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Planning the development of inland shipping in the seaport-hinterland transport: A case study of the Oder River in Poland

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Abstract
The need to prioritize activities aimed at increasing the use of inland waterway transport to support seaports and their staging is of primary importance for ports that have natural conditions (direct access to inland routes), but do not meet the basic requirements for their development (access to high-quality inland waterway connections). Due to the cost- and time-consuming nature of many of the recommended activities, it is crucial to properly plan internal and external measures by placing them on a timeline and assigning responsibility for their implementation to various stakeholders, including port authorities and waterway managers. Revitalizing the linear waterway infrastructure of these ports will be of paramount importance.

Introduction

As landlords, seaport authorities play a major role in creating a competitive position by managing seaport infrastructure and implementing seaport policies to improve access to the port from the foreland and hinterland (Slack, 1993; Heaver, 1995; Van Der Horst & De Langen, 2008; Kotowska & Pluciński, 2011). Port authorities can enact appropriate policies to change the hinterland transport structure to make it more environmentally-friendly (Haezendonck et. al., 2000; De Langen, 2007, Di Vaio & Varriale 2018; Di Vaio, Varriale & Alvino, 2018), thus decreasing the need for external transport, especially by road (Bergqvist et al., 2015; Wiercx, van Kalmthout & Wiegmans, 2019). One way to achieve this goal is to increase the share of inland shipping via seaport-hinterland transport, but it is necessary to take a number of investment and non-investment measures which must implemented in an appropriate sequence. This applies in particular to seaports connected with their hinterland via a system of inland waterways that have low technical parameters, and upgrading these is both time- and capital-consuming.

This is exemplified by the Szczecin-Świnoujście port complex that has access to the Oder Waterway (OW), the only navigable river in Poland. Nevertheless, only 4% of the Oder Waterway serving the hinterland transport of the Szczecin-Świnoujście port complex is navigable. Due to many years of underinvestment, the OW has poor linear infrastructure, which has rendered the Oder River a waterway of only local significance. Regular inland shipping operations to/from the Szczecin-Świnoujście port complex occur only on the Szczecin-Berlin route via the Oder-Havel waterway which meets the minimum technical requirements and is a class III waterway over its entire length. However, recent years have seen significant changes in the transport policy

of the Republic of Poland, and more attention has been paid to upgrade the waterways and adapt them to meet the requirements of international waterways (European Agreement on Main Inland Waterways of International Importance; **A**ccord Européen Sur Les **G**randes Voies **N**avigables – AGN). At the same time, the investment measures to make the OW navigable are of the highest priority (Ministry of Maritime Economy and Inland Navigation, 2016) and are designed to upgrade this waterway to class Va (which permits the operation of push barges of up to 3k tonnes). The scale of planned investment measures aimed at reaching the desired waterway class is considerable, both in terms of costs and implementation time. In 2015, the Szczecin and Świnoujście Seaports Authority performed a detailed study aimed at, among other things, specifying the nature of measures necessary to increase the portion of hinterland transport that occurs via inland shipping. However, no timescale for those measures was specified.

The purpose of this article is to assess the progress of implementing the measures planned by the Port Authority in 2015 and to develop a concept to phase them in, taking into account the entities responsible for their implementation.

The literature review

Inland waterway transport a transport mode that is minimally detrimental to the natural environment (Frémont & Franc, 2010; Brons & Christidis, 2012; Jaimurzina & Wilmsmeier, 2016). In terms of costs, inland shipping may also be competitive to alternative modes of seaport-hinterland transport (Konings, Kreutzberger & Maraš, 2013). However, even with lower transport costs, if deliveries are not reliable and on-time, shippers will not be convinced to make a modal shift to this transport mode. The survey performed by Kotowska et al. (Kotowska, Mańkowska & Pluciński, 2018a) among selected actors of land-sea transport chains, including the Szczecin-Świnoujście seaport complex (shippers, forwarders, stevedores, port authorities, intermodal carriers, mines, and river shipyards) showed that reliable delivery is the most important condition for making a modal shift between competitive transport modes. Access to high-quality inland waterway connections with the seaports is necessary for inland shipping to meet shippers' expectations and preferences and ensures transport competitiveness.

Ensuring reliable delivery by having high-quality inland waterway connections with the seaports is a necessary – but not the only – condition for a modal shift from road and rail transport to inland shipping. Studies have shown that a significant factor for improving the competitiveness of inland shipping to serve seaport hinterlands is an appropriate policy among port authorities and other stakeholders (Mihic, Golusin & Mihajlovic, 2011; Maraš, 2016). Kotowska et al. (Kotowska, Mańkowska & Pluciński, 2018b) performed a study based on Multiple Case Study Design which covered four seaports (Antwerp, Rotterdam, Hamburg, and Marseilles – Fos-sur-Mer port complex). Their results identified measures necessary to streamline inland shipping in the hinterland, which included both external and internal initiatives. In addition to improving the quality of inland waterways, the most common external actions included initiatives that improved the quality of shipping connections with the hinterland. Internal initiatives were focused on improving the port infrastructure for handling barges and on implementing an appropriate information policy. The research studies were based on the experiences of Western European ports which primarily used inland shipping to transport to their hinterland and which had high-quality inland waterway infrastructure, thus meeting the reliability of delivery desired by cargo shippers. However, none of these studies hierarchized the measures or phased them in over time in situations when this necessary condition was not met, which is the goal of this study.

Methodology

The object of the study was to specify the hierarchy of measures aimed at increasing the share of inland shipping in hinterland transport, using Polish seaports as a single case study (Gillham, 2000; Yin, 2003; Hartley, 2004). Since the focus was on a single case study, it was possible to gain a deep insight into the interdependencies between measures taken by various entities/stakeholders (port authorities, port operating companies, and state and local authorities) and the impact of such measures on increasing the share of inland shipping in seaport-hinterland transport (Dyer, Wilkins & Eisenhardt, 1991). The analysis covered measures which were commenced or completed from 2015–2018.

At the first stage, the following three research questions were formulated:

1. How is the implemented program expected to increase the share of inland shipping in hinterland transport to/from Polish seaports?
2. Which measures are being taken up and by whom, and which measures have not yet been implemented?

3. What does implementing the measures depend on? How should the measures be scheduled?

Based on the questions, the following proposal was stated: The measures aimed at increasing the share of inland shipping in seaport-hinterland transport are systemic in nature and must be implemented in a coordinated fashion by many entities/ stakeholders.

Another stage of the study was specifying the *unit of analysis*. In Poland, there are four seaports of primary significance for the national economy, managed by three Port Authorities. Three of them (Szczecin, Świnoujście and Gdańsk) have access to international inland waterways covered by AGN: Szczecin and Świnoujście to E30, and Gdańsk to E40. Due to the navigation parameters and the volume of inland waterway transport, the object of the case study was the Oder Waterway and the Szczecin and Świnoujście ports located in its lower reaches. Moreover, the Szczecin and Świnoujście Seaports Authority was the only entity who developed a program to make use of inland waterway transport to serve the Szczecin-Świnoujście port complex (Pluciński, 2016). In the research part of this study, a detailed analysis was performed on the measures taken by both the Szczecin and Świnoujście Seaports Authority and other port stakeholders, as well as the measures taken at the national and regional levels.

The data sources applied in the study included informational materials obtained from the Szczecin & Świnoujście Seaports Authority, the government's strategic documents, and press releases. Some information was obtained during direct, unstructured interviews held with representatives of the Szczecin and Świnoujście Seaports Authority and other port stakeholders. Analysing the gathered research materials made it possible to identify and evaluate the extent to which the said measures have been implemented, as well as their effect on increasing the share of inland shipping in hinterland transport.

In terms of the causal agent, the measures aimed at increasing the share of inland shipping in the hinterland transport to/from the Szczecin and Świnoujście seaports can be divided into external and internal measures. External measures are taken by the national government, self-governments, private port owners, and by inland transshipment facilities. Internal measures, in turn, are implemented within the Szczecin-Świnoujście port complex area by the Port Authority and the port operating companies, primarily the stevedoring companies. Since only a short period of time has elapsed (November 2015 – February 2019) since the said measures were formulated in the strategic documents, external measures have seen the most progress.

Identification and evaluation of measures aimed at increasing the share of inland shipping in hinterland transport to/from the seaports of Szczecin and Świnoujście

External measures

External measures aimed at increasing the share of inland shipping in hinterland transport to/from the said seaports primarily include infrastructural investments and market-related measures which aim to provide a competitive offer of transport services and to promote inland shipping. Table 1 details these measures and shows their implementation progress, and additionally specifies which projects are still at the conceptual design stage.

As for obtaining navigability class III parameters, investments in the area of the free-flowing Oder and the border section of the Oder are still in the design coordination and environmental approvals stage. Restoring the parameters of navigability class III is underway on the Gliwice Canal and on the canalised Oder. Construction of a new boat lift in Niederfinow is underway. To improve the accessibility of the Szczecin and Świnoujście ports, it is also necessary to increase the vertical clearances on the Oder, which will enable carriage of containers in 2 layers. The bridge in Szczecin Podjuchy (a fixed clearance of 6.20 m), the road bridge in 2.45 km of the Warta river (clearance of 5.25 m), and the railway bridge in Kostrzyn on the Oder are planned to be modernized. In 2018, the barrage in Malczyce was commissioned, and work has begun to construct barrages in Lubiąż and Ścinawa, which are expected to be completed by 2030. The Racibórz Reservoir is to be completed in June 2020 as a dry flood control reservoir which may be converted into a water storage reservoir. Measures aimed at providing the OW with international waterway parameters (*inter alia*, waterway class IV) are still at the conceptual design stage, and demand research studies have been completed (E&Y, 2019). The implementation of a project aimed at developing a concept for upgrading a section of the canalised OW and barrages on the free-flowing Oder to obtain a class Va waterway began in 2018. The Szczecin and Świnoujście Seaports Authority has also established the OW Office which is responsible for preparing a technical concept for the OW modification. Conceptual design works regarding the construction of the Oder-Danube Canal are underway, and were

Table 1. Characteristics and implementation progress of external measures

Areas of measures	Specific measures	Stage of completion of specific activities
Upgrading the OW	Adapting the OW infrastructure to navigability class III	**underway:** – Free-flowing Oder, border section of the Oder – design coordination and environmental approvals, to be completed by 2022 – Gliwice Canal – underway, to be completed in 2019–2021 – Canalised Oder – underway, to be completed in 2020–2023 – Upgrading the locks: 2 of them (Kłodnica & Rudziniec) have been completed, the remaining 8 locks are underway, to be completed in 2019–2022 – Upgrading and construction of weirs – underway, to be completed in 2020–2023 – Upgrading the barrages – underway, to be completed in 2020–2021
	Alteration/ construction of bridges	**underway:** – New Szczecin Podjuchy railway bridge – to be completed in 2020–2022 – Bridge in Kostrzyn on the Warta river – to be completed in 2020–2021, – Railway bridge on the border in Kostrzyn – the letter of intention has been signed
	Construction/ upgrading the ports/ transshipping facilities on the Oder	**underway:** – Kędzierzyn-Koźle – Opole (2018–2019) – Lower Oder, Szczecin Pomorzany (2018–2019)
	Completing the construction of the boat lift in Niederfinow	– Underway, to be completed in 2019
	Adapting the OW infrastructure to navigability class IV	**underway:** – Analysis of the demand – completed (2018–2019) – Cost-Benefit Analysis – underway, to be completed in 2019 – Activity of the OW Office – Commissioning the barrage in Malczyce (2018), tenders for the construction of barrages in Lubiąż and Ścinawa (2018–2019)
	Construction of the Oder-Danube Canal*	**underway:** – Construction included in the demand research study, Cost-Benefit Analysis and technical concepts – The Czech feasibility study for the Danube-Oder-Elbe (2018)
	Changing the function of the Racibórz Reservoir	**underway:** – Dry flood control reservoir; can be changed into a water storage reservoir in the future
	Construction of the Silesian Canal*	**underway:** – Construction included in the demand research study; cost-benefit analysis and technical concepts – Preliminary concepts of the canal route
	Further extension of RIS and its integration with VTS	**underway:** – Extension up to 250 km, underway, to be completed in 2021
Measures to restore confidence in inland shipping	Organising the Oder cluster	**completed** – establishing the "Odrą w Świat" Association
	Attracting new cargo shippers to the OW Corridor area	– **uncompleted:** lack of new cargo shippers
Measures to increase the supply of transport services	Changes in the area of the Inland Navigation Fund activity	**completed** – amending the Act on the Inland Navigation Fund (promotion)
	Establishing an incentive system for young people to increase the human resources base for inland shipping	**underway:** – Information measures – Establishing the Technical Secondary School of Inland Navigation in Wrocław
Measures to increase the demand – organising inland shipping operations	Establishing a comprehensive offer of cost-competitive transport services	**uncompleted**
	Starting cooperation with inland ports on the OW	**uncompleted**
	Moving border clearance to inland ports	**uncompleted**
Measures to create inland shipping development policies	Placing a representative of Szczecin and Świnoujście Seaports Authority in the Council of Inland Navigation Promotion	**uncompleted**
	Appraising legal acts on the European, national, regional and local level	**completed**
	Including OW to the transport corridor network	**completed** – including the Szczecin-Berlin connection in the North Sea-Baltic corridor

* Following in-depth analyses

included in the major conceptual documents drawn up in 2018–2019 regarding the OW. At the end of 2018, a Czech feasibility study for the lower Oder was drawn up. As for the Silesian Canal, an additional analysis of archival materials was performed, and preliminary versions of its route were prepared. Also, investment projects near inland ports began. The project to upgrade the Kędzierzyn-Koźle inland port is at the most advanced stage of implementation. Thirty percent of the fuel terminal has been completed, but the container terminal and dry bulk cargo terminal are still at the design stage. However, railway access to the port is still an unsolved problem. In 2018, Polska Grupa Energetyczna, a Polish power company, generated conceptual designs for the construction of a transshipment facility in the power station in Opole, Dolna Odra, Szczecin Pomorzany, and in an intermodal terminal in Opole. Infrastructural upgrades of the waterway are ongoing, and 250 km of the OW will be covered by the EU RIS system by the end of 2020, which currently covers 100 km of the OW.

In order to intensify the cooperation between the barge operators and ports, the "Odrą w Świat" Association was established in 2016, at the request of representatives of the port industry and academics from Szczecin. The new Act on the Inland Navigation Fund and the Reserve Fund included provisions to make it possible to spend the Fund's money on promotional activities. Due to the current level of the OW navigability, there are no comprehensive cost-competitive transport services in place, and border clearance is not available at inland ports. Consequently, new cargo shippers are not attracted to the area near the river route. However, land was purchased to construct a fuel terminal in the Szczecin port by the investors responsible for reconstructing the inland port in Kędzierzyn-Koźle. Also, no incentive system has been developed to encourage young people to work in inland navigation. Nevertheless, promotional activities are run as part of the cooperation between upper secondary schools with tertiary educational institutions and the state administration, discussion panels at conferences, and TV programs. In 2018, the Technical Secondary School of Inland Navigation in Wrocław resumed its operation.

No representative of the Szczecin and Świnoujście Seaports Authority became a member of the Council of Inland Navigation Promotion, at the Ministry responsible for the maritime economy. Still, the activities of the Seaport Authority can be noticed in other areas of inland shipping promotion. At an international level, this is connected with the membership of the Szczecin and Świnoujście Seaports Authority in the European Federation of Inland Ports (EFIP). The Szczecin and Świnoujście Seaports Authority is also a supportive partner of the "Odrą w Świat" Association and participates in business-related debates and conferences on inland waterway transport organized in Poland (e.g., the UNESCO conference in Wrocław). The Seaports Authority also provides opinions regarding legal acts and strategic documents related to waterborne transport.

An important achievement in the area of inland shipping promotion is the formal inclusion of the OW in TEN-T – the Trans-European Transport Networks in Europe. In June 2018, the European Commission published a draft regulation that laid out the rules for the "Connecting Europe Facility" (CEF) funding instrument. Annex I to the regulation included the Świnoujście/Szczecin–Berlin inland waterway in the North Sea-Baltic TEN-T Core Network Corridor, which makes it possible to apply for CEF funds to upgrade the hydrotechnical infrastructure.

Internal measures

Internal measures taken to increase the share of inland shipping in hinterland transport to/from the seaports in Szczecin and Świnoujście are focused on increasing the demand and supply of services. The detailed activities along with an assessment of their progress are presented in Table 2.

Many internal measures within the Szczecin-Świnoujście port complex are uncompleted due to their secondary importance related to upgrading the infrastructure. Such measures include:

- Establishing a Barge Handling Centre;
- Establishing a council aimed at promoting a comprehensive offering of transport services to/from the hinterland of the ports. The tasks have partially been taken over by the "Odrą w Świat" Association;
- Establishing an online platform to provide information on the possibilities of inland transport by barge;
- Providing berths for barges in the port of Szczecin, due to the lack of interest by barge operators and for the need for excessive capital spending.

However, two investments have been commenced, which are important for cargo shippers whose cargoes are to be delivered to the seaport via inland shipping:

1. Dredging the Szczecin-Świnoujście fairway to a depth of 12.5 m. The project has been subsidized

Table 2 Characteristics and implementation progress of internal measures

Areas of measures		Specific measures	Stage of completion of specific actions
Measures with regard to increasing the supply of transport services		Establishing a Barge Handling Centre	– uncompleted
		Inventorying and equipping berths for barges	– uncompleted
Actions taken to increase the demand:	information targeted at cargo shippers	Establishing the Council comprising representatives of the Seaport Authority, waterborne transport operators, and stevedoring companies, aimed at promoting among the potential cargo shippers a comprehensive offering of transport services to/from the hinterland of the ports	– uncompleted
		Establishing an online platform to provide information on the possibilities of inland waterway transport by barge	– uncompleted
	infrastructure of the port complex (by importance)	Dredging the approach to the port in Szczecin to 12.5 m	– underway, to be completed in 2021
		Dredging the approach to the port in Świnoujście to 14.5 m	– partially completed
		Creating conditions for construction of dedicated terminals	– underway: construction of the second Fast-Terminals terminal.
		Construction of the LNG loading berth	– underway: documentation phase, preparing the documentation for tender
		Construction of a deep-water container terminal in Świnoujście	– underway: completion of a technical concept, demand research studies and cost-benefit analysis.
		Construction of a deep-water bulk cargo terminal in Świnoujście	– the project has been abandoned
	suprastructure of the port complex	Increasing the storage capacity and capacities of providing additional services regarding cargoes	– underway: the storage capacity at the new Fast Terminals terminal was increased, both open-air and roofed storage capacity of other companies was increased, and a range of additional services was developed.
		Construction of tank farms	– underway: the storage potential for liquid cargoes is being expanded
		Increasing the efficiency of transshipment devices	– underway: upgrading existing and investing in new devices at the terminals of major port operating companies.
		Purchasing a crane vessel	– uncompleted
	developing the network of regular connections	Expanding the network of SSS connections	– underway: two new conventional general cargo lines from Szczecin (AtoB@ShippingAB), (UPM-Kymmene Oyj Logistics Szczecin); one new general cargo line from Świnoujście.
		Development of feeder connections	– uncompleted
Measures to implement innovations in navigation		Research projects aimed at improving the quality of services in inland shipping	– underway: filing a project package on waterborne transport to the National Centre for Research and Development; conceptual works regarding the OW for public administration and business practice

with EU funds for the 2014–2020 period. The construction will be carried out from 2019–2021.

2. Dredging the fairway and port basins in Świnoujście for vessels with a capacity of 100 thousand DWT. The fairway has been dredged, and the turning basin has been widened. However, the berths at the wharves have not yet been dredged, so it is still impossible to handle large ships.

The following investments are at the preparation stage:

- Construction of a berth for re-export and bunkering ships filling at the LNG terminal in Świnoujście. Since inland barges cannot reach the port, two alternative solutions are considered: construction of a berth dedicated to barges in the inner port and combining it with the berth for re-export, or providing barges with LNG from bunkering ships in the inner port;
- Construction of a deepwater container terminal in the outer port in Świnoujście. Based on the preliminary demand research studies (E&Y, 2015), a technical concept was developed (Wuprohyd, 2017) as well as a cost-benefit analysis of the project implementation (SNIGiR, 2018). In 2019, the Szczecin and Świnoujście Seaports Authority ordered another demand research study.

As a result of actions aimed at improving the quality of the Szczecin & Świnoujście port complex suprastructure, nearly all companies increased their storage capacities. New storage facilities were constructed for dry bulk cargoes, along with storage tanks for liquid bulk cargoes, and investments in the transshipment suprastructure were also implemented. All major entities involved in the port operation have developed their own range of additional services.

As for extending the network of connections with the foreland, new conventional general cargo lines were established between Szczecin and Denmark and Finland/Holland. In turn, the Fast Lines connections between Szczecin and Great Britain were reduced, and feeder connections to/from the port of Szczecin were not developed. The only carrier that maintained such connections at the beginning of 2019 was Unifeeder.

As for implementing innovations in navigation, in 2017 representatives of research centres filed a project package to the National Centre for Research and Development, which has not been accepted. During the period in question, many studies on waterborne transport were conducted, as ordered by the Ministry of Maritime Economy and Inland Navigation, Province Marshal's Offices, or businesses interested in using this mode of transport. The issue of waterborne transport was also included in the scope of international and national transport projects.

Hierarchization and phasing of measures aimed at inland shipping development in seaports hinterland transport

The analysis performed in item 3 shows that the measures aimed at promoting inland shipping in hinterland transport should be implemented in an appropriate time sequence. An original concept to harmonize the measures is presented in Figure 1.

The most important measure necessary for effective transport on the OW is the elimination of bottlenecks in the linear infrastructure. This is the responsibility of the State, since the investment must be financed with funds from the State budget (Phase I). No private entity will implement any infrastructural investment until the transport possibilities are ascertained, which was confirmed by the analysis of measures taken by the entities at the regional or local level (i.e. port authorities, stevedoring companies, or inland port owners). Parallel to the infrastructural measures, Phase I should include measures connected with enhancing the position of inland waterway transport in the European, national, and regional transport system, operations- and management-level measures in human resources training, and measures in education connected with adapting available education to future transport needs.

Elimination of bottlenecks and ensuring the possibility of transport throughout the entire navigation period will make private entities as well as port authorities more willing to invest in primary point infrastructure. First, they will provide the primary infrastructure to handle barges in inland ports and seaports (Phase II). This is also the phase during which a gradual integration of the supply chain should occur, i.e. waterborne transport operators, inland port operators, inland waterway transport operators, and stevedoring companies. This could be effected via e.g., seaport stevedoring companies investing in inland ports or via purchasing holdings in ship companies. The role of the State at this stage to further improve infrastructure parameters, i.e. construction of linear infrastructure with the target parameters (waterway class IV) and adapting the access infrastructure to the seaport from the sea. This is also the phase in which ship companies, seeing the actual possibilities of providing transport services, will decide to renew their fleet. Due to long-standing negligence in that regard, it will be necessary to

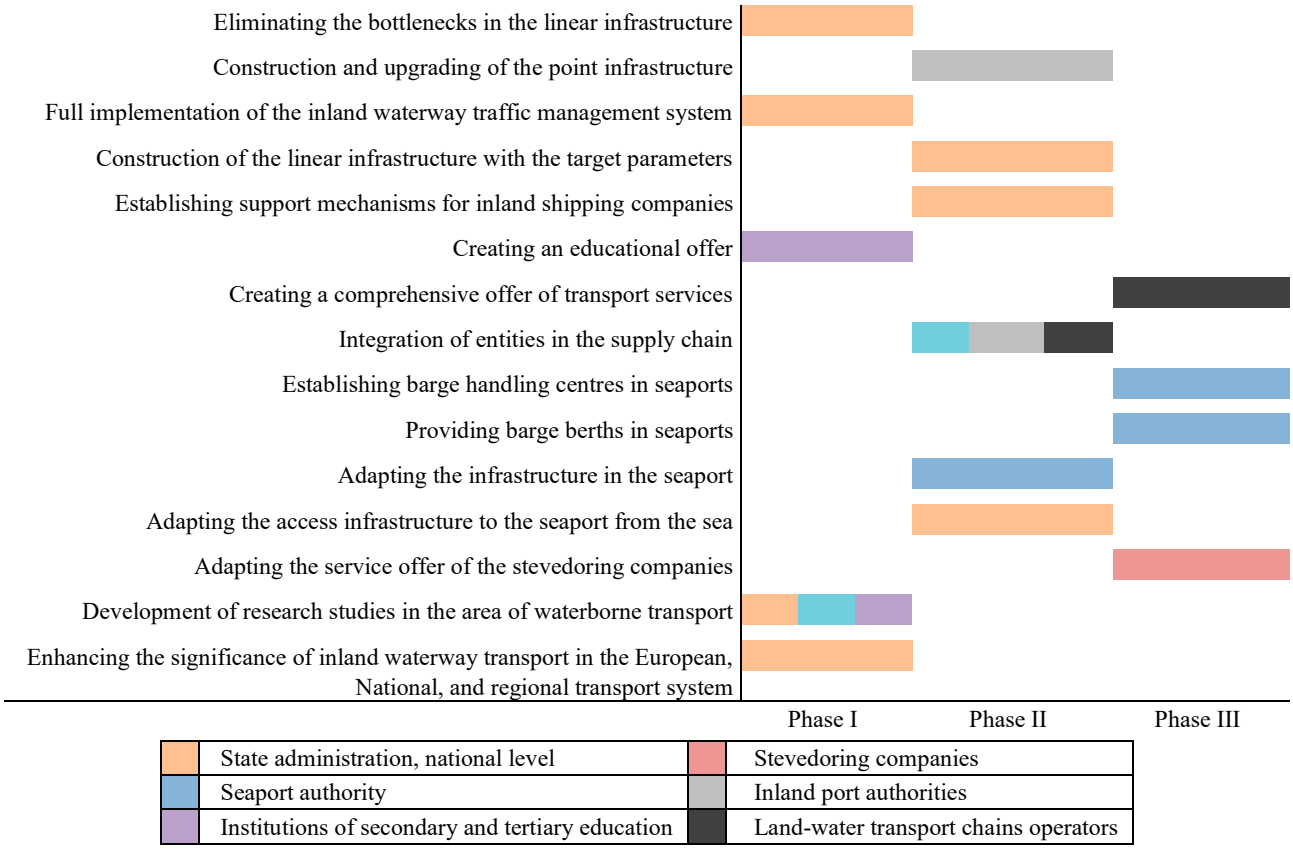

Figure 1. A concept to harmonize the measures aimed at increasing the share of inland shipping in seaport-hinterland transport.

establish effective support mechanisms with funds from the national budget.

Phase III is the last phase, and has an ongoing nature that includes creating a comprehensive offer of transport services, and establishing the entire infrastructure to completely integrate the offer in the land-water transport chain. Along with an increase in the number of handled barges, it will be necessary to provide barge berths in seaports, IT systems for managing the barge traffic in seaports, or barge management centres.

Conclusions

The research studies described in this article have shown that in order to increase the share of inland shipping in seaport-hinterland transport, it is necessary to implement a number of investment and non-investment measures in an appropriate sequence. If the particular groups of measures are implemented in incorrect phases, they will become ineffective over time. The need to hierarchize and phase the measures is particularly important for ports which have the natural conditions (direct access to inland waterways), but do not meet the prerequisites for its development (access to high-quality inland waterway connections). The analysed case study of the Szczecin-Świnoujście port complex and the Oder Waterway is an example. Since many of the recommended measures are time- and capital-consuming, the proper planning of the respective internal and external measures is of key importance and is accomplished by determining when they should be implemented and assigning responsibility for implementing them to various stakeholders, e.g., port authorities, waterway authorities, and carriers. For these ports, the most important issue is the revitalization of the waterway's linear infrastructure, and investments in this area are more important than other measures. At the same time, any transport infrastructure takes a long time to develop. Consequently, it is reasonable that measures unrelated to the infrastructure will not begin until significant progress has been made in upgrading the linear infrastructure. Measures in the area of navigation safety (RIS, River Information Services), as well as promotional, education, and research studies are an exception, since they should be carried out in parallel to linear infrastructure development. In the second phase, within the investment measures group, priority should be given to improving access to the ports from the sea, adapting the elements of the port infrastructure and

suprastructure to new parameters, and developing the infrastructure in inland ports. Implementing the measures will make it possible to integrate the entities engaged in combined maritime and inland waterway transport chains. Phase III should focus on improving the quality of barge handling in seaports, as well as developing a comprehensive offering of transport services.

Implementing the measures in linear infrastructure is performed by the state government. Thus, enhancing the significance of inland shipping in seaport-hinterland transport depends to a large extent on the transport policy pursued by the State and the role of inland waterways stipulated in major strategic documents and investment plans. An important factor influencing the future decisions of other entities involved in the development of combined maritime and inland waterway transport chains (particularly cargo shippers and inland port operators), is the certainty and timeliness of implementing infrastructural investments.

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