

External Factors of the Rail Freight Transportation

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Abstract: *The aim of this study is to analyse the reason why Rail Freight has a competitive disadvantage in comparison with road transportation. Both external and internal actions are needed to improve the competitive position. Over the last decade the demand for individualized goods has increased continuously, which has triggered changes in the structure of transported goods, the market and the clients' expectations. Taking into consideration the importance of environmental protection, rail freight transport has a very important role in economic growth. This study concentrates on the external factors, the necessary internal actions being analysed in a future study.*

Key words: *rail, transportation, infrastructure, investment, competitive advantage*

1. Introduction

1.1. The importance of freight transportation

Freight transportations are fundamental to our current economy. Transportations enhance economic growth and create workplaces; they must be sustainable. Fig.1. below shows the estimated development of freight transportations in the 27 European States until 2050.

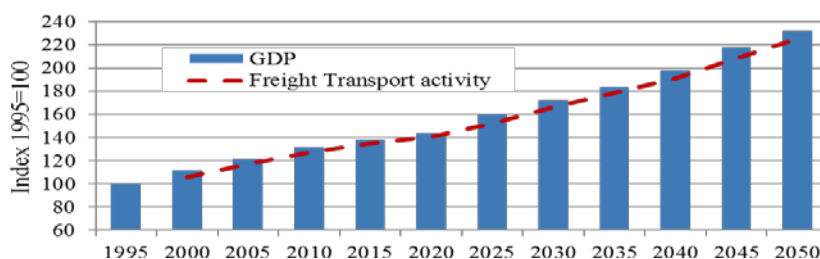


Fig. 1. *Development of freight transportations in the 27 EU States until 2050 (European Commission, EU Reference Scenario 2016, 12)*

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1.2. The importance of environmental protection

Despite all the efforts, over the past decades the role of rail freight transportation has significantly decreased, whereas the part of road transportations has continuously increased. See Fig. 2.

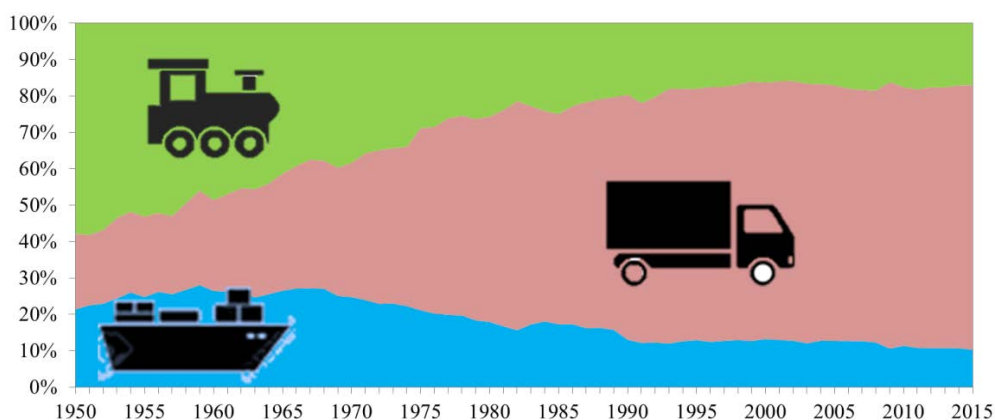


Fig. 2. *Development of the Modal Split in Europe [tons x km]*
(the authors' presentation, based on Eurostat\Database\Transport.)

These trends are in sharp contrast to EU policy objectives, which include a target shift of 30% from road freight to rail freight for journeys over 300km by 2030, and a shift of over 50% by 2050, as set out in the 2011 White Paper (*European Commission, White Paper, 2011*) on transport.

2. Objectives

A significant number of initiatives in the EU and the member countries have been introduced in order to facilitate the possibility of a smoother passage from road freight transportation to rail freight transportation.

These initiatives include the reform of rail transportations, opening markets for higher competition, improving interoperability and programs for investment in new technologies, such as Shift2Rail program. Alongside these initiatives, EU Member States have implemented a number of measures (including the direct financial support measure) designed to help develop rail infrastructure. All these measures were only enough to stop the further decline of the share of rail Transportation, but could not improve its position.

Were all these efforts worth? Can the rail freight transportation make the turnaround? To achieve this, both external and internal changes are needed.

The aim of this study is to analyse the external support needed. The similar important internal changes will be analysed in a future study.

3. Methods

3.1. Market analysis

In the last decade, the demand for individualized goods has increased continuously, which has resulted in changing the structure of the transported goods, and respectively in decreasing the share of heavy goods transported mainly by rail (such as coal or iron ore) and in increasing the share of processed goods transported on road.

Fig. 3 presents the estimate made for Germany for the period 2000-2025, where one can see that the demand for the transportation of heavy cargo will decrease from 53% to 27%. This has a negative effect on rail freight transportations since it has been optimized until now for general heavy transport cargo.

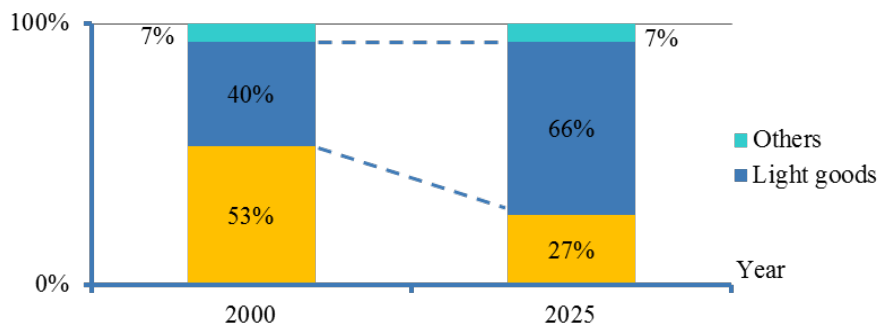


Fig. 3. *Changes in the structure of transported goods* (König et al. 2012, 12).

3.2. Legislation

Most European countries present differences as regards the characteristics of the railway track and of the technical equipment. This means that sometimes trains have to be recomposed at the border of countries, which means extra delay and costs.

The problem of the European international rail transport is that it is nationally organised. The different national rail transport services have to be combined with each other, but this is very difficult.

Fig.4. shows a simplified version of the technical and organisational difficulties an operator encounters when organising a transport between Rotterdam/Netherlands and Milano/Italy. Four countries have to be entered, thus four different requirements have to be fulfilled. By way of contrast, a truck can drive with any EU truck and by drivers of any nationality through all these countries.

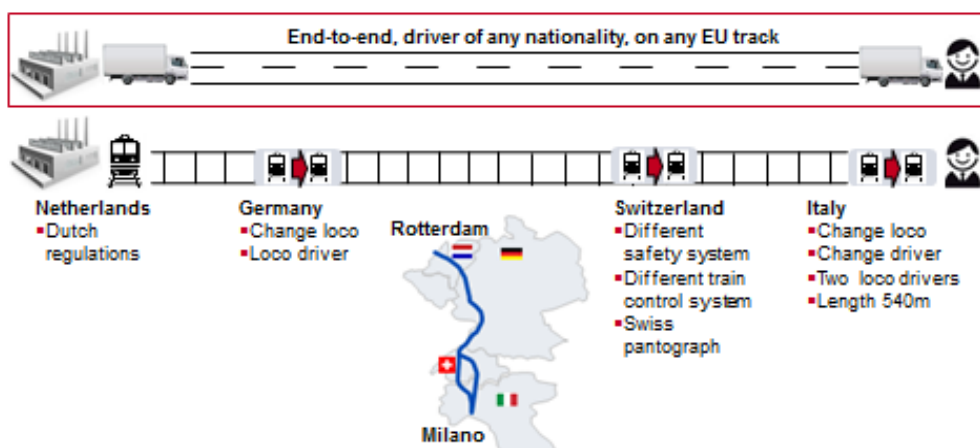


Fig. 4. *Different technical requirement, when crossing the border (own presentation based on Schmidt, 2016, 12).*

3.3. Infrastructure

The investments in the road infrastructure still enjoy higher priority than the ones in the rail infrastructure. Fig.5. shows the relative growth of these two categories.

Besides less infrastructure, the rail freight transportation has the shortcoming, specific to Europe, that passenger transportation has priority in all cases. These two factors have a significant limitation on the capabilities of the rail freight.

3.4. Political trends with a major impact on the rail freight

Expectations for the next years remain unclear; rail freight will be confronted with an increasing number of challenges:

- The slowdown of the economy in China could affect transport, which can cause further growing competition with the sea transport.

- The political crisis in Ukraine and the conflict with Russia are going to have an impact on the future growth of the East-West corridor.
- The tense situation within the EU due to migrant crisis, which also has an impact on rail freight (e.g. stop of rail freight operations through the Eurotunnel for several days, significant delays in Southern Europe due to the situation along the borders).
- Decrease of international trade due to the Brexit and the possible protectionist policies in the USA.

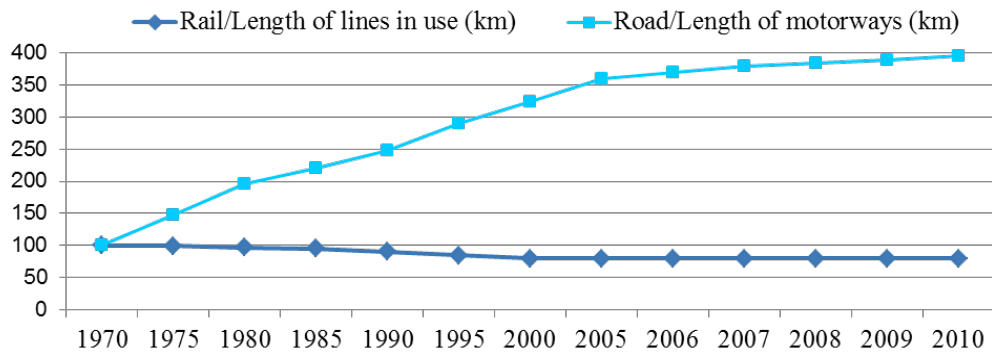


Fig. 5. *Rail track versus motorway length in EU-15, 1970-2008*
(Community of European Railway and Infrastructure Companies, 2013, 29).

3.5. Social and environmental impact

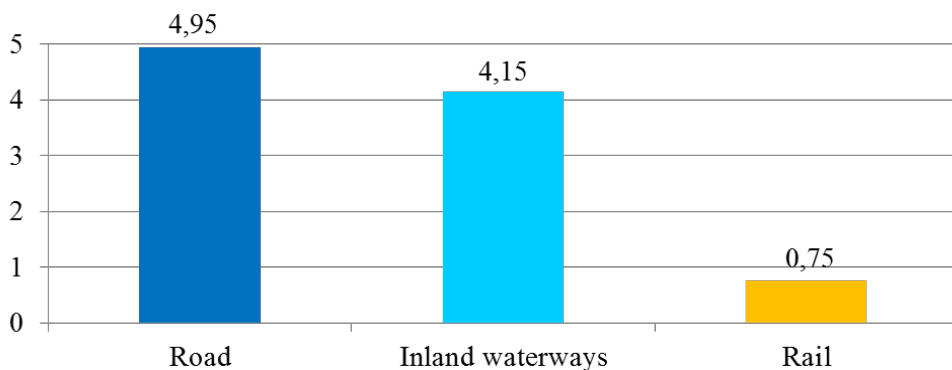


Fig. 6. *Transport of 100 tonnes of freight, Basel to Port of Rotterdam – CO2 emissions comparison (tonnes)*
(Community of European Railway and Infrastructure Companies, 2013, 14).

Rail has a number of strengths it can draw on to build on the recent signs of recovery. As well as being particularly safe, rail is environmentally friendlier and less polluting than other modes of transport — a significant advantage at a time of increasing congestion on Europe's roads and growing public concern about environmental issues (*European Commission, Directorate-General for Energy and Transport 2008, 5*). Rail transport generates the lowest specific CO₂ emissions and is the most energy-efficient mode compared with road, air and even waterborne transport (See also Fig. 6).

4. Main findings

The main external difficulties the Rail Transport faces are:

- 1) Change of the transportation market
 - a. Change in the structure of the shipment;
 - b. Change in the customer expectations (JIT, Lean etc.);
 - c. Decrease in the trade of some „historic” commodities, like coal.
- 2) No real European market
 - a. The rail transportation industry is nationally organised;
 - b. Differences in standards.
- 3) Deficiencies in infrastructure
 - a. Fewer investments than in roads;
 - b. Especially the intermodal capacities are missing;
 - c. Passenger trains always have priority, thus no room for freight.
- 4) Hard to follow the volatile demand
 - a. Rail industry is asset and resource intensive, which requires a careful long-term investment planning;
 - b. Rail transport faces an increasingly volatile demand, resulting in short-term commercial and operational challenges, thus there are no resources for long-term investments.

5. Discussions

In the already mentioned White Paper, the European Commission set the target to increase the modal share in Europe to 30% by 2030 and 50% by 2050. Taking into consideration the status and the analysis completed in the previous chapters, it can be stated that major changes are needed for the mentioned targets to be achieved. Internal and external changes are indispensable conditions to the success of rail transportation.

The aim of this study is to discuss the external changes needed, while the internal changes will be discussed in a future study.

The external factors, which can improve the competitive position of the rail freight, can be grouped as follows:

- **regulatory measures**, including monetary incentives to increase the price-competitiveness of rail;
- **infrastructure investment measures**, including investment projects that improve the quality and reliability of the rail freight infrastructure.

5.1. Regulatory measures

Conditions to put all transport modes on a level-playing field

- Rail freight transport generates the lowest specific CO₂ emissions and is the most energy efficient mode compared with road freight, air freight and even waterborne freight transport (Korzhenevych, 2014). However, rail transport still suffers from a charging regime which not only disregards its environmental performance, but is also discriminating against rail, compared to other modes of transport.
- Reducing the cost of rail freight transport, in particular through **lower infrastructure access charges** and targeted discounts to incentivise mode shift;
- In parallel, introducing **road charging schemes** that better reflect the external costs of road transport.

Market competition

- The effectiveness of relatively low infrastructure charges also depends on the extent to which freight operating companies pass these on to their customers in the form of lower prices. **Strong competition between operators** can help ensure this.
- In addition, the entry of new operators can be supported by **reducing the administrative burden** of processes related to the market entry (such as granting licences and homologation) and by ensuring that non-discriminatory frameworks are applied as regards the access to services and facilities.
- Adopting a more flexible approach to rail capacity allocation processes in the Member States, including accommodating requests for **freight paths** on national rail networks currently dominated by passenger services
- Allowing the circulation of **longer and heavier trains**, while limiting the expansion of longer and heavier Gigaliner Truks.

Monetary incentives

- **Innovation** is crucial to help raise the quality of rail freight services. The European and national governments should foster innovation with dedicated programs.

- Examples are the Shift2Rail program from the European Union or the „5L-Demonstrator” financed by the Swiss authorities.
- These programmes will support the implementation of new technologies, increase capacity bundling and help improve the use of available infrastructure. This will in turn help reduce the costs related to rail transport and increase the attractiveness of rail freight for the customer.

5.2. Infrastructure investments

- A well-connected and well-maintained **infrastructure network** with high capacity is crucial for the performance of rail freight services. Investments in this infrastructure are urgently needed.
- Promoting the construction and expansion of **intermodal** facilities, including railway sidings and dedicated connections to ports and industrial areas, which incentivise combined transport and thus better integrate transport modes. The aim should be that the investments in the intermodal facilities enable shippers to make as much use of rail transport as possible, while continuing to benefit from the flexibility offered by road connectivity.
- A serious obstacle for the rail freight services is the lack of „**last mile**” links to industrial sites, ports and logistics centres. While the access to the road network is always provided by default by local authorities at no extra charge, access to the rail network is far from being a given.
- Improving the **interoperability** of freight services Europe-wide, by implementing the standard systems Europe-wide (e.g. common signalling systems).



Fig. 7. TEN-T Core network corridors
(*International Transport Journal*)

- **Improving cross-border infrastructure** is a must. Since longer-distance journeys in Europe are likely to involve a cross-border component, ensuring that the barriers to cross-border transport are removed is of particular importance in improving the competitiveness of rail freight. A good example of this Europe-wide infrastructure is the TEN-T Core network corridors program, shown in Figure 7.

6. Conclusions

6.1. The status

Europe's railways started to struggle from the late 1960s, with rail freight transport finding it difficult to compete with the increasing popularity of road and to adapt to new customer requirements. The European and national findings of the recent years were only enough to stop the further decline of the market share of the rail freight. Does rail freight have a chance to survive or even develop further?

6.2. Necessary external changes

There are external changes which are indispensable to the success of the Rail:

Regulatory incentives:

1. Infrastructure charges that promote rail transport;
2. Support strong competition;
3. Monetary incentives to support innovation in rail transportation.

Infrastructure:

1. Dedicated Freight infrastructure (e.g. Ten-T);
2. Intermodal facilities;
3. Improve European wide interoperability.

6.3. Outlook

Summarising all the facts presented above, it can be stated that the rail freight industry already faces big challenges and will have to face even bigger ones in order to survive and further develop. External support is needed to create a competitive environment, but this alone will not solve all the problems. The needed internal changes will be analysed in a future study.

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