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COMPETITIVENESS OF INTERMODAL TRANSPORT IN THE OPINION OF EXPERTS FROM THE BALTIC SEA REGION

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Abstract: The article presents the results of a survey conducted among experts in the field of transport research, from the Baltic Sea region, on the competitiveness of intermodal transport in relation to road transport. The study aimed to identify factors that positively and negatively influence the choice of intermodal transport as an alternative to road transport along the entire transport route. The available literature was reviewed, and attention was paid to the problem of differences in the perception of intermodal transport by experts from different countries. It was also indicated that, depending on the approach to this problem and the local point of view, significantly different results can be obtained regarding the factors influencing the choice of intermodal transport as an alternative to road transport.

Keywords: intermodal transport, road transport, competitiveness, Baltic region

JEL classification: F0, R5, L9

INTRODUCTION

Due to the fact that transport is essential in the functioning and development of the modern economy [Bylinko 2018], it seems necessary to eliminate its negative effects. Air pollution, noise and congestion referred to in the literature as external costs of transport [Pawłowska 2018], have become the target of European Union activities, the ultimate goal of which is the complete decarbonization or significant reduction of emissions of this branch of the economy [Clean and sustainable mobility 2023; The European Green Deal 2019]. According to Eurostat data, in the European Union, transport as the cumulative value of the category „transportation and storage"

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represents ≈ 10% of total greenhouse gas emissions in 2023 [Statistics: Eurostat]. Analyzing the above data in relation to previous years, it can be concluded that in the years 2015-2023, excluding the years in which restrictions caused by the Covid19 pandemic were in force, transport is the only category that records a systematic annual increase in total greenhouse gas emissions. On a year-to-year basis, the average annual growth was ≈ 0.85% in the full period of 2015-2023 and ≈ 6.77% excluding time of the pandemic lockdowns. The impact of the pandemic on the economy is significant, although transport saw a significant decline in transshipments, in practice the value of emissions in thousands of tones in years 2015-2023 practically did not change, which is an exception for other industries where emissions are reduced. One of the tools that can reduce the overall transport emissions is to move away from the currently dominant road transport in favor of more environmentally friendly solutions, such as rail transport or inland navigation. [Efficient and Green Mobility; Psaraftis 2016; Shah et al. 2021]. In the assumption of EU transport policy, this can be achieved by utilizing intermodal transport, [Miklińska 2017] i.e. the use of one standard transport unit (container, semi-trailer or swap body) and moving it without dismantling by utilizing at least two modes of transport [Kine et al. 2022] in order to make the best use of their strengths. Observing changes in the European transport market, in the context of EU plans, we can notice a significant problem, which is the systematic increase in the share of road transport in the total land transport in Europe. [Freight transport statistics - modal split]. Naturally, this occurs at the expense of inland navigation and rail transport, where a systematic decline in their share within European transportation is observed. Simultaneously, the number of transported cargo units and the overall transport performance in Europe are increasing. However, the tendency to increase the share of road transport in Europe is contrary to the adopted assumptions of the EU's transport policy and is raising concerns about the possibility of achieving the planned climate goals. Hence, the question arises regarding the reasons for the lesser competitiveness of alternative to road transport cargo transportation methods. The answer to the above is necessary to be able to make changes in the organization of transport or in regulations and transport laws, which will lead to better utilization of intermodal transport. In this article, an expert-based response to the aforementioned question is presented by identifying areas where the competitiveness of intermodal transport relative to road transport (for the entire route) manifests both positively and negatively.

LITERATURE REVIEW

First and foremost, it should be noted that for the purposes of this study, the following definition of competitiveness was adopted: “competition is understood as the ability of entities to achieve success in conditions of competition between them. This concept is referred to as a method of action, a struggle for specific economic benefits, competition, a process [Grzybowska 2012]”. In the sense

of taking an entity as a form of transport. In the literature of the subject, two basic divisions of sources can be distinguished. The first is a collection of sources resulting from orders such as reports and analyses, while the second consists of sources in the form of books and articles. It is important to separate these two sets due to different approaches adopted. Scientific articles generally describe a specific problem, while reports aim to describe a certain issue and reach a wider audience (such as experts from other fields than the subject of the report). In the context of the article, it is possible to adopt a general approach that reports and analyses will focus mainly on the positive aspects of intermodal transport competitiveness, while scientific publications will tend to focus on negative issues. Due to the adopted limitations, only a few sources outlining the general approach to the topic will be described below.

One of the most important reports is the one prepared periodically by UIC experts (Fr. Union Internationale des Chemins de fer, Eng. International union of railways) [railways 2023]. In the document from 2020 [2020 Report on Combined Transport in Europe 2020], many factors that affect intermodal transport competitiveness, both positively and negatively, were identified, selected of them are presented in Table 1

Table 1. Selected factors affecting the competitiveness of intermodal transport from the UIC 2020 report

Having a positive impact	Affecting negatively
Reduction of greenhouse gas emissions	Lesser flexibility
Higher energy efficiency of transport	Bottlenecks
Increased safety in road transport associated with fewer accidents	Lower infrastructure density in rail and inland waterway transport than in road transport
Noise reduction	Additional reloading time
Bypassing transport restrictions related to legal regulations	Additional cost of reloading operations

Source: chosen, from: 2020 Report on Combined Transport in Europe

Currently available reports and analyzes also include the UN (United Nations) report analyzing market changes caused by the Covid19 pandemic [Intermodal Transport in the Age of COVID-19: Practices, Initiatives and Responses 2020]. In that report it is shown that the most significant market aspects influencing the development of intermodal transport are the progressive computerization (development of telematics, progressive digitalization), the simplification of procedures in freight transport and, among others, the trend of creating "green transport lines".

Looking at selected scientific publications, authors such as Kurtulus E. and Çetin I. B. [Kurtuluş, Çetin 2020] are writing that according to their model based on survey research and interviews with entrepreneurs, intermodal transport is most often chosen due to its competitiveness in terms of time (including the regularity

of connections) and transport costs. A high correlation coefficient was also attributed to the size of the enterprise (those with fewer than 50 employees more often prefer road transport) and whether it already uses intermodal solutions. The authors also indicated a certain correlation in terms of the amount of fees for handling and storing cargo units, but this coefficient was not assigned a high value (compared to the others). The article also briefly covers the impact of transport policy, but the authors point out that the strength of its impact depends on the existence of specific legal solutions. Zając M. and Świeboda J. [Zajac, Swieboda 2017] point out the high importance of transport policy (ecological policy, deregulation of the rail transport market and subsidy programs for intermodal transport). As the main positive factors, they indicate the technological development of railway wagon constructions, various management possibilities within intermodal transport chains (the company does not have to have its own means of transport) or increased flexibility of intermodal transport compared to exclusive rail transport along the entire transport route. As one of the conclusions, the authors conclude that for intermodal transport to be fully competitive, it must offer flexibility and prices similar to road transport (throughout the transport route), and investments should also be made to improve the quality of infrastructure (in the most popular and frequently used transport routes, at the expense of less significant ones) Mindur L. [Mindur 2021] also points to the importance of transport policy in terms of, for example, reducing the negative effects of transport and EU (European Union) overall support for intermodal transport. However, referring to Asian examples, he also draws attention to factors that negatively affect the development of intermodal transport, such as uneven cargo flows in rail transport or low competitive potential within the railway transport sector. The most important positive factors, indicated by the author, include the progressive standardization in the technical and technological aspects of transport (loading units, reloading devices, terminals, etc.) as well as the unification of intermodal systems in economic and organizational terms. On the negative side, uneven development, and sometimes low density of transport infrastructure (rail, water, road, or terminal) were indicated. The last of the authors listed in this article is Antonowicz M. [Antonowicz 2018], who describes insufficient support for the development of railway infrastructure (low commercial train speed or network capacity), and at the same time, negligible support for the development of the road segment of intermodal transport chains (in terms of expanding the fleet to handle container transport, modern trailers, or swap bodies). On the positive side of intermodal transport development, the increasing containerization of cargo and the adopted direction of transport policy were indicated. At the same time, the author discusses many elements of transport programs and policy that should be undertaken, such as improving the flow of information within the transport chain, reducing or eliminating certain fees (such as viaTOLL or fees for using the railway network), increasing priorities for intermodal trains, or introducing bans (following other EU countries) on the operation of heavy road vehicles.

METHODOLOGY

The results presented in this study are based on a survey conducted among European transport experts. The selection of experts was purposive and was carried out using the citation tracking method by analysis of scientific databases aggregating publications and the ReasearchGate portal. Experts with publications in the field of intermodal, rail and inland transport, transshipment terminals (including seaports), as well as issues of transport and logistics networks and chains were searched for. The focus was on these topics in the context of European freight transport. The survey was conducted using the CAWI method (Computer Assisted Web Interview) in the form of surveys in English. For the purposes of this study, three questions from a broader survey were used. The first of them is a single choice closed question aimed at determining whether intermodal transport is a real alternative to road transport (the entire transport route) in relation to the country of residence of the respondents. The second and third questions were open-ended and encouraged respondents to indicate factors that, in their opinion, positively, and negatively affect the competitiveness of intermodal transport (in relation to road transport). In this way, opinions of thirty-one experts from countries such as Poland, Sweden, Norway, Estonia, Lithuania, and Finland were obtained. The results are broken down by country and presented in the next part of the article.

RESULTS

Poland

Due to its location, Poland is an important link in the transport network of the Baltic Sea region, functioning as a connector for other regions of Europe. Ten experts took part in the study, three of whom believe that intermodal transport in Poland is not a real alternative to road transport along the entire transport route, while seven have a different opinion. Selected most frequently indicated factors having a positive and negative impact on the competitiveness of intermodal transport are presented in Table 2.

Table 2. The most important factors influencing the competitiveness of intermodal transport in the opinion of Polish experts

Having a positive impact	Affecting negatively
Reducing congestion	Transport and reloading costs
Greater eco-friendliness	Flexibility
Cargo security	Time of the entire transport process
Economies of scale associated with the ability to transport more or heavier cargoes in one shipment	Poor quality of railway infrastructure

Source: own study

Sweden

Sweden functions as a local cargo distribution hub, in particular in relation to the European north-south transport corridor running from Mediterranean ports towards Scandinavia. Eight experts took part in the study, three of whom believe that intermodal transport in Sweden is not a real alternative to road transport along the entire transport route, while five disagree. The selected most frequently indicated factors positively and negatively influencing the competitiveness of intermodal transport in the opinion of Swedish experts are presented in Table 3.

Table 3. The most important factors influencing the competitiveness of intermodal transport in the opinion of Swedish experts

Having a positive impact	Affecting negatively
Reducing congestion	Time of the entire transport process
Energy efficiency of transport	Complexity of the transportation process
With good planning - lower cost	Flexibility
Greater eco-friendliness	Transport and reloading costs

Source: own study

Norway

Two Norwegian experts took part in the study, both of whom believe that intermodal transport in their country is a real alternative to road transport along the entire transport route. The selected most frequently indicated factors having a positive and negative impact on the competitiveness of intermodal transport in the opinion of the above-mentioned are presented in Table 4.

Table 4. The most important factors influencing the competitiveness of intermodal transport in the opinion of Norwegian experts

Having a positive impact	Affecting negatively
Greater eco-friendliness	Time of the entire transport process
Lower cost of long-distance transportation	Flexibility
	Service/handling time at the terminals
	Poor regularity

Source: own study

Estonia

Two Estonian experts took part in the study, one of whom believes that intermodal transport in Estonia is not a real alternative to road transport along the entire transport route, while the other has a different opinion. The selected most frequently indicated factors positively and negatively influencing the competitiveness of intermodal transport in the opinion of Estonian experts are presented in Table 5.

Table 5. The most important factors influencing the competitiveness of intermodal transport in the opinion of Estonian experts

Having a positive impact	Affecting negatively
The transport capacity of road transport is limited (permissible weight, driver availability and infrastructure capacity)	Low cooperation between entities
Transport policy	Social habits
Competitive for longer distances	Regulations not made in mind of new transport solutions
Lower personnel costs (drivers)	Three different rail gauges in Europe

Source: own study

Lithuania

Five experts from Lithuania took part in the study and all of them agree that intermodal transport in Lithuania is a real alternative to road transport along the entire transport route. Selected most frequently indicated factors positively and negatively influencing the competitiveness of intermodal transport in the opinion of Lithuanian experts are presented in Table 6.

Table 6. The most important factors influencing the competitiveness of intermodal transport in the opinion of Lithuanian experts

Having a positive impact	Affecting negatively
Lower cost	Poor development in the field of IT, which extends the time of cargo handling
Greater eco-friendliness, reducing congestion	Weather (difficult to use inland water transport in winter)
Demographic situation of the region (e.g. driver shortages)	Short transport distances in Lithuania, which often makes it impossible to use all available solutions
High road tolls	Requires larger loads (weight, quantity), reloading is necessary

Source: own study

Finland

The study involved four experts, half of whom believe that intermodal transport in Finland is not a real alternative to road transport along the entire transport route, while the other half has a different opinion. Selected factors most frequently indicated that have a positive and negative impact on the competitiveness of intermodal transport in the opinion of Finnish experts are presented in Table 7.

Table 7. The most important factors influencing the competitiveness of intermodal transport in the opinion of Finnish experts

Having a positive impact	Affecting negatively
Greater eco-friendliness	Transport and reloading costs
Reducing congestion	Low population density
Improving road safety	Ease of using road transport
Transport security	Time of the entire transport process

Source: own study

CONCLUSION

As shown in the article, both surveyed experts and literature sources agree that issues related to ecology are the most important factor positively affecting the competitiveness of intermodal transport compared to road transport. In this matter, often mentioned are: reducing road congestion, reducing emissions and higher energy efficiency of intermodal transport. Scientific articles more often raise the issue of transport policy, but also some experts pointed out its positive impact on the competitiveness of intermodal transport. Other positive factors include transport safety, possible economies of scale, lower personnel costs (drivers), and in the case of good planning, lower total transport costs. On the negative side, experts point to transport flexibility as the most important factor working to the detriment of intermodal transport. The total transport time can also be indicated as an important factor negatively affecting the competitiveness of intermodal transport compared to road transport. Other negative factors include: poor quality of railway infrastructure, low regularity, the impact of weather conditions, local, social, cultural, and demographic issues, outdated rules and regulations and different technical/technological requirements dependent on the country (e.g. different rail gauges). The presented results also show differences in the perception of intermodal transport by experts in the Baltic Sea region. Studying competitiveness factors is necessary if we want to achieve the goals set by EU transport policy. Such studies allow to understand differences between countries and to find basic problems and areas where current actions achieve the best effect. The above leads to a better understanding of the subject of intermodal transport, which then enables improvement in the cooperation of regions and the conduct of development activities and activities related to the implementation of the assumptions of the EU transport policy.

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