region-wide basis, yet would bring around 60% of the total expected trade benefits.”

After joining the EU, between 2007 and 2016, Romania continued increasing its state roads network by 7%, but also its motorway network (519 kilometres) while Bulgaria by only 0.96%, focusing more on building highways (an increase of 55% and 346 kilometres). After accession, the V4 countries decreased their state road networks (by 215% in the Czech Republic, by 61% in Poland and by 36% in Hungary). In the same time, they increased their network of highways (by 136% and 412 km in the Czech Republic, by 255% and 1,382 km in Hungary, and by 305% and 1,235 km in Poland).

Chart 2. State roads in selected countries (km)

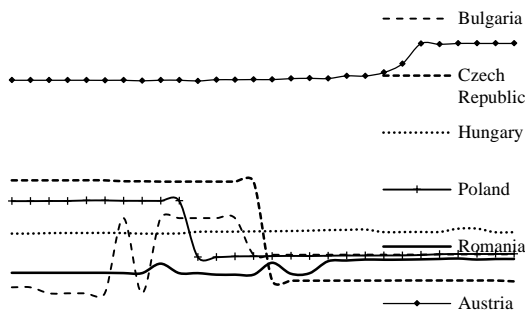
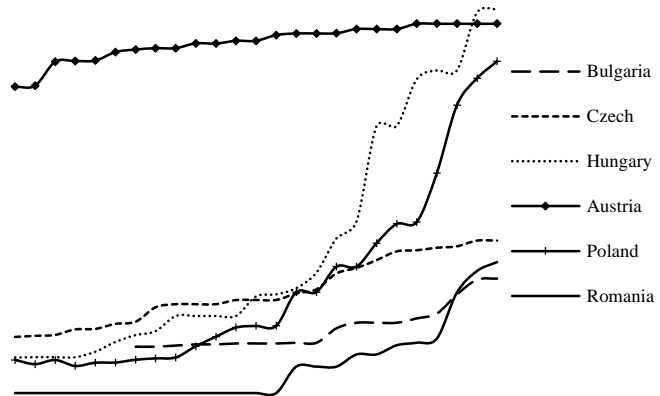


Chart 3. Motorways in selected countries (km)



Source: Author, based on Eurostat, 2018

Overall, between 1989 and 2016, Hungary built 1,657 km of motorways, followed by Poland (1,383 km), the Czech Republic (866 km), Romania (634 km) and Bulgaria (467 km). For comparison purposes, in the same period, Germany built 4,174 kilometres of highway, 2,5 times more than Hungary and 6,5 times more than Romania. So, it seems that while Romanian authorities were creating perfect master plans, other countries in our region managed to efficiently build their infrastructure or at least to advance in the right direction, and nobody considered the conclusions of the research made by Shepherd and Wilson in 2007.

According to INS (2015), regarding the quality of the surface, on the 31st of December 2014, Romania had a network of modernised public roads of 30,240 km, 35.4% of the total (see Table 2). The length of light cover roads was of 22,088 km (25.9% of total public roads), and the length of the stone and ground roads was 33,034 km (38.7%), the highest share in the total. Almost half of the modernised and light cover roads had overrun service duration.

Table 2: Public roads by category and type of cover on 31.XII.2014, in km

Category of roads	National roads	Country roads	Communal roads
Modernised roads	16,172	10,923	3,145
Roads with light cover	861	15,235	5,992
Stone roads	224	7,150	14,746
Ground roads	15	2,197	8,702

Source: INS, 2015

The last master plan, being implemented by 2026 (six years from now), aims at building 1,218.8 kilometres of motorways at the cost of 13,353.4 million euros. According to it (the master plan), the longtime expected highway that links Constanța to Arad (Nădlac) will be finalised the earliest by 2020 (the version through Pitești – Sibiu), and the latest by 2024 (the corridor that crosses the mountains through Comarnic and Brașov), if funds will be available. The EU funded priority transportation axes (TEN-T) cover only a small part of road needs in Romania, namely the corridor Rhine – the Danube, that includes Arad, Sibiu, Pitești, București Constanța and Orient/East-Med that passes through Arad, Timișoara, Orșova, Craiova and Calafat. Under these circumstances, our competent authorities need to identify a broad array of financing sources to manage to connect Romania to the essential international transport corridors.

No EU transportation corridor links Constanta to Botoșani, in the North East of the country or Transylvania by Moldova, two significant provinces of Romania. Under these circumstances, currently, Romania cannot play an essential role for the investors aiming to benefit from the Chinese initiative "One Belt, One Road"

(OBOR), that plans to give a boost in the trade between the second largest economy of the world and the EU. If we plan to finalise the highway that would facilitate a speedy transit of Romania by 2024, the latest, other countries are ready now to take over the traffic generated by OBOR.

Chart 4. Infrastructure investment
- roads (millions euro)

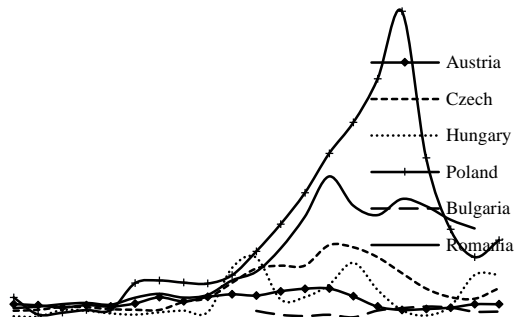
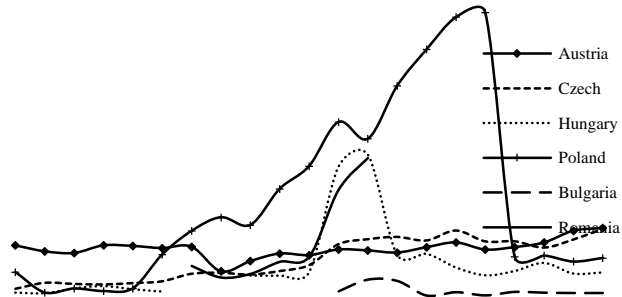


Chart 5. Infrastructure maintenance
- roads (millions euro)



Source: Author, based on OECD, 2018

Between 1995 and 2006, Romania increased its road infrastructure investment by 454% (see Chart 4), reflected in the expansion of state roads and highways. In 2003 as compared to 1995, the V4 countries also invested more in road infrastructure. Thus the allocations of the Czech Republic grew by 128%, while in Hungary and Poland the increase was of 85% and 58% respectively. It is worth mentioning that in 1995, Romania invested 352 million euros in infrastructure, more than Hungary (131 million euros) and the Czech Republic (283 million euros) and continued to do so in most of the following years, without having the results of the other analysed countries. **Thus, from 1995 to 2015, Romania invested 33.5 billion euros in road infrastructure, the second highest amount after Poland 50.3 billion euros and 1.8 times more than the Czech Republic (19 billion euros) and 2.6 times more than Hungary (13,06 billion euros). In this period, Romania built 634 kilometres of highway and Hungary 1549 kilometres of highway, while the Czech Republic over 800 kilometres.** It is true that in this stretch, Romania built 6,925 km of state roads, and Hungary only 388 km. In the meantime, the rest of the analysed countries from the Soviet bloc decreased their share of state roads. However, the figures speak volumes about the priorities of the Romanian authorities and the lack of vision in times of fierce competition among neighbours and countries in general in the context of globalisation.

According to the OECD database (2018), Hungary increased the road maintenance spending by 191%, the Czech Republic by 413% and Poland by 45% in 2015 as compared to 1995.

Romania recorded a boom regarding road maintenance between 2001 and 2007 from 341 million euro to 1,335 million euro. If we compare Romania's spending in 2007 with the other analysed countries, we notice that our country spent on maintenance less than Poland and Hungary, but more than the Czech Republic. Unfortunately, the OECD (2018) not provide sufficient data to make relevant comparisons for the whole stretch (see Chart 5). However, Romania's ranking in the Global Competitiveness Report 2016-2017 regarding the quality of roads, mentioned above, is more than relevant and drivers travelling our roads can witness their actual quality. According to a report of the European Parliament (2014) "Road infrastructure spending in Romania is highly dependent on central government funding. Although the road maintenance budget increased by 78% between 2004 and 2008, the percentage allocated to this budget decreased by 23.7%. No evidence has been found on the impact of the economic crisis on maintenance activities." According to Etveş (2018) since its establishment in 2016 after the reorganisation of National Company for Motorways and National Roads (CNADR), the National Company for Road Infrastructure Administration (CNAIR) did not register any notable results regarding road infrastructure. The big projects are still blocked or record significant delays. Projects worth around 4 billion euro, in various tendering phases, are contested and recontested. The current government tries to re-organise the company again. Thus, the Ministry of Transportation will administer two companies involved in road infrastructure: CNAIR, that will manage the maintenance of the existing road network and National Company for Road Investment (CNIR) that would manage the finalisation of the roads and highways being currently built and would prepare and execute significant infrastructure projects. The latter exists on paper since 2016, but it did

not have the required staff to start operating. Since 2006, CNADR/CNAIR had 12 general managers, one a year. There is a need for continuity in management and also in the political vision of the parties that govern our country.

The poor condition of Romanian road infrastructure, but also the lack of economic performance in the context of transition and privatisation also reflected on freight. Thus, if in 1989 Romania's freight transport on the road was of 2.4 million tonne-kilometres, by 2006 that dropped by 89% to only 0.2 million tonne-kilometres. In the Chart 5, we observe that all the analysed countries experienced significant decreases, but Poland, Hungary and the Czech Republic started the recovery process by the end of the 90's. In 1989, Hungary had just 0.2 million tonne-kilometres and Bulgaria 0.04 million tonne-kilometres. After joining the EU, Romania continued its decline regarding road freight. Thus in 2016, the value of the indicator decreased by 62% as compared to 2006, the year before accession, while in Bulgaria's case it dropped by 36%. Between 2003 and 2016, the V4 countries recorded dramatic increases in road freight, namely Poland by 479%, the Czech Republic by 421% and Hungary by 120%.

Chart 6: Freight transport on road, Million tonne-kilometres

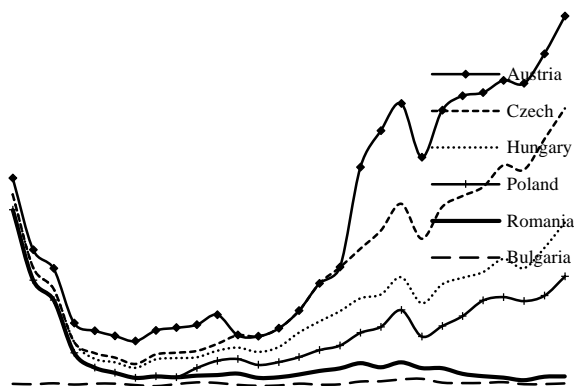
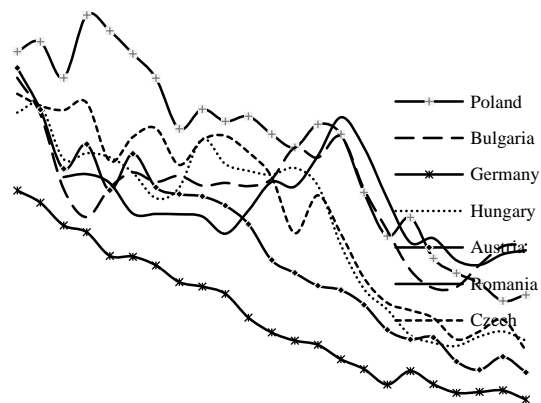


Chart 7: Road accidents death/1 million inhabitants



Source: Author, based on OECD, 2018

In 2016 Romania had the second highest road accidents incidence from the analysed countries (97 death/1 million inhabitants) being surpassed by Bulgaria (99 death/1 million inhabitants). As a general remark, we notice a significant decrease in road accidents between 1994 and 2016 (See Chart 7). In 1997, the peak year for Romania's road accidents the indicator reached 127 death /1 million inhabitants, our country ranked the fourth better than Poland (189), the Czech Republic (155) and Hungary (135), but worse than Bulgaria (110). This dynamic could be explained in Romania by the low road maintenance, the length of one-lane roads used by all kinds of vehicles (trucks, buses, automobiles, motorcycles, carts and so forth). Pușcaci and Pușcaci (2017) argue that in the first part of the year most of the accidents occur in urban areas, while in the second part of the year in the rural areas, related to the harvest time.

Chart 8: Logistic competence

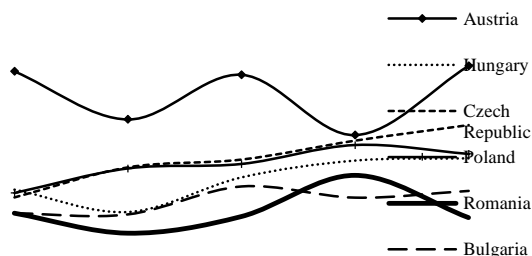
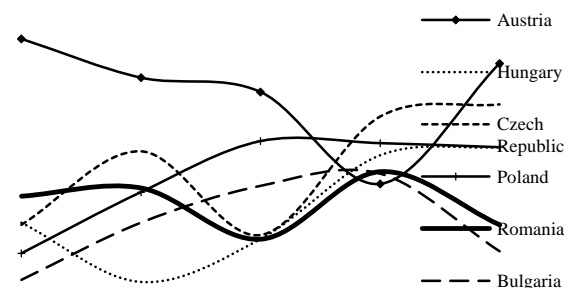


Chart 9: International shipments



Source: Author based on The World Bank database, 2018.

Between 2007 and 2016, Romania's rank in the Logistic Performance Index (LPI)*, issued by the World Bank dropped from 51 to 60, although the value of the indicator improved from 2.91 to 2.99. Bulgaria fell from the 55th position to 72, while the value of the index decreased from 2.87 to 2.81. Poland, Hungary and the Czech Republic had all positive evolutions rank and index wise.

Between 2007 and 2016, Romania lost in logistic competence 2.86 to 2.82 and in international shipments (from 3.2 in 2007 to 3.06 in 2016), and registered a small increase in infrastructure (from 2.73 to 2.88).

**The logistics performance (LPI) is the weighted average of the country scores on the six key dimensions: 1) Efficiency of the clearance; 2) Quality of trade and transport related infrastructure (e.g., ports, railroads, roads, information technology); 3) Ease of arranging competitively priced shipments; 4) Competence and quality of logistics services (e.g., transport operators, customs brokers); 5) Ability to track and trace consignments; 6) Timeliness of shipments in reaching destination within the scheduled or expected delivery time.*

3. Conclusions

Along the history, Romania was crossed by vital trade routes connecting the East and the Far East to the Western and Northern European countries. The roads network developed according to the needs of the land-rulers, being developed and well organised during the Roman occupation of Dacia and entering a darker time in the Middle Ages without losing its importance for the international trade. The 19th Century and its Organic Regulation marked the rebirth of road infrastructure works in Wallachia and Moldavia that continued its development regardless time vicissitudes (two world wars, various occupations, the communist regime, transition and so forth), registering periods of expansions but also of collapse.

The comparisons with the analysed countries from the former Soviet bloc revealed the fact that Romania and our neighbour from the south lost the start regarding road infrastructure at most of the assessed indicators.

First, we identified a prioritisation problem. While our authorities focused on the development of state roads, the V4 countries chose to develop their motorway networks, the champion from this point of view being Hungary (1924 kilometres, while Romania only 747). Investment-wise, although between 1995 and 2015 our country spent 33.5 billion euro in road infrastructure, 2.6 times more than Hungary, and 1.8 times more than the Czech Republic, Romania only added 634 kilometres of highway, while Hungary, 1549 kilometres and the Czech Republic 800. International traders prefer highways to state roads that cross the cities and villages. Despite the high investment in infrastructure, Romania still ranks the last in the EU when it comes to the quality of roads being bested even by less developed countries such as Chad, Sierra Leone, Benin and so forth. That is a consequence of the poor quality of road works and maintenance, managed by unstable institutions regarding leadership and vision. There is no wonder that Romania's indicators regarding logistic competence and international shipping are below the other reference countries.

Secondly, as a consequence of reduced economic performance, but also of inappropriate transportation infrastructure the freight transported on roads decreased dramatically from 1989 to present. This situation characterises both Romania and Bulgaria. The other analysed countries also registered a decline in the first half of the 90` but started recovering afterwards.

Thirdly, even if the overall trend in the EU regarding road accidents is decreasing, Romania still ranks the second last at the end of the analysed stretch. In the first part of the analysed interval (until 2004) Romania outperformed Hungary, Poland and the Czech Republic, but as these countries progressed in developing their road networks, our country fell behind.

Let us hope that in the Centenary year, having a new strategy in place, Romanian authorities and politicians of different views will also manage to unify their visions and start catching up the more advanced countries in our proximity. Their only goal should be to connect our country to the international trade and transport corridors, under better values of the assessed indicators.

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