



PULASKI POLICY PAPER

Silent Guardians

**Part 3: The Role of the Navy
Modernization Program in Advancing
Poland's Shipbuilding Industry**

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Introduction

The maritime sector is becoming increasingly important to Poland due to its critical role in the country's energy and armaments imports following Russia's full-scale invasion of Ukraine. Both the Baltic Sea and the maritime industry significantly contribute to Poland's trade – particularly with non-EU countries – as well as to the overall growth of its economy. The maritime sector encompasses a wide range of industries, each influencing the entire economy to some degree.

From Poland's perspective, especially in the context of the ORKA program and other ongoing technical modernization efforts, the shipbuilding industry is of paramount importance. It is expected to facilitate the transition from outdated Soviet-era technologies to cutting-edge solutions developed by leading shipbuilding companies worldwide. Poland's submarine program has attracted fierce competition among major contenders seeking to supply the country with the most advanced air-independent propulsion (AIP) submarines available on the market. Previous analyses of the ORKA program have examined the strategic significance of the Baltic Sea to Poland's security and economy, as well as the capabilities and technical specifications of competing submarine classes. This final paper in the series focuses on the future of Poland's shipbuilding industry in the context of the ORKA program, as well as the establishment of a strategic partnership with a selected country to support the sector's revitalization and modernization.

While the construction of submarines is often considered the pinnacle of shipbuilding technology and design – typically requiring decades of strategic development, sustained investment, and the accumulation of specialized expertise – the ORKA program offers a unique opportunity to enhance Poland's shipbuilding sector. We argue that technology transfer (ToT) related to submarine construction, maintenance, repair, and overhaul (MRO), among other areas, could significantly bolster Poland's capabilities. This approach could enable local yards to manufacture vessels that were previously too complex to produce domestically, thereby generating higher value added in the Polish economy.

Although most countries initially focus on civilian shipbuilding before expanding into military vessels, the opposite approach could also be a viable option. The shipyards competing in the ORKA program possess extensive experience in constructing vessels of various sizes, types, and classes for both civilian and military purposes. Thus, the ORKA program, in collaboration with a selected partner country, presents a unique opportunity not only to strengthen the Polish Navy but also to reinvigorate the entire shipbuilding sector. This would be achieved through the spillover of both technological know-how – including ship design, digitization, and automation – and non-technical knowledge, such as advanced shipbuilding management methods, which could potentially be transferred to Poland. This paper explores the potential future of Poland's shipbuilding industry by drawing on the experiences of leading nations in the global shipbuilding sector.

1

Global Significance of the Shipbuilding Sector

The shipbuilding industry is a cornerstone of the global economy, facilitating maritime trade, which accounts for over 80 percent of global trade by volume.¹ This includes the shipment of key natural resources – such as oil and gas transported by specialized tankers and LNG carriers – as well as components that supply various industries worldwide. Additionally, shipbuilding supports the transportation of consumer goods that people use daily, often without considering the extensive journey each product has undergone. The shipbuilding sector serves as an assembly industry integrating various resources, intermediate goods, and services produced by other sectors. These include the manufacturing and fabrication of steel and other metals, machinery, and, in the case of highly-sophisticated military vessels, various types of military equipment such as radars, sonars, missiles, and other weapon systems. Due to the global distribution of comparative advantages at different stages of the manufacturing process, the shipbuilding industry is characterized by complex global value chains, with final assembly often requiring the integration of hundreds of thousands of components. This process requires sophisticated management systems and skilled workforce at each stage of the planning, manufacturing and integration process. Approximately 70–80 percent of the final output value is generated by intermediate goods provided by suppliers.²

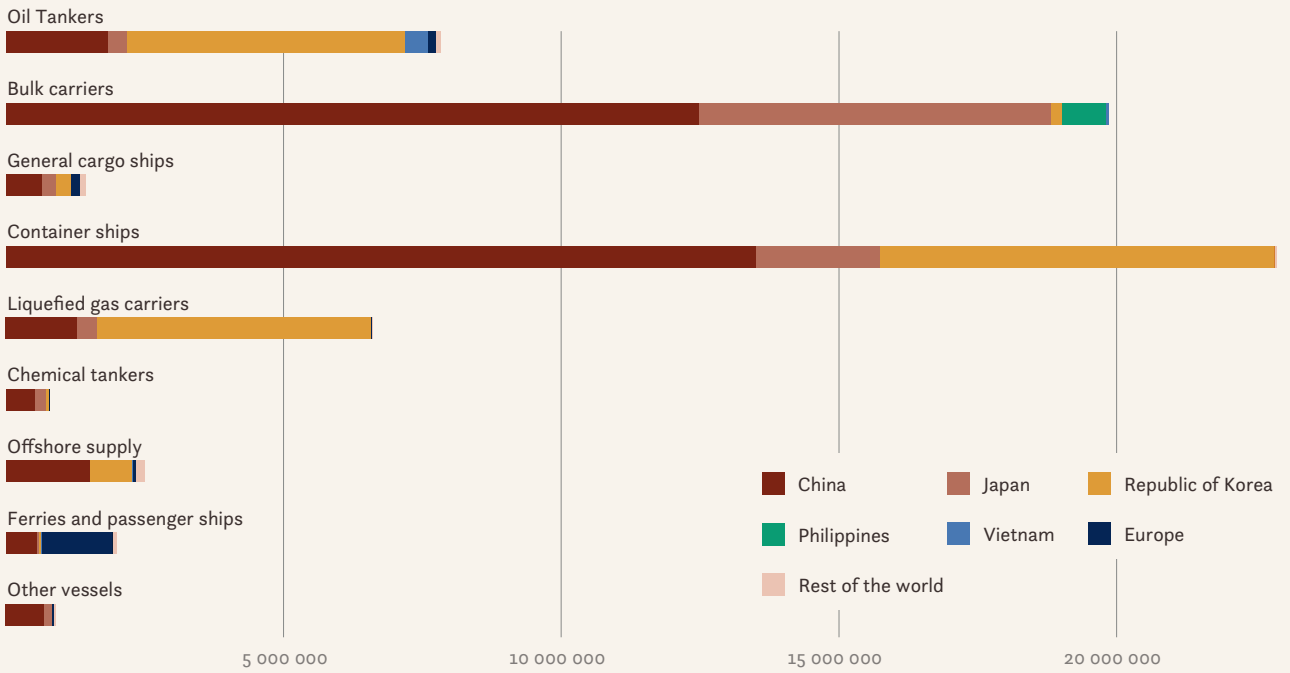
The sector is highly dynamic, with the composition of the yearly output and the structure

of the world fleet evolving in response to global demand for specific types of vessels. In 2024, the most dynamic growth, in terms of deadweight tons, was observed in the production of container ships (7.7 percent), liquefied gas carriers (6.4 percent), and bulk carriers (3.1 percent).³ As of 2023, 95 percent of the sector's total output was generated by just three countries.

China, South Korea, and Japan have achieved their global positions through well-designed, long-term government strategies and policies that facilitated the acquisition of critical expertise from more advanced nations. This, in turn, led to the development of cutting-edge technologies, allowing them to surpass other leading shipbuilding nations over the past 30 to 40 years. Other notable manufacturers, each accounting for no more than 2 percent of the sector's global output, include the Philippines, Vietnam, and several EU countries, such as France, Italy, and Germany.⁴

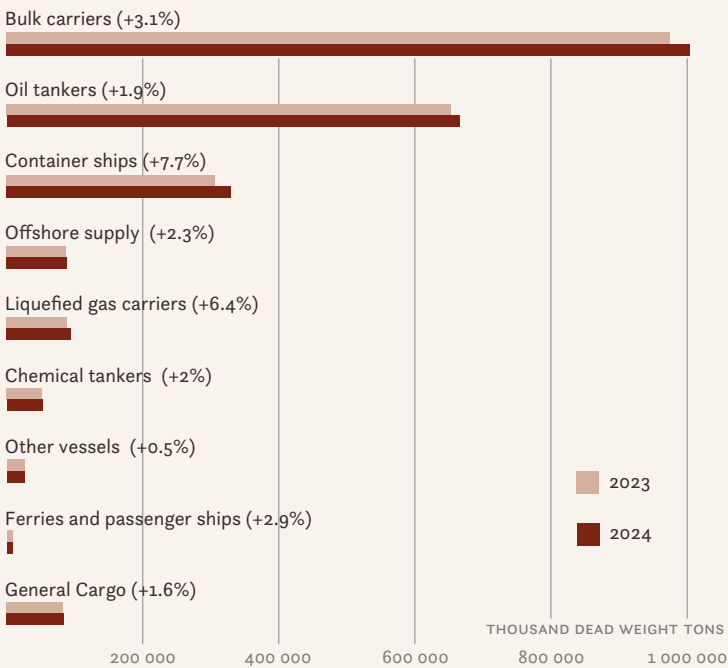
The shipbuilding industry is also characterized by specialization. China and Japan focus on bulk carriers and container ships, while the South Korean industry specializes in high-value vessels, such as oil tankers and liquefied gas carriers. European shipbuilders, on the other hand, primarily concentrate on cruise ships, which is why major European companies were more severely affected by the COVID-19 pandemic compared to their East Asian competitors.⁵

GRAPHIC 1 Deliveries of newbuilt vessels in gross tons in 2023



Based on: 2024 Review of maritime transport, UNCTAD

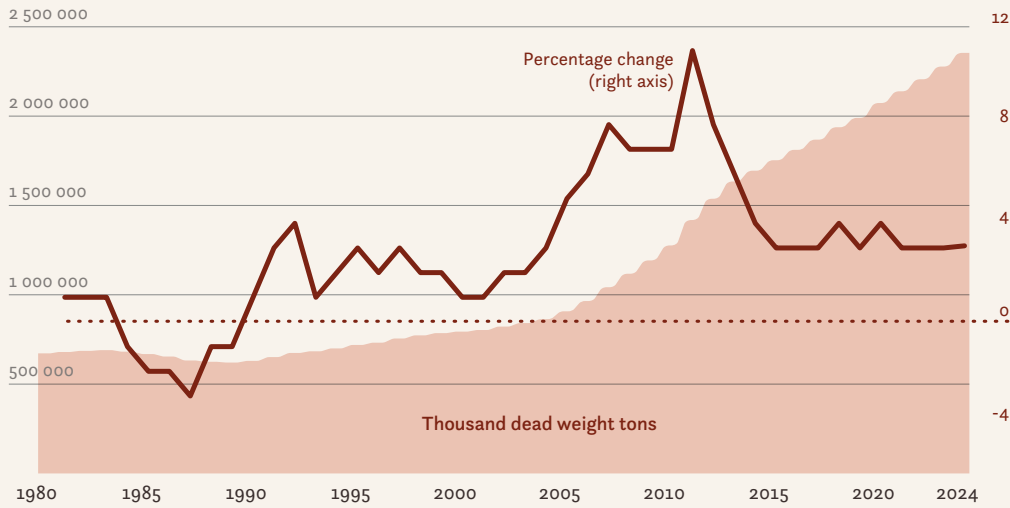
GRAPHIC 2 Developments in the world fleet capacity by vessel type



Based on: 2024 Review of maritime transport, UNCTAD

Considering that the shipbuilding industry is an assembly sector, its overall economic impact – direct, indirect, and induced – depends on the capacity of other sectors to contribute to vessel construction within a given country. In the three leading nations, for example, there is a significant difference in their approach to sourcing intermediate goods. As a result of the Made in China 2025 initiative, the Chinese industry has focused on maximizing the share of domestic inputs, while South Korean shipbuilding companies are more oriented toward globalization and specialization, enabling them to acquire selected types of equipment primarily from European Union countries to optimize manufacturing costs. A similar approach has been prevalent in Japan, with China serving as a major foreign supplier of inputs.⁶

GRAPHIC 3 Trends in yearly world fleet growth: capacity continues to expand in 2023 and 2024 but below the long term average



Source: 2024 Review of maritime transport, UNCTAD

One of the key challenges and sources of new opportunities for the shipbuilding industry is the aging world fleet, which requires retrofitting and replacement with newer, low-carbon, and more energy-efficient vessels. According to data from the UN Conference on Trade and Development, 57 percent of general cargo ships, 47 percent of specialized ships such as

liquefied gas carriers and chemical tankers, and 35 percent of operational oil tankers are at least 20 years old.⁷ The market is expected to see growing demand for bulk carriers to transport raw materials required for the transition to more environmentally friendly technologies, as well as for specialized vessels, including LNG carriers.⁸

2

Lessons Learned from Shipbuilding Industry Leaders

The complexity of the shipbuilding industry and the significant structural differences among leading nations make it difficult to draw direct conclusions from the experiences of countries such as China, given the sheer size of the Chinese economy, relatively low labor costs, government subsidies, and extensive industrial base that vastly exceed the capacity of other notable manufacturers. However, in the case of nations such as South Korea, Japan, and major EU countries, more general conclusions can be drawn, particularly in the context of industrial policies implemented by the governments of these nations, despite the clear technological and industrial gap between them and Poland.

The examples of South Korea and Japan – to a certain degree – are particularly relevant from a Polish perspective, as these two countries are the only major ship producers that managed to remain highly competitive despite the rise of Chinese shipbuilding enterprises. European nations, such as West Germany and France, dominated the shipbuilding market following World War II. However, by the 1960s, their position began to decline due to the rise of the Japanese industry, which remained the largest producer worldwide until the late 1990s, when South Korea overtook it.⁹ The growth of the Japanese shipbuilding sector, along with the entire economy, can primarily be attributed to state assistance, loans provided by state-controlled financial institutions, and various tax measures and incentives designed to stimulate the development of strategic industries, including

shipbuilding. This Japanese growth model later inspired the development policies of South Korea, enabling Seoul to rapidly expand its manufacturing capacity and effectively become a global industrial leader in just thirty years.¹⁰

The origins of the South Korean shipbuilding industry are quite humble, considering the country had to rebuild its entire economy from scratch following the 1953 Korean Armistice Agreement, which ended the three-year period of hostilities on the Korean Peninsula.¹¹ As a former Japanese colony, South Korea in the 1950s was largely an agrarian society with limited light industries and a development policy focused on import substitution. This approach was essential at the time to establish basic manufacturing capabilities for producing consumer goods.¹² In the 1960s, the South Korean government adopted a dynamic strategy focused on export-oriented industrialization and a shift from labor-intensive manufacturing to strategic capital-intensive sectors such as heavy and chemical industries. This development policy was supported by a wide array of infrastructure projects aimed at fostering long-term growth in these sectors, as well as measures like providing subsidized loans, offering tax exemptions, and adapting monetary policy to promote exports.¹³ One of the key sources of funding for these large-scale infrastructure projects – including the construction of the Pohang Integrated Steelworks (POSCO), investments in shipyards, highways, and the development of manufacturing and mining – was a package of loans worth USD



**Kawasaki Shipbuilding
Kobe Shipyard &
Machinery Works of
Kobe Harbor in Kobe,
Hyogo prefecture,
Japan**

Author: 663highland

500 million provided by Japan.¹⁴ This financial support followed the signing of the 1965 Treaty on Basic Relations between Japan and the Republic of Korea.¹⁵ Paradoxically, the agreement significantly strengthened South Korea's industrial sector, to the extent that Seoul soon became a major competitor to Tokyo. Rather than using these funds to purchase goods from Japan, the South Korean government strategically invested them in domestic industries, fueling rapid economic growth and industrial expansion.

This shift – led by private, highly competitive conglomerates supported by the government and other public institutions established to promote exports – contributed to the rapid development of more sophisticated, innovation-driven industries over the following decades. A key feature of South Korea's dynamic approach to industrialization was the development of industries that could benefit from synergistic relationships and had significant potential for international expansion. For example, the rapid growth of the shipbuilding industry in the 1970s was a natural consequence of the steel industry's expansion. As shipbuilding became a major consumer of domestically produced steel and other intermediate goods, it generated significant spin-off effects in adjacent sectors, contributing to broader economic growth and job creation.¹⁶ The progress made in the 1980s

and 1990s would not have been possible without significant investments in education and technical training, as well as technology acquisition and foreign assistance. This assistance included the transfer of knowledge in areas such as management, design technologies, and engineering software, which were provided to South Korean companies between the late 1970s and early 1990s.¹⁷ These changes enabled the South Korean shipbuilding industry to expand its production from relatively small and simple cargo ships to technologically advanced, high-value oil tankers and offshore vessels. This transformation allowed the industry to establish itself as the second-largest shipbuilding sector in the world by the 1980s, with its leading shipyards located in Geoje and Ulsan.¹⁸ In the 1980s and 1990s, the South Korean government shifted its focus from heavy industries to more technologically advanced sectors. This shift required a significant increase in research and development (R&D) spending, as well as the establishment of sufficient infrastructure within companies and research institutions, which elevated development projects in areas of automation, robotics, and welding technologies, among others. As a result, industrial clusters began to form, providing the foundation for domestic supply chains and enabling a significant reduction in import dependency. By the turn of the century, approximately 70-80 percent of inputs were

sourced domestically, including ship engines and to a certain extent electronics produced by the booming South Korean semiconductor industry.¹⁹ The development of the shipbuilding industry had a significant impact on the labor market, directly generating nearly 70,000 jobs in major shipyards and subcontractors by 2003, compared to approximately 40,000 jobs in 1993.²⁰

The South Korean shipbuilding sector has also benefited from the country's long-term defense planning, dating back to the mid-1970s when the government launched the first Yulgok Project. This initiative aimed to strengthen the capabilities of the Republic of Korea (ROK) Armed Forces while enhancing domestic manufacturing capabilities and reducing import dependency in the defense sector.²¹ In contrast to most Western countries, which significantly reduced their military shipbuilding capabilities, South Korea expanded its capacity and enhanced its technological prowess. This progress was achieved partly through technology transfers – such as in submarine construction – that facilitated the development of indigenous designs.²² Currently, the South Korean defense and shipbuilding industry is able to produce all types of vessels, including surface combatants such as destroyers, frigates, landing and combat support ships, submarines with AIP systems, and a wide array of weapons and other systems, including radars, sonars, torpedoes, as well as cruise and ballistic missiles for submarines and land forces.²³

The shipbuilding industry remains a vital component of South Korea's economy. Its large and highly capable industrial base – originally developed for civilian purposes – along with a skilled workforce, can be leveraged for the production of sophisticated vessels incorporating cutting-edge technologies. The synergy between civilian and military shipbuilding is particularly significant, given that South Korea is home to some of the world's largest shipyards. This integration has become a defining feature of recent developments in naval shipbuilding, as the country continues to construct increasingly larger naval vessels that fully capitalize on an industrial base originally designed for commercial shipbuilding.²⁴ The success of South Korea's shipbuilding industry and its strong global competitiveness can be attributed to government policies that supported export-oriented investments, a long-term and consistent approach to policy making, significant investments in R&D, education, digitization, and automation, as well as direct linkages between civilian and military shipbuilding. This allowed South Korea not only to secure large export contracts with countries that have less developed shipbuilding industries but also to acquire foreign shipyards and provide maintenance, repair, and operations (MRO) services to the U.S. Navy.²⁵

On the other hand, European countries have lost their previous position as global leaders in the shipbuilding industry and now primarily



**Hanwha Ocean
Shipyard in Geoje**

Author: IikajuchiN

specialize in the production of passenger ships, including cruise ships. The decline of the European shipbuilding sector has led to a situation where virtually the entire merchant shipbuilding industry is now controlled by East Asian countries.²⁶ Nonetheless, these countries offer valuable insights into the development of the shipbuilding industry. Noteworthy examples with significant capabilities include Italy, Germany, and France. The latter serves as a particularly useful example, given that the French shipbuilding industry has made significant strides in areas such as technological innovation, production capacity, and naval defense. Furthermore, the French case illustrates a different approach to developing naval production compared to East Asian countries, such as South Korea and Japan, and can serve as a model for the specialization of European shipbuilding capabilities and other related services.



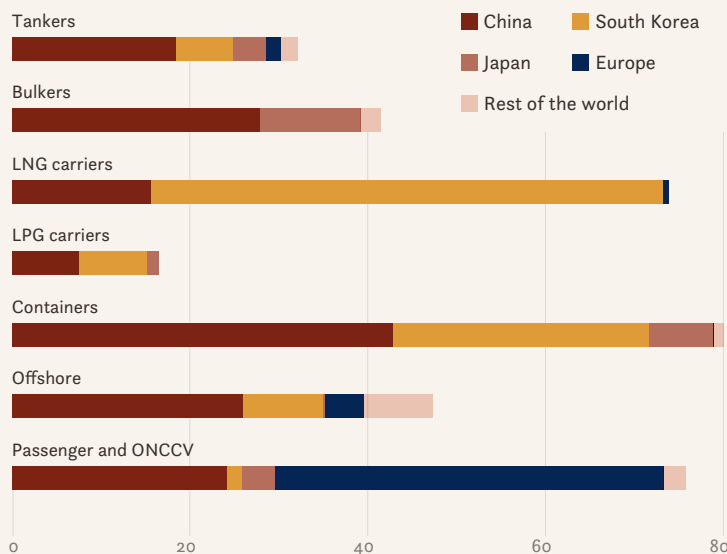
Toulon Harbor

Author: Jackname

According to UNCTAD data, France now holds second place in Europe, after Italy, and is among the top 10 largest shipbuilders globally.²⁷ The French maritime sector, including the shipbuilding industry, renewable marine energy sector, and offshore industry, employs over 125,000 people, generating an annual turnover of EUR 45 billion, while the broader maritime economy sustains over 500,000 jobs. The sector is heavily export-oriented and has significant military shipbuilding capabilities, thanks to the leadership of the French defense company Naval Group, which is owned by the French state and Thales Group.²⁸ The company is capable of producing a wide array of vessels, including frigates and corvettes, nuclear submarines, and a plethora of specialized vessels. In 2023, the Naval Group employed over 16,000 people in total.²⁹

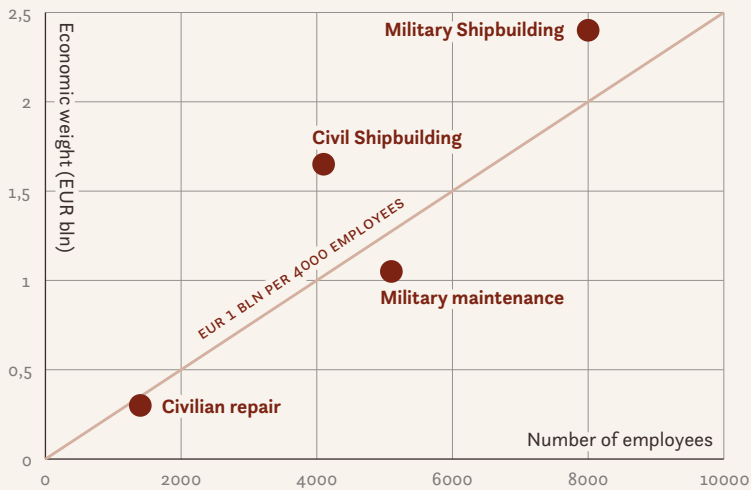
The French shipbuilding sector comprises approximately 60 shipyards, which directly employed over 21,000 workers in shipbuilding and repair services in 2018. The military shipbuilding sector is twice the size of the civilian sector, with military shipyards directly employing over 8,000 workers, compared to 4,000 in civilian shipbuilding. The shipbuilding sector generated the bulk of the revenue (over EUR 5 billion), followed by the naval equipment sector (over EUR 2.5 billion), which employed about 9,500 people at the time.³⁰ In addition to Naval Group, the next largest French shipbuilding company is state-controlled Chantiers de l'Atlantique (CdA), specializing in production for civilian markets,

GRAPHIC 4 Value of world orderbook by main shipbuilding areas in 2023 (bln USD)



Based on: 2023 Shipbuilding Market Analysis, SEA Europe

GRAPHIC 5 Economic weight of the French shipbuilding industry in 2018



Based on: "French ports & yards analytic overview" ISEMAR, 2021

TABLE 6 Specialization of French shipyards

Public Sector (Navy administration)

Vessel Type	Shipbuilder
Submarines	Naval Group
Large Surface vessels	Naval Group, Chantiers de l'Atlantique
Medium navy vessels	Naval Group
Small navy vessels	Intermediate shipbuilders
Coastal Patrol vessel	Small shipbuilders
Seadboat	Small shipbuilders

Passenger ships

Vessel Type	Shipbuilder
Cruise ship	Chantiers de l'Atlantique
Expedition cruise ship	Chantiers de l'Atlantique
Large ferry	Chantiers de l'Atlantique
Small ferry	Intermediate shipbuilders
Touristic boat	Small and Intermediate shipbuilders

Based on: "French ports & yards analytic overview" ISEMAR, 2021

such as cruise ships and large naval vessels, including tanker supply ships and future aircraft carriers for the French Navy, as CdA possesses the only dry dock capable of building such large ships.³¹ Major yards specializing in ship repair and maintenance for merchant and passenger vessels are located in Brest and Dunkirk.³² These yards are controlled by the Dutch defense and shipbuilding giant, Damen Group. Another important company in this sector is Chantier Naval de Marseille (CNDM), owned and operated by the Italian company San Giorgio del Porto.³³

The French shipbuilding industry, overall, is highly specialized and innovative, offering, among others, advanced LNG technologies, hydrogen-based solutions, well-developed repair and maintenance services, and nuclear propulsion systems. Despite the key position of several major companies, the French shipbuilding sector relies on a diversified ecosystem of SMEs (small and medium enterprises) and larger companies, which operate in sectors adjacent to shipbuilding or serve as subcontractors for major shipbuilders. It is also worth noting that two companies are directly controlled by the state, allowing the French government to influence their development. On the other hand, this also presents a significant challenge for the sector, as French shipbuilding and repair companies are dependent on state orders, which could negatively impact their international competitiveness in the long run. Although sector fragmentation could enhance competition among companies, it is worth noting that the global shipbuilding industry is heading toward greater consolidation. These mergers are particularly evident in the leading shipbuilding nations of East Asia such as China and South Korea.

3

Restoration of Poland's Shipbuilding Capabilities

The ORKA program presents an opportunity to revitalize the Polish shipbuilding sector and restore its place among Europe's leading industrial players. The rationale behind large-scale investments in this sector is straightforward – Poland's maritime economy and the Baltic Sea are increasingly vital from both an economic and a security perspective. The Baltic Sea is essential to Poland's energy security, accounting for 90 percent of total gas imports and playing an increasingly significant role in crude oil imports. Poland's reliance on energy supplies transported via the Baltic Sea is expected to rise from 48 percent today to 61 percent by 2040.³⁴ With maritime cargo traffic to non-European ports accounting for approximately 36.5 percent

of Poland's total international maritime trade, the country's four largest ports – Gdańsk, Gdynia, Szczecin, and Świnoujście – generated PLN 58 billion in tax revenue for the government in 2022 alone.³⁵ With the growing importance of the maritime economy, Poland's shipbuilding industry should be capable of meeting the needs of both the national economy and export customers, particularly in Europe. This is especially relevant given the limited competitiveness of the EU's civilian shipbuilding industry, which, in turn, has led to a reliance on imports of merchant vessels, offshore ships, and a significant share of passenger ships from East Asian nations that currently dominate this market.³⁶

LNG carrier in the Świnoujście LNG terminal

Author: Maciej Margas



**PGZ Stocznia
Wojenna
Shipyard**

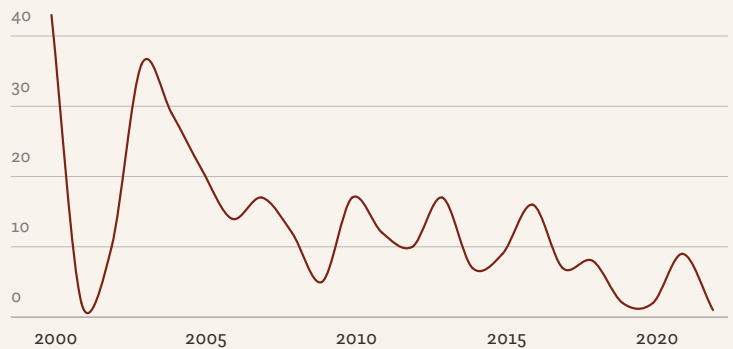
Copyright: PGZ
Stocznia Wojenna



Poland's shipbuilding industry has been in steady decline, with annual ship production dropping from 43 in 2000 to just five in 2023. This trend reflects the diminishing capacity of Polish shipyards to manufacture vessels domestically, further weakening the industry's competitiveness. This decline is also evident in revenue distribution, as new vessel construction accounted for only 12 percent of the total revenue generated by Poland's shipbuilding industry.³⁷ Interestingly, however, the industry is fully capable of manufacturing large components for various ship types, including major vessels such as tankers and container ships. For example, between 2018 and 2022, only 23 fully equipped ships were built, compared to 168 fully completed hulls, the majority of which were exported primarily to European shipyards for final assembly.³⁸ This is further evidenced by the majority of revenue in Poland's shipbuilding industry coming from subcontracting. For example, in 2022, 78 percent of the industry's total revenue came from the provision of parts and components as subcontractors.³⁹

The Polish shipbuilding industry is, however, in an interesting position, with a very limited number of large enterprises. This is reflected in the distribution of revenue: in 2021, 13 percent of total revenue was generated by Remontowa Holding, 4 percent by state-owned enterprises such as PGZ Stocznia Wojenna (PGZ Naval Shipyards), and the remaining 83 percent by various smaller private companies.⁴⁰ The industry itself employs 37,000 people, with each workplace generating an

GRAPHIC 7 Polish shipbuilding industry – number of vessels contracted for production



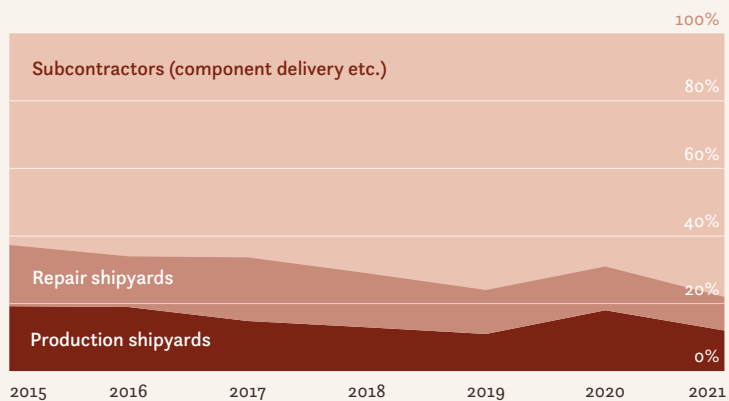
Based on: Peer review of the Polish shipbuilding industry. OECD 2024

additional 5 to 7 jobs in connected sectors, resulting in stable employment for roughly 222,000 to 296,000 people.⁴¹ Remontowa Holding remains the largest employer on the market and one of the leading companies in manufacturing and repair services, as evidenced by its Gdańska Stocznia „Remontowa” (Gdańsk Shiprepair Yard, Remontowa S.A.), one of the largest repair shipyard in Europe. The yard employs over 2,000 workers and nearly as many workers as subcontractors. Likewise, Remontowa Shipbuilding S.A. directly employs nearly 400 workers, and an additional several hundred people are employed by Remontowa's subcontractors.⁴² However, the industry still struggles with a shortage of qualified professionals due to insufficient training programs and highly competitive offers from abroad, which have led to a significant brain drain in the Polish sector.

As part of a comprehensive partnership agreement, based on the ORKA programme, the decision makers should also strive to achieve: a) transfers of technology, including MRO and shipbuilding capabilities; b) assistance in developing the necessary infrastructure; c) support in workforce training, as well as in acquiring technical and non-technical know-how, such as shipbuilding management methods; d) long-term transformation of the industry aimed at strengthening the competitiveness of Poland's shipbuilding and maritime sectors.

Establishment of MRO capabilities in the Polish shipbuilding industry is crucial to secure long-term maintenance of Poland's submarine fleet and other advanced vessels acquired in the future. The transfer of these competencies should support the national economy, increase the turnover of Polish shipbuilding companies, and consequently contribute to the state budget through the taxes paid by businesses directly or indirectly involved in providing MRO services. This is also an opportunity for Polish companies to gain valuable experience and know-how in dealing with cutting-edge technologies and advanced ship designs. Given that Poland possesses some of the largest ship repair yards on the continent, investing in their capabilities would allow for a significant expansion in their operations, establishing Poland as a regional MRO hub.⁴³ The technical knowledge gained from maintaining submarines could also deepen the understanding of the latest technological innovations, potentially paving the way for the development of Poland's domestic ship design

GRAPHIC 8 Polish shipbuilding industry by provided services, in terms of % of total revenue generated by the industry

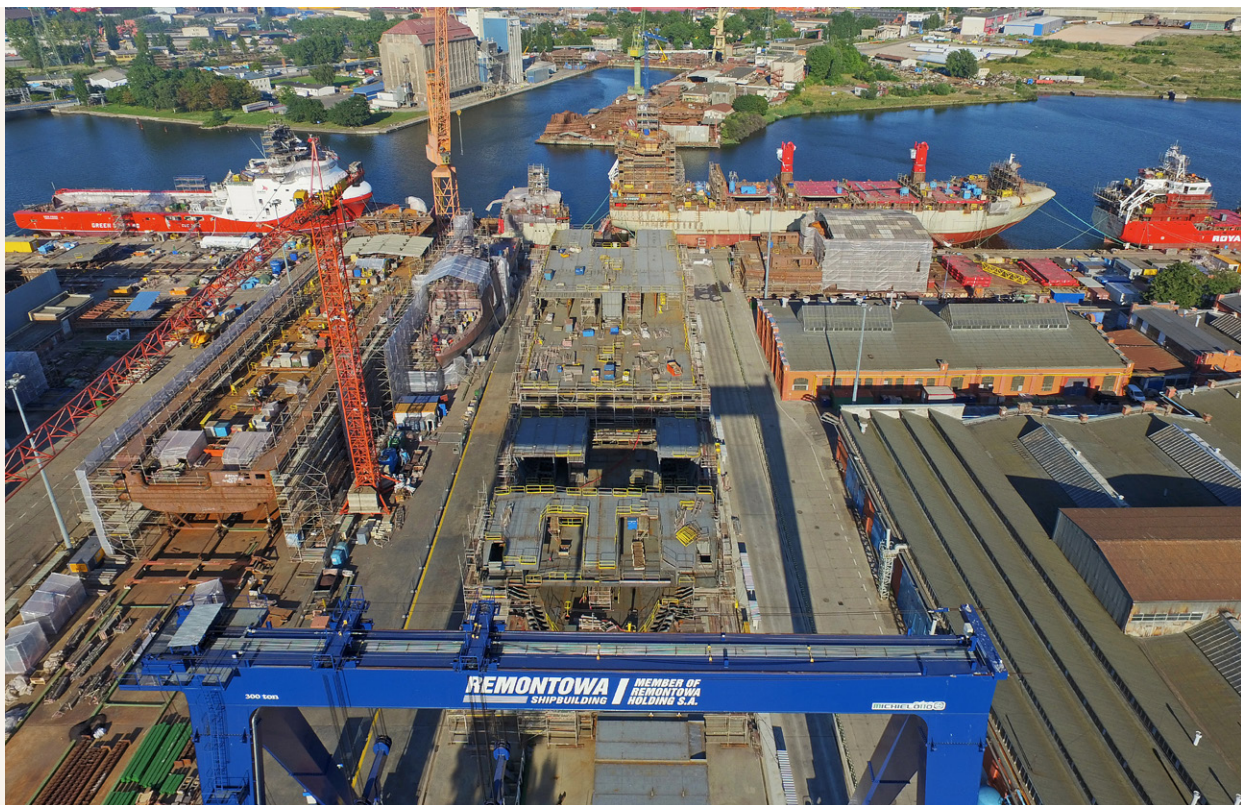


Based on: Czuczman, J. Raport: Przemysł stoczniowy w Polsce w przededniu wojny na Ukrainie. Gospodarka Morska 2023

capabilities. On this basis, the ORKA program should also endeavor to secure technology transfers of selected components, not only to support the MRO services, but also to catalyse the spill-over of those solutions. Certain technologies, designs, and construction techniques employed in the ORKA program could significantly enhance the capabilities of domestic shipyards in designing and constructing both military and merchant vessels. This, in turn, would contribute to the development of more sustainable and self-sufficient supply chains within Poland's shipbuilding industry, supporting future naval procurement programs as well as orders for merchant ships from both domestic and international customers. A similar approach has already been employed by Remontowa Shipbuilding, one of the most successful Polish enterprises in this sector. One of the latest

Construction works at Remontowa Shipbuilding

Copyright: Remontowa Shipbuilding





**ORP Ślężak in
the PGZ Stocznia
Wojenna Shipyard**

Copyright: PGZ Stocznia
Wojenna

passenger ship designs created by Remontowa draws on the experience gained during maintenance of vessels designed by other shipyards. According to Grzegorz Landowski, the communications director at Remontowa Holding, the research and development of new solutions can be facilitated by interacting with established designs and technologies:

“The hardest part is building a prototype. Thanks to the experience of rebuilding numerous ferries, it is easier to build this type of vessel from scratch, including the production of the hull.”⁴⁴

In this context, the technology and know-how transfers, including those related to MRO services, could potentially accelerate research and development (R&D) efforts in Poland, ultimately fostering the growth of indigenous solutions.

Potential directions for the development of the Polish civil shipbuilding sector include investments in green technologies, energy-centered projects, and other sustainable solutions, which could provide Poland with a significant advantage over other competitors. Driven by the need to comply with environmental regulations, which set out ambitious goals of limiting carbon emissions, the shipbuilding market is now urgently seeking and investing in solutions that can limit the impact of maritime operations and enhance the sector’s sustainability.⁴⁵ Lech Grycner – the president of the board of

Maritime Advanced Research Centre – has already noted the potential in the ongoing green transformation:

“Undoubtedly, low-emission technologies are a trend we want to follow. Let us remember that in addition to new constructions, in the coming years it will speed up the modernization process of the existing fleet.”⁴⁶

This shift presents an opportunity for research and development (R&D) projects focused on alternative propulsion technologies using LNG, methanol, or ammonia – fuels with lower carbon emissions than traditional diesel engines. Already a significant increase in alternatively powered vessel procurement could be observed with a total 515 such ships on order in 2024, which marks a 38 percent increase in comparison with 2023. Furthermore, 69 percent of container ships ordered in 2024 are to be capable of utilizing alternative fuel sources – primarily LNG, methanol, and ammonia.⁴⁷ In this context, it would be beneficial for the Polish shipbuilding industry to seek partnerships with companies and countries that have already made significant progress in these areas. Such collaborations could provide a competitive edge by enabling Poland to capitalize on the growing number of contracts arising from the ongoing green transformation of the maritime industry, while potentially giving Polish companies direct access to the partner’s client base.



Panoramic view of the PGZ Stocznia Wojenna Shipyard and surroundings

Copyright: PGZ Stocznia Wojenna

Naturally, both the production and maintenance requires not only the necessary technology and technical expertise but also the ability to create innovative products that are competitive in the global shipbuilding market and have potential for future commercialization, along with the infrastructure necessary for rapid deliveries in sufficient quantities. For example, Polish shipyards have found a niche for themselves in the production of Ro-Pax (roll-on/roll-off passenger) vessels and other similar ships, which are highly popular in the Baltic Sea with a very high potential for future international orders and fleet maintenance. However, the majority of these contracts are currently being awarded to Chinese manufacturers, who can build ships quickly and on a large scale.⁴⁸ As a result, their offers are perceived as more attractive due to lower costs and shorter delivery times – for example, in 2024, China-built ships were reportedly 30 to 40 percent cheaper compared to European counterparts.⁴⁹ According to Landowski, the reason why European buyers choose to procure Chinese vessels is “the lack of competitive offers in Europe.” While Polish shipyards, like the Remontowa, have the capability to produce Ro-Pax vessels they are trailing behind. There is a chance, however, to catch up to the East Asian shipyards, observes Landowski:

“China’s competitive advantages, such as production speed and price, are starting to diminish.

Chinese shipyards are experiencing contract delays and production costs are rising.”

The COVID-19 pandemic and subsequent disruptions to supply chains have diminished the attractiveness of non-European manufacturers, prompting European customers to consider local options for acquiring new vessels. Therefore, Polish shipbuilding companies should focus on expanding their product portfolios and scaling up production capabilities. This should include the revitalization of outdated manufacturing infrastructure as well as investments in new production technologies, including automation. Although the extent of these technological improvements should be determined by the industry, the modernization process could incorporate, for example, AI-based solutions to boost productivity and overall manufacturing efficiency. Such an endeavor requires vast amounts of resources and experience, which points to the idea of establishing partnerships with foreign companies that could support such a transition. Jerzy Czuczman, the president of the board of the Polish Forum of Marine Technologies Poland suggests to look to the Far East in search of capable partners:

“Korean shipyards have the capacity for mass production, while allocating large financial capital to the shipbuilding sector. On the other hand, Polish enterprises have a unique ability to

manufacture unit products, which so far few or no one has made. I see this as a great opportunity to create a strong cooperation.”⁵⁰

It is worth noting that Poland has a well-established relationship with South Korean shipyards, which recently constructed two LNG carriers for the Polish oil and gas company ORLEN, as domestic shipyards currently lack the capacity to build such vessels.⁵¹ The expansion of LNG infrastructure in Poland, driven by growing demand for natural gas as well as the evolving needs of Polish companies across various sectors, presents an opportunity to enhance the capabilities of domestic shipyards. Strengthening these capabilities would help ensure that future contracts are fulfilled by Polish companies rather than relying on foreign suppliers.

The transformation of the Polish shipbuilding industry hinges on a critical factor: manpower. This encompasses the recruitment, training, and retention of qualified personnel, including technicians, engineers, and other professionals with strategic competencies. The decline of the Polish shipbuilding sector, along with better career opportunities abroad following Poland’s accession to the EU in 2004, contributed to the brain drain and emigration of thousands of qualified and experienced professionals.⁵² In order to develop

and grow, Polish enterprises should invest in training facilities and programs that could support the education of new cadres. For this reason, it is essential to cooperate with partners that possess necessary know-how and experience in large-scale training programs aimed at enhancing technical and non-technical skills. Such programs could encompass, among others, the introduction of new digital technologies, latest advances in welding techniques, or production automation in the shipbuilding industry. Such programmes have already been established in other areas connected with maritime industry, i.e. the Center for New Competences which provides specialised training for port employees such as crane operators or terminal tractor operators.⁵³ Furthermore, as part of the agreement the industry partner could support the organizational and management development, providing the necessary know-how to the companies’ leadership and middle management. Katarzyna Romantowska, the managing director at Damen Engineering Gdansk noticed that Polish professionals and enterprises lack the necessary skills, which have to be relearned:

“In addition to strictly technical knowledge, soft skills are very important, i.e. understanding the project management standard, the ability to co-create a team, ‘the ability to play on a team’



**Remontowa
Shipbuilding Shipyard
with Ro-ro vessels
under construction**

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Shipbuilding



Digital image of the new logistical hall at PGZ Stocznia Wojenna

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in the daily work of every specialist – this is the key to the success of a given project. We are a nation of individualists, cooperation does not come to us intuitively, we have to learn it.”⁵⁴

As such it would be invaluable for Poland and its shipbuilding industry to access the knowledge of experienced companies that have invested countless resources and spent years developing such skills and creating a strong position on international markets.

The final point to consider is recent EU initiatives aimed at increasing the readiness of European armed forces and strengthening member states’ industrial capabilities. Although the implications of these EU regulations are beyond the scope of this analysis, it is noteworthy that the modernization of both the Polish Navy and the shipbuilding industry encompasses numerous areas crucial to enhancing Poland’s industrial capacity. These include overall manufacturing capabilities, workforce development, and the adoption of new technologies – not only to bolster the country’s defense posture but also to improve the effectiveness of its industrial base. This broad scope of improvements

presents an opportunity for both major Polish shipbuilding companies and SMEs. Furthermore, such an extensive approach to industry modernization could help Poland establish secure supply chains, thereby positively impacting both the nation’s defensive capabilities and other strategic sectors that rely on merchant ships and specialized vessels for effective operation. In order to benefit from the improved effectiveness of the industrial base, the Polish shipbuilding industry requires a partner’s assistance in securing a client base and future export contracts.

Given current political circumstances and the industrial capabilities of each potential partner in the ORKA program, it is reasonable to assume that no option should be ruled out, including those from outside the European Union. Notably, recent EU documents explicitly call for tighter industrial cooperation between EU member states and key partners in the Indo-Pacific region, such as South Korea. Poland’s decision-makers face a challenging task, as the selection process must consider not only the tactical and technical characteristics of each submarine class but also the broader industrial implications.

4

Conclusion

The ORKA program can serve as a unique opportunity for Poland to invest and revitalize its shipbuilding industry. For this reason, the decision makers should not only consider the technical and operational requirements of the new submarines but rather approach this purchase with a wider, industrial perspective, taking into account the potential effects that the acquisition and partnership agreement can have. With this in mind, the selection process should re-examine the final offers and partnerships in the ORKA program based on the transfer of selected technologies and competencies – including those pertaining to MRO services – to the Polish shipbuilding sector. The future partner should

also have the capacity to support the long-term development of Poland's shipbuilding industry and the broader maritime economy by assisting in the modernization of shipbuilding infrastructure, reinforcing personnel training, and transferring knowledge necessary to transform Poland into one of the leading players in this sector – capable of competing and succeeding in international markets. Through this holistic approach the decision makers will be both able to settle on the most favorable offer, revitalize Polish shipbuilding industry, and establish long-lasting partnerships that could propel Poland's development, economic prosperity, and strategic security.

5

Recommendations

1. Polish decision makers need to look at the ORKA program not only as an acquisition program for new submarines but as an opportunity for the modernization and development of the Polish shipbuilding and maritime industry. The maritime sector plays a strategic role in Poland's energy imports and is increasingly important in securing a stable supply of critical natural resources and enables Poland to sustain beneficial trade relations with key partners. These factors necessitate greater investments in these sectors of the economy, including the shipbuilding sector.
2. The agreement on the acquisition of new submarines should secure technology transfers, especially those related to MRO services and shipbuilding capabilities, to the Polish industry. This could generate significant economic benefits for the Polish shipbuilding industry along with other sectors thanks to spillover effects of technology transfers. In turn, such an approach to cooperation with a given country would enable Polish companies to generate significant revenue, create new jobs, and consequently support the state budget through direct and indirect taxes. It is also important to note that technology transfers related to the submarine program could potentially benefit the entire industry in the long run by enhancing its technological capabilities and competitiveness.
3. The potential partnerships should have a special focus on the development of green technologies offering alternative fuel sources and cutting carbon emissions, allowing Poland to complete EU green transformation goals while maintaining steady pace of development and keeping a competitive edge in European markets.
4. To enhance the competitiveness of the shipbuilding sector, Poland should invest in its domestic R&D capabilities through the cooperation on joint innovative solutions with a partner that possesses cutting-edge technologies and experience in designing complex, high-value vessels.
5. The selected partner should be able to support the development of the competencies and skills of the Polish workforce and assist Poland in establishing necessary training capacities to secure the education of the new generation of engineers, technicians and management cadres.
6. Potential partnerships should enable the Polish shipbuilding industry to secure a stake in large contracts executed by a strategic foreign partner or, alternatively, to obtain new contracts that can be entirely transferred to Poland and implemented domestically – from the design phase through to final construction – which the strategic partner will secure based on its own client base.

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