

Article

Shaping the New Vistula Spit Channel: Political, Economic, and Environmental Aspects

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Abstract

In September 2022, the new shipping channel in Poland was opened for service. It connects the Port of Elbląg and the Gdańsk Bay in Poland, cutting through the Vistula Spit and the Vistula Lagoon. It was intended to enable direct access to the Baltic Sea from the Port of Elbląg without crossing Russian territory. Originally conceptualized decades ago, it has taken its final shape only recently. Its construction was associated with several issues, including economic, political, and environmental ones. But at the same time, the rationale of its construction has to be confronted with the analysis of the long-term consequences for the city's economy and the environment of the Vistula Lagoon. Many of these issues are presented and discussed in the article, along with some initial conclusions regarding future opportunities and threats associated with operational and maintenance-related issues.

Keywords

access; Elbląg; infrastructure; Vistula Lagoon; Vistula Spit

Issue

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1. Introduction

The Port of Elbląg is located in northern Poland (Figure 1). The port is connected to the Vistula Lagoon, part of the internal marine waters of the Baltic Sea, through the River Elbląg. Providing access to the Port of Elbląg has been an important issue since medieval times. Being one of the many ports located within the Gdańsk Bay area, it gradually lost its importance to other main cities in the region—mainly Gdańsk and present-day Kaliningrad (former Königsberg; see Krośnicka et al., 2021). At the same time, it has become a part of the porous harbor region (Hein, 2021), subdivided by numerous boundaries—including political ones. Additionally, due to changes in inland water management (mostly related to the Vistula River delta), the Port of Elbląg has become more shallow. As a result, it lost its commercial importance and has become a tertiary port center when compared to

Gdańsk and Gdynia. Still, along with other small- and medium-sized ports, it has become a potential hub of water-based recreation and tourism (Palmowski, 2010). This was further spurred by the fact that in the Baltic Sea, the tides are much reduced in comparison to other waters and that in the case of the Vistula Spit, these are almost unnoticeable. These issues are discussed in other sources, although the authors believe the discussion on types of waters, landscapes, etc., goes beyond the scope of this article.

Further development of the Port of Elbląg as a regional transshipment center has become endangered due to restrictions resulting from the existence of the state border separating the Polish and Russian parts of the Vistula Lagoon. To deal with this issue, the vision of a channel crossing the Vistula Spit and connecting the Vistula Lagoon and the Gdańsk Bay had already been conceptualized in the early 1990s (Sas-Bojarska, 2010).



Figure 1. Location of Elbląg in the European context. Source: Own elaboration using Google Maps.

Along with ideas of regenerating the commercial functions of the Port of Elbląg, it has become a strategic project for the Polish government as its separation from the Gdańsk Bay—and, in general, the entire Baltic Sea—was perceived as a significant development threshold (Moretti, 2020). Overcoming this barrier was perceived as a significant opportunity for the regeneration of both the city and port of Elbląg as well as of other minor ports located within the catchment area of the Vistula Lagoon (Sosidko, 2002; Szwankowska & Szwankowski, 2002). Therefore, it was hoped that the processes undergone in other port cities in Europe would also be initiated in the case of Elbląg (Ast, 1999; Schubert, 2011). Moreover, this concept was perceived as an opportunity to transform and activate the entire part of the Vistula River delta, as was discussed, i.e., concerning the Dutch cases (Meyer et al., 2010, 2015).

After many years of consideration, this project was finally introduced in the years 2020–2022, and the new channel provided new opportunities for the development of the Port of Elbląg. This still has to be treated as a half-done project as many other improvements are still awaiting execution before it will be possible to provide credible data on the success or failure of this strategy. Therefore, the main aim of this article is to present the scope of political, economic, and environmental issues associated with the construction of this new waterway. In addition, the authors intended to discuss the possible consequences of this construction on the economy of the city and the entire region as well as on the local environment of the Vistula Lagoon. At the same time, authors have to note that, due to the fact this new waterway has just recently been made available for commercial traffic and many construction works associated with dredging the waterway to the Port of Elbląg have not been com-

pleted yet, it is impossible to discuss the real impact of this development on the economy and environment of the region.

2. Methods

This article is based on both the analysis of the existing literature and the authors' own analysis of the selected case study: the Vistula Spit channel. This analysis was developed both regarding the development trends of the city and Port of Elbląg as well as other minor cities and ports located within the area of Vistula Lagoon. The authors were able to present a specific perspective on the topic based on their personal experience since they were involved in the process of maritime and spatial planning for the area. At the same time, it has to be noted that there is very little literature available on both the development of the channel and the redevelopment of the Port of Elbląg. Therefore, this article to a large extent reflects the authors' own opinions and observations. Thus, the literature review also includes an overview of papers and books dealing with port-city relations and the transformation of water-related areas.

The analysis of the outcomes of the construction process of the Vistula Spit channel discussed in this article has been embedded in the description of the history of the city and Port of Elbląg. This allowed for providing the proper background related to the main topic.

3. Literature Review

Since this article, to a large extent, is based on the review of existing literature, the authors decided to provide an overview of the existing body of research concerning four major aspects that are crucial to the topic.

These include (a) city–port relations, (b) regeneration of urban waterfronts and transformation of waterfront cities, (c) the situation in Poland regarding shaping the port cities and maritime areas, and (d) specific issues in shaping the Port of Elbląg and Vistula Spit channel.

Regarding city–port relations and issues in shaping port cities, some of the key publications include works by B. Hoyle (1988, 1996), dealing with the development dynamics of the port–city interface as well as with issues in shaping the economic relations between ports, cities, and coastal zones. These works shall be regarded as the basis for any further research on this topic. Additional works on port–city relations were developed by Meyer (1999), Schubert (2011), Hein (2011, 2021), and Moretti (2020). Most of these works deal with spatial issues in shaping port–city relations and consequences for urban transformation processes coming from these issues. In addition, it is necessary to mention Polish research, developed—among others—by K. Krośnicka, P. Lorens, and E. Michałowska (see Krośnicka, 2018; Krośnicka et al., 2021). It is also advisable to mention works on “delta urbanism” and—within these—point out works by Meyer et al. (2010, 2015).

Concerning urban transformation and waterfront revitalization, the major body of research includes works by Breen and Rigby (1994, 1996), as well as Bruttomesso (1991) and Schubert (2018). Also in the case of Poland, several works can be identified, namely Lorens (2009a, 2009b, 2013) and Ast (1999).

Since this article deals with a specific case study, the authors also decided to analyze the Polish body of literature dealing with the topics related to shaping the port and maritime areas. Relevant legal acts on the subject must also be mentioned (see Council of Ministers, 2019; Marshal of the Sejm of the Republic of Poland, 1991). However, there is a much larger scope of existing works associated with seaside regions and the role of maritime ports in the process of economic development. Within this group, the most important works were developed by Gawlikowska-Hueckel (2007), Bocheński and Palmowski (2015; see also Bocheński, 2022), Dutkowski and Kulawczuk (2009), as well as Sosidko (2002) and Szwankowska and Szwankowski (2002).

Finally, concerning the Port of Elbląg and the Vistula Spit channel, the issues in shaping local identity and landscape must be mentioned (Gołędzinowska, 2018) as well as cultural, social, and economic aspects of development (Palmowski, 2010). Concerning issues of shaping the Port of Elbląg, publications dealing with its history, present-day, and future development scenarios have to be mentioned (Breś, 2020; Czaja, 1993; Gierszewski, 1978; Gierszewski & Groth, 1993; Krośnicka & Zavorotynskiy, 2016; Matczak et al., 2015; Myślińska, 1998; Palmowski, 2001; Salomon, 2018). Of no less importance are more popular articles and publications (ANA, 2023; Kojzar, 2022; Libudzka, 2022; Milszewski, 2022; PAP, 2022), as well as the Port of Elbląg website (<http://www.port.Elblag.pl/o-porcie>). Regarding the

Vistula Lagoon and the Vistula Spit channel, important publications include works by Różyński et al. (2015) and Sas-Bojarska (2010).

4. Political and Economic Aspects Behind the Construction of the Vistula Spit Channel

The development of the Vistula Spit channel was proposed as early as the middle ages but never executed due to numerous reasons. The concept of providing a direct link between the harbour of Elbląg and the Gdańsk Bay was rediscovered only a few years ago, when—after political changes coming with the collapse of the communist system in 1989 and political changes in Poland resulting in its integration into the European Union—the economic and political ties with Russia weakened. In addition, Russia started to perceive Poland as a hostile country, which resulted in the strengthening of restrictions concerning access to the Port of Elbląg through its territorial waters. This happened despite international treaties, which are still in force, that provided access to the harbour of Elbląg through an existing water connection.

As a result, the Polish national government decided to come back to this idea, which was also supported by potential internal political gains. The ruling party (right-wing) perceived this development as an opportunity to reinforce the regional centre—the city of Elbląg—and catch some of the regional cargo, which by now was shipped through the large ports in Gdańsk and Gdynia. This was supposed to result in reinforcing the political importance of the political party in Elbląg and diminishing the importance of the Port of Gdańsk and the Port of Gdynia. Both were perceived as remaining under the influence of the political opposition to the ruling party. Therefore, the first ideas were developed in the years 2007–2009 (during the first period, when the right-wing party was in charge of the national government) and then refreshed after 2015 (when the same right-wing party retook charge of the national government).

Therefore, it can be stated that the decision on the development of the Vistula Spit channel was made due to political reasons and not purely economic ones. Although, it has to be stated that the extensive discussion on the rationale for shaping this channel took place in Poland after the concept took its final shape after 2015. This discussion included topics associated with environmental issues (dealing with mixing the waters and touching the sediments that might be potentially harmful to the environment of the Vistula Lagoon) and economic ones (reinforcing the regional centres, not the main cities and ports like Gdańsk and Gdynia). In addition, it was discussed that the Port of Elbląg could play a complementary role to the ports of Gdańsk and Gdynia, especially in light of the burning need to improve the transportation infrastructure providing access to these large transshipment centres.

All these discussions and arguments must be further analysed, which goes beyond the scope of this article.

But the authors believed that a short overview of the political and economic background needed to be presented to discuss the selected case study.

5. Development of the Maritime Harbour of Elbląg

5.1. Historical Background of Elbląg's Port in the Context of Waterway Development

The city of Elbląg was founded by the Teutonic Order in 1237 (Czaja, 1993). The settlement was initially located on an island at the mouth of the river and later moved to the area of today's Old Town, where the Teutonic Castle was built. In the vicinity of the castle, an original settlement was developed (Figure 2a) and later, in the 14th century, another settlement called New Town was established east of the Old Town (Figure 2b; see Gierszewski, 1978). Both of these were governed according to the Lubeck law, which regulated most aspects of urban life. The port of Elbląg was initially located on the right riverbank within the Old Town (Figure 2a). The port soon grew to the left side of the river on Granary Island (Figure 2b). Thanks to the connection to the Vistula River and access to the Baltic Sea, the city became a flourishing port city—which, at the end of the 13th century, was the largest seaport in the region (Gierszewski & Groth, 1993). Back then, the Port of Elbląg was an important military and trade center with economic and legal ties with other Hanseatic port cities. The city was a starting point for further Teutonic expansion due to its favorable location near the mouth of the Elbląg River to the Vistula Lagoon and on the Vistula Delta (Gierszewski, 1978).

The growth of shipping activity in Elbląg continued in the 14th century, which included trade with England and other Western countries. However, the development of the port slowed down at the beginning of the 15th century, in favour of the port of Gdańsk. This was largely due

to insufficient navigation conditions, a change in the transshipment profile (from trading luxury goods to bulk), and the imposition of fees on ships crossing the Pilawa Strait on their way to Elbląg's port. The port of Gdańsk, situated directly by the Baltic Sea, had a more advantageous location and trade connections. Thus, Elbląg became a hinterland port for the port of Gdańsk. Changing the layout of waterways in the 15th century, including directing the Nogat riverbed directly to the Vistula Lagoon and thus bypassing the area of Elbląg, meant cutting off the city from important inland waters. Secondly, the navigation conditions of the fairway towards the sea deteriorated due to the accumulation of sand. Already in the 14th century, constructions preventing the sanding of the fairway were erected in the port roadstead, which was financed by the authorities of the city and merchants from Elbląg. The waterway from the port of Elbląg to the lagoon was a 10 km shallow route with a narrow section through the Pilawa Depth, which was constructed in the 16th century. After the collapse of trade in the mid-17th century, carrying out work preventing silting of the bottom was difficult for economic reasons (Gierszewski, 1978). At the same time, both city and port facilities were gradually growing (Figure 2).

In the 17th century, the city, with its new bastion-type fortifications (Figure 2c), suffered from an attack by the Swedish army, followed by the first partition of Poland in the 18th century when it went under Prussian jurisdiction. The poor condition of the fairway was greatly affected by the Polish-Swedish war, after which access to the Port of Elbląg was blocked. The war was followed by the first partition of Poland in the 18th century when it went under Prussian jurisdiction. New authorities invested major funds in deepening the riverbed, however, from the middle of the 18th century, dredging activities were no longer sufficient. Access to the port in Elbląg was hindered by the high growth rate of



Figure 2. Scheme of the historic development of Elbląg concerning water and port activity. Source: Breś (2020).

the lagoon shore, which negatively impacted the access from the port to the sea. As a result, most of the cargo was transshipped not in the Port of Elbląg, but in the Port of Piława. Soon, the city would transform from a port city to an industrial one. The shipbuilding industry developed in the 19th century largely due to the launch of the first Schichau shipyard in 1854. Many new industrial activities were taking place by the riverfront such as automotive, heavy mechanics, military, and brewing. Along with the gradual relocation of port activities to the north, where the industrial hub was spreading (Figure 2d), the historic waterfront no longer performed its original function (Breś, 2020).

World War II had a destructive impact on Elbląg's historic city centre. The Old Town together with Granary Island and New Town were practically destroyed (it is claimed that 90% of the buildings in Old Town and almost 100% of the New Town were destroyed; see Myślińska, 1998), even though industrial infrastructure remained almost intact. However, it must be noted that the looting of the industrial plants' equipment by the Red Army in 1945 made the resumption of production in these plants difficult. In the post-war years (1945–1990), local ports, including the Port of Elbląg, had little importance for the Polish economy, which resulted from the specificity of the political system and centrally controlled economy. They were not properly adjusted to serve marine traffic, i.e., bridges reconstructed in Elbląg after the war did not take into account the size of sea vessels.

5.2. Current Investments Related to Access to the Seaport in Elbląg

After years of neglect, the port of Elbląg started to develop in terms of reestablishing sea connections at the break of the 20th and 21st centuries. A limitation of the port's growth, apart from lack of funds, was the railway bridge limiting the size of the ships entering the city centre. New quays could therefore develop only to the north of the European Union bridge, including freight and passenger terminals. A new route was developed to connect the northern port quays with the hinterland of the port at the beginning of the 21st century—the so-called European Union Road, which allows traffic connection with the express road bypassing the city from the south and bypassing the city centre (Elbląg University of Humanities and Economics, 2019). Among port investments completed in the 21st century, the most important include the development of the European Union route (also bridge), which connects the city and port with the S7 national road; a transshipment terminal with a border and customs control site; a passenger terminal with an international check-in point; and renovation of the waterfront with passenger quay within the Old Town of Elbląg, including the conversion of two drawbridges and the development of the yacht marina.

The Port of Elbląg is classified as a medium-sized port in Poland (Supreme Audit Office Gdańsk Branch,

2018). It is a regional port serving the Vistula Lagoon and Baltic Sea cargo and passenger shipping (Council of Ministers, 2019). The area of the port is about 400 ha, the length of the quays is less than 4,000 m, and the depth of the fairway in the port is 2 m. The annual transshipment capacity of the port is estimated at 0.5–1 million tons (bulk cargo) and 0.1 thousand tons (general cargo). The terminal serves ships with a carrying capacity of up to 3–3.5 thousand DWT (Elbląg University of Humanities and Economics, 2019). More than 30,000 passengers are transported annually in Elbląg. Cargo turnover in the port is currently approximately 100,000 tons (Statistics Poland Statistical Office in Szczecin, 2022). Since 2015, Elbląg's port has recorded a decrease in the volume of transshipped goods. The decrease in transshipment (from 200,000 to 100,000 t) was largely due to a decrease in trade with the ports of the Kaliningrad Oblast (Russia Federation enclave), which accounted for approximately 97% of its total turnover. This was caused by the imposition of sanctions by the Russian Federation and the European Union. The tourist shipping in the port of Elbląg, however, did not record a significant decrease (Supreme Audit Office Gdańsk Branch, 2018). As a result, there was not much change to the structure of the Port of Elbląg and the city's waterfront (Figure 3).

The ongoing construction of the waterway connecting the Vistula Lagoon with the Gdańsk Bay (Figure 4) is an opportunity to increase the economic attractiveness of the Warmia and Masuria Voivodeship and to develop further medium and small ports of the Vistula Lagoon, in particular the Port of Elbląg. The Vistula Lagoon was split between Poland and the Soviet Union after World War II. The Polish-Russian agreement on navigation within the Vistula Lagoon, signed after the war, did not allow foreign ships to cross the Polish-Russian border. Currently, the lagoon is shared between the Republic of Poland and the Kaliningrad Oblast. Until the recent construction of the channel through the Vistula Spit, the only inlet was located in the Russian part through the Piława Strait (Figure 5; see also Różyński et al., 2015). The water route from Elbląg to the Baltic Sea, which until the 21st century used to lead through the Piława Strait controlled by Russia, is now shortened by almost 100 km as it leads through the channel through the Vistula Spit. The channel was built in 2022; however, all additional investments were forecasted to be completed in the last quarter of 2023 (Libudzka, 2022). Despite these declarations, keeping this deadline seems to be unlikely since the agreement on dredging the waterway to the Port of Elbląg has not yet been signed. The planned waterway includes the construction of a shipping channel through the Vistula Spit, connecting the Vistula Lagoon with the Gdańsk Bay, the introduction of a new port on the side of the Gdańsk Bay, construction of road and bridge connections across the channel, construction of an artificial island in the Vistula Lagoon, improvement of a fairway and entrance to the Port of Elbląg, and construction of a new bridge over the Elbląg River (Supreme Audit Office

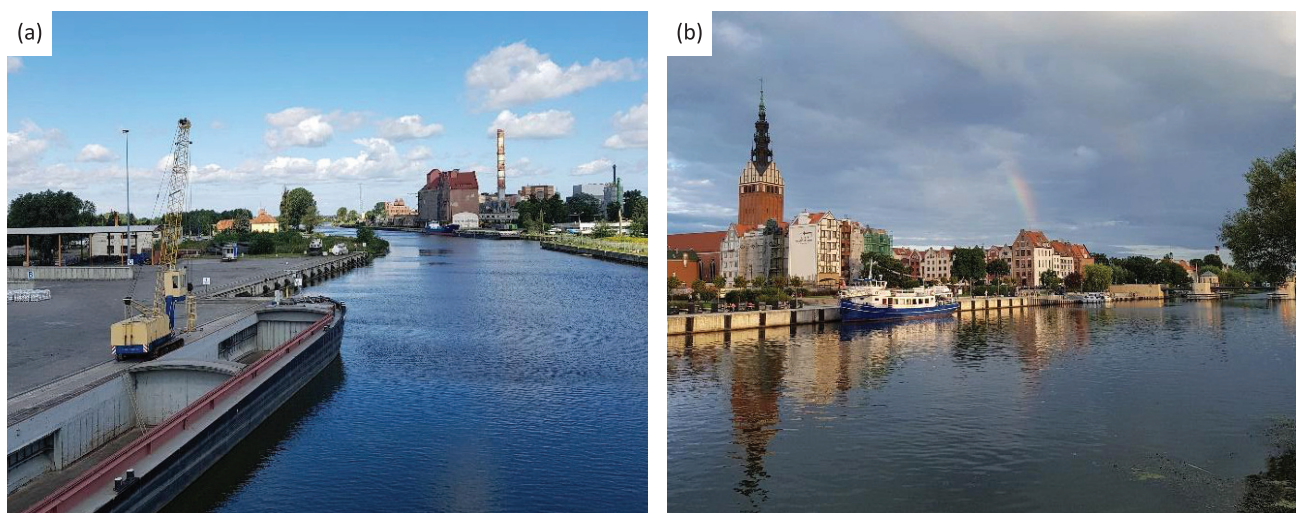


Figure 3. Current images of the city and Port of Elbląg: (a) the northern part of the seaport in Elbląg (transshipment terminal); (b) the waterfront in the Old Town of Elbląg (post-port areas).

Gdańsk Branch, 2018). The new waterway will enable vessels up to 100 m long and 20 m wide with a 4.5 m draft to enter Elbląg's port. The channel and the entire fairway will ultimately be 5 m deep. It has been estimated that this investment will shorten the sea route from Elbląg to Gdańsk by approximately 90 km, to ports of Western Europe by 60 km, and to the eastern Baltic Sea by 15 km. The construction of the channel through the Vistula Spit is, from the perspective of Elbląg, more advantageous than the improvement of the inland waterway connection with Gdańsk which would entail significantly higher investment expenditures (Figure 5a). The inland waterway leads along Elbląg River, Jagiellonian Canal, Nogat River, Szkarpawa River, Wisła River, and through flood

gates, which are the remnants of the Bielnica water lock built in 1898 and the 19th-century water lock in Przegalina built in 1895 (Figures 5b and 5c). The cost is associated with deepening the inland fairways and rebuilding existing constructions (Elbląg University of Humanities and Economics, 2019).

In order to take advantage of the channel through the Vistula Spit for the Port of Elbląg, reconstruction of the infrastructure and deepening of the Elbląg River is necessary. The construction of a fairway to the Port of Elbląg is a complex undertaking partly implemented outside the city limits that can only be conducted by the Maritime Office. In the city, the Elbląg Seaport Authority is responsible for the reconstruction of quays (Council of



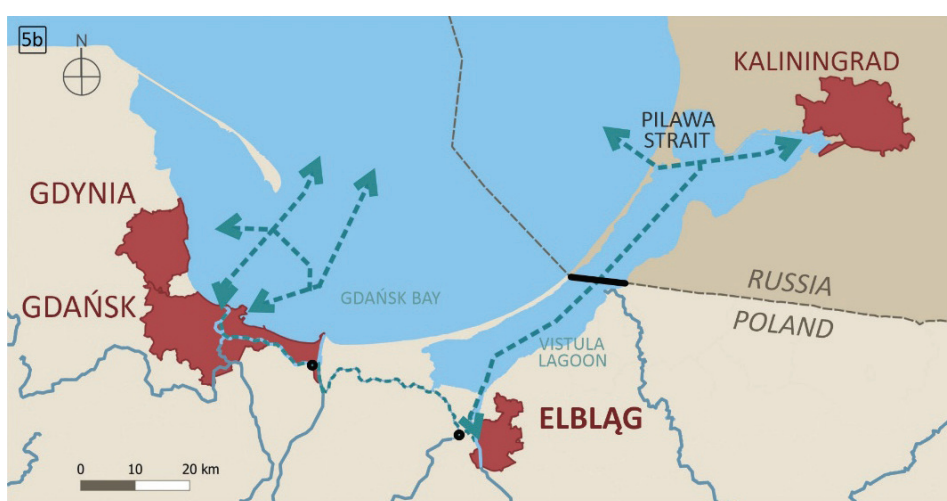
Figure 4. Current view of the Vistula Spit channel.



MIDDLE AGES

Legend

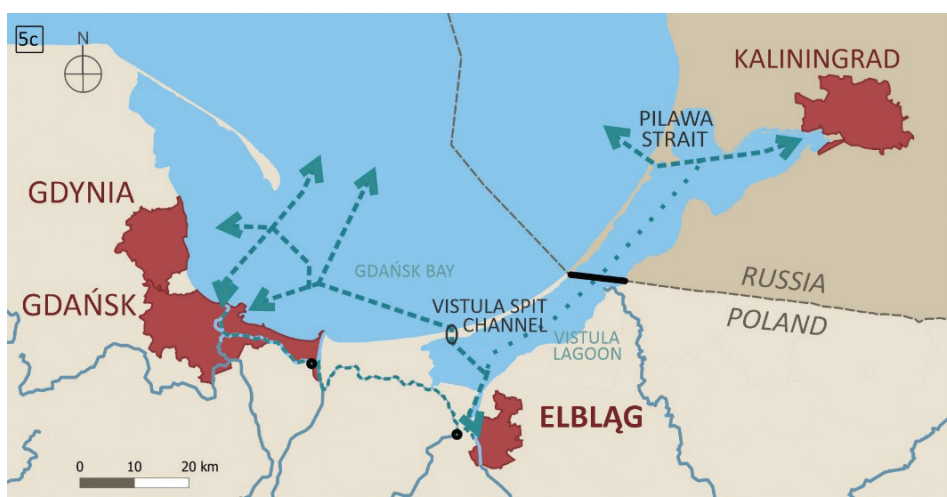
- post war territory of Poland
- post war territory of Russia
- marine and inland waters
- main marine routes
- location of Ebląg in the context of neighbouring port cities



20TH CENTURY

Legend

- current state border
- post war territory of Poland
- post war territory of Russia
- marine waters
- inland waters
- main marine routes
- inland water route connecting Ebląg and Gdańsk
- location of major port cities
- communication barrier (traffic restrictions)
- water lock



21TH CENTURY

Legend

- current state border
- post war territory of Poland
- post war territory of Russia
- marine waters
- inland waters
- main marine routes
- unexploited marine routes
- inland water route connecting Ebląg and Gdańsk
- location of major port cities
- communication barrier (traffic restrictions)
- water lock
- Vistula Spit channel

Figure 5. Transformation of marine routes connecting the Port of Elbląg with its foreground. Source: Own elaboration based on data published on <https://www.geoportal.gov.pl> (accessed on January 18, 2023).

Ministers, 2023). The dispute over competencies in this area caused some problems at the stage of coordinating the implementation of the entire project. Furthermore, there are plans to build a turntable for ships with a

diameter of up to 180 m, along with strengthening the quays and construction of a transshipment wharf for a new universal terminal with the accompanying infrastructure such as storage yards, warehouses, and railway

siding. This investment, provided by the Elbląg Seaport Authority, will increase the port's capacity and facilitate the navigation of larger vessels.

5.3. Strategy for the Development of the Port of Elbląg and Its Connection to the Baltic Sea

Spatial planning in the seaport of Elbląg is based on separate spatial plans for the area of the territory and the water reservoir. The spatial planning system at the edge of sea and land in Poland consists of different legal documents on land and water areas, which are prepared at various administrative levels. Adoption of the study of conditions and directions of spatial development and local spatial development plans (based on the study) on the land is within the competence of the city authorities. Maritime spatial development plans, on the other hand, are prepared at the national level by the maritime office. Elbląg Seaport Authority also developed its own strategy for the development of the port—a guideline for the development of the port, which is not, however, a planning document itself.

Although the city authorities are working on a new document, the 2010 *Study of Conditions and Directions of Spatial Development of the City of Elbląg* (Elbląg City Authorities, 2010) is currently in force. Among the strategic development goals, this document mentions the development of the seaport function and taking advantage of the connection between Elbląg and the Gdańsk Bay through the channel through the Vistula Spit. The study provides for the expansion of the port in the areas to the north of the Old Town within the boundaries of the port, as well as beyond the boundaries of the city to the west of the boundaries of the seaport, after concluding relevant inter-municipal agreements. In addition, the document mentions the creation of a new railway stop in the vicinity of the port and the provision of a railway siding to the quays, as well as securing the port areas against flooding. However, the study does not refer in detail to the development of the port's territory or aquifer itself, it only outlines the area intended for the development of the industrial and port function, as well as the location of the new railway stop.

The draft spatial development plan for the waters of the seaport in Elbląg and the spatial development plan for the internal sea waters of the Vistula Lagoon are currently being prepared. The plan for the seaport in Elbląg reserves sea areas on the Elbląg River for the development of the water transport system, which includes the fairway to the port, the planned turntable, and ensures their width in accordance with the investment in the construction of a waterway connecting the Vistula Lagoon with the Gdańsk Bay. Additionally, north of the European Union bridge in Elbląg, the location of infrastructural elements was limited to at least 20 m above the water level (Maritime Office in Gdynia, 2022). Nevertheless, the maritime plans do not include provisions regarding the depth of fairways or the detailed location of the

expanded quays and bridge connections. The provisions of the maritime plan enable the construction of a waterway connecting the Port of Elbląg with the Gdańsk Bay while maintaining highly liberal provisions and limiting itself to very general guidelines for the development of water transport.

When discussing the development of the Port of Elbląg, its existing and potential functional area has to be taken into account. It might also require redevelopment of some parts of the area, including conversion of the land uses and differentiating the modes of access to the waterfront. The current situation of the area is presented in Figure 6.

According to the *Strategy for the Development of the Sea Port in Elbląg* (Matczak et al., 2015), the subject of the port's service includes inland passenger and cargo shipping, inland and sea yachts, and short-sea shipping, including potential ferries. In the context of maritime shipping, this strategy indicates the port's development potential based on two shipping ranges: ports of the Vistula Lagoon and ports of the Baltic and North Seas. Currently, shipping to the Baltic and the North Sea ports is incidental due to Russia's restrictions. This situation may change in the future, due to the construction of a channel through the Vistula Spit in 2022. This will theoretically allow cargo ships with 3.5 to 4.0 DWT to enter Elbląg and passenger's vessels with a length of up to 120 m. Sea sailing is also a prospective source of income for the port of Elbląg in the context of the new water connection. According to this strategy, the construction of the channel allows for forecasting an increase in terminal turnover of up to 100,000 tons (general cargo) and 1 million tons (bulk cargo). These perspectives require the use of all land reserves on the eastern bank of the river provided in the city plans. In addition, the necessary actions listed in the strategy include ensuring the depth of the fairway to 5 m in the northern part of the port, construction of a turning basin, ensuring appropriate depths at port terminals on both sides of the river, enlarging the existing transshipment terminal on the left bank of the river, and creating an integrated cargo and passenger terminal with the possibility of rail service (Elbląg University of Humanities and Economics, 2019).

6. Results

The main results of this article are associated with possibilities for the development of the Port of Elbląg in reference to the Vistula Split channel. However, it must be noted that the marine activities of Vistula Lagoon ports in the Polish part may significantly change after the construction of the new waterway connecting the Vistula Lagoon with the Gdańsk Bay is completed. This investment might have a noticeable impact on the economy of the city of Elbląg; however, it is not yet known to what extent it will enable the development of the port. Some previous economic research estimates that the investment will be cost-effective in the long term,



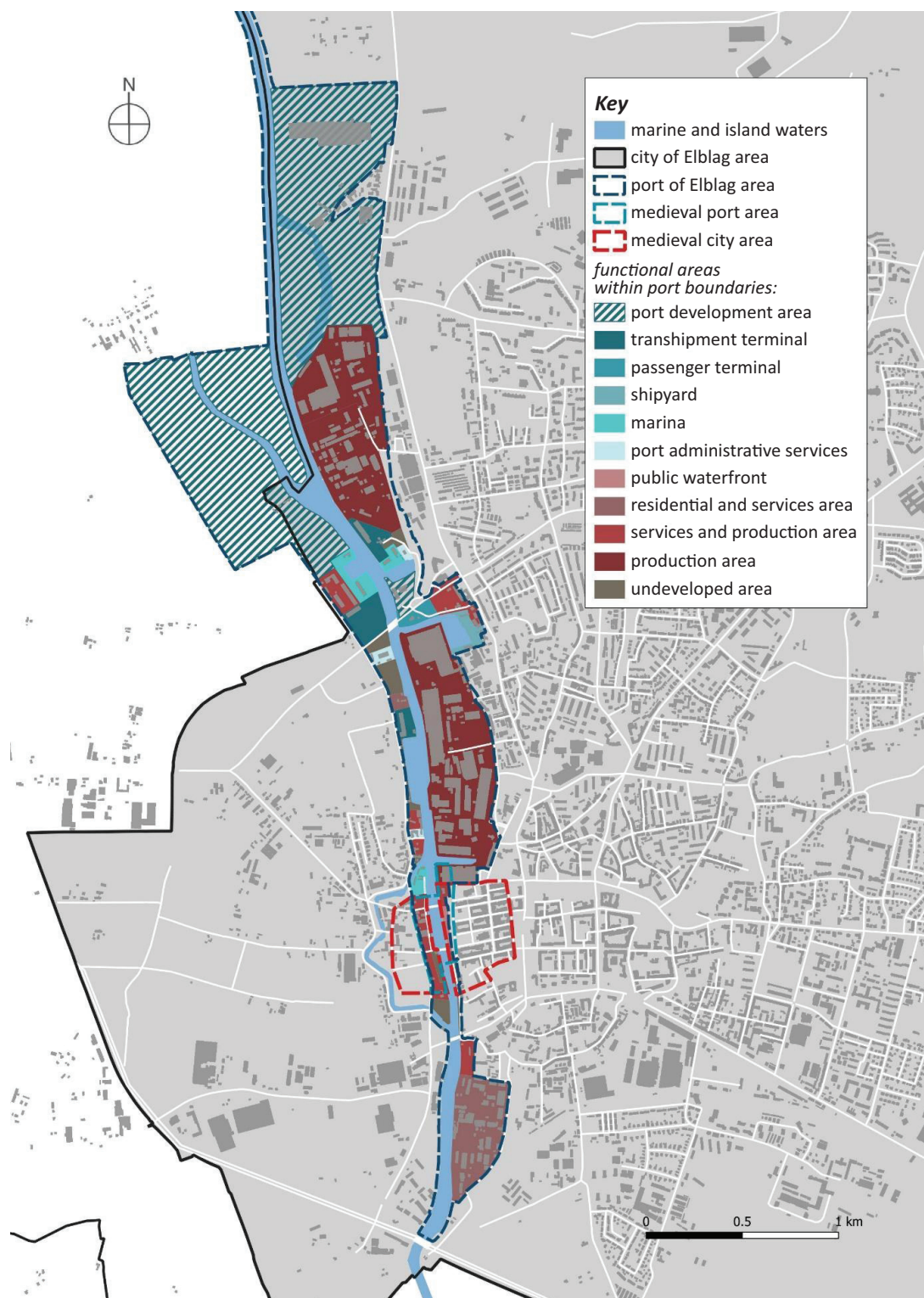


Figure 6. Functional area of the seaport of Elbląg. Source: Source: Own elaboration based on data published on <https://www.geoportal.gov.pl> (accessed on January 18, 2023).

but it is not known what economic benefits it will provide and whether new infrastructures will bring prosperity to other Polish ports near the Vistula Lagoon. It is also unknown whether the nearby ports in Gdańsk and Gdynia will take advantage of the channel (Różyński et al., 2015).

So far, after almost a year of operations in the channel (as per the writing of this article, on July 2023), the channel was used very little. According to statistical data gathered by the Maritime Office and published in the economic portal Businessinsider, during the first eight months of operations (from September 18, 2022, until

March 3, 2023) the Vistula Spit channel was used by only 545 vessels, including pleasure boats (such as yachts and motorboats) and vessels involved in the construction process of the channel. This means that the channel was used by three vessels per day. This resulted in the shortening of the channel's operation hours—at this moment, it remains operational only for four hours per day (ANA, 2023).

This low volume of traffic may result in the fact that funds invested in the development of the channel will not be recovered—as of 2023—any time soon. It is estimated that it may take approximately 500 years to recover the sum of more than 2 bln Polish Zloty invested in this development (Kojzar, 2022). Although, as was discussed in previous parts of this article, the economic calculations were not the reason for deciding on the development of the Vistula Spit channel—the main reasons were political, meaning, making the Port of Elbląg more attractive and providing access to the Vistula River Lagoon independent from the agreements (or lack of these) with the Russian Federation. This reasoning is well justified by the situation that took place in the years between 2006 and 2010—within these years the Russian Federation imposed a blockade on traffic through its territorial waters which resulted in minimizing the volume of cargo transhipped in Elbląg: It was approximately 3,000 tons, mostly of bulk products like sand, etc. Additionally, after the 2010s, when the new international treaty between the Republic of Poland and the Russian Federation was signed concerning access to these waters, obtaining permits for the access of vessels to the Port of Elbląg in many cases was questionable.

These numbers prove that developing the Vistula Spit channel was not justified by economic reasons, especially since within the range of approximately 60 km, there is a deep-water cargo terminal in Gdańsk, where the volume of the cargo is increasing year by year: For example, in 2021, more than 2 mln containers were transhipped there. Also, the environmental aspects of this development are questionable: Numerous experts were discussing the ecological value of the Vistula Lagoon,

which may be largely diminished by the construction of the new waterway. For example, the issue of bird migration corridors was discussed along with the fact that the entire construction was supposed to take place within the areas designated as Landscape Park (which, according to the Polish legal system, is one of the forms of preservation of nature) and/or Nature 2000. The main environmental organisation, the Polish Ecological Club (Polski Klub Ekologiczny) also pointed out that the construction might lead to the worsening of the quality of water within the Vistula Lagoon, as well as the destruction of its flora (Kojzar, 2022). However, it must be stated that more thorough research on the environmental and economic consequences of this development can be made only after some time of functioning of the channel—the current perspective on this may be incomplete.

Based on the above analysis, it is possible to discuss a set of opportunities and threats associated with the current development. These were discussed separately for the Port of Elbląg (economic functions) and the city of Elbląg (city forming issues) and are presented in Tables 1 and 2.

As can be derived from the above analysis, the development of the Vistula Spit channel can bring little consequences for the urban development processes of the City of Elbląg, mainly due to the location of existing and future waterfront redevelopment processes south of the potential port development areas. On the other hand, the chances for the development of the Port of Elbląg are much higher, although it is possible to point out three main possible directions of its transformation:

1. Independent transshipment port: Expansion of the northern port areas within the city of Elbląg and in the municipality of Elbląg according to the *Strategy for the Development of the Sea Port in Elbląg* (Matczak et al., 2015), deepening of the fairway within the city limits by the Elbląg Seaport Authority and in the area of sea waters outside the city by the Maritime Office in Gdynia, constituting

Table 1. Economic development of the Port of Elbląg: Presentation of possible opportunities and threats.

Opportunities	Threats
Development of the transshipment activities in a partnership or separate from the activities of the Port of Gdańsk.	Over-investments associated with the port infrastructure.
Development of the inland waterways allows water-based connections with Gdańsk and other parts of the region.	Under-utilization of the port areas.
Activation of the port-related industries within the area of the Port of Elbląg and/or the entire City of Elbląg.	Lack of cooperation with the Ports of Gdańsk and Gdynia.
Regeneration of the “working waterfront” areas.	Under-development of the water-related industries.
Diversification of the economic base of the city.	Lack of interest in the tourist industry and leisure sector.
	Potential conflicts with the development of other city-related functions.
	Issues associated with environmental preservation and protection.

Table 2. Urban development of the City of Elbląg: Presentation of possible opportunities and threats.

Opportunities	Threats
Reinforcing the economic base of the city.	Diminishing the opportunities of the waterfront redevelopment processes.
Spurring the development of the tourist infrastructure.	Differentiation of the economic rationale of the port and city areas.
Spurring the redevelopment of the urban waterfront (especially within the area of the Old Town and Granary Island).	Lack of city-port integration processes.
Reinstating the maritime identity of the city.	

a direct connection between Elbląg and the Baltic Sea (ports of the Baltic Sea basin), which will create conditions for the development of transshipment terminals.

2. Transshipment feeder port for the seaport in Gdańsk: Expansion of the northern port areas within the city of Elbląg and in the municipality of Elbląg according to the Port Development Strategy, deepening of the fairway within the city limits and in the area of sea waters outside the city, constituting a sea connection between Elbląg and Gdańsk which will create conditions for the development of the back-up transshipment terminals and facilities of the seaport in Gdańsk.
3. Touristic port: Expansion of the northern port areas within the city of Elbląg for the needs of the passenger terminal, deepening of the fairway within the city limits and in the area of marine waters outside the city, constituting a direct connection between Elbląg and the Baltic Sea (ports of the Baltic Sea basin), which will create conditions for the development of an international passenger terminal, development of the southern areas within the port boundaries, located near the Old Town for maritime, and inland tourism for small water vessels (current residential and commercial area with abandoned post-port buildings), additional deepening of the inland waterway in the direction of Gdańsk: Elbląg River–Jagiellonian Canal–Nogat–Szkarpawa–Wiśła for maritime and inland tourism for small water vessels.

The materialization of any of the above-mentioned scenarios will depend on several factors, including the effectiveness of the new marine route connecting the Port of Elbląg and the Gdańsk Bay as well as opportunities for developing port function within the structure of the city and in its close vicinity. However, this last part will depend on the economic demand and the condition of the Port of Gdańsk. This last factor has not been taken into account until very recently (Fall 2022) when the increase in demand for imported coal has led to the rapid increase in the transshipment of this type of cargo. Since the Port of Gdańsk was not ready for this, it proved incapable of handling this increase in demand for the transshipment of coal.

7. Conclusions

Development of the Vistula Spit channel has just been completed. In addition, there are ongoing works on additional infrastructure improvements and many more works still have to be completed concerning the transformation of the Port of Elbląg facilities. Therefore, the impact of this development on the future of the Port of Elbląg is still to be determined. The same relates to the transformation of the urban structure of the city of Elbląg.

The development of the Vistula Spit channel was conceptualized as an economic project, helping the development of the Port of Elbląg. However, one must conclude that the reasons for this development were mostly political. Furthermore, this development may result in some environmental harm. The real impact of this development must still be determined and needs further research. On that basis, one must also conclude that the development of new channels and waterways does not always have to be economically justified, as political arguments may prevail. In light of the current conflicts (war in Ukraine, for example), these reasons must be taken into account.

All of these arguments also relate to the development of the Port of Elbląg and the transformation of the urban space of the city of Elbląg. At this stage, it is already possible to conclude that the previously obvious direction of transformation of the port into a recreational hub is not decided yet. Therefore, the commercial functions of this facility may be restored and/or improved. This may be spurred not only by the presence of the new channel but also by the development of the situation in the Port of Gdańsk as well as by the future directions of the region's development. Considering current political issues associated with the Russo-Ukrainian conflict, many new (mainly political) factors may have to be taken into account. One thing is obvious: For now, this channel contributes towards securing the day-to-day operations of the Port of Elbląg, as transit through Russian territory at this moment is unthinkable due to political tensions.

Conflict of Interests

The authors declare no conflict of interests.

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