

THE PROSPECTS FOR GROWTH OF THE INTERMODAL TRANSPORT IN POLAND

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Abstract: Intermodal transport has been one of the most supported forms of transport in the programs of EU transport policy and national conceptions of the policy. The effects of this support is still limited. By 2030 it is expected to improve the competitive position of intermodal transport in mature markets with innovation and technological progress and organizational. Intermodal transport market in Poland is a young market, which is characterized by a small, but steady growth. An increase in this type of transport in the overall transport of goods , but the share of intermodal transport performance in freight transport performance in Poland amounts to less than 5 % (the highest percentage of intermodal freight services characterized by foreign shipowners FTP sea - about 14 %). In this article, the author analyzes the current conditions shaping the intermodal transport market, and defines the areas in which it is necessary to implement changes and innovations that enable the sustainable development of the intermodal market in Poland. The strategic objective of the development of intermodal transport in Poland is to create favorable conditions for the technical, legal, organizational , economic and financial implications for the dynamic development of the intermodal transport system , so that their share of rail transport in 2020 reached the average level of the European Union in 2000, such as 10-15 % in terms of tonnage. (Tomasz Szmid 2012) The condition of the available infrastructure and various instruments, including financial ones, ensuring increased availability of intermodal services are also of decisive importance.

Keywords: Intermodal transport, transport and handling technology

1. INTRODUCTION

Since a some time in the European Union is seen continuous growth in freight of goods by the road transport. The share of road transport in total freight transport (tkm) implemented in European countries stands at 76.9%, while the share of rail transport is only 17.6%. This situation, combined with an increase in trade in goods, leading more and more roads reaches its maximum capacity and the efficient organization of transport processes is becoming increasingly difficult or almost impossible.

The problem of increasing traffic congestion and improve safety on the roads for years is trying to solve by the European Commission in document which presents the

development strategy of transport and logistics. One of the first ideas, published in the White Paper was to increase the share of alternatives to road freight transport modes, particularly rail. Strong emphasis was also placed on the use of intermodal transport, such as, those in which the loads are moved by a different modes of transport. (Strategia rozwoju transportu, 2013)

Intermodal transport is based on joining the various modes of transport in the same integrated unit load. The condition for the operation of intermodal transport is also discretization load, which means that it is only subject to manipulation reloading the entire unit load. (Modelewska, 2013)

Classification of intermodal transport

Intermodal transport is divided into:

- Due to the range
 - domestic transport,
 - international transport,
 - continental transport
 - intercontinental transport.
- Due to the nature use of units
 - transport of containers,
 - transport semi-trailers,
 - transport of swap bodies,
 - transport trucks,
 - transport of special containers.
- Due to the nature of the operator
 - direct transport - operated by the carrier,
 - indirect transport - operated by the auxiliary carrier.
- Due to the nature of the means of transport
 - transportation of rail - road,
 - transportation of road - sea,
 - transportation of road - aviation,
 - transportation of rail - road - sea,
 - transportation of rail - road - aviation,
 - transportation of rail - road – river. (Kadłubek, 2013)

Today, with a growing demand for transport services, time of the transport and handling are most important factors. To optimize these processes developed many systems that significantly reduce the time of loading / unloading and provide the highest level of security. These systems include: Cargobeamer, Modalohr, Flexiwaggon, Rollende landstrasse and bimodal transport.

Cargobeamer is a fully automated, horizontal support system of intermodal rail traffic.

Main advantages of the system:

- loading takes place much faster than loading by crane,
- the system is working under the direct supervision,
- wagons are compatible with different types of trailers.

Modalohr is a system which, reminds in function Cargobeamer.

Main advantages are:

- fast loading and unloading,
- the ability to handle multiple cars at the same time,
- no need to use elevators.

Flexiwaggon this is another horizontal cargo handling system.

Main advantages are:

- the loading and unloading operations simply cured substrate,
- the ability to transport car kits,
- speed of operation,
- enables transport of road sets up to 60 ton.

Rollende landstrasse this is a kind of intermodal transport, which involves carriage by rail or truck tractor sets + sets of special wagons low-loading trailer. These wagons have a small diameter wheels (380/360/335 mm) and a flat floor suitable for the transport of vehicles and trailers.

Principle of operation are:

- train pulls into the terminal,
- from the front end of the wagon is adding a ramp,
- the ramp turn coming up cars and move along,
- vehicles are locked in their positions in order to ensure safety,
- ramp is dismissed, the train is ready for departure,
- unloading takes place in the opposite direction.

Main advantages are:

- fast loading and unloading,
- terminals do not need to be equipped with sophisticated equipment only ramp is required,
- the ability to transport the entire road sets.

Spreading the railway transport, inland waterway transport and short sea shipping with the use of intermodal transport techniques is one of the tools to ensure the sustainable development of transport system. (Nowakowski, Kwaśniowski, Zając, 2010)

2. METHODOLOGY OF RESEARCH

Using a simplified model of the hypothetical-deductive method, one should collect information about unit processes and formulate a research problem. Then formulate a hypothesis and confirm it fully or partially in the last phase. (Lisiński, 2016)

In addition, the following limitations were adopted in the research process: (Wood, Goodman, Beckmann, Cook, 2008)

- the research area is limited to logistic operators due to the availability of the necessary statistical data;
- statistical data refer to the years 2006-2020.

In order to achieve the goal, to solve the research problem, a number of research tasks were performed:

- a review of specialist literature on logistics operators;
- selection of the method for assessing the logistic capabilities of the analyzed service providers;
- evaluation of logistic possibilities in accordance with the adopted method;
- comparative analysis of the logistics capabilities of service providers - conclusions and recommendations.

Logistics operators play an important role in the integration of different modes of transport. They provide a wide range of logistics services. Logistics centers are important logistics hubs for world trade. (Pilegii, Indorf, Nagi, Kersten, 2020) The capacity of the centers can be measured in a measurable way using appropriate management methods.

The aim of the study is to answer the question: Will the competitive position of intermodal transport on European markets improve along with innovation and technological and organizational progress by 2030?

3. RESULTS

The main player in this sector of the market remained the PKP Group companies. The PKP and PKP LHS companies share at the end of 2011 amounted accordingly to: in the weight of transported units – 73.1% and transport performance – 75.5%. The second railway undertaking, as far as volume of intermodal transport is concerned, was the Lotos Kolej company. This company's share in the market, taking into consideration the weight and transport performance, amounted accordingly to 21.3% and 21.4%. The total share of the remaining companies including the capital groups of CTL and DB Schenker and STK company is inconsiderable, totally according to the transport performance amounted to around 3.1%. Similar to the previous years, the national transport share, measuring by the transport performance, did not exceed 20.5%. Due to high costs of performing such transport by rail, disproportionately to the road transport and low quality of the railway line parameters, including the average commercial speed not exceeding 35 km/h, the transport of containers for short distance are not profitable. The share of international transport is still very high and is shaped at the level of 80%. Taking into consideration the international transport, the share of particular types of communication, according to the number of transported units, was relatively similar and amounted accordingly to: in import – 26.14%, in export – 25.97% and transit – 25.12%. The Polish intermodal transport are based mainly on use of the land transport, which constituted 77% (in terms of transport performance). The share of transport through seaports is still insignificant, in 2011 it amounted to nearly 23%. Intermodal transport takes place mainly with the use of containers, the share of which in the general number of units amounted to 98.26% (at the end of 2011). 40 feet units transport dominated, which constituted 59%. The share of remaining containers amounted accordingly to: 20 feet – 33.47% and 30 feet – 5.76%. (Fechner, Krzyżaniak, 2011; Dargiel, 2013)

The total mass of the intermodal transport in the first quarter of 2014 amounted to 2,832 million tons, and the transport performance close to 1380 million tonne-kilometers. In the first quarter of 2014 rail intermodal transport carries out eight licensed operators, including: PKP Cargo S.A., PKP LHS Sp. z o.o., Lotos Kolej Sp. z o.o., DB Schenker Rail Polska S.A., CTL Logistics Sp. z o.o., Rail Polska Sp. z o.o., STK Wrocław S.A. and ITL Polska Sp. z o.o.

It should also be mentioned about plans new player in the market – ATC Rail SA, which is a special purpose company of ATC Cargo SA. The listed company is planning in the coming years to develop in intermodal network. From the beginning of 2012, the company began building a network of terminals since the launch two locations in Radomsko and Poznan. With the launch of these two transshipment terminals currently ATC Cargo SA organizes two connections per week to the Łódź Province and two to the Wielkopolska region. (Majczyk, 2013)

The dynamic development of intermodal transport sector contributes to an increase in demand for transport of highly processed goods in containers. Although the Polish market still relies on the mass transport, but studies show the systematic decline since the early 90s the last century. Since 2007, only once - in 2011 - mass transport recorded an increase, which was the result of increased demand for transport aggregate for road

program GDDKiA worth over 75 billion PLN. (Polityka Transportowa Państwa na lata 2006-2025, 2005)

Such solutions also favors EU policy that promotes intermodal transport. The EU recognizes the need to input transport solutions that are beneficial to the environment and improve the quality of life in big cities. According to the report of the International Union of Railways UIC, thanks to intermodal transport, external costs of transport reduce (eg accidents, air pollution, and environmental degradation). Supporters of this type of transport argue that such transport is also much cheaper. (Polish Railway Market, 2011)

The most important problem associated with the implementation of intermodal transport in Poland may be the poor condition of the rail infrastructure and years of neglect occurring in rail transport. Poland is one of the few countries in Europe where the modern railway infrastructure is almost entirely maintained from charges for access to the tracks.

A serious threat to the development of intermodal transport in Poland is a small amount of intermodal terminals and logistics centers on main lines and junctions. One major problem may be also insufficient equipment and facilities in existing terminals. There is a significant lack of modern and efficient cargo handling equipment, lack of monitoring systems and the security passage of goods. (Szepiatowska, Baran, 2012)

Other limitations in the development of intermodal transport in Poland include:

- the amount of specialized intermodal rolling stock is limited to carry trailers, interchangeable chassis or trucks,
- temporary shortages of specialized rolling stock (mainly sgs wagons with floors);
- lack of goods transit monitoring systems that would provide customers with real-time information about the status of goods shipments,
- lack of cooperation between actors in the intermodal transport market,
- lack of a uniform and comprehensive information system in the land and sea chains of intermodal transport,
- lack of adequate financial aid from the state for the development and promotion of intermodal transport, as well as the lack of legal solutions in this area,
- no system of effective protection of parcels (theft) and transport safety (damage at the valve),
- strong competition from road transport:
 - a) better transport pricing and lower infrastructure access charges,
 - b) no accompanying costs (for reloading, technical control, costs of close deliveries),
 - c) greater mobility of road transport - the possibility of combining import with export,
 - d) failure by road carriers to comply with applicable standards in the field of permissible loads for road vehicles.

4. DISCUSSION

Poland as a transit country should be a transport route traffic to both North-South and East-West. Throughout our country run almost all corridors transport. The share of intermodal transport, however, is too low compared with the potential, which has Poland.

Year after year increases in Poland, the market share of intermodal transport. While other European countries have taken us away, it is already clear that there is no other transport direction development. In the first quarter of this year, the share of intermodal transport increased by 6 percent compared to the same period in 2012.

Unfortunately, despite significant development of intermodal infrastructure in Poland, the share of intermodal transport using rail vehicle estimated based on data from the Central Statistical Office, PKP Cargo and PCC Intermodal SA data is only around 2.5-3 %. Currently, most of the container traffic from Polish seaports is realized by road (about 80 %). However, this market has great development potential, and the volume of intermodal transport can in the near future rise to the level of about 10-15%. However, further development is necessary as well as modernization of both point and linear logistics infrastructure. These changes, due to its key importance for the growth of intermodal transport should be a priority for the authorities both at national, regional and local. (Mindur, 2010)

The factors favoring the development of intermodal transport in Poland may include, among others:

- EU transport policy - focused on the of environmentally friendly modes of transport development and the reduction of environmental pollution and accidents (White Paper 2011),
- favorable position of Poland - at the crossroads of major European transport corridors (east-west: the corridor I, II and III and north-south: corridor IV)
- an increase in international trade - which generates increased demand for international transport,
- an increase in the demand for transport of highly processed products with high susceptibility to combined transport technologies,
- the provision of railway transport capacity - the prospect of the railway
- freight taking over part from road transport,
- emergence of new operators - companies that have their own fleet and that develop their own network of intermodal terminals, which will lead to improving the quality of transport services. (Instytut Badań Strukturalnych, 2008)

The volume of intermodal transport per capita in the case of Poland and the volume of intermodal transport per capita is relatively low compared to most European Union countries with an extensive railway network. The very high values of this indicator for Switzerland and Austria are the result of the strong subsidization and legislative support for the transport of transalpine semi-trailers and whole wheelsets between Switzerland and Austria and Italy. The high index for Germany results from the fact that it is a highly industrialized country with a much better developed transport network and logistic infrastructure, neighboring with very highly developed countries. It has large seaports in front of the Danish Straits, significantly increasing the costs of access to Polish ports for trans-oceanic freight, and is also located on the route of high-volume rail transit of goods from Scandinavia to other European Union countries. On the basis of the value of the index for Italy and the Netherlands, it can be assumed that skilfully supported development of intermodal rail transport in Poland in the perspective of several years may allow to increase their volume by about 50% (Antonowicz, 2018)

The main intermodal operator in Poland is a company which is part of a group Cargosped PKP Cargo SA. The company has a network of 6 Cargosped handling terminals acquired from the PKP group cargos. (Gliwice, Kobylnica, Mława, Małaszewicze , Żurawica , Warsaw - Prague). The largest terminal belonging to the company Cargosped is a terminal in Gliwice, its total area is 65 000 m² and a capacity of 1 400 TEUs.

The leader of the private intermodal operators in Poland is PCC Intermodal SA. The company specializes in the organization of intermodal transport using container in the

"door to door" system. One of the goals of PCC Intermodal is the aspiration to increase capacity on the roads, reducing long distances road transport and transferring them from road to rail. The Company has three intermodal terminals the first was opened in Kutno and it is the largest PCC Intermodal terminal, a further two terminals in Gliwice and in Brzeg Dolny. Intermodal terminals support a year from 50 000 thousand TEUs to 200 000 thousand TEUs. The important element of development, in this type of transport are reloading terminals. The way of terminals location in Europe is very uneven, the largest quantity have Germany, followed closely by Italy and France. On good position is the Czech Republic, surface attributable per one terminal is 1.23 thousand kilometers. That same ratio in Poland is 9.77 and is three times larger than Germany, Italy and France, so there is a large disparity amounts of terminals to length line railway in Poland.

It should be build new terminals and modernize existing ones, that enabling carriers greater access to the rail network. In the European Union countries with the largest network of road-rail connections and the largest number of intermodal terminals are Germany and Italy. For this reason, intermodal transport is growing faster there than in other European countries. One of the largest intermodal transport operators in Europe is the German company Kombiverkher. The company has a network of connections across Europe. Polish railways have still a lot of work to do, a low level of punctuality lowers the quality and competitiveness of the company. The main connection between the Polish and Germany is Poznan - Duisburg, trains on this connection have often delayed up to 24 hours, however, the company Kombiverkher seeing the potential for the Polish market has changed the schedule calls and joined the network traffic Warsaw and Gliwice. Reduction and spreading the relation between the merger resulted in improving punctuality of trains. Just after the German company ranks Italian company Cemat.

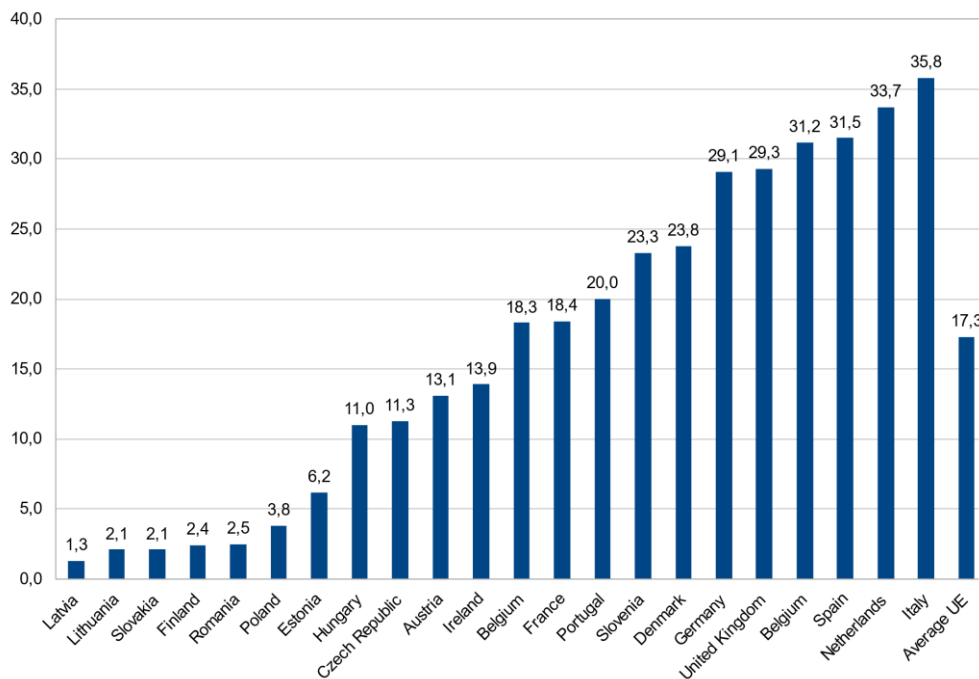


Fig. 1. Intermodal transport in the Member States of the European Union in 2010. (Source: EUROSTAT 2011)

Average Member States of the European Union amounted to 17.3% of intermodal transport in 2010. Poland fared very poorly against the background of European countries, and despite the increase in the critical year 2009 for the industry TSL in the world still ranks low. (Stokłosa, 2011)

However it should be noted, that the year by year increase in the share of intermodal transport in Poland is becoming more and more significant.

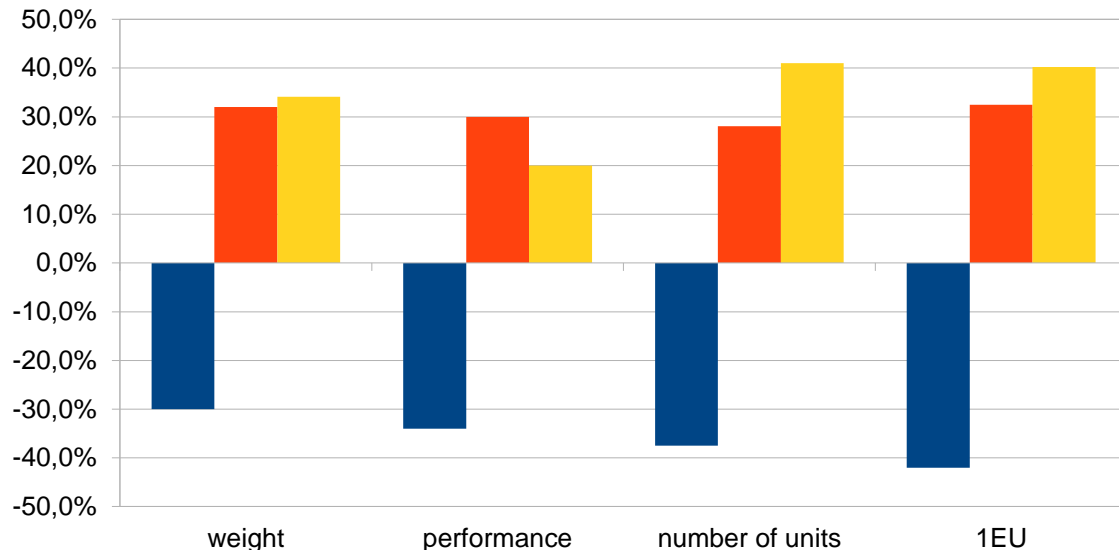


Fig. 2. Change of the intermodal transport volume in the years 2008-2011

In 2011, intermodal transport was performed by seven licenced railway undertakings, including two companies of the PKP group: PKP Cargo S.A., PKP LHS Sp. z o.o. and Lotos Kolej Sp. z o.o., DB Schenker Rail Polska S.A., CTL Express Sp. z o.o., CTL Logistics Sp. z o.o. and STK S.A. It should be pointed out that since 2007 the number of railway undertakings performing intermodal transport has not considerably changed. In 2011, railway undertakings transported the record number of unit loads, 488.9 thousand pieces in total, including 480 thousand containers, which in calculation constituted nearly 800 thousand TEU. In comparison to the previous year, number of transported units increased by 41.9%. The total weight of transported loads exceeded 5.9 mln tonnes and the transport performance was equal to 2.4 billion tonne-kilometres. Comparing the data to the results from 2010 it constituted an increase of transport by 34.1% and 29.6% accordingly. It should be underlined that this is the best outcome recorded in the Polish history of intermodal railway transport. (Dargiel, 2013)

5. CONCLUSION

Development of intermodal transport depends on the appropriate legal solutions support this technology (as in Austria and Switzerland), the appropriate amount of highly efficient intermodal terminals equipped with suprastructure, or handling equipment and systems, an adequate price for access to terminals, terminal operations prices and the prices for access to linear infrastructure. Despite the growth in the development of the intermodal market in recent years, Poland continues to diverge from the countries of Western Europe in terms of the share of intermodal rail transport in the total mass of rail transport. The current situation is, inter alia, related to the transport time and the average commercial speed of rail transport, which is a weakness of the Polish intermodal transport system. Poland strives to achieve the speed achieved by

the countries of Western Europe, inter alia, through a significant improvement as a result of the modernization of the condition of the railway infrastructure and strengthening the role of the public factor in the regulation of this segment of the transport market (Grzelakowski, 2018)

The experience of the European Union show that the government must promote intermodal transport until equalize the attractiveness of road and rail transport. We must hope that the intermodal transport in Poland will start to grow as rapidly as in the countries of "old EU ". Very good transit location of our country can be advantage. If we neglect transport to the north-south direction, you may find that the transport on the direction taken by our neighbors across the Oder River where infrastructure is developing very dynamically.

In Poland, there are several favorable conditions for the development of intermodal transport

1. The territory of Poland is a bridge between Europe and Asia, where there are long distances (over 1000 km), which are favorable for rail and combined rail-road transport.
2. Favorable forecasts for the development of our ports, which are expanding their terminal infrastructure.
3. Polish rail transport has a dense network (6.8 km / 100 km²), highly electrified (58.8%), occupying a good position on the goods market. This type of transport has great development potential
4. The distances traveled for freight journeys are quite long: in this sector 12% of national traffic travels over 350 km, while all international transport travels over average distances over 350 km. In the door-to-door international road transport sector, the average distance exceeds 950 km.
5. The area of the territory of Poland allows the profitability threshold of intermodal transport to be exceeded (the distances between the borders exceed 600 km).

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