

## EVOLUTION OF FREIGHT TRANSPORT IN COUNTRIES OF THE VISEGRAD FOUR AND REST OF THE EUROPEAN UNION<sup>1</sup>

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### Vývoj nákladnej dopravy v krajinách Visegrádskej štvorky a vo zvyšku Európskej únie

***Abstract:** Study is aimed at evolution of freight transport types in countries of the Visegrad Four compared to the European Union. The goal is to calculate, how much each freight transport type has increased or decreased in proportion. Main source of data is official European statistical office, Eurostat. All data are of a secondary character. In the article there are graphical visualizations of these calculated outcomes, using figures and tables. By comparing the results, we came to the conclusion that transporting goods has not changed the proportions but has decreased in overall. 75.9 % of all transport in the European Union is done by road transport, 6.3 % by inland waterways and 17.8 % by railway transport. The stability of these numbers suggests no future fluctuations. Countries of V4 are following the European trend of increasing road transport share. In conclusion, we consider this trend to be on the negative side, road transport is known for its environmental pollution.*

***Keywords:** freight transport, inland transport, the Visegrad Four, environment, green transport*

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## 1 Introduction

Requirements of industry and businesses for the division of logistics are rising. Businesses prefer higher quality and faster processes with focus on individuality and flexibility. Industries need to be provided goods on time to synchronize all their processes, putting pressure on logistic departments. In this era the changes to transport modes are inevitable.

Each of these methods of transport has unique features and usually when transporting goods, it is necessary to use a combination of these methods.

### 1.1 Literature Review

In the book *Intermodal Freight Transport and Logistics* by Jason Monios, Rickard Bergqvist is stated: “Different geographical regions have substantially different prerequisites for the respective mode of transport. There are, therefore, substantial differences between regions and countries when it comes to usage of different modes of transport. Some differences can be explained by geographical conditions, but other important facts are regulatory aspects, status of infrastructure and, occasionally, technology” [4]. This is the base assumption we are working with and are going to study in this paper.

“International Freight transport takes place on the range of scales: cross-border trade in some cases may be over only a few kilometers and transport methods may be extremely simple, e.g. by means of a small truck, barge or sailing craft making use of the available basic infrastructure and prevalent physical conditions. In these cases is it simply needed to bridge a small gap between the supplier and a customer. At a regional level, trading is over longer distances, transport solutions are more varied, procedures are more formal, and control protocols more rigid. The world major trading blocs, such as the North American Free Trade Agreement (NAFTA), the European Union (EU) / Schengen, the Economic Community of West African States (ECOWAS), the Association of Southeast Asian Nations (ASEAN), and the Southern African Development Community (SADC) have international transport at their heart and although they vary in their structures, control mechanisms and context, they are all designed to facilitate or promote intraregional movement of freight or people, or usually both. Within these blocs, and between these blocs and non-affiliate neighboring states, much progress has been made in the areas of trade facilitation and transport efficiency, but tensions remain, and progress is still required in pursuit of the free movement of goods without compromising security and control.” [1]

## 1.2 Methodology

This article is mainly statistical, therefore data used are of a secondary character. Most of the data found in this article come from the official statistical office of the European Union, Eurostat.

Data are measured in tonne-kilometre (tkm), which is a standard measurement unit in transport (usually in millions of tonne-kilometer). “One tonne-kilometre represents the transport of one tonne of goods (including packaging and tare weights of intermodal transport units) by a given transport mode (road, rail, air, sea, inland waterways, pipeline etc.) over a distance of one kilometer. Only the distance on the national territory of the reporting country is taken into account for national, international and transit transport.” [2]

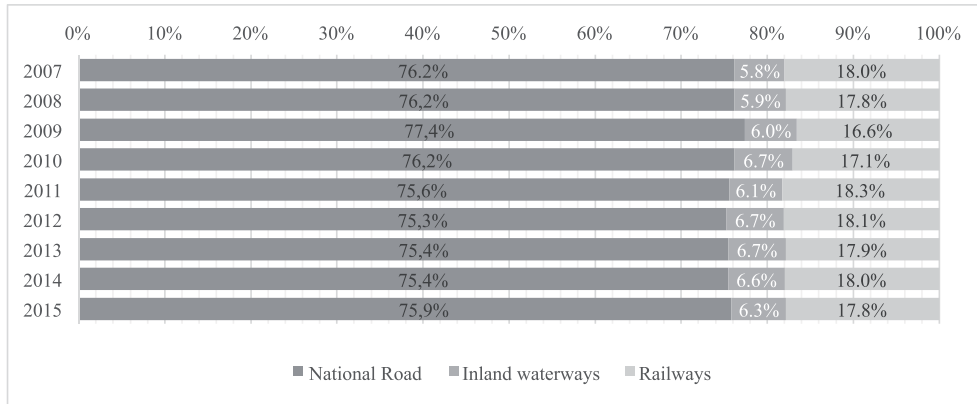
The aim of the article is to compare and visualize shares of each inland transport modes in the European Union. There are three inland transport methods. Road transport is the most used method of transporting goods. Inland waterways, which is primarily used by countries with naturally river rich environment, such as the Netherlands or Belgium. Railway transport is the last one.

The most current data to this date were used, data for the years 2016 and 2017 are not complete yet.

## 2 Statistical Findings for Europe

Road transport plays the biggest role in freight transport in Europe. Out of all three inland transport types (road transport, inland waterway transport and railway transport), road transport accounted for 75.9% in the year 2015, which is 1,770,446 million tkm total. This share has not changed in the last decade, only by small margin.

Figure 1

**Evolution of inland transport in EU, 2007 – 2015 (% of tkm)**

**Source:** Eurostat (2018) [3].

As shown in Figure 1, there have not been any dramatic changes in the share of each transport type. Railway transport has increased since the year 2010 and stayed at 18.3 % onwards. In 2015 inland waterways supplied 6.4 % of inland transport, making it the least used inland transport method of all. 75.9 % of transport was done by road in the year 2015.

The only year with a slight fluctuation is year 2009 where the road transport increased by 1.2 %, which then turned back the next year. Other than that, modal split is very stable.

Table 1

**Evolution of inland transport in EU, 2007 – 2015 (millions tkm)**

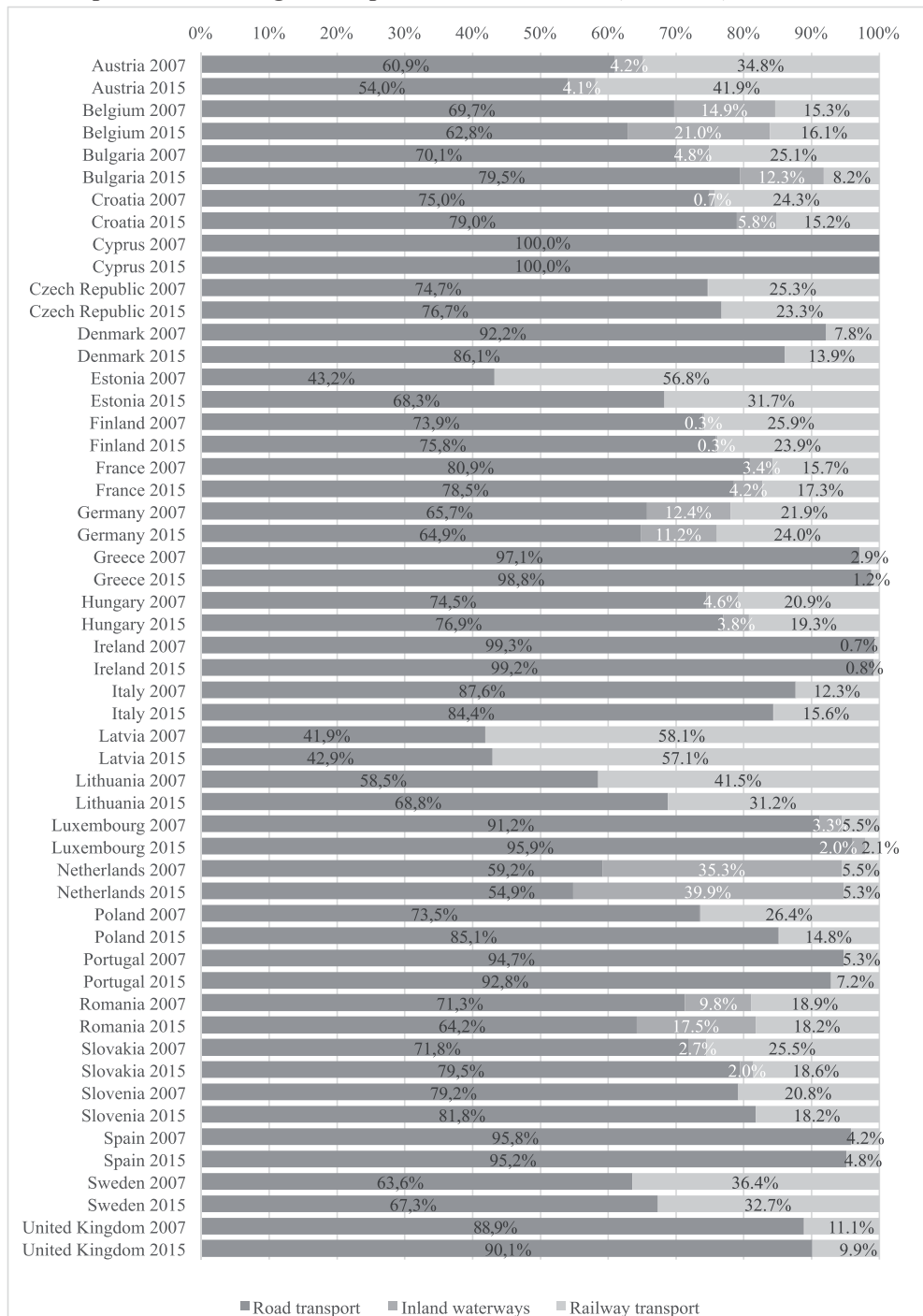
	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>National Road</b>	1 914 206	1 890 876	1 699 507	1 756 114	1 745 434	1 694 612	1 721 095	1 727 642	1 770 446
<b>Inland waterways</b>	145 564	147 067	132 739	155 521	141 969	149 987	152 795	150 876	147 471
<b>Railways</b>	451 989	442 763	363 540	393 531	422 096	407 279	407 366	411 469	415 881

**Source:** Eurostat (2018) [3].

Table 1 shows total number of good transported, it is visible there is decreasing trend in transportation. All modes of transport are decreasing at roughly the same pace, therefore the shares are similar. Only waterway transport had a slight increase of two thousand tonne-kilometres.

Figure 2

## Modal split of inland freight transport in EU, 2007, 2015 (% of tkm)



Source: Eurostat (2018) [3].

The modal split of each member state is mainly focused on road transport, with some countries reaching 100 % share of road transport due to lack of railways or possible inland waterway transport, Cyprus being one of them. Out of all countries only 17 have useable inland waterways system. Countries with more than 10% modal share of inland waterways are Belgium, Bulgaria, Germany, Netherlands, and Romania. Netherlands is leading country, with its naturally river rich environment, the most current modal share of 45.5% of inland waterways transport. The rise of waterway transport between years 2007 and 2015 was significant in Belgium where it rose by 6.1%, Bulgaria 7.5%, Croatia 5.1%, Netherlands 4.6%, and Romania 7.7%.

Railway systems are mostly utilized by Austria, Estonia, Latvia, and Sweden. All these countries have the modal split of railways above 30%. Biggest changes in railway usage were in Bulgaria with the decrease of railway usage by 16.9 %, Estonia 25.1% decrease, Lithuania 10.3% decrease. These countries increased their road transport respectively, only in case of Bulgaria was waterway transport increased.

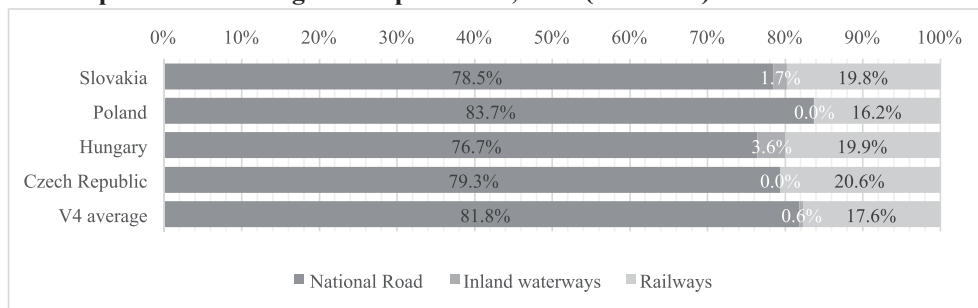
The biggest overall change experienced Estonia with the increase of road transport at the expense of the railway transport and Lithuania with the same changes.

### 3 Statistical Findings for the Visegrad Four

Countries of the Visegrad Four (V4) are Slovakia, the Czech Republic, Poland, and Hungary. They form a cultural and political alliance based on historical background, located in the middle of Europe. Since they are neighboring countries, there is an expectation these countries on would have similar natural conditions.

Figure 3

#### Modal split of inland freight transport in V4, 2015 (% of tkm)



**Source:** Own processing according to Eurostat (2018) [3].

The average of modal split in countries of V4 is at 81.8%, therefore only fifth of transport is done by other means than road. Waterways are generally not utilized much, only a small fraction of goods are transported via inland waters, in countries of Slovakia and Hungary. In Slovakia it is 1.7% and Hungary 3.6%. It is thanks to the river Danube, which is connecting shipyards in Slovakia and Hungary all the way to the Black Sea and the North Sea. The biggest shipyards in Slovakia are in Bratislava and Komárno, in Hungary it is in Budapest, Győr and Dunaujváros.

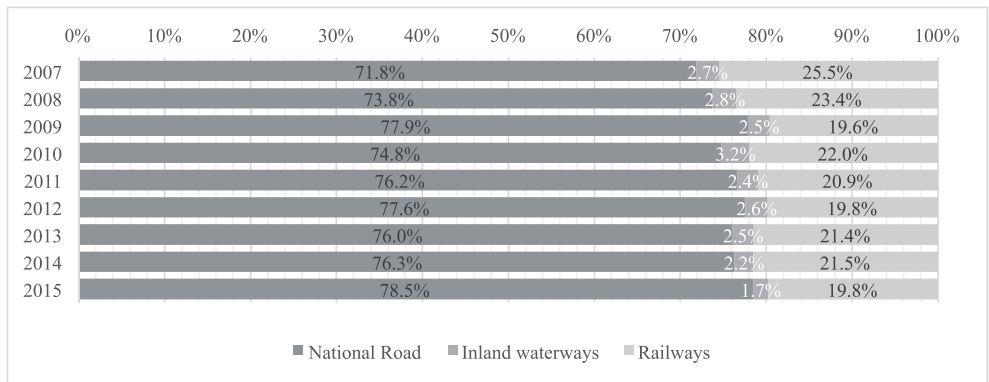
There is a very dense web of railroads, making them suitable for transporting goods. By average 17.6% of goods are transported by railways in countries of V4, where Poland has the lowest portion of 16.2% and the Czech Republic the highest of 20.6%.

### 3.1 Slovakia

Slovakia’s modal split has not changed dramatically over the last decade. Waterways usage is averaging around 2.5%, with a slight drop in year 2015 to 1,7 %. There is an evident trend of utilizing more road transport at the expense of railway transport. Road transport share has increased by 6.7percentage points, meaning it is rising by 0.8% every year by average. Railways usage has decreased by 5.7percentage points between the year 2007 and 2015.

Figure 4

Modal split of inland freight transport in Slovakia, 2007 – 2015 (% of tkm)



Source: Own processing according to Eurostat (2018) [3].

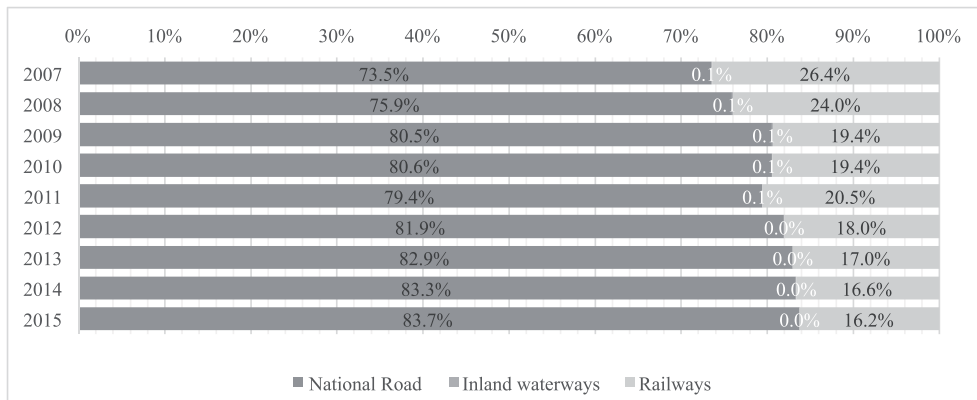
### 3.2. Poland

Modal split of Poland follows a pattern of rising road transport utilization. The road transport has increased by 10.2 percentage points, between years 2007 to 2015. The biggest leap was in the year 2009, where the share increased by 4,6 percentage

points. By average it is rising by 0,8 % every year, similarly to Slovakia. While Slovakia is utilizing waterways, Poland is using its waterways marginally. It is currently below 0.1%. Even these marginal numbers tend to drop over time. As road transport is being used more, consecutively railway transport share is dropping.

Figure 5

#### Modal split of inland freight transport in Poland, 2007 – 2015 (% of tkm)



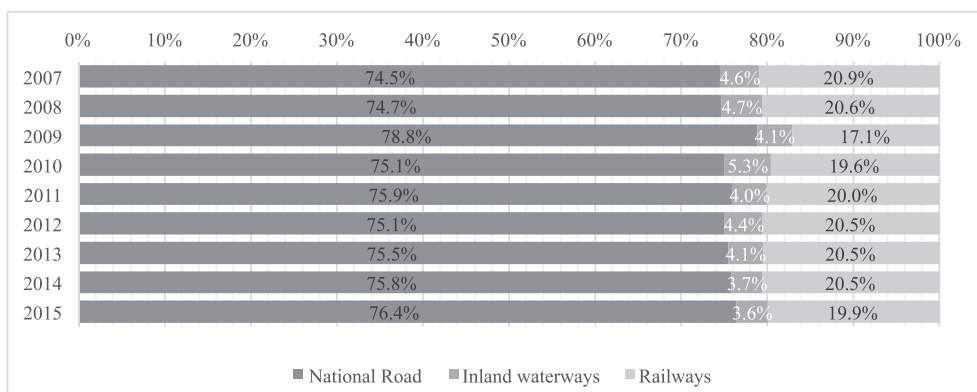
Source: Own processing according to Eurostat (2018) [3].

### 3.3. Hungary

Hungary has a stable modal split among the years, with only the year 2009 being an exception. From year 2007 to year 2015 the share of road transport has increased by 1,9 percentage points. Waterway usage is averaging by 4.3%, with a slight drop in years 2014 and 2015. In the year 2015 it was at 3.6%. Railway transport is stable too, with a slight drop, at 19.9% in the year 2015.

Figure 6

#### Modal split of inland freight transport in Hungary, 2007 – 2015 (% of tkm)



Source: Own processing according to Eurostat (2018) [3].

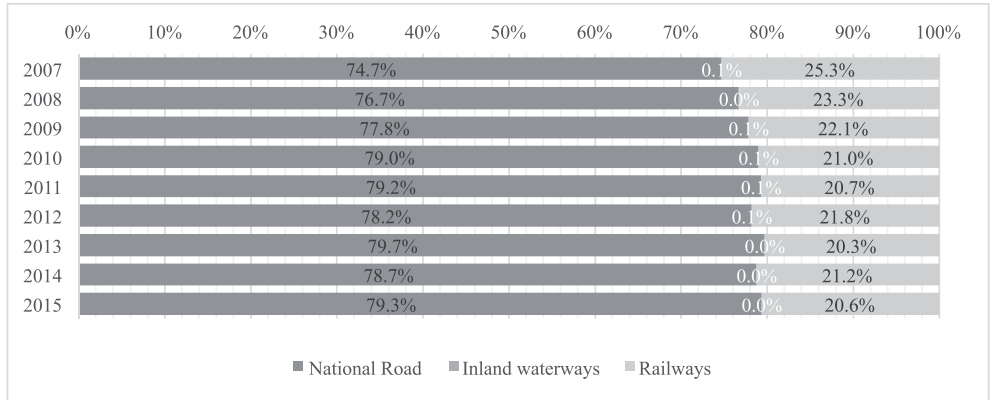


### 3.4. Czech Republic

The Czech Republic does not dispose with a usable waterway system, only a minor one. Therefore, the evolution of modal split is very similar to Poland. Currently waterway usage is under 0.1%. Meanwhile road transport share is increasing and is currently at 79.3%. Railway transport share on the other hand is decreasing and is currently a 20.6%, making the Czech Republic the country with the biggest share of railway transport out of V4.

Figure 7

#### Modal split of inland freight transport, Czech Republic, 2007 – 2015 (% of tkm)



Source: Own processing according to Eurostat (2018) [3].

## 4 Conclusions

Countries of V4 are following the European trend of utilizing more road transport. The most evident rise of share of road transport out of V4 countries was in Poland. Slovakia's road transport share has risen by 6.7 percentage points.

In the year 2015 there were transported 1.8 trillion tkm of goods via road transport. Via waterways, it is 0.15 trillion tkm goods and 0.4 trillion goods via railways. Or respectively 75.9% goods by road 6.3% goods by waterways and 17.8% railways.

It is understandable companies tend to use road transport due to its flexibility. Railways are usually used when transporting goods for longer distances. And waterway usability is very constricted by natural conditions of a country.

We consider this trend to be on the negative side; road transport is known

for its environmental pollution. Meanwhile, trains are more ecological and can carry much more. However, the final destination is always going to be reached by road.

## References

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