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TRANSPORT INFRASTRUCTURE EXPENDITURES AND THE REGIONAL COMPETITIVENESS

Abstract

Infrastructure, being the basis of economic growth, is an important factor affecting the competitiveness of the regions. The state of transport infrastructure – its structure, connections with other countries, technical specification and the quality of particular infrastructure parts are dependent, among others, on the expenditure volume on transport infrastructure and their modal structure. The goal of the article is to present the diversity of transport infrastructure expenditures in different countries and periods and to analyse the relations between the transport infrastructure expenditures and the regional competitiveness. Qualitative and quantitative methods are used to prove a high impact of transport infrastructure expenditures on the regional competitiveness.

Keywords: transport infrastructure investments, regional competitiveness

Introduction

The transport infrastructure is the basis of socio-economic growth. It can stimulate the economic growth by attracting the investors and providing a high standard of life through the accessibility of science and culture. It can also diminish the growth if it doesn't match the needs for the quality of transport services or their structure. The understanding of that relation doesn't change the fact of a high diversity of transport infrastructure expenditures, both in the countries and the regions, as well as their structure. This is related, among others, to the economic potential of a given country and the preferences connected with the chosen transport policy.

The goal of the article is to show this diversity and to analyse the relations between the transport infrastructure expenditures and the regional competitiveness.

It will be proven that a high share of infrastructure expenditures in the GDP doesn't always mean that there are high expenditures, whereas their modal diversity might impair the sustainable transport growth policy

1. Share of transport infrastructure expenditures in the EU Member States GDP

A transport infrastructure expenditures share of 1–1.5% of the GDP is advisable for the EU Member States (Wojewódzka, Rolbiecki, 2013). In the Western Europe (WEC) the transport infrastructure expenditures share in the GDP has constantly decreased from 1.5% in 1975, through 1.2% in 1980 to 0.8% in 1995 and has stabilised at that level since. According to the OECD data, the average share of the land transport infrastructure investments in the years 1995–2011 oscillated between 0.9 and 0.8% of the GDP. For the next three years it remained still at the level of 0.7%.

In 2015, in 11 WEC countries the share was on average equal to 0.8%. There were however differences between the countries. There are countries in which the share was over average, such as: Switzerland (1.5% in 2010), Greece (1.3% in 2013), Norway (1.3% in 2014). There are also countries such as Italy or Portugal, in which by 2008 the share of transport infrastructure investments amounted to at least 1% of the GDP. However, in the following years the share of investments was equal to 0.2% in Portugal (2012–2013) or 0.4–0.5% of the GDP in Italy in the years 2010–2013 (Figure 1).

The infrastructure expenditures in the developing economies undergoing transformation are different from the expenditures in the developed economies. In the Central and Eastern European Countries (CEEC) by 2001 the share of land transport infrastructure remained at the level of 1% GDP, then it increased rapidly by 2008 reaching the level of 1.8% and then it started to decrease back to the level of 1.1% in 2013. In the following years the share started to raise once again. In 10 countries, for which the data is available, in 2015 it reached the level of 1.4% (Figure 2).

2. Diversity of the land transport infrastructure expenditures in European countries

The analysis of the transport infrastructure investments should be carried out along with the analysis of the GDP of a given country. This allows to include the country's financial capabilities. The analysis of only the share of investments in the GDP can lead to erroneous conclusions. A higher share of the transport infrastructure expenditures in the GDP of the CEEC countries in comparison to the WEC countries doesn't mean that the value of these expenditures is higher, as the GDP is lower in the CEEC countries. Among the Central and Eastern European Countries, Poland which had a below average level of the infrastructure investment expenditures share (due to the highest level of GDP in the CEEC), had

a higher value of infrastructure expenditures than Albania, which had the highest investment share in the GDP. In 2013, in Germany the level of 0.6% GDP resulted in an investments of 16 bn EUR, whereas a share of 0.7% GDP in Poland – 2.7 bn EUR. A similar situation occurred in the Western European Countries, in which the value of GDP differed significantly from other countries, e.g. Germany, France, Italy or United Kingdom.

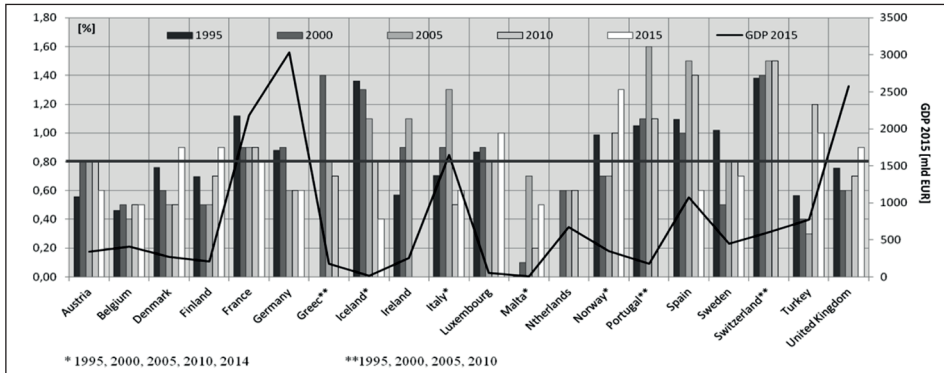


Figure 1. The share of inland transport infrastructure investments in GDP in Western European Countries (%)

Source: (own elaboration based on: OECD data, 2018)

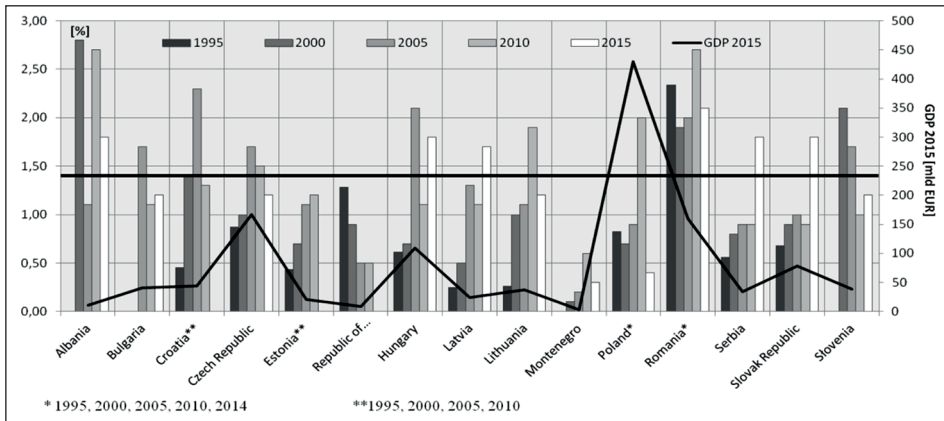


Figure 2. The share of inland transport infrastructure investments in GDP in Central and Eastern European Countries (%)

Source: (own elaboration based on: OECD data, 2018)

In Western European Countries the investments (in nominal prices) in the years 1995–2015 were the highest in 2006, being over 40% higher than in 1995¹.

¹ No data for 1995 for the Netherlands and Greece.

The changes of the investment expenditures in the Western European Countries in the years 1995–2015 are shown in the Figure 3.

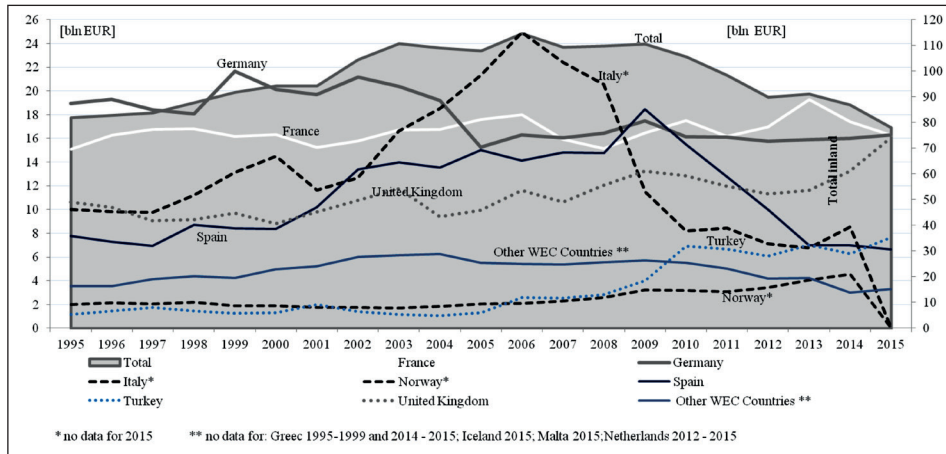


Figure 3. Inland transport infrastructure investments in Western European Countries in the period 1995–2015 (bn EUR at constant prices) according to OECD data
Source: (own elaboration based on: OECD data, 2018)

The European Union economies such as: France, Germany, Italy, Spain and United Kingdom had the highest impact on the value of land transport infrastructure expenditures in the analysed period of 1995–2015. The most stable level of investments in transport infrastructure is observable in France and, by 2013, in Switzerland. After an extended period of a decrease of infrastructure investment in Germany, since 2006 this level has also stabilised there. In Italy the transport infrastructure investments increased intensively until 2006, in which they reached a level of 26 bn EUR. In the following years the level started to decrease significantly. In the 2014 they were at a level of 8.5 bn EUR. The highest positive dynamics of transport infrastructure investments was observed in Turkey, for which a six times growth of investments occurred between 1995 and 2015.

In the case of Central and Eastern Europe, the total dynamics of transport infrastructure investments were shaped mostly by countries such as: Poland², Czech Republic, Hungary (in the EU since 1.05.2004) and Romania (in the EU since 1.01.2007). The Figure 4 shows the significant effect of Poland becoming a Member State of the European Union in 2004 and how the use of European Funds affected the transport infrastructure growth. The investment level of CEEC (in nominal prices) in 2013 decreased almost by half when compared to the peak moment of 2009. This is a result of a radical decrease of investments, mostly in Poland (the ending of European Football Championships EURO 2012) and in Czech

² Among the CEEC countries, Poland has the highest nominal GDP (EUR 430 billion in 2015), the largest number of inhabitants and the largest territory; in the following places are the Czech Republic and Romania and Hungary. However, Slovenia and the Czech Republic have the highest GDP per 1 citizen in relation to the EU average, 83% of the EU average – Slovenia and 87% the Czech Republic, Poland 69% (EU transport in figures, 2017).

Republic. In Poland, the highest share of investments in the land transport infrastructure in the GDP occurred in 2011 (2.4%).

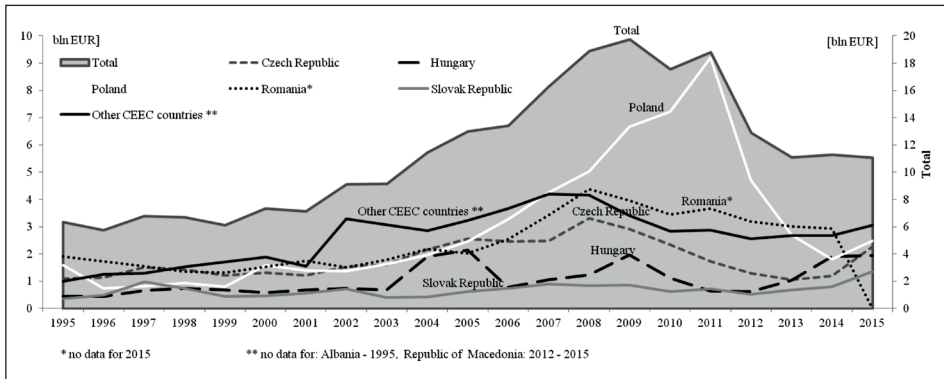


Figure 4. Inland transport infrastructure investments in Central and Eastern European Countries in the period 1995–2015 (bln EUR at constant prices) according to OECD data
Source: (own elaboration based on: OECD data, 2018)

Since 2002, the level of infrastructure investments in Central and Eastern Europe increased significantly in the developing and transforming countries. In 2009 the land transport infrastructure investments were three times as high (in nominal prices) as they were in 1995. However, in the following year, a decrease trend was observed (OECD data, 2016).

3. Modal expenditure structure in the EU Member States

The analysis of the investment distribution between the road and railway transport³, goes to show that the average share of railway investment expenditure in the OECD countries increased from 17% in 1995 to 26% in 2013. This trend is mostly created by Japan, North America and Western Europe, where the investments in railway increase faster than the investments in road transport (Statistics Brief, 2015). In Central and Eastern Europe (CEEC) the funds continued to be concentrated in the road transport infrastructure. The division of investment funds on railway and road transport in Europe in the years 1995–2015 is shown in the Figures 5 and 6.

In Western European Countries a decrease tendency of the share of road transport in infrastructure expenditures can be seen since 1995 (a decrease from 70% in 1995 to 54% in 2015), whereas the railway infrastructure expenditures increase (50% increase in share between 1995 and 2015).

³ One should consider that the OECD data has missing records in regards to the investment expenditures in different modes of transport, countries and periods. They are updated at: <http://stats.oecd.org>.

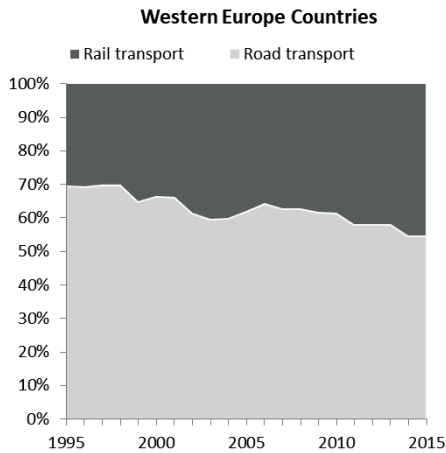


Figure 5. The structure of expenditures for rail and road transport infrastructure in Western Europe Countries in the years 1995–2015

Source: (own elaboration based on: OECD data, 2018)

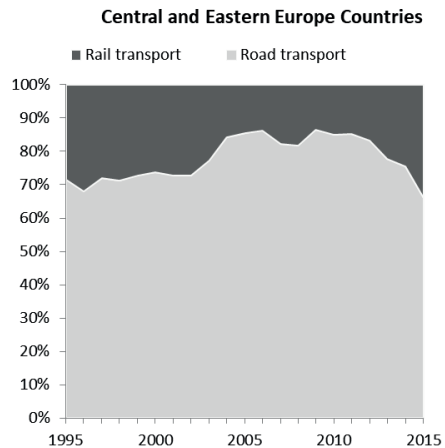


Figure 6. The structure of expenditures for rail and road transport infrastructure in Central and Eastern Europe Countries in the years 1995–2015

Source: (own elaboration based on: OECD data, 2018)

The countries which used above average (the average for WEC was 46%) funds in railway transport expenditures in 2015 are: Austria (77%), Belgium (56%) and United Kingdom (61%). The Central and Eastern European countries invested significantly in road transport infrastructure, for which the share in investments increased from 72% in 1995 to 86% in 2006. The recent years show a significant change in this trend and a steady increase of the share of railway transport (the structure of infrastructure investments in 2015 was as follows: road transport 66%, railway transport 34%). It is worth noticing that in countries such as: Bulgaria (54%), Czech Republic (57%), Latvia (51%), Lithuania (41%) and Slovenia (79%), the average share of railway infrastructure investments was higher than in other Central and Eastern European Countries. In countries such as: Poland (14%), Serbia (14%) and Albania (0.3%) this share was significantly lower than the average of Central and Eastern European Countries.

4. The relation between the transport infrastructure quality and the competitiveness of the regions

Based on the global competitiveness index GCI a Regional Competitiveness Index RCI, was created. It allows to present the territorial competitiveness of NUTS2 regions in a synthetic way (Figure 7) (Transport, 2016). For the purpose of the RCI index, the transport infrastructure is analysed within the basic group with the use of the following indicators:

- the potential accessibility of the railway transport (population living in the surrounding regions weighted by the railway commute time);
- the potential accessibility of the road transport (population living in the surrounding regions weighted by the car commute time);
- daily number of passengers flights reachable within a 90 min. drive from the centre of the region⁴.

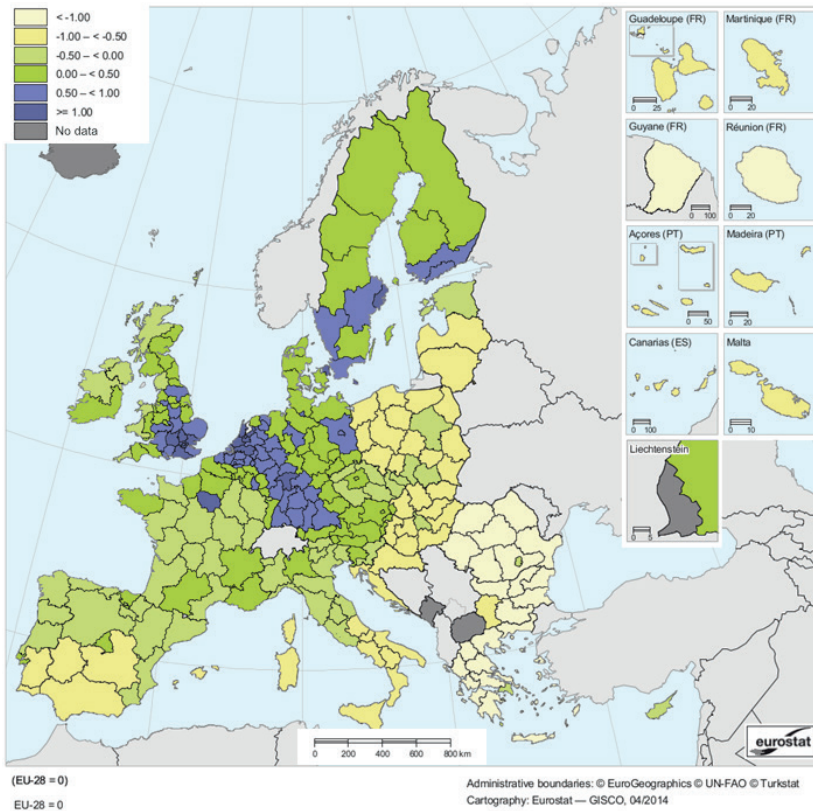


Figure 7. The Global Competitiveness Index NUTS 2
 Source: (Regional competitiveness statistics, 2014)

The Figure 7 shows a clear division of regions with the lowest competitiveness index values, among which there are regions in the CEEC countries (e.g. large parts of Poland, Slovakia, Hungary, Romania, Bulgaria, Croatia, Lithuania, Latvia) and the southern parts of Spain, Portugal and Italy as well as the regions with the highest competitiveness indexes in Europe, such as: Iceland, parts of UK, Germany, Luxembourg, Belgium, the Netherlands, southern parts of Norway and Sweden, the Paris region in France.

⁴ The index of potential accessibility is based on an assumption that the attractiveness of the place increases along with the size of the population and decreases along with the increase of the travel time (Annoni, Dijkstra, 2013).

The RCI index values in 2013 (Figure 7) and the values of the multimodal accessibility of the EU regions in 2011 are quite convergent, which proves a significant role of the transport infrastructure in the creation of the regional competitiveness.

The competitiveness level determines the competitiveness of the countries. The more regions there are with the highest values of the competitiveness index, the higher the index is for the country. In The Global Competitiveness Report 2015–2016, the five countries with the highest values of the GCI (Global Competitiveness Index) are as follows: Switzerland, Singapore, USA, Germany, the Netherlands. Poland is on the 41st place (out of 140). In regards to the quality of the transport infrastructure Poland received a very low score and reached the 68th place. In comparison, the Czech Republic reached the 36th place (Table 1).

Table 1. Global Competitiveness Index (GCI) and quality assessment of transport infrastructure in EU-28, Norway and Switzerland in 2015–2016

EU-28 Countries, Norway and Switzerland				Global Competitiveness Index (GCI)		Quality of transport infrastructure	
Rank GCI In EU-28	Country	Country codes	Organisation	Score	The place in global rank	Score	The place in global rank
–	Switzerland	CH	EFTA:1960	5.76	1	6.5	1
1	Germany	DE	EU-15	5.53	4	5.9	11
2	Netherlands	NL	EU-15	5.5	5	6.3	5
3	Finland	FI	EU-15	5.45	8	6.2	6
4	Sweden	SE	EU-15	5.43	9	5.6	19
5	United Kingdom	UK	EU-15	5.43	10	5.3	24
–	Norway	NO	EFTA:1960	5.41	11	5	27
6	Denmark	DK	EU-15	5.33	12	5.8	12
7	Belgium	BE	EU-15	5.2	19	5.4	22
8	Luxembourg	LU	EU-15	5.2	20	5.6	17
9	France	FR	EU-15	5.13	22	5.9	10
10	Austria	AT	EU-15	5.12	23	6	8
11	Ireland	IE	EU-15	5.11	24	4.9	32
12	Estonia	EE	EU-13	4.74	30	5	28
13	Czech Republic	CZ	EU-13	4.69	31	4.9	36
14	Spain	ES	EU-15	4.59	33	5.7	14
15	Lithuania	LT	EU-13	4.55	36	4.9	30
16	Portugal	PT	EU-15	4.52	38	5.7	15
17	Poland	PL	EU-13	4.49	41	4.1	68
18	Italy	IT	EU-15	4.46	43	4.1	66
19	Latvia	LV	EU-13	4.45	44	4.8	38
20	Malta	MT	EU-13	4.39	48	4.4	54
21	Bulgaria	BG	EU-13	4.32	54	3.7	89
22	Romania	RO	EU-13	4.32	53	3.6	91
23	Slovenia	SI	EU-13	4.28	59	4.9	37

EU-28 Countries, Norway and Switzerland				Global Competitiveness Index (GCI)		Quality of transport infrastructure	
Rank GCI In EU-28	Country	Country codes	Organisation	Score	The place in global rank	Score	The place in global rank
24	Hungary	HU	EU-13	4.25	63	4.7	41
25	Cypr	CY	EU-13	4.23	65	4.6	44
26	Slovak Republic	SK	EU-13	4.22	67	4.5	49
27	Croatia	HR	EU-13	4.1	77	4.6	46
28	Greece	EL	EU-15	4.02	81	4.3	57

Source: (own elaboration based on: World Economic Forum, 2015)

The quality of transport infrastructure was deemed the highest in Switzerland (Both in the Europe and in the World). For the EU-28, the Netherlands and Finland received the highest marks (port infrastructure received the best grade in both cases). Among the EU-28, Poland was graded as 25th and 11th within the EU-13 (railway transport infrastructure was graded as the worst).

The correlation between the global competitiveness index and the grade of the quality of its infrastructure is strong (Pearson correlation coefficient $r = 0,7876$). The distribution of the values of GCI and the grades of the quality of the general transport infrastructure in the EU-28 and Norway and Switzerland is presented on the Figure 8.

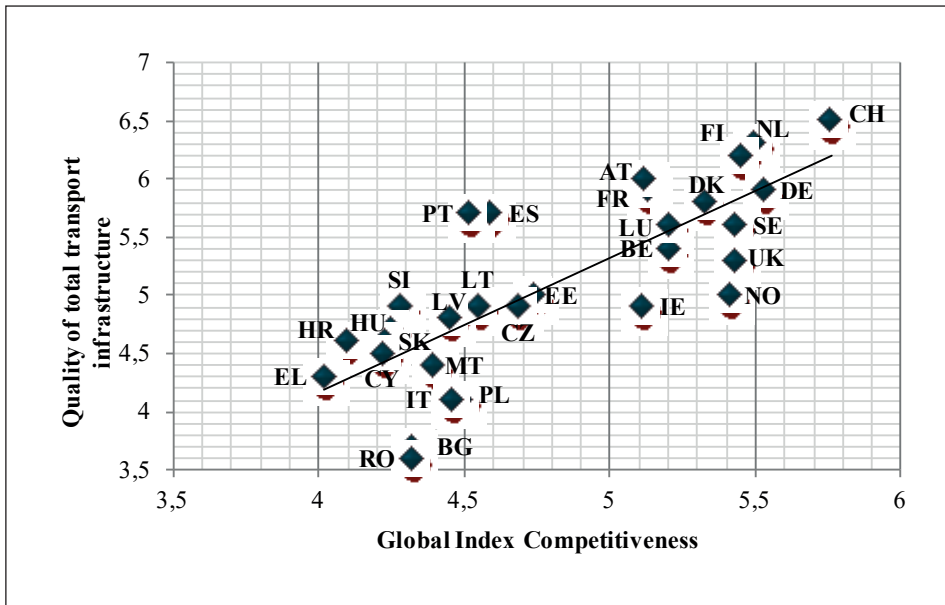


Figure 8. Dispersion of the global competitiveness index (GCI) and assessment of the quality of total transport infrastructure in the EU-28 as well as Norway and Switzerland
 Source: (own elaboration based on: World Economic Forum, 2015)

Conclusions

The analysis of the determinants of the competitiveness level of a given country shows a significant role of the transport infrastructure, which is treated as part of the basic requirements of the GCI⁵. A high quality transport infrastructure with the structure corresponding to the needs of the whole economy is needed to for the efficient functioning of the whole economy. It allows to transport goods and services into the market in a safe and prompt way, while providing the workforce the ability to commute and achieve their need for mobility. An insufficient level of infrastructure supply is deemed to be the fifth most significant impairment of business activity⁶.

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⁵ The general grade of transport infrastructure is constituted by: the general infrastructure quality, the quality of the roads, the quality of the railway infrastructure, the quality of the port infrastructure, the quality of the airway infrastructure, the number of chairkms per week in airway transport [mln].

⁶ Before there are: funding accessibility, corruption, bureaucracy and taxation (World Economic Forum, 2015).