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CARGO AND PASSENGER TRANSPORT IN POLAND

Abstract

The aim of the paper will be a presentation and assessment of the situation in the field of cargo and passenger transport in Poland. The specific objective will be to assess and identify factors that influenced changes in the transport of cargo and passengers, as well as changes in transport and logistics in Poland. An analysis of cargo transport in thousands of tons, passenger transport in thousands of passengers and transport work in millions of passenger kilometers in Poland in 2010–2017. On the basis of this data, the structure in percentages will be calculated. The data used in the analyzes will be published in the Central Statistical Office in Warsaw for the years 2010–2017.

Keywords: transport, logistics, enterprise, cargo, passengers

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Introduction

In the final part of the introduction, the research goal and general hypothesis or main and detailed hypothesis must be given. Transport of cargo and passengers in Poland is a very important economic issue. It concerns the development of the Polish economy and it is one of the most important branches of the national economy. Transportation is used to carry passengers or cargo. Depending on the environment in which the shipment takes place, land transport (including rail, road, pipeline), water (inland and sea) and air transport is distinguished. The individual regions of the country are very diverse in terms of the degree of transport development. This is due, among other things, to the uneven distribution of population, diversification in the economic development of individual regions, environmental and geographic conditions. Historical issues are also significant, which also

influenced the development of transport in Poland. In Poland, natural conditions favor the development of transport; the vast majority of the country is lowland. In addition, access to the sea is a great asset, thanks to which it is possible to make contacts by sea with other countries. The location relative to other countries is also favorable; Poland is a kind of a bridge between Germany and Russia, and more broadly between Western and Eastern Europe. It makes it a very important transit country on the communication map of the continent.

1. Methodology and theory

An analysis of cargo transport in thousands of tons, passenger transport in thousands of passengers and transport work in millions of passenger kilometers in Poland in 2010–2017 will be carried out. On the basis of this data, the structure in percentages will be calculated. The data used in the analyzes will be published in the Central Statistical Office in Warsaw for the years 2010–2017.

Transport as one of the most significant sectors of the economy, plays a dual role in it, and is both a donor and a recipient. By fulfilling its primary function – providing transport services (donor), it supports other branches of the economy. It enables the exchange of goods and services, it is a condition and also a factor determining economic growth. On the other hand, as a recipient, it benefits from the production of other sectors of the national economy, including the metal, metallurgy, woodworking industries, etc. Two branches of transport have the largest share in satisfying transport needs, both in passenger and cargo transport: Railway. Over the past five years, there has been a tendency to increase the use of road transport, as well as a systematic decline in transport by other transport modes. The development of road transport infrastructure (hereinafter also referred to as road transport), the increase in the number of vehicles traveling on the roads have a negative impact on the environment (Rydzkowski, Wojewódzka-Król, 2009). Due to the emphasis on various aspects, the literature defines the concept of transport in a variety of ways. I. Tarski emphasizes the classic role that transport plays and defines it as „the technological process of all distance transport, i.e. the movement of people or objects or energy” (Tarski, 1993). Transport is closely related to the use of specific means of transport and infrastructure, as well as to the existence of specific economic entities providing transport services and obtaining a financial result related to carrying out transport activities (Kozłak, 2008). According to J. Neider, transport is the provision of services consisting in the movement of goods or additional services directly related to this. Transport is a broad concept and involves many activities that will allow the cargo to reach its destination. It is a set of activities consisting in moving, among others material goods in space and time, using appropriate technical means (Neider, 2008). Similarly, transport is defined by M. Madeyski, E. Lissowska and J. Marzec, according to which, in the subjective aspect, transport is „technically, organisationally and economically separated from other activities, intentional movement of all loads and people” (Madeyski, Lissowska, Marzec, 1971).

One of the authors dealing with transport is I. Tokarski. He believes that transport is a technological process of all distance transport, that is, the movement of objects or

energy (Tarski, 1993). Transport is undoubtedly very important for socio-economic development. On the one hand, it enables mobility, which is extremely important for the quality of life of citizens who are able to travel freely. On the other hand, it enables economic growth and creation of new jobs. In addition, it should be emphasized that the accessibility of transport infrastructure and its appropriate capacity enable the diffusion of economic growth from strong regions to slower developing ones (Zimny, 2017). Transport also includes a number of additional activities, such as reloading, preparation of means of transport, activities related to organizing shipments. Due to the means of transport and the transport route, the following basic branches are distinguished: road transport, rail transport, sea transport, water transport – inland, air transport. Transport needs relate not only to business operations of enterprises, but also to society. The continuous growth of communication needs is connected with the huge civilization development. In addition to the growing share of individual transport, collective transport plays an important role in communication, which is characterized by a number of advantages related to costs, energy and ecology as compared to individual transport. In addition, the safety of transport by collective transport is definitely higher (Szoltysek, 2009). Transportation infrastructure is needed to provide transport services. The existence of infrastructure determines the functioning of the economy. It is a basic technical component enabling transportation in the above-mentioned transport branches (Piskozub, 1982). Before and after the transport process, activities related to the organization of carriage take place, which can be defined as auxiliary activities. The whole of the transport process and auxiliary activities is called forwarding (Pyza, Jachimowski, 2016).

2. Results

The purpose and subject of further considerations will be to analyze and evaluate cargo transport with a division of means of transport in Poland in 2010–2017. For this purpose, data on the number of transports of cargo and the percentage structure were used.

The effects of the conducted analyzes indicate that in 2010–2017 there was a significant variation in the number of transported loads in Poland (Table 1). In Poland, in 2010, 1,838,492 tons of cargo were transported, and in 2017 as much as 2,053,245 tons. It means an increase of 200,000 tons comparing 2010 to 2017. The largest increase was recorded in road transport from 1,551,841 tons of cargo in 2010 to 1,747,266 tons in 2017. This resulted from the ease of access, speed and price for transport. It was important that the growth of transported cargo by road transport was at the expense of rail transport. Railway transport in 2010 carried 216,899 tons of cargo, and in 2017 – 239,501 tons of cargo. In 2010 air transport carried 41,000 tons of cargo, and in 2017 – 53,000 tons of cargo. In 2010, sea transport carried 8,362 tons of cargo and in 2017 – only 8,254 tons. Inland waterway transport carried 5,141 tons of cargo in 2010, and in 2017 – 5,778 tons.

Table 1. Cargo transport in Poland in 2010–2017

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Transports in thousands of tons	1,838,492	1,912,172	1,844,070	1,848,348	1,839,961	1,803,818	1,836,652	2,053,245
Rail transport, including standard-gauge	216,899 216,767	248,606 248,491	230,878 230,821	232,596 232,565	227,820 227,820	224,320 224,320	222,523 222,523	239,501 239,501
Car transport including commercial economic	1,551,841	1,596,209	1,548,111	1,553,050	1,547,883	1,505,719	1,546,572	1,747,266
Pipeline transport	791,848 759,993	839,193 757,016	808,297 739,814	857,959 695,091	874,260 673,623	891,978 613,741	954,459 592,113	1,104,209 643,057
Sea transport	56,208	54,482	52,985	50,656	49,810	54,850	54,058	52,393
Inland water transport	8,362	7,737	7,476	6,965	6,781	6,963	7,248	8,254
Air transport	5,141	45	4,579	5,044	7,629	11,928	6,210	5,778
	41	41	41	37	38	38	41	53

Source: (own study based on: Cargo transportation, Statistical Yearbook of the Republic of Poland 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, GUS Warszawa, 2011 pp. 522–523, 2012 pp. 524–525, 2013 pp. 537–538, 2014 pp. 538–539, 2015 pp. 536–537, 2016 pp. 538–539, 2017 pp. 536–537, 2018 pp. 539–540)

The analyzes show that in 2010–2017 there was a significant diversification of the percentage structure of cargo transport in Poland (Table 2). The largest share in total cargo transport in Poland was in road transport. In 2010, the share of this transport in total transport was 84.4%, while in 2011 as much as 83.5%. At the end of 2017, the share of this transport was 85.1%. In 2010, the share of commercial and economic car transport was almost the same. At the end of 2017, the share of commercial car transport was higher than the economic one. Road transport is currently the most common way to transport people and goods. It includes transports: passenger cars, trucks, buses, trolleybuses. The development of car transport began in the nineteenth century with the development of a method for refining crude oil and the invention of a diesel engine. This transport is great at short and medium distances and plays a very important role in the transport of passengers and perishable goods (e.g. food). The share of rail transport in 2010 was 11.8%, until 2016 this share increased, and in 2017 it decreased. Rail transport plays a particularly important role in the long-distance transport of bulk cargoes. However, it is losing importance in the transport of passengers and general cargoes in highly developed countries, as car transport effectively competes with it. Increasingly, enterprises resigned from rail transport for the benefit of road transport, which resulted from ease of access, more favorable prices, as well as speed of delivery. The share of pipeline transport decreased from 3.1% in 2010 to 2.6% in 2017. Pipeline transport means transportation of goods through pipelines. The most frequent are liquids and gases, but there were also pneumatic tubes that can transport solids using air under pressure. In the case of gases and liquids, any chemically stable substance can be sent through the pipeline. So there are pipelines transporting sewage, water or even beer. The most important from an economic point of view are pipelines transporting crude oil and natural gas. Speaking of the transport of significant quantities of oil and gas on the surface, pipeline transport is the only economically beneficial way. Compared to railways, it has a lower cost per unit and higher capacity. Although pipelines can be built even under the sea, it is a very economically and technically demanding process, so most of the oil is transported by sea tankers. On the other hand, the share of sea transport and inland water transport in the entire analyzed period was very low and did not exceed 1.0%.

The aim and subject of the considerations will be first to analyze and assess the diversity of passenger transport in Poland in 2010–2017. For this purpose, information on the number of passenger transports and the percentage structure was used. The effects of the conducted analyzes reveal that in 2010–2017 there was a significant variation in the number of passengers carried in Poland (Table 3). At the same time, it is worth noticing that in Poland in 2010, 838,024 passengers were transported, and in 2017, only 696,178 passengers. Which means a big drop by 150,000 passengers by comparing 2010 to 2017. The largest decrease was recorded in road transport from 596,652 passengers in 2010 to 378,610 passengers in 2017. It was important that the number of passengers transported by other modes also changed in 2010–2017, but to a lesser extent. And so, rail transport in 2010 carried 261,314 passengers, and in 2017 303,001 passengers. In 2010, 4,990 passengers used air transport, and in 2017 11,846 passengers. In 2010, sea transport carried 671,000 passengers, and in 2017 1,459 passengers. On the other hand, inland water transport in 2010 amounted to 1,397 passengers, and in 2017 1,262 passengers.

Table 2. Cargo transport in Poland in 2010–2017 (in percentage)

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Transport in thousands of tons	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Rail transport, including standard-gauge	11.8	13.0	12.5	12.6	12.4	12.4	13.1	11.7
Car transport including commercial economic	84.4	83.5	84.0	84.0	84.1	83.5	78.7	85.1
Pipeline transport	3.1	2.8	2.9	2.7	2.7	3.0	5.8	2.6
Sea transport	0.4	0.4	0.4	0.4	0.4	0.4	2.1	0.4
Inland water transport	0.3	0.3	0.2	0.3	0.4	0.7	0.2	0.3
Air transport	0	0	0	0	0	0	0.1	0

Source: (own study based on: Cargo transportation, Statistical Yearbook of the Republic of Poland 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, GUS Warszawa, 2011 pp. 522–523, 2012 pp. 524–525, 2013 pp. 537–538, 2014 pp. 538–539, 2015 pp. 536–537, 2016 pp. 538–539, 2017 pp. 536–537, 2018 pp. 539–540)

The analyzes carried out show that in 2010–2017 there was a significant diversification of the percentage structure of individual modes of transport in passenger transport in Poland (Table 3). The largest share in total passenger transport in Poland was in road transport. In 2010, the share of this transport in total passenger transport amounted to 68.0%, while in 2017 only 54.4%. This means that the share of this transport decreased for rail transport, whose share in 2010 was 31.1%, and in 2017 it increased to 43.5%. More often, passengers resigned from car transport for rail transport. The share of air transport increased very slowly from 0.6% in 2010 to 1.7% in 2017. In contrast, the share of sea transport and inland water transport in 2006–2011 was very low and ranged from 0.1% to 0.3%.

Taking into account passenger-kilometers, a decrease in the length of routes of passengers carried in 2010–2017 is observed. And so, in 2010, 47,985 million passenger-kilometers were done, and in 2017 as many as 61,588 million passenger-kilometers. The largest increase was recorded in air transport from 8,273 million passenger-kilometers in 2010 to 22,169 million passenger-kilometers in 2017. The reason for this is the development of airlines and the fact that more and more people are traveling by air. In the other types of transport, the number of kilometers traveled throughout the analyzed period also changed. In rail transport, there was an increase from 17,921 million passenger-kilometers in 2010 to 20,319 million passenger-kilometers in 2017. In sea transport, there was a decrease from 168 million passenger-kilometers in 2010 to 151 million passenger-kilometers in 2017.

Table 3. Passenger transport in Poland in 2010–2017

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Transport in thousands of tons	838,024	807,141	779,797	739,556	709,698	703,742	693,826	696,178
Railway transport including standard-gauge	261,314 261,298	263,609 263,595	273,182 273,172	269,815 269,815	268,204 268,204	277,321 277,321	291,981 291,981	303,001 303,001
Car transport	596,652	534,885	497,288	459,947	431,516	416,774	390,410	378,610
Sea transport including ferries inland water transport	671 652 1,397	637 620 1,519	642 626 1,515	606 587 1,540	611 595 1,579	597 577 1,762	632 605 2,024	1,459 606 1,262
Air transport	4,990	6,491	7,170	7,648	7,788	7,288	8,779	11,846
Passenger transport (in percentage)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Railway transport including standard-gauge	31.1 31.1	32.7 32.7	35.0 35.0	36.5 36.5	37.8 37.8	39.4 39.4	42.1 42.1	43.5 43.5
Car transport	68.0	66.2	63.8	62.2	60.8	59.2	56.2	54.4
Sea transport including ferries inland water transport	0.1 0.1 0.2	0.1 0.1 0.2	0.1 0.1 0.2	0.1 0.1 0.2	0.1 0.1 0.2	0.1 0.1 0.3	0.1 0.1 0.3	0.2 0.1 0.2
Air transport	0.6	0.8	0.9	1.0	1.1	1.0	1.3	1.7

Source: (own study based on: Passenger transport, Statistical Yearbook of the Republic of Poland 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, GUS Warszawa, 2011 pp. 525, 2012 pp. 527, 2013 pp. 540, 2014 pp. 541, 2015 pp. 539, 2016 pp. 541, 2017 pp. 539, 2018 pp. 542)

When comparing the share structure with regard to passenger-kilometers, one can observe that the share of car transport was the largest. In 2010, it amounted to 45.0%, and in 2017 it decreased to 30.7%. The share of rail transport also decreased from 37.4% in 2010 to 33.0% in 2017. When analyzing the passenger transport in terms of passenger kilometers, it can be noticed that air transport had a relatively large share. In 2010, it was 17.2%, and in 2017 it increased to 36.0%. It was the result of very long routes, which cannot be done by other means of transport. The share of sea transport and inland water transport was very low. The share of these transports ranged from 0 to 0.4%.

Table 4. Passenger transport in Poland in 2010–2017

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Transport work in millions of passenger-kilometers	47,985	50,073	49,884	50,088	51,441	52,584	54,102	61,588
Railway transport	17,921	18,177	17,826	16,797	16,015	17,367	19,175	20,319
including standard-gauge	17,921	18,176	17,826	16,797	16,015	17,367	19,175	20,319
Car transport	21,600	20,651	20,012	20,039	21,449	21,570	19,168	18,931
Sea transport	168	156	158	148	148	139	143	151
including ferries	164	153	155	144	145	135	139	139
inland water transport	23	24	24	20	19	22	25	18
Air transport	8,273	11,065	11,864	13,084	13,810	13,486	15,591	22,169
Transport work (in percentage)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Railway transport	37.4	36.3	35.7	33.5	31.1	33.0	35.5	33.0
including standard-gauge	37.4	36.3	35.7	33.5	31.1	33.0	35.5	33.0
Car transport	45.0	41.3	40.1	40.0	41.8	41.0	35.4	30.7
Sea transport	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
including ferries	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3
inland water transport	0	0	0	0.1	0	0	0	0
Air transport	17.2	22.1	23.8	26.1	26.8	25.7	28.8	36.0

Source: (own study based on: Passenger transport, Statistical Yearbook of the Republic of Poland 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, GUS Warszawa, 2011 pp. 525, 2012 pp. 527, 2013 pp. 540, 2014 pp. 541, 2015 pp. 539, 2016 pp. 541, 2017 pp. 539, 2018 pp. 542)

3. Discussion

The main objective of national transport policy is to increase territorial accessibility and improve the safety of road users and the efficiency of the transport sector by creating a coherent, sustainable and user-friendly transport system in the national (local), European and global dimension. The improvement of territorial accessibility in Poland requires the integration of the main transport branches (rail, road, sea, air and inland water transport) understood as an integrated transport system. The main task of such a system is to overcome geographical barriers, so that interaction between citizens, entrepreneurs on the one hand and between

entire economies on the other may be possible. It is also a step towards better use of the economic potential of the regions. Consolidation of the entire transport system requires both a dynamic expansion of the missing elements of transport infrastructure that allow this system to be launched as soon as possible, as well as the use of modern, intelligent transport systems to improve the functioning of transport and improve the safety of traffic users. Continuous traffic monitoring and proper management are also necessary. This means limiting the growth rate of traffic and transport in some transport subsystems (e.g. individual transport in cities) as well as shortening the travel time and the division of transport tasks. The main objective of the Transport Development Strategy refers both to the creation of an integrated transport system through investments in transport infrastructure (strategic objective 1) and creation of favorable conditions for the efficient functioning of transport markets and the development of efficient transport systems (strategic objective 2). The implementation of the main transport objective in the perspective up to 2020 and beyond is associated with the implementation of five objectives specific to each of the transport modes. A specific objective 1: creation of a modern and coherent transport infrastructure. A specific objective 2: improvement of the organization and management of the transport system. A specific objective 3: improving the safety of traffic users and transported goods. A specific objective 4: limiting the negative impact of transport on the environment. A specific objective 5: building a rational model of financing infrastructure investments. The goals and directions of intervention mentioned above result both from the need to make up for the neglect of the past and to enter new technological and economic trends in Europe and the world. Currently, many areas in Poland do not yet have easy access to local centers of economic growth (in particular larger cities). They cannot, therefore, serve as a natural resource base for rapidly developing territories. As a result, there are areas of social exclusion with unused human capital resources that could be activated in a situation of good territorial accessibility. Therefore, the challenge for Poland is first of all to remove the backlog in the expansion, modernization and revitalization of transport infrastructure and infrastructure connections of the most important growth centers with areas of lower development dynamics and their inclusion in the European transport network (TEN-T). In the second period, focus should be on increasing the level of infrastructure saturation and creating an integrated transport system. Only a coherent network of highways, freeways and high-speed railways, a developed network of airports, seaports and inland waterways and public transport systems will allow for the full use of the potential hidden in the Polish economy, education, science and culture (*Strategia Rozwoju Transportu do 2020 roku – z perspektywą do 2030*, 2013).

Conclusions

Summing up the analysis of the structure of cargo transport, it should be noted that the largest role in transport in Poland in 2010-2017 was played by road transport. The amount of transported cargo as well as the length of the route increased

very dynamically at the expense of rail transport. This resulted from the ease of access, speed, as well as from the price for transport and what is important from the changing structure of the Polish economy and foreign trade. Other types of transport, similarly to railway, decreased in terms of the amount of transported cargo. However, analyzing the structure of passenger transport it should be noted that car transport had the largest role of transport in Poland in 2010–2017. However, unlike cargo transport, the share of car transport decreased in favor of rail transport. When analyzing the structure of transport in Poland, it should be stated that the most important means of transport were: railways and cars, whereas car transport played a greater role at shorter distances, while railway transport – at longer distances. The above dependence concerned both cargo and passenger transport. Car transport dominates in transport across Poland, both taking into account the quantity of transported goods and people, as well as counting revenues from the sale of transport services. In addition, car transport has several advantages: first of all, the ability to transport goods “door to door”, with different dimensions, as fast as possible. As a disadvantage, one should mention a tendency for accidents on Polish roads, high transport costs and a relatively small loading mass. Rail transport is one of the oldest means of transport, in Poland a bit neglected, currently experiencing a crisis; among the advantages should be mentioned the possibility of transporting goods with a large mass, and as a disadvantage – low speed (slow mode of transport). The attractiveness of air transport, mainly passenger transport, is increasing.

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