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Improving External and Internal Transport Accessibility in the Zachodniopomorskie Voivodship - Management Aspects and Economics

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Abstract:

Purpose: *The main aim of this article is to examine how ongoing and planned infrastructure investments in the West Pomeranian Voivodeship will improve external and internal transport accessibility in the region. Another aim is to analyze how Poland's accession to the European Union has affected the development of the province's transportation infrastructure.*
Design/Methodology/Approach: *Analysis of the level and development of transport infrastructure before and after Poland's accession to the European Union.*
Conclusions: *The results of the analysis show that ongoing and planned infrastructure investments have improved the level of internal transport accessibility in the West Pomeranian region. In addition, the analysis showed that a significant increase in transport accessibility was recorded after Poland's accession to the European Union.*
Practical Implications: *The article will find application in planning work at the regional and local levels.*
Originality/value: *The study of individual components of the region's transport infrastructure before and after Poland's accession to the European Union, together with the determination of the components with the highest growth dynamics, constitutes the originality of the scientific article.*

Keywords: *Regional policy, european integration, transportation.*

JEL codes: *R41, R42.*

Paper type: *Research article.*

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1. Introduction

The Zachodniopomorskie Voivodeship, located in northwestern Poland with centrally located main centers, i.e.. Szczecin located in the western part of the voivodeship and Koszalin located in the northeastern part of the voivodeship, is struggling to improve transport accessibility both externally (national and European) and internally (within the voivodeship). Improving the accessibility of smaller urban centers distant from major, large cities is today the primary goal to be realized in the next few years.

The realization of this goal should take into account all modes of transport, i.e. road, rail, sea water and air. Actions taken in this regard, in addition to improving the accessibility of peripheral areas to major urban centers, will affect the competitiveness of the province against other provinces in the country, increase the level of safety and quality of life of the residents of West Pomerania (Appendix No. 2 to Resolution No. XVII/214/20 of the West Pomeranian Voivodeship Assembly of June 24, 2020.

Regional Office for Spatial Management of the West Pomeranian Voivodeship in Szczecin, Plan of Spatial Management Spatial Management of the West Pomeranian Voivodeship Volume II Objectives and Directions of Shaping the Spatial Policy of the Voivodeship , hereafter referred to as PZPWZ).

The article analyzes statistical data on transportation in the West Pomeranian Voivodeship in 2004 (before Poland's accession to the European Union) and 2022 (after Poland's accession to the European Union). In addition, key infrastructure investments were discussed, the implementation of which will enable the achievement of the goal, i.e. improving external and internal transport accessibility in the West Pomeranian Voivodeship . In addition, the managerial and economic aspects of the implementation of the aforementioned public objective are presented.

2. Literature Review

2.1 Infrastructure Theory in a Regional Setting

The term infrastructure in semantic terms (Latin infra and structura) means as much as the basis of a system or structure, a particular overarching system. [2] Further, it can be pointed out that infrastructure is a set of institutions or facilities that enable the functioning of some system.[3] An important role is played by infrastructure in relation to the economy and the provision of an adequate standard of living regionally. The

[2]*K. Kuciński, Economic Geography. Zarys teoretyczny, Szkoła Główna Handlowa, Warszawa 1994, p. 155.*
[3]*M. Ratajczak, Infrastructure in the market economy, Academy of Economics in Poznań, Poznań 1999, p. 11.*

literature distinguishes two types of infrastructure - economic and social. With regard to the economic view, it should be pointed out that it refers to the proper functioning of the economy. Accordingly, it includes communications, energy, environmental protection and water management.[4]

However, for the purpose of this article, it is necessary to refer to transportation infrastructure. This is an important issue in national and regional terms. In its scope it includes, among other things, road infrastructure, railroads, airports, seaports or transshipment ports.[5]

2.2 Importance of Transport Infrastructure Development in Regional Policy

The level of development of transport infrastructure will determine the competitiveness of a region. Inadequate transporot infrastructure will negatively affect not only society, but also the functioning of already existing businesses and decisions to create new economic entities. It is natural that regions with good access to road infrastructure develop much better and more efficiently than those that do not have such infrastructure. The role of transportation in economic development is a much talked about topic in recent times.[6]

Literature as well as studies clearly indicate that investments made in the development of transportation infrastructure result in better transportation accessibility and consequently have a positive impact on the development of the economy.[7]

Infrastructure development can be understood through the construction of new expressways, highways or the creation of new railroads for quick access to airports. It's also road renovations that strengthen already existing road infrastructure. On the other hand, it can be investments directed at more efficient use of already existing infrastructure by introducing a more effective management system and optimizing it.[8]

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[4]*K. Kuciński, Economic Geography. Zarys teoretyczny, Szkoła Główna Handlowa, Warszawa 1994, p. 155.*

[5]*L. Kukiełka, D. Wozniak, (2011). Some aspects of transport logistics. Institute of Science and Publishing "SPATIUM" Ltd.*

[6]*D. Biehl, The role of infrastructure in regional development, r.w. Vickerman (ed.), Infrastructure and Regional Development, european research in regional science 1, London 1991*

[7]*A. Koźlak, B. Pawłowska, Improvements in transport infrastructure accessibility as important factor of regional development in Poland, networks for mobility, the 4th international symposium, proceedings, abstracts and cD-rom, ed. by u. martin et al., universität stuttgart, stuttgart 2008.*

[8]*Decoupling Transport Impacts and Economic Growth, oecD, enV/epoc/wpnep/t(2003)4.*

The above will enable better trade, affect the region's competitiveness and eliminate inequalities with other regions.[9]

3. Statistical Data on Transportation in the West Pomeranian Region in 2004 and 2022

Between 2004 and 2022, 1255.3 kilometers of hard-surfaced roads, 55 kilometers of national roads, 1200.3 kilometers of local government roads, 280.8 kilometers of new expressways and 6.8 kilometers of highways were added.

The length of the rail network has decreased by 6 km over 18 years. However, the length of railroad lines per 100 km2 remained unchanged at 5.1 km. There was an increase of 10 km of electrified lines compared to 2004. In addition, in 2022, there was a decrease of 56 km in the length of single-track lines, resulting in an increase of 48 km of two-track or more lines.

Table 1. *Road Transport in 2004 and 2022*

	2004 r.	2022 r.
Hard-surfaced roads	13026 km	14281.3 km,
National roads	1106 km	1161.0 km
Local government roads	11920 km	13120.3 km
Expressways	28.2 km	309 km
Highways	21.6 km	28.4 km

Source: *Own compilation based on data from the Statistical Office in Szczecin - Transport in the West Pomeranian Voivodeship in 2022, the Statistical Yearbook of the West Pomeranian Voivodeship in 2004 and the website eregion.wzp.pl*

Table 2. *Rail transport in 2004 and 2022*

	2004 r.	2022 r.
Length of railroad network	1177 km	1171.0 km
Number of km of railroad lines per 100 km2	5.1 km	5.1 km
Electrified lines	739 km	749 km
Single-track lines	763 km	709 km
Two and more track lines	414 km	462 km

Source: *Own compilation based on data from the Statistical Office in Szczecin - Transport in the West Pomeranian Voivodeship in 2022 and the Statistical Yearbook of the West Pomeranian Voivodeship in 2004.*

A total of 4101 takeoffs and landings were made in air services in 2004, that's 319 more takeoffs and landings than in 2022. In addition, there were 784 more domestic

[9] *A. Koźlak 2009, Problematics of Transport Infrastructure Development in Polish Regional Policy, Wrocław.*

air flights in 2004 than in 2022. However, the higher number of takeoffs and landings and domestic flights did not translate into more passengers. In 2022, 323,697 more of them checked in than in 2004.

Table 3. *Air transport in 2004 and 2022*

	2004 r.	2022 r.
Number of takeoffs and landings	4101	3782
Number of domestic air flights	3028	2244
Number of passengers	96208	419905

Source: *Own compilation based on data from the Statistical Office in Szczecin - Transport in the West Pomeranian Voivodeship in 2022 and the airport.com.pl website.*

Table 4. *Maritime transport in 2004 and 2022*

	2004 r.	2022 r.
Number of maritime transport fleet	29 ships	66 ships
Total Carrying Capacity of the Transport Fleet	676 thousand t	2232.8 thousand tons
Number of ships flying the Polish flag	5 pcs.	7 pcs.
Number of passengers transported in international communication by sea transport fleet	626059 people	924200 people

Source: *Own compilation based on data from the Statistical Office in Szczecin - Transport in the West Pomeranian Voivodeship in 2022 and the Statistical Yearbook of the West Pomeranian Voivodeship in 2004.*

In 2022, there was a mean increase in the number of marine transport fleet compared to 2004, i.e. by 37 units. This also resulted in an increase in the carrying capacity of the transport fleet by 1,556.8 thousand tons. However, the number of vessels flying the Polish flag increased by only 2 units, from 5 units in 2004, to 7 units in 2022. Compared to 2004, the number of passengers transported in international communication by the maritime transport fleet increased significantly, i.e. by 298141 more passengers.

Table 5. *Seaports in 2004 and 2022*

	2004 r.	2022 r.
Cargo turnover	22031.1 thousand tons	32700 thousand t
Domestic maritime trade	540.9 thousand tons	2908.4 thousand tons
International maritime trade	21490.2 thousand tons	29775.1 thousand tons

Source: *Own compilation based on data from the Statistical Office in Szczecin - Transport in the West Pomeranian Voivodeship in 2022 and the Statistical Yearbook of the West Pomeranian Voivodeship in 2004.*

The last 18 years have also been a time of development for seaports in the West Pomeranian region. Cargo turnover in 2022 was recorded at 32700 thousand tons, which was 10668.9 thousand tons more than in 2004. In addition, domestic maritime

turnover in 2022 increased by 2367 thousand tons compared to 2004. International maritime turnover, on the other hand, increased in the same period, by as much as 8284.9 thousand tons.

4. Infrastructure Investments of Supra-Local Importance

Pursuant to Article 39(3) of the Law on Spatial Planning and Development of March 27, 2003, "The provincial spatial development plan takes into account the findings of the provincial development strategy and the recommendations and conclusions of the landscape audit, and specifies in particular 3) the location of public purpose investments of supra-local importance."

In addition, according to Article 39(5), "The provincial spatial development plan shall include those investments of public purpose of supra-local importance, referred to in paragraph 3(3), which have been established in documents adopted by the Sejm of the Republic of Poland, the Council of Ministers, the government plenipotentiary established by law, the competent minister or the provincial assembly, in accordance with their jurisdiction."

With this in mind, the Spatial Policy of the province identifies the following public purpose investments of supra-local importance (government tasks).

The implementation of strategic investments, especially road investments (as described in Table 6 in the Appendix), will make it possible to achieve the goal of improving external transport accessibility in the West Pomeranian region. To confirm this, below I will indicate investments that will help achieve these two goals of both internal and external accessibility.

The S3 road under construction will enable efficient transit on the Szczecin-Swinoujscie route, moreover, the S3 expressway should be viewed more broadly, as one that is a key transportation corridor opening Polish ports to Central and Southern Europe.

And the S6 expressway will connect the largest cities in northern Poland: Szczecin, Koszalin, Slupsk, Gdynia and Gdansk, from the A6 highway near Kolbaskowo to the beginning of the A1 in Rusocin, and will be nearly 400 kilometers long. (https://www.gov.pl/web/gddkia/drogi-ekspresowe-s3-i-s6--stan-realizacji, accessed 29.11.2024).

The S10 expressway, about 410 km long, will connect Szczecin via Pila, Bydgoszcz and Toruń with the Warsaw agglomeration. In the West Pomeranian Voivodeship, sections of the S10 expressway will be implemented from Szczecin to Pila. Contracts for the investment have now been concluded, and the entities that won the tenders are at the stage of preparing technical documentation.

The sections in the West Pomeranian Voivodeship should be completed by 2028, while the entire route from Szczecin to Warsaw should be completed by 2030 (https://www.gov.pl/web/gddkia-szczecin/podpisalismy-umowe-na-pierwsze-odcinki-drogi-ekspresowej-s10-szczecin-pila, accessed).

The S11 expressway will be more than 580 km, and together with the joint course of the S6 from Kolobrzeg to Koszalin (about 35.5 km), nearly 620 km. Currently, drivers have at their disposal more than 150 km (including the joint run of S6 and S11), from Kolobrzeg to Bobolice, a bypass of Szczecinek, sections near Poznan and four bypasses: of Jarocin, Ostrów Wielkopolski, Kępno and Olesno.

The road will be a major transportation support in the West Pomeranian region. In addition, it will connect northern and southern areas.
(https://www.gov.pl/web/gddkia/drogi-ekspresowe-s10-i-s11--stan-realizacji).

In addition, the Program for the construction of 100 bypasses for 2020 - 2030 is currently being implemented. In the West Pomeranian region, 9 investments will be made in: Człopa, Gryfino, Kołbaskowo, Rusinowo, Stargard, Szczecinek, Sweden, Wałcz and Strącznie, as well as in Złocieńc. This will improve the safety of residents in the indicated locations, relieve the traffic system and increase capacity. (https://www.gov.pl/web/infrastruktura/wojewodztwo-zachodniopomorskie).

What is more, the implementation of a number of railroad investments and rolling stock replacements mentioned in the table above will contribute to improving accessibility both internally in the province and externally in interregional and trans-European relations.

The above-mentioned investments are only part of the tasks that are already underway or planned. Currently, Western Pomerania is the largest construction site in Poland. It is in the West Pomeranian region that the largest investments in the country are being implemented or planned.

The investments that have been put into operation confirm that with the development of transport infrastructure, transport accessibility in the region is improving. And at the same time, given the list of ongoing and planned investments mentioned in the table above, one can be sure that their implementation will contribute to a significant improvement in the region's accessibility compared to other regions in Poland.

5. Impact of Transport Infrastructure on the Growth of the Economy in the Province

In assessing the impact of transportation infrastructure on the growth of the region's economy, it is essential to determine the transportation accessibility in the region and to determine its level. In this case, it will be necessary to juxtapose two components - time and cost. Namely, transport accessibility will be higher if it takes less time and

financial resources to cover the most frequently used route. Good accessibility of transport infrastructure will protect a region from being perceived as peripheral, and this in turn will be an incentive for business to invest in the area, which will subsequently affect the development of the region (J. Burniewicz, Modern transport infrastructure as a basic element of intensification of development processes in drafted strategic documents, expert opinion prepared for the Ministry of Regional Development, Warsaw 2010, pp. 26-27).

In addition, Anna Tomczyk, in an article titled "The importance of transport infrastructure for Poland's economic growth" pointed out that "Transport is understood as a production process, the purpose of which is to overcome space.

Among the functions it performs in the economy, we can distinguish, among others, the consumption function, meaning the satisfaction of transport needs; the production function, meaning the satisfaction of transport needs by creating the conditions for economic activity, its stimulation and influence on the functioning of the market; and the integration function, which enables the integration of the state and society."

6. Impact of Transport Management on the Efficiency of Transport Operations Handled

To be effective, transportation in the region must be consistent with the regional transportation system, as well as the national and trans-European systems. In addition, it should allow more efficient connections to major urban centers or economic entities important from the perspective of the region. In addition, it is necessary to improve communication between tourist destinations, which generate a higher concentration of population than other locations in the region.

Still in many regions in Poland, internal and external transport accessibility is at an unsatisfactory level and does not meet the real needs of the local community. In most cases, this is due to the lack of efficient transport infrastructure (dilapidated road pavement, obstructed road drains, damaged bridge structures, etc.), as well as poor and inefficient management in the field of transport infrastructure (Kamil Zieliński University of Economics in Wroclaw, Transport management in the region - regional transport system, 2010).

Hence, a major management challenge faces local government officials, under whose supervision 91.9% of all roads in the West Pomeranian Voivodeship remain.

7. Conclusion

This article has proven that the implementation of the infrastructure investments described in the Table 6 in the Appendix will make it possible to achieve the main aim of this article, i.e., improving internal transport accessibility in the West

Pomeranian region. The investments already underway and those planned will certainly improve accessibility to the largest urban centers in the province, i.e., Szczecin, Koszalin and Kolobrzeg. And also to the smaller ones, i.e. Stargard, Szczecinek, Swinoujscie and Walcz (Regional Transport Plan of the Western Pomeranian Voivodeship until 2030).

Improved transportation accessibility will provide access to a wider labor market, easier access to suppliers and customers, and greater market reach. All of this will contribute to the development of existing businesses, while also spurring decisions to create new businesses.

In addition, analyzing transport statistics in the West Pomeranian Voivodeship in the years 2004 and 2022, i.e., before and after Poland's accession to the European Union, it was shown that significant development of transport infrastructure took place precisely after Poland's accession to the European community.

This was possible thanks to the European funds obtained, especially in the years 2014-2020, i.e., the amount of 82.5 billion euros. At that time, Poland was the largest beneficiary of EU aid among all EU member states.

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Improve external and internal transport accessibility and efficiency of the transport system	
Lp.	**Project name**
1.	Construction of S3 Szczecin - Swinoujscie, including: Construction of the S3 road on the section Troszyn- -Swinoujscie Construction of the S3 Miękowo-End of Brzozow bypass road along with the expansion of the Miękowo-Rzęśnica, Brzozowo-Rurka, Rurka-Rzęśnica sections
2.	S6 Koszalin-Słupsk
3.	S10 Szczecin-Piła
4.	S3/A6 on the section Kijewo junction - Rzesnica junction
5.	S3 on the section Miękowo-end of Brzozów bypass, together with the extension of the section Miękowo-Rzęśnica
6.	S11 Szczecinek-Piła
7.	S11 Koszalin-Szczecinek: section Koszalin Zachód-Bobolice Junction, section Bobolice-Szczecinek
8.	Construction of a western road bypass of Szczecin with the Police-Swięta tunnel crossing in the course of road No. 6, along the new track from Goleniów to Kołbaskowo
9.	Improving the transport link between the islands of Usedom and Wolin
10.	Construction of the Walcz bypass along the S10 national road
11.	Construction of the second carriageway of the bypass of Kobylanka, Morzyczyn, Zieleniewo in the course of the national road S10
12.	Construction of the bypass of Przecław and Warzymice (along national road No. 13 on the section Haken traffic circle in Szczecin - Kołbaskowo interchange - Kołbaskowo bypass)
13.	Elimination of "bottlenecks" on national roads through construction of bypasses of Gryfino (DK No. 31), Mysliborz (DK No. 23/26) and Węgorzyn (DK No. 20)
14.	Modernization of railroad line No. 273 on the section Głogów - Zielona Góra - Rzepin - Dolna Odra, together with connecting lines No. 821 and 822
15.	Reconstruction of the Szczecin Dabie-Szczecin Główny railroad line
16.	Modernization and electrification of railroad line No. 402 (Goleniow-Koszalin)
17.	Restoration of the Kamień Pomorski-Trzebiatów coastal connection (in a new route - close to the coastline)
18.	Modernization of the E 59 railroad line on the section Poznań Główny-Szczecin Dąbie
19.	Modernization of railroad lines No. 408 and 409 Szczecin Main-State border (Tantow)
20.	Revitalization of railroad line No. 405 section Szczecinek - province border
21.	Improving the technical condition of travel service infrastructure (including adaptation to the requirements of TSI PRM), stage I - Szczecin
22.	Modernization of the Swinoujscie-Szczecin waterway to a depth of 12.5m
23.	Implementation of the RIS (River Information System) of the Lower Oder River.
24.	Modernization works on the Oder River border to provide winter icebreaking
25.	Improving the flow of winter flood waters from Lake Dabie
26.	Repair and modernization (elimination of limiting places) of regulatory buildings on the border Oder River In the long term: Adaptation of the Oder Waterway to the parameters of Class Va

27.	Construction of berthing mooring infrastructure on the Lower and Border Oder and new signage for the shipping lane
28.	Improving rail access to seaports in Szczecin and Swinoujscie
29.	Expansion and modernization of technical infrastructure in the ports of Szczecin and Swinoujscie
30.	Expansion of the infrastructure of the Szczecin-Swinoujscie port complex
31.	Improving access to the port of Szczecin in the area of the Debicki Canal
32.	Improving access to the port of Szczecin in the Kashubian Basin area
33.	Expansion of port infrastructure in the Debica Canal in the port of Szczecin
34.	Modernization of road access to the Port of Szczecin: reconstruction of the traffic system in the area of Międzyodrze
35.	Construction of port infrastructure in the Upper Silesian Basin in the port of Szczecin
36.	Adaptation of the infrastructure of the Swinoujscie Ferry Terminal to handle intermodal transport
37.	Construction of a deep-water wharf in the outer port of Swinoujscie
38.	Efficient and environmentally friendly access to the infrastructure of the Port of Swinoujscie - phase I
39.	Expansion of the marine terminal - improvement of access to the terminal from the land side and construction of wharves in Police
40.	Expansion of the barge terminal - widening of the access track and construction of wharves
41.	Improving accessibility to the port of Kolobrzeg from the land side. Stage III
42.	Passenger terminal - modernization of the ferry approach at the Ro-Ro quay
43.	Efficient and environmentally friendly access to the infrastructure of the Port of Swinoujscie - phase II
44.	Reconstruction of the entrance to the Port of Darlowo
45.	Reconstruction of existing wharves, construction of a heavy type wharf along with an access road for port needs marine in Darlowo
46.	Construction of a Refining Wharf for the service of commercial vessels in the Port of Darlowo
47.	Dredging of the Klucz-Ustowo Crossing