DOI: 10.20472/BM.2015.3.2.002

THE INFLUENCE OF RAILWAY INFRASTRUCTURE ON THE LIVE IN SELECTED EUROPEAN COUNTRIES

HELENA MITWALLYOVA, VUKICA JANKOVIC

Abstract:

The article focuses on the influences that a railway infrastructure has on the life of a given country. The role of railway transportation is viewed especially from the point of employment, quality of railway infrastructure and using a railways by passengers. It is comparing the length of the railway network to the numbers of railway employees which contains employees in the railway sector including the service related to transport operation, transport management, operability and modernization. It is also used an indicator which suitably adds the conversion of railway employees per train-kilometres (tkm), passenger-kilometres (pkm) and gross-ton-kilometres (gtkm). The research is concerned selected European countries.

Keywords:

Railway infrastructure, investment, the European Union, employment, the use of a railway system

JEL Classification: L92, O18, R40

Authors:

HELENA MITWALLYOVA, University of Economics, Czech Republic, Email: mitwally@volny.cz
VUKICA JANKOVIC, University of Economics, Czech Republic, Email: jankovic.vukica@gmail.com

Citation:

HELENA MITWALLYOVA, VUKICA JANKOVIC (2015). THE INFLUENCE OF RAILWAY INFRASTRUCTURE ON THE LIVE IN SELECTED EUROPEAN COUNTRIES. International Journal of Business and Management, Vol. III(2), pp. 18-26., 10.20472/BM.2015.3.2.002

1. THE INTRODUCTION

The significance of transportation and transportation investments has always been indisputable for any economy. In 2010, the share of transport, trade and telecommunications in the total GDP amounted to 21%, whereas the share of all European countries including Turkey reached an even higher percentage, i.e. 23% (EUROSTAT, 2014).

To meet the needs of the society, transport should fulfil several functions with the dominant function being the transfer of goods and people, which in turn is fundamental for the mobility of workforce. The mobility in the labour market contributes to economic growth. The stimulation function in economy is performed by investments into transport infrastructure that initiate recovery in economy and facilitate labour market flexibility, including social-stabilizing, substituting and complementary functions (Eisler et al., 2011). In any country, transportation as such is a very important branch of its economy that can significantly influence the quality of the life of its citizens. The academic and political circles share a general consensus that public investment into infrastructure plays a fundamental role as the economy's engine (Pereira and Andraz, 2012). According to Vickerman (2008), infrastructure is the ground for economic development. For example, Alfonso (2007) implies that an investment of 100 million in a city railway transit project generates the growth by 263 million in GDP, and numbers in vacancies increase up to 8,000. The direct effect can be seen in branches related to construction, e.g. civil engineering, architecture, design, electronics and metallurgy. An indirect effect is evident in fields like the real estate market, environment preservation, tourism, etc. (Alfonso, 2007). The influence of transport infrastructure seems to be much stronger in the long-term perspective than in short or medium-term ones (Melo, et al., 2013). According to Cervero (2009), the transport infrastructure is important for the successful competitiveness of cities and regions in the global market. Furthermore he adds that from the historical point of view the transport infrastructure was designed primarily to enhance mobility, including labour access and production capacity (Cervero, 2009). The synergy effects accompanying the development of the railway infrastructure (here meant urban) is pointed to by Huang Chang-fua and Xia Yuan (2011) who understand the development of the railway transport as having a long-term effect that will show positively in other strata of life in cities with a particular focus on "Green GDP", thus supporting the role of railway in sustainable development (Huang Chang-fua and Xia Yuan, 2011). Railway transport and its development do not constitute the only contribution to a country's economy. Administration, maintenance and operation of the railway also provide employment to a large number of workers, which significantly supports the economic development. Railway companies usually belong to the biggest employers. For instance, Správa železniční cesty České republiky (Railway Infrastructure Administration of the Czech Republic) employs more than 17 thousand employees (SZDC 2014). Similarly, Železnice Srbije presents the number of over 17 thousand employees as of 31st December 2014 (Serbian Railways 2014). However, this company operates passenger as well as freight transportation, whereas in the Czech Republic, this service is split between two state companies: České dráhy a.s., having more than 15 thousand employees (ČD 2014), and ČD Cargo with 7.5 thousand employees (ČD Cargo 2014. It is nearly 40 thousand employees in these state companies. According to the Czech Statistical Office report the number of all the employed had reached 3.7 million in total (CZSO 2014) as of the 3rd quarter of 2014; i.e. the number of railway employees constitutes 1 % of all employees in the Czech Republic. Serbia states that the number of employees was

1.76 million (Czech Trade 2014), which means that the number of employees working for Železnice Serbije constituted 1% of all the employed too.
In 2012, the important transportation branch was employing 1 186.2 thousand employees out of the 249,359 thousand of all employees in the 30 monitored countries, which was 0.47%. The largest portion of employees in the railway area is held by Luxembourg where the value is 1.69% of all the employed. It's followed by Lithuania, the Slovak Republic, Hungary and Austria with the values moving from 1.37 to 1.04%. In other countries, the portion has been declining continually. (UIC 2012)
The railway plays a very important role as an employer. This article investigates the efficiency of railway workforce in relation to such factors as the length of the railway network and the performance of the railway.

1. THE ROLE OF TRANSPORTATION IN THE ECONOMIES OF EUROPEAN COUNTRIES - *GDP and the modernization of the railway infrastructure*

The quality of the railway is tightly interconnected with the system's utilization. For the railway companies to be able to vindicate high numbers of their employees, they need to perpetually improve the railway transportation quality and thus ensure its utilization.
European countries are typical for their high portion of administrative expenditure. The role of the state in financing the railway infrastructure is obvious, it may rise up to 100%. Nevertheless, the share of investments into the railway system in GDP is relatively small. In the 22 monitored European countries [1] the total amount of investments into the railway infrastructure reached EUR 24.3 billion. The share in the total GDP takes only 0.21% on average. Such a negative indicator stems from the fact that the overview does not include countries with a traditionally high share of investments like Sweden and Denmark. On the contrary, candidate countries where the subsidies to the railway infrastructure are very low are included (UIC, 2012). Lithuania performed the largest railway investments in relation to GDP, i.e. 0.64% GDP, followed by Spain with 0.55% on second place. The group of four states, Slovakia, Switzerland, Estonia and Great Britain oscillate between the values of 0.34 – 0.31%. Finland, the Czech Republic and Germany move from 0.26% down to 0.21%. Despite these relatively low indicators, the transport development sets conditions for the development of other economic areas hand in hand with the social and economic development of a country. A prognosis of the economic development in a certain country has to incorporate direct as well as indirect influence of the railway system (Lingaitisa and Sinkevičius, 2013). This is one of the reasons why EU administrations are the prevailing investors in the transport infrastructure.

2. THE NUMBER OF EMPLOYEES VS. INDIVIDUAL INDICATORS

It is interesting to compare the length of the railway network to the numbers of railway employees whereby the productivity of labour becomes evident. Comparing the number of employees per 1 km of track, the highest portion is reached by Luxembourg having 14.5 employees per 1 km. It is followed by Belgium with 10 employees per 1 km, Austria with 9.39 employees and Switzerland with 8.87 employees per 1 km of

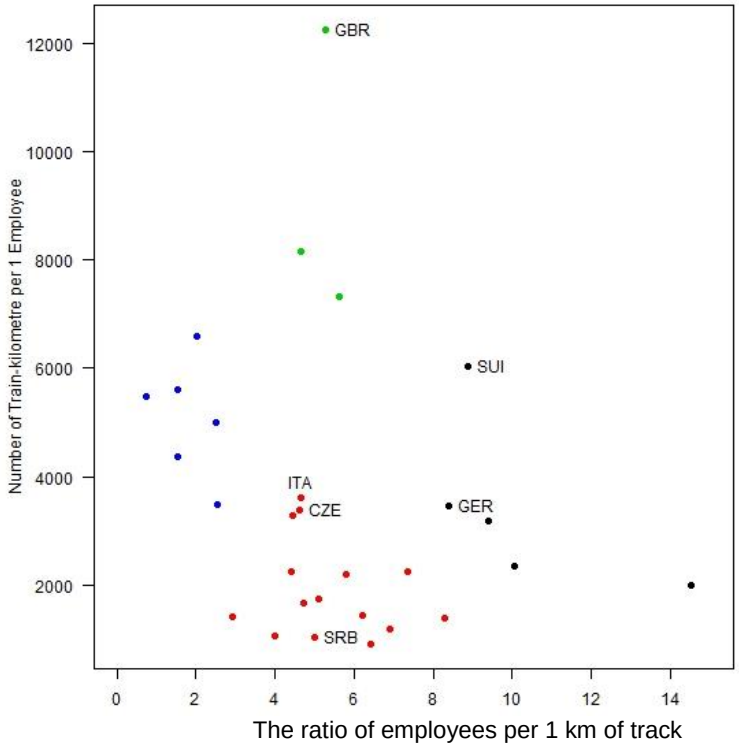
[1] Bulgaria, the Czech Republic, Germany, Estonia, Greece, Spain, France, Croatia, Italy, Latvia, Lithuania, Hungary, Portugal, Romania, Slovenia, Slovakia, Finland, the United Kingdom, Switzerland, FYROM, Serbia, Turkey.

railway track. The average value is 5.2 employees per 1 km. The fewest employees per 1 km are recorded by Greece (1.3) and Sweden (0.7). The low coefficient may suggest under-employment as well as a tendency toward the less intensive use of the railway, which is by the data specified later in the article.
The above-stated may imply how the given countries utilize the railway be it for passenger or freight transportation. Understandingly, these indicators will help to determine the work efficiency of staff. Luxembourg with the highest number of employees per 1 km (14 employees per 1 km of track) does not prove to be the most efficient one; its values in the conversion of indicators per 1 employee are below the average in all monitored areas. Switzerland having the second highest count of employees per 1 km of track (8.9 employees per 1 km) shows good results in passenger transportation, while the cargo indicators fall considerably. To judge the number of employees is truly precarious as e.g. states with state-of-art remote-controlled safety devices have considerably reduced the numbers of employees in this area even though they have improved safety. The fact that low numbers signal underemployment and threats to safety can only be assessed for each country individually according to the technical state of all components related to the railway. The graphs presented below show efficient utilization of employees per tkm, gtkm and pkm. Source charts to all presented graphs are provided in the appendix.

2.1 The ratio of employees per 1 km of track to tkm per 1km of track

Graph 1 proves high efficiency of the railway system in Great Britain, Denmark and the Netherlands where the potential is well used despite a high number of employees per 1 kilometre of track. Germany resembles the Czech Republic in values, whereas Serbia and Lithuania belong to the least efficient states in this area. When comparing net outcomes of the ratio of employees per 1 tkm, Great Britain comes first in efficiency once again reaching the value of 12,000 tkm /1 employee. The Netherlands tightly follows Great Britain, having the value of 8,000 tkm/1 employee. To compare, Estonia's indicator is one third (3,500 tkm /1 employee). Lithuania yet again closes the group with only 900 tkm /1 employee. The average value reaches 3,600 tkm /1 employee.

Graph 1. The ratio of employees per 1 km of track compared to tkm per 1 km of track



The graph has been created on the basis of data from Eurostat, OECD and UIC by the authors.

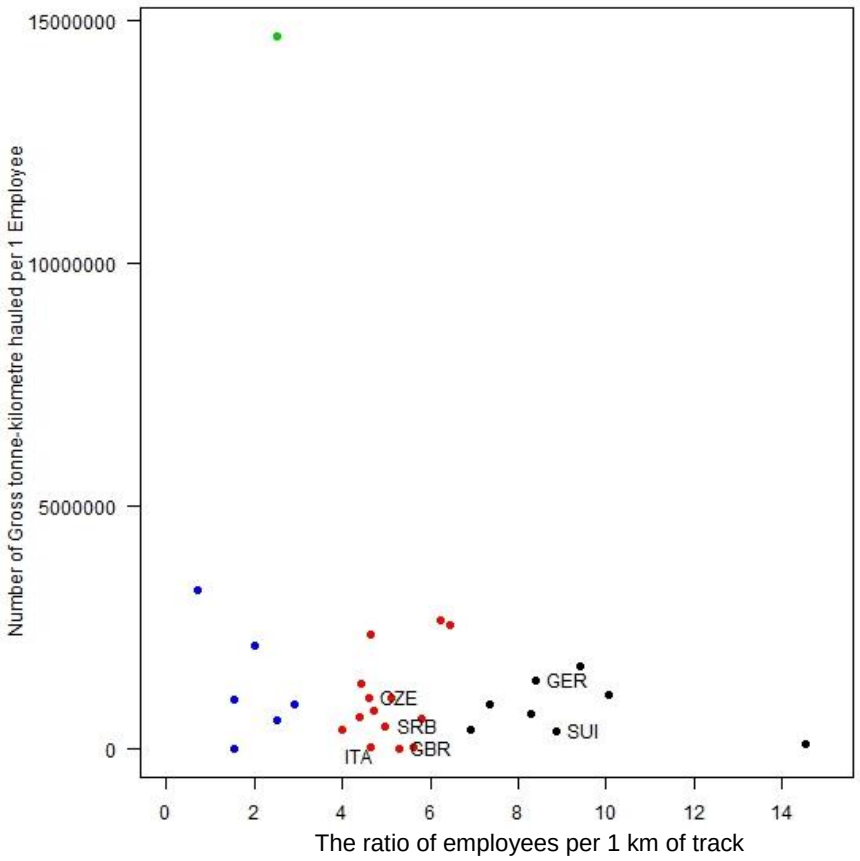
Green pointed states– the states with the most efficient approach to the use of workforce regarding the number of employees on 1 km of track in relation to the number of tkm per 1 employee.
Black pointed states – states that are relatively efficient; however, whose values are lower than those of the first group.
Red pointed states – states with low efficiency, i.e. those with a low count of both monitored values or low output indicators and fairly high number of employees per 1 km of track. The states at the lower part of the graph lack efficiency because of low track-operation and simultaneously from the necessity to procure the operation.
Blue pointed states – the states with the good approach to the use of workforce regarding the number of employees on 1 km of track in relation to the number of tkm per 1 employee.

2.2 The ratio of employees per 1 km of track vs. gtkm per 1 km of track

In the freight transportation area, all states are predominantly surpassed by Estonia that successfully exploits its position on the Baltic Sea coast. Germany and the Czech Republic reach mean values, while Serbia exceeds Italy as well as Switzerland and Great Britain. The differences are not very significant though. If we only compare the indicators of transported gross-ton-kilometres per 1 employee, a huge dispersion is striking which shows in analysis outcomes in Graph 2. The average value is 1.52 million gtkm per 1 employee, the most efficient Estonia having the indicator of 14 million gtkm per 1 employee, while the lowest being held by Great Britain with a mere 29.8 gtkm/1 employee. It is necessary to note that railway workforce offer service for

freight as well as passenger transport. The above stated facts also imply the use of the railway for freight transportation.

Graph 2. Number of employees per 1 km of track to gtkm per 1km of track



The graph has been created on the basis of data from Eurostat, OECD and UIC by the authors.

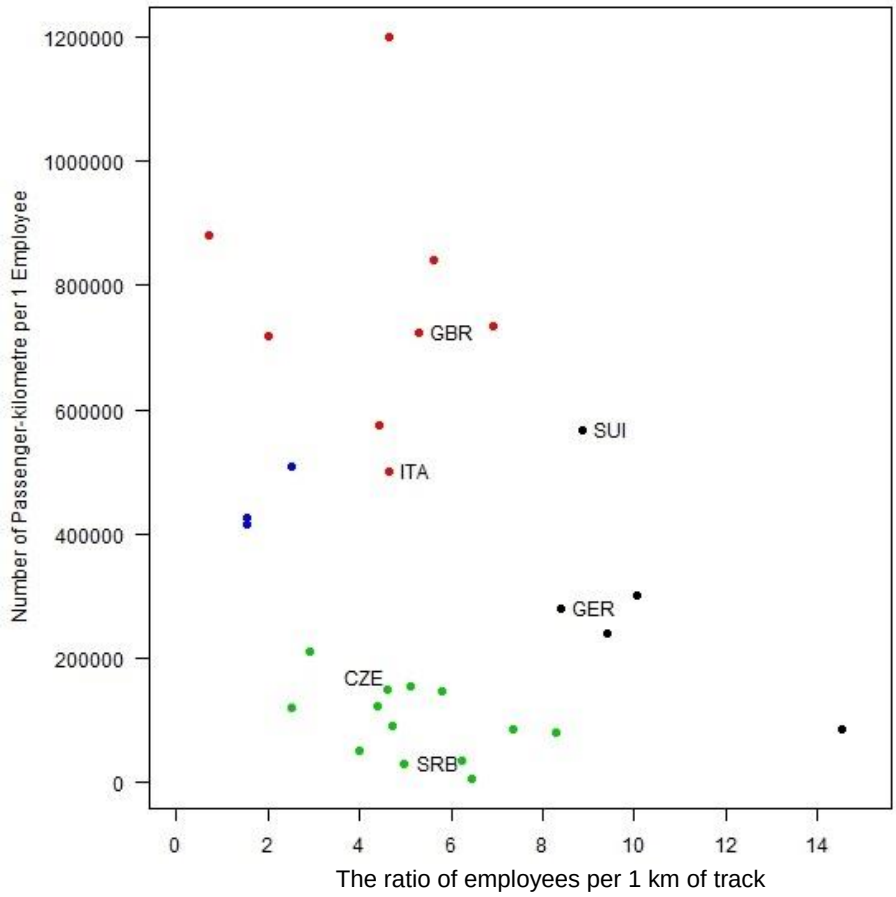
Green point on the up of the graph belongs to Estonia that, being a significant transit country, focuses primarily upon freight transport leaving from ports at the Baltic Sea.
Black pointed states – show decent values primarily in the number of employees per 1 gtkm.
Blue pointed states –may point to underemployment in the area or to a highly sophisticated system of transport operation, or out-sourcing in this area.
Red pointed states – fall amongst the least efficient states due to a very small volume of transported freight.

2.3 The ratio of employees per 1 km of track vs. pkm per 1 km of track

The results of the last analysis focusing on passenger transportation are led by the Netherlands. Also Great Britain, Switzerland and Italy reach very good values, whereas Germany takes mean values. The Czech Republic is half the values of Germany; Serbia climbs the lowest levels. The indicators in person-kilometres per 1 employee are again supported by the results of an analysis presenting the Netherlands as being the most efficient in the utilization of its employees with the

value of 1.2 million pkm/1 employee, in comparison to the least efficient Lithuania with 6,000 pkm/1 employee.

Graph 3. Number of employees per 1 km of track to pkm per 1km of track



The graph has been created on the basis of data from Eurostat, OECD and UIC by the author.

Red pointed states – being the most efficient group situated in the upper part of the graph in which states like Great Britain reach very good values of indicators in passenger transport and in the numbers of employees per 1km of track.
Black pointed states – states with the highest number of employees per 1 km of track.
Blue pointed states – northern states, e.g. Finland and Norway show high numbers of transported passengers at relatively small numbers of employees, maybe thanks to outsourcing.
Green pointed states – the Czech Republic and Serbia are again placed in the least efficient group that has small indicators of transported passenger numbers at quite high numbers of employees.

3 CONCLUSION

To conclude the three analyses, E15 states are capable of far more efficient utilization of their workforce than post-communist states with the exception of Estonia in the area of freight transportation. A certain diversion at advanced European states like Great Britain and Switzerland is caused by their low use of railway for freight transportation.

This situation may be the result of better transport organisation, implementation of intelligent operation systems as well as job out-sourcing the scope of which has not been tracked down. Despite the above stated, the railway will indisputably be the key employer, and only the quality and ability to attract larger numbers of customers will ensure a positive effect that will multiply into the whole society.

REFERENCES

Alfonso, H. L. (2007) Investment and Spanish economic growth. *Explorations in Economic History*; 44(3): 452-468.

Cervero, R., Transport Infrastructure and Global Competitiveness: Balancing Mobility and Livability, *American Academy of Political and Social Science*, 2009, pp 210-225, ONLINE: WWW: www.jstor.org/stable/40375931

Eisler, J. Kunst, J. Orava, F. (2011): Ekonomika dopravního systému, Vysoká škola ekonomická v Praze, *Nakladatelství Oeconomica*, ISBN 978-80-245-1759-9

Huang Ch., Xia Y., (2011) Research on the role of urban rail transit in promoting economic development. *Procedia Engineering* 21. 520-521pp.

Lingaitisa, V., Sinkevičius, P., (2014) Passenger transport by railway: evaluation of economic and social phenomenon, *Procedia - Social and Behavioral Sciences* 110, 549 – 559 pp.

Melo, P. C., Graham, D. J., Brage-Ardao, R. (2013) The productivity of transport infrastructure investment: A meta-analysis of empirical evidence, *Regional Science and Urban Economics* 43, 695–706 pp.

Pereira, A., Andraz, J.: On the economic effects of investment railroad infrastructures in Portugal. *Journal of Economic Development* 79, Vol. 37, Number 2, 2012

Vickerman, R.: Recent evolution of research into the wider economic benefits of transport infrastructure investments, The wider economic benefits of transport, macro-, meso- and micro-economic, transport planning and investment tools, *OECD*, (2008), ISBN 978-92-821-0160-5, pp. 29-50

Institutions:

České dráhy, a.s. (ČD) [online]. Available on http://www.ceskedrahy.cz/skupina-cd/personalistika/personalistika-v-cislech/-778/

ČD Cargo, a.s. [online]. Available on https://www.cdcargo.cz/o-nas

Český statistický úřad (2014) [online], Available on http://www.czso.cz/csu/2014edicniplan.nsf/publ/110024-14-q3_2014

Czech Trade, a.s., [online], Available on http://exportnivzdelavani.cz/sluzby-2014/informacni-servis/novinky/srbsko-zamestnanost-na-historickem-minimu-21226/

EUROSTAT 2014 *Gross value added – Construction* [online], Available on: http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tec00005

EUROSTAT 2014 *Gross value added - Trade, transport and communication services*, [online], Available on: http://epp.eurostat.ec.europa.eu/portal/page/portal/product_details/dataset?p_product_code=TEC00006

EUROSTAT 2014 *Total general government expenditure* [online], Available on: http://epp.eurostat.ec.europa.eu/portal/page/portal/transport/data/database

International Union Of Railways, (2012), *Tab. 76 Investment*

Správa železniční a dopravní cesty, s.p. [online]. Available on http://www.szdc.cz

Zeleznice Srbije. [online]. Available on http://www.zeleznicesrbije.com/active/sr-latin/home/glavna_navigacija/o_preduzecu/istorijat_zeleznice.html, [05.07.2014]

Zeleznice Srbije. [online]. Available on http://www.zeleznicesrbije.com/active/en/home/glavna_navigacija/o_preduzecu/opste_informacije.html

