



Transforming Poland's Defense Industry

Strategic Insights from the Republic of Korea

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Executive Summary

Following Russia's full-scale invasion of Ukraine in 2022, the Polish government launched an unprecedented military modernization program with the primary long-term objective of establishing Poland as a major land power in Europe. In 2024 alone, Poland's defense spending is expected to reach PLN 170 billion or USD 43 billion based on the current exchange rate, accounting for over 4.2 percent of GDP. In 2024, the overall defense spending could reach up to USD 50 billion, accounting for 5 percent of Poland's GDP. This clearly indicates that Poland should no longer rely on off-the-shelf military procurement. The Polish government must ensure greater involvement of the domestic industry in manufacturing, maintaining, and developing military hardware in the future. Nonetheless, achieving the level of industrial advancement seen in other leading nations would take years, if not decades, and certainly cost billions of dollars in research and development. Given Poland's geopolitical conditions and the lingering fear of another conflict in Europe, the only way to overcome the aforementioned issues is to follow the path of other states that have faced comparable problems in the past like the Republic of Korea. Since 2022, the Polish-South Korean cooperation has accelerated significantly, demonstrating the commitment of both governments to strengthen industrial and economic ties between Seoul and Warsaw. The Polish Ministry of National Defense has ordered hundreds of K2 main battle tanks, K9 self-propelled howitzers, K239 rocket launchers, and FA-50 aircraft. The scale of Poland's

military procurement represents an unprecedented opportunity not only to strengthen the Polish Armed Forces but also to transform the Polish defense industry, which lags behind that of other industrialized nations. Potentially, Poland could cooperate with South Korean defense companies, such as Hyundai Rotem and Hanwha Aerospace, to jointly manufacture and export South Korean-Polish weapon systems to other European countries. Considering that no Polish company is currently capable of manufacturing main battle tanks, the cooperation with the South Korean defense industry in the K2 program presents an opportunity to re-establish Poland as an MBT producer to meet the needs of the Polish Armed Forces and potentially attract other export customers. Therefore, the cooperation with the South Korean industry could be highly beneficial for numerous Polish defense companies.

The rise of the South Korean industry offers valuable lessons and insights that Polish policymakers could use to develop a long-term strategy for modernizing Poland's economy, particularly the defense sector. Over the course of 50 years, South Korea has successfully developed a highly innovative and competitive defense industry capable of manufacturing complex weapon systems in all domains. This achievement would not have been possible without the bipartisan support of South Korean political elites, well-designed long-term industrial policies, efficient institutional frameworks, perseverance, and significant funding aimed at establishing domestic manufacturing

capabilities. These efforts have strengthened the nation's military and elevated South Korea to the position of one of leading arms producers in the world. Seoul has effectively used cooperation with more advanced nations, particularly the United States, to build a robust defense industry from scratch, acquire crucial technologies, and develop the skills and know-how required to become an innovator and an arms exporter. These factors are particularly important given that Poland lacks similar policies, and decisions concerning the procurement of military equipment are often politicized and used by Polish political parties to wage political conflict.

To emulate the South Korean model, Poland could utilize licenses, technology transfers, and other non-technical know-how to rapidly improve the capabilities of Polish arms producers. Nonetheless, to catch up with more advanced economies and foster domestic innovations, the development of the domestic defense industry will require significant R&D funding and long-term planning. To begin with, one of the

key areas to analyze is the choice between off-the-shelf military procurement, domestic production based on foreign licenses, and entirely domestic production utilizing national or international research and development projects. The implementation of any of these three options in a given case requires in-depth analysis of security threats, the international situation, economic and financial considerations, national industrial and other strategic interests, and potential long-term export opportunities. These plans should also include the development of dual-use technologies in Poland. International cooperation in the defense industry, exemplified by numerous projects jointly conducted by European arms producers, demonstrates the benefits of shared R&D costs and industrial specialization. Similar cooperation frameworks could be applied by Poland and South Korea in the future. Potential business-related gains for the Polish defense industry include future export opportunities and the reciprocal acquisition of Polish-made weapon systems by the Republic of Korea.

1

Introduction

Since Russia's full-scale invasion of Ukraine in 2022, Poland has demonstrated its key role in the North Atlantic Treaty Organization as the cornerstone of the Alliance's Eastern Flank by becoming one of Kyiv's staunchest allies and a leading proponent of greater involvement by Western democracies in supporting Ukraine's efforts to defend its territory against the might of the Russian forces. Warsaw not only encouraged other NATO states to provide more capable and advanced weapon systems to the Ukrainian Armed Forces but also transferred a significant amount of combat equipment, such as main battle tanks, infantry fighting vehicles, fighter aircraft, artillery, unmanned aerial systems, and air defense systems. These hundreds, if not thousands, of weapon systems delivered in the past two years by Poland have allowed the Ukrainian Armed Forces to withstand the Russian onslaught and effectively reclaim some parts of the territory that had been conquered by Moscow. On the other hand, the new-generation equipment manufactured by the Polish defense industry has been battle-tested, allowing for further improvements based on experiences from the Ukrainian theater.

Undeniably, Poland's involvement in sustaining Ukraine's war efforts was invaluable and largely underestimated, considering the sheer number of systems, such as main battle tanks, that Warsaw donated to Kyiv. **In response to the gaps in Poland's defensive capabilities made evident after the transfer of equipment to Ukraine, the Polish government launched**

an unprecedented military modernization program with the primary long-term objective of transforming Poland into a major land power in Europe. These defense procurement programs remain largely based on the concepts drafted over ten years ago and incorporated into the 2013–2022 Technical Modernization Plan. The main difference, however, is the scale and scope of acquisitions, which now must address the needs of much larger and more capable land forces, consisting of six very well-equipped divisions. **Donations of substantial military assets to Ukraine undoubtedly aligned with Poland's strategic interests, given their impact on strengthening Ukraine's capabilities and thereby reducing direct threats posed by Russia to Poland's external borders. Nonetheless, Poland is now compelled not only to modernize its armed forces but also to rearm itself as soon as possible.** In addition to other long-term procurement programs, such as WISŁA and NAR-ŁEW air defense systems, the Polish government decided to pursue the parallel acquisition of two types of main battle tanks: the General Dynamics' M1A2 SEP V3/M1A1 FEP Abrams and the K2/K2PL Black Panther main battle tanks designed by Hyundai Rotem. **It is worth noting that the Polish Ministry of National Defense announced plans to acquire approximately 1,000 K2/K2PL MBTs, clearly indicating that this type of main battle tank will become the backbone of Polish armored units in the future.** A similar situation has occurred regarding rocket artillery with the acquisition of hundreds of South Korean K239 and American HIMARS launchers.

Regardless of technical and tactical characteristics of highly advanced U.S.-made weapon systems, such purchases are often perceived as a political decision, a signal that Poland remains one of the closest allies of the United States. **The cooperation with the Republic of Korea, on the other hand, seems to be a consequence of more in-depth analyses, taking into account industrial and economic implications of deeper ties between Seoul and Warsaw. In recent years, Poland has attracted numerous South Korean greenfield projects, including the manufacturing of electric vehicle (EV) batteries and other advanced technologies.¹ This has made South Korea one of Poland's major non-European sources of foreign direct investment² and has established Warsaw as a key economic partner of Seoul in Central and Eastern Europe.³** Despite Warsaw and Seoul intensively cooperating in various sectors since Poland's political and market transformation in the 1990s, and South Korea becoming a source of technologies that facilitated successful development of the KRAB self-propelled howitzer (SPH) in the past ten years, Poland had not been a major customer or partner of the South Korean defense industry prior to Russia's invasion of Ukraine in 2022.

The need for Poland's rapid rearmament has changed the priorities of the Polish government, highlighting the importance of swift deliveries and Poland's commitment to involving the domestic industry in the procurement programs. The financial aspects of Poland's military modernization are equally important in this regard. **In 2024 alone, Poland's defense spending is expected to reach PLN 170 billion or USD 43 billion based on the current exchange rate, accounting for over 4.2 percent of GDP.⁴** According to the Polish Defense Minister Władysław Kosiniak-Kamysz, Poland plans to increase its military spending by 10 percent in 2025. However, the Ministry of Defense does not rule out the possibility that overall defense spending could reach up to USD 50 billion, accounting for 5 percent of Poland's GDP.⁵ **This**

clearly indicates that Poland should no longer rely on off-the-shelf military procurement. The Polish government must ensure greater involvement of the domestic industry in manufacturing, maintaining, and developing military hardware in the future. The ultimate objective of Polish policymakers in the context of the defense industry should be to transform the sector into a source of innovation capable of exporting its products regionally and globally. Undoubtedly, this could be achieved through direct support for Polish companies in domains where the Polish defense industry possesses necessary skills and capabilities. However, the Polish military industry has lost numerous manufacturing capabilities in the past 20 years, including the production of main battle tanks and various types of ammunition. **In certain domains, achieving the level of industrial advancement seen in other leading nations would take years, if not decades, and certainly cost billions of dollars in research and development. Given Poland's geopolitical conditions and the lingering fear of another conflict in Europe, the only way to overcome the aforementioned issues is to follow the path of other states that have faced comparable problems in the past like the Republic of Korea.** Poland is no longer a poor, underdeveloped country barely able to finance basic infrastructure projects, but a thriving and proud nation that can leverage existing challenges against all odds. The recent strengthening of ties between Seoul and Warsaw is usually viewed in the context of large-scale military procurement programs and the expansion of South Korean companies. However, the rise of the South Korean industry offers more valuable lessons and insights that could be utilized by Polish policymakers in developing a long-term strategy for modernizing Poland's economy, particularly the defense sector. Considering their common historical experiences, Poland and South Korea share similar external threats and geopolitical issues. Moreover, the two nations can learn much from each other and establish a strong industrial relationship beneficial for both sides.

2

The Rise of the South Korean Defense Industry from the 1970s to the 1990s

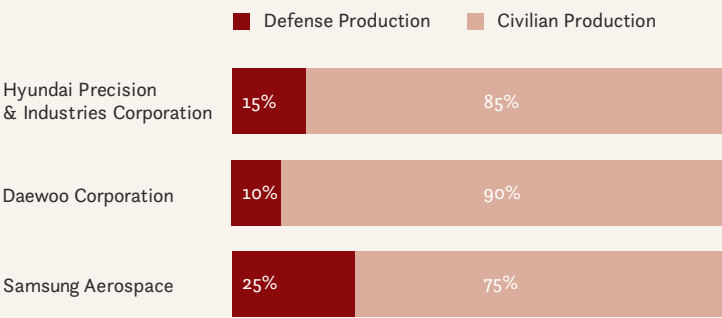
In the mid-1950s, following three years of tumultuous war on the Korean peninsula, South Korea emerged as a shattered nation with one million people dead and an economy in ruins.⁶ The political instability, corruption, and dependency on U.S. aid hindered economic recovery. Nonetheless, the U.S. economic assistance, estimated at USD 12.6 billion by 1976, allowed for the reconstruction of the country's infrastructure and military, as well as sustained South Korea's massive trade deficit.⁷ In the late 1950s, South Korea's economic policy followed the path of other developing and postcolonial countries, implementing import substitution industrialization as the national development strategy.⁸ This approach to industrialization was not viable for South Korea given the lack of natural resources, rapidly growing population, and dependence on agriculture as a major sector of the economy. However, U.S. aid contributed to a significant improvement in human capital, providing technical training and education for skilled bureaucrats and other professionals who would later become one of the foundations of the South Korean economic miracle. In the late 1950s, the Economic Development Council was established under the auspices of the Ministry of Reconstruction. The council was tasked with drafting long-term development plans for the South Korean economy based on macroeconomic modeling.⁹ These efforts, along with other policies such as education and land reforms, paid off in the 1960s. Socioeconomic transformation of the country was strengthened by the exodus of rural population and rapid

urbanization. Simultaneously, a new generation of entrepreneurs emerged and formed large businesses, known as chaebols, which over time evolved into massive conglomerates and are now the foundation of South Korea's economy and the source of its global success. The model applied in South Korea resembled Japan's industrial structure, where strategic sectors were dominated by keiretsu.¹⁰ However, the Korean chaebol-based model relied on state funding and a centralized production structure, with multiple specialized subsidiaries producing selected components. In contrast, Japan's production structure was more decentralized, with greater involvement of external contractors and virtually unlimited funding provided by financial institutions within keiretsu's organizational structures.¹¹

The history of most South Korean corporations began after liberation in the 1940s and 1950s, including Hyundai, LG, Ssang Yong, and Samsung. In the 1960s, the South Korean conglomerates became even more prominent with a change in the national development policy, which began pursuing export-oriented industrialization. In the 1960s, the average GDP growth rate reached 7.5 percent. In the 1970s, the South Korean economy expanded by an average of 8.6 percent annually, and the average growth rate accelerated to 9.3 percent in the 1980s.¹² These new economic and financial conditions allowed the South Korean government to develop new sectors, including the defense industry.

The rise of the South Korean defense sector dates back to the early 1970s when the administration of President Park Chung-hee drafted the first plans to launch domestic production of military equipment, as well as research and development programs. In 1970, the government established a specialized research and development (R&D) institute, the Agency for Defense Development (ADD), which was tasked with supervising and coordinating military technology development to strengthen the domestic industry and ensure the state's autonomy in the defense sector.¹³ These efforts, encouraged by the United States and North Korea's military modernization, led to the establishment of license-based manufacturing of firearms, ammunition, and maintenance services in the Republic of Korea by the mid-1970s.¹⁴ The South Korean government studied the experiences of developed countries and concluded that defense technology is the key factor in building defense capability and competency. Based on this conclusion, the government decided to establish the ADD as the first step in strengthening South Korea's defense capabilities. In the late 1970s, President Park's administration envisioned an ambitious modernization program for the industry, with the ultimate objective of making South Korea virtually self-sufficient in the field of military manufacturing, except for advanced electronics and combat aircraft.¹⁵ The 1974 Yulgok defense industrialization plan assumed that the diffusion of skills and technologies would strengthen the country's private sector and thus allow for the rapid modernization of the South Korean military.¹⁶ To guarantee the swift and successful implementation of the program, the government prepared incentive packages for defense contractors, including low-interest loans, duty exemptions for raw materials, tax incentives, as well as draft exemptions for key professionals in the industry. These measures were largely based on three government policies: the 1973 Special Law on the Defense Industry, the 1974 Force Improvement Plan, and the 1975 Defense Tax Law.¹⁷ The defense sector development was integrated into a broader scope of industrial policies intended to foster manufacturing in heavy machinery, shipbuilding, steel, and electronics.¹⁸ Along with the aforementioned regulations, South Korean companies were not allowed to allocate their entire manufacturing capabilities to military purposes¹⁹ and had to pursue dual military-civilian production.²⁰ For instance, in

FIGURE 1 Arms Revenue as % of Total Revenue of Selected South Korean Defense Companies in the early 1990s.



Based on: U.S. Congress, Office of Technology Assessment, 'Global Arms Trade', OTA-ISC-460, p.131.

the early 1990s, defense products accounted for 15 percent of the sales of Hyundai Precision & Industries Corporation, 10 percent of Daewoo Corporation, and approximately 25 percent of Samsung Aerospace.²¹ (Figure 1)

In the 1980s, the South Korean government established several new institutional arrangements to promote the growth of the domestic defense industry. The overall legal framework promoted specialization over competition to reduce sunk costs associated with financing multiple development programs simultaneously. Other arrangements included guaranteed production costs by the government and access to preferential financing schemes²² provided by the Defense Industrial Promotion Fund established in 1980.²³

By the 1980s, the South Korean defense industry was capable of manufacturing most of its land forces' combat equipment, including tanks, as well as naval vessels, thanks to its rapidly expanding shipbuilding industry.²⁴ The development of these new weapon systems was a challenging task, given that South Korea lacked necessary experience at the time. Ultimately, the South Korean government opted for cooperation with American partners, which allowed for joint development of a new indigenous tank, later known as the K1, based on technologies developed for the M1 Abrams. It is

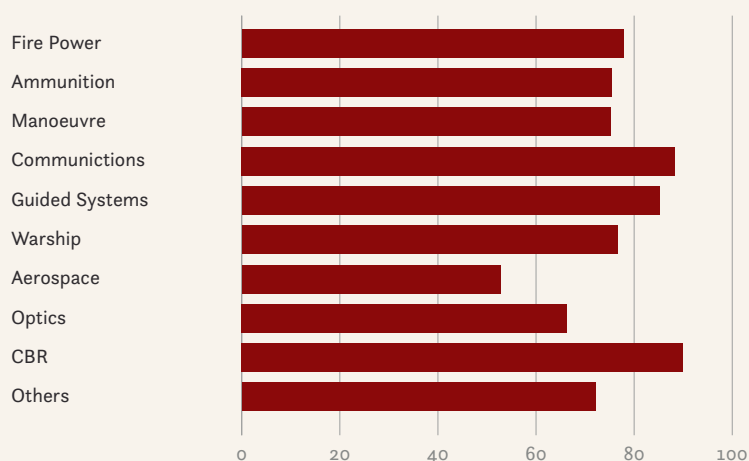
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sierż. Aleksander Perz
18 Dywizja
Zmechanizowana



worth noting that Seoul's decision to utilize international cooperation as a model for developing weapon systems aimed at securing domestic manufacturing capabilities in the newly established Hyundai Precision & Industries Corporation in 1977 (now Hyundai Rotem). After nearly a decade of development, the company successfully launched the production of the K1 main battle tank in 1987 in Changwon.²⁵ In total, the company delivered over 1,000 K1 MBTs by the late 1990s.

By the end of the 20th century, South Korea became capable of domestically assembling and producing various types of armament, including armored personnel carriers, artillery and missile systems, and fighter aircraft.²⁶ Nonetheless, this would not have been possible without the import of key technologies and parts that South Korean conglomerates were not able to produce domestically at the time.²⁷ Undeniably, the country's ability to manufacture such advanced weapon systems proves South Korean ingenuity. However, the most significant aspects of the aforementioned developments were well-designed cooperation agreements with mostly U.S. defense firms, a long-term approach to establish necessary domestic capabilities, and sound financial and economic foundations, which have contributed to the rise of South Korea as an advanced and highly innovative economy in the 21st century. (Figure 2)

FIGURE 2 South Korea's Indigenization Rate of Weapons Systems.



Based on: International Trade Administration, 'South Korea – Defense Industry Equipment', 2023.

3

South Korean Defense Industry in the 21st Century: From Imitation to Innovation

Research and Development

In the late 1990s, thanks to the experience of the previous two decades, Seoul began placing more emphasis on entirely domestic products, developed through national R&D programs, to establish South Korea as a global arms exporter. This approach highlights that the South Korean administration favored long-term industrial development planning, which could be divided into three stages:

1. Domestic production of basic military equipment, such as firearms, based on licensing.
2. Joint development programs and imitation of foreign weapon systems by the domestic industry.
3. Production of indigenous weapon systems for domestic purposes and export markets alike.²⁸

Seoul's focus on industrial development through national research and development programs reflects how the South Korean government and businesses perceive the importance of innovations. The South Korean government first developed the technological capabilities of the ADD and then supported private companies in the defense sector by providing technology and research and development financing. Thus, the government could retain ownership of key defense technologies and gain control over private defense companies. According to the World Bank

database, the Republic of Korea ranked 2nd in the world in terms of research and development spending, allocating over 4.9 percent of its GDP for this purpose in 2021.²⁹ Since the early 2000s, the South Korean military R&D budget has seen a systematic increase in spending for the development of core technologies that cannot be acquired abroad and are of strategic importance for the state's security. It is also worth noting the growing expenditure by private companies and other specialized research centers that gradually take over the financial burden from the Agency for Defense Development.³⁰ A characteristic feature of the South Korean model is the constant collaboration between the state and private sector, which guarantees secure source of funding for research and ensures government control over defense technologies and technology transfers within the sector.³¹ The South Korean government has also been promoting the development of dual-use technology and collaboration among various ministries, government agencies, and the private sector,³² which can be highly beneficial for the future development of civilian and military technologies alike, particularly in the context of the Fourth Industrial Revolution.³³ The promotion of dual-use technologies also boosts a growing base of highly innovative small and medium enterprises (SMEs) that benefit from the state's cluster policy, particularly the Changwon National Industrial Complex,³⁴ where factories of the largest South Korean defense contractors, such as Hyundai Rotem

and Hanwha Aerospace, are located.³⁵ This is also important in the context of regional development in the Republic of Korea, given that the defense industry generates high-skilled and quality jobs and stimulates both the labor market and local industrial base away from the country's capital, Seoul.³⁶

In recent years, considering that South Korea's strategy for defense industry development is embedded in export-oriented industrialization, which played a key role in elevating the country's position as one of the most innovative and advanced economies in the world, Seoul has implemented numerous industrial policies focused on the defense sector, including the Defense Acquisition Program Act of 2018, the Defense Science and Technology Innovation

Promotion Act, and the Defense Industry Development Act in 2021.³⁷ All of this is accompanied by other initiatives, such as the 2021 Buy Korea Defense and Korea Defense Capability plans, which formalize the objectives of national defense procurement programs and their economic implications, as well as prioritize the acquisition of domestically developed weapon systems and technologies.³⁸ The statistical data demonstrate Seoul's perseverance in this regard, given the growing percentage of domestic procurement, which increased from 54 percent in the 1970s to approximately 77 percent in the 1990s.³⁹ The existing procurement policy of the Defense Acquisition Program Administration (DAPA) introduced even more ambitious objectives, aiming for 80 percent of defense products to be manufactured in South Korea.⁴⁰

Institutional Framework

Besides the aforementioned Agency for Defense Development (ADD) and the Ministry of National Defense, the development of the South Korean defense sector is influenced by other institutions, including the Defense Acquisition Program Administration (DAPA) and the Export-Import Bank of Korea, which was founded in the mid-1970s and today serves as South Korea's export credit agency (ECA).⁴¹ The existence of the ECA is crucial for promoting South Korean defense products in foreign markets and providing secure and stable financing for importers that often rely on loans provided by an exporting country.

South Korea's Defense Acquisition Program Administration (DAPA) was established in 2006 with the aim of supporting the Ministry of

National Defense and centralizing business-related operations in the defense sector that were previously dispersed among several government institutions. DAPA, which operates under the Ministry of National Defense, is tasked with coordinating military R&D activities and procurement programs, as well as strengthening domestic industrial capabilities and the export potential of South Korean defense companies.

The South Korean government utilizes the Planning, Programming, Budgeting, Execution and Evaluation System (PPBEEs) to maximize the efficiency of the national defense planning, armed forces' modernization process, development of the defense industry, and research and development programs.⁴²

FIGURE 3 Scheme of South Korea's defense planning system.



Based on: Jong-Chul Choi, 'South Korea,' in *Arms Procurement Decision Making Volume I: China, India, Israel, Japan, South Korea and Thailand*, ed. Ravinder Pal Singh, SIPRI, Oxford University Press, 1998.

The origins of the PPBEES can be traced back to the budgeting and planning system developed in the United States in the early 1960s,⁴³ which was subsequently adopted by South Korea in the late 1970s for the purpose of systematic and effective force building and has been modified over the past four decades. The implementation of the PPBEES has enabled synergistic effects from the cooperation between the Ministry of National Defense, the South Korean military, government agencies, research institutes, and the defense industry. **The involvement of key stakeholders—such as the Ministry of National Defense, the Joint Chiefs of Staff, DAPA, the National Assembly, and defense**

contractors—as well as long-term planning and programming, spanning 10 and 5 years respectively, makes the system resistant to political influence and facilitates the successful implementation of military modernization programs (Figure 3).⁴⁴ **The PPBEES is strictly regulated by laws and regulations, ensuring that any agency or organization failing to fulfill its role or responsibility within the system is penalized by the Board of Audit and Inspection of Korea. The cooperation and interaction among the organizations have been closely monitored and refined over the past four decades, resulting in unparalleled efficiency and effectiveness.**

Major Private Actors

Today, the South Korean industry is capable of producing major types of combat equipment in all domains, including:

- a) Land systems such as firearms and man-portable missile systems, main battle tanks (K2 Black Panther and K1E1/E2), infantry fighting vehicles (e.g. K21), wheeled armored personnel carriers (K808), artillery systems (e.g. K9 self-propelled howitzers and K239 Chunmoo missile launchers), and various types of ammunition;

- b) Surface combatants (e.g. KDX-III/Sejong the Great-class destroyers and Daegu-class guided missile frigates) and submarines (e.g. KSS-III/Dosan Ahn Changho-class), as well as related armament and other naval combat systems;

- c) Military aviation and space systems, including trainers and combat aircraft (e.g. T-50/FA-50 advanced jet trainer/light combat aircraft and KF-21 fighter aircraft), satellite systems, as well as ballistic and cruise missiles (e.g. Hyunmoo missiles).⁴⁵

South Korean defense industry plays a significant role in job creation, particularly with regard to high-skilled and quality, specialized jobs.

35,000

DIRECT EMPLOYMENT

130,000

JOB CREATION

\$34 BLN

INDUCED EFFECTS OF EXPORTS

Most of the aforementioned weapon systems are produced by six major South Korean arms manufacturers: Hyundai Rotem (land systems), Hanwha Aerospace (land, aerospace, and navy), Korea Aerospace Industries (aerospace), Hyundai Heavy Industries (navy), LIG Nex1 (missiles), and Poongsan (ammunition). **The South Korean defense industry plays a significant role in job creation, particularly with regard to high-skilled and quality, specialized jobs. The aforementioned six companies directly employ over 35,000 workers,⁴⁶ with additional tens of thousands employed in other branches of South Korean chaebols and other companies operating in the defense sector. In 2022, the induced effects of South Korea's growing defense exports reportedly generated 130,000 new jobs and USD 34 billion.**⁴⁷ This allows South Korea to diversify its economy, which in recent years has been heavily reliant on sectors such as semiconductors, electronics, as well as the automotive industry.

Export Endeavors and Global Expansion

Since the 1990s, besides the threats to national security posed by North Korea, Seoul's determination to become self-sufficient in defense manufacturing can certainly be attributed to economic considerations, particularly the ability to export its defense products, which became increasingly difficult due to U.S. military export restrictions.⁴⁸ Undeniably, South Korea's history and the experience of foreign oppression and colonization have strengthened the need for a powerful military. The nation's economic success, the expansion of South Korean companies, and the global recognition of their brands are of great symbolic importance to the South Korean public. These factors constitute one of the foundations of national pride, strengthening citizens' patriotic sentiments. This phenomenon is well understood by South Korean political elites, ensuring bipartisan support for coherent industrial policies aimed at empowering the domestic defense industry and elevating Seoul's position as a major arms exporter.

According to the SIPRI database, South Korea was the 10th largest arms exporter in the world between 2019 and 2023.⁴⁹ The share of South Korea's exports in the global arms trade increased from 1.7 percent (2014–2018) to 2.0 percent (2019–2023), with Poland being a major importer of South Korean military equipment. Undeniably, South Korea's position has been elevated by the growing global demand

for the military equipment, particularly following Russia's aggression against Ukraine in 2022. Nonetheless, Seoul has much greater ambitions, and the significance of the defense industry development has been highlighted by high-ranking South Korean officials on a number of occasions. In 2023, President Yoon Suk-yeol pledged to strengthen the nation's defense industry even further to turn South Korea into the fourth largest arms exporters by 2027.⁵⁰ It is also worth noting that Seoul has prioritized cooperation with Poland, given Warsaw's massive arms procurement programs and determination to rapidly rearm the country, as well as modernize its domestic defense industry. On June 21, 2024, during the Poland-South Korea Strategic Dialogue organized by the Casimir Pulaski Foundation, Poland's Minister of National Defense Władysław Kosiniak-Kamysz and his South Korean counterpart, Minister Shin Won-sik, underlined the strategic dimension of cooperation between the two nations.⁵¹ Despite Poland currently being a top importer and business partner for South Korean defense contractors, the country's defense industry has achieved numerous successes elsewhere, in both the Asian and European export markets, as shown in **Table 1**.

The ROK's government plans to export approximately USD 20 billion worth of military equipment in 2024.⁵² **In the past decade, South Korea exported several types of combat equipment, including K9 self-propelled howitzers that were acquired by Australia, Egypt, Estonia, Finland, India, Norway, Poland, Romania, and Turkey; K239 rocket artillery systems imported by Poland, Saudi Arabia; and the United Arab Emirates, the T-50/FA-50 jet trainer and light combat aircraft purchased by Indonesia, Iraq, Malaysia, Philippines, Poland, and Thailand; and the K2 Black Panther main battle tank acquired by Poland.** Moreover, the list of countries interested in acquiring South Korean weapon systems is much longer and includes a growing number of European states that share Poland's perception of the Russian threat. The most prominent example in this context is Romania, which has pursued a virtually identical acquisition policy to Poland⁵³ and is currently considering the procurement of K2 main battle tanks along with other equipment.⁵⁴ **In conclusion, the**

TABLE 1 Selected Export Arms Deals of the South Korean Defense Industry.

TYPE	IMPORTER	UNITS ORDERED
K2 MAIN BATTLE TANK	Poland	1 000
K9 SELF-PROPELLED HOWITZER	Poland	648
	Turkey	280
	Egypt	200
	India	100
	Finland	48
	Norway	24
K239 CHUNMOO	Poland	288
CHEONGUNG II SAM	United Arab Emirates	12 batteries
FA-50	Poland	48
	Malaysia	18

Based on: International Trade Administration, 'South Korea – Defense Industry Equipment', 2023.

success of South Korean companies can be attributed to:

1. **High quality and technological advancement of the equipment, comparable or even exceeding the specifications of the systems manufactured by American and European defense contractors;**
2. **Application of NATO standards and interoperability with Western equipment, including the use of NATO munitions;**
3. **Fast-paced and swift delivery schemes thanks to well-developed and reliable South Korean supply chains, which are of particular importance to countries such as Poland;**
4. **Large-scale production, vastly exceeding the capabilities of most Western producers, dictated by the needs of the South Korean Armed Forces;**
5. **Often lower costs compared with similar Western equipment thanks to the economy of scale;**
6. **Contractors' flexibility in drafting sales and maintenance agreements;**
7. **Willingness to conduct the transfer of technology to partner countries.⁵⁵**

These factors have also played a key role in Poland's decision to reorient its procurement programs toward South Korea. However, from the Polish security perspective and given Warsaw's long-term economic interests, Seoul's willingness to conduct technology transfers is particularly important, especially in areas where the Polish defense industry lacks crucial capabilities, such as tank manufacturing. In recent years, Poland has had positive experiences cooperating with South Korean companies. This includes the transfer of technology related to the manufacturing process of the K9 chassis, which was successfully integrated into the Polish KRAB howitzer and subsequently produced locally in Poland by Huta Stalowa Wola (HSW). Prior to the Polish K9/KRAB deal, the South Korean defense industry had been a source of key technologies that allowed for modernization of domestic industries and the development of advanced weapon systems in other countries as well. **The most prominent example of South Korea's long-term commitment to jointly designing advanced weapon systems is the 2008 Turkish deal, worth approximately**

USD 0.5 billion, for the development of a new main battle tank for the Turkish ground forces.⁵⁶ Ankara selected Hyundai Rotem as the strategic partner for the program to facilitate the transfer of technology and provide necessary development assistance. Selecting Hyundai Rotem was not a coincidence given the company's two decades of experience in developing and manufacturing the K1 main battle tank, as well as Hyundai Rotem's successful development of a completely new tank, the K2 Black Panther. This newly developed tank design has become the foundation of numerous technologies and solutions implemented in the Turkish Altay MBT.⁵⁷ It is also worth noting that Hyundai Rotem, which cooperated with American partners as a recipient of the technology transfers in the late 1970s and the 1980s, achieved the status of a technology exporter just 20 years after launching the production of K1.

In May 2024, the Turkish Defense Agency announced that the mass production of Altay MBTs had begun.⁵⁸ Türkiye reportedly increased the share of domestically manufactured systems during the development process and will utilize South Korean components in areas where the Turkish industry is not capable of delivering local solutions, such as HD Hyundai Infracore's engines and SNT Dynamics' transmissions. Türkiye's industrial and export ambitions seem to resemble South Korea's plans in the late 1990s. In the near future, Ankara will certainly focus on production for its own armed forces, given that the initial plans assume the acquisition of approximately 1,000 main battle tanks.⁵⁹ Simultaneously, Türkiye might seek opportunities for exports and international industrial cooperation with other nations to enhance its own defense industry in the long run. The Turkish-South Korean cooperation should be closely observed and analyzed in Poland, considering Warsaw's large-scale procurement programs and potential export opportunities for the Polish defense industry, especially in Central and Eastern Europe. The potential gains from industrial ties with South Korea have also been noticed by European Union institutions and other European countries.⁶⁰ In June 2024, EU officials reportedly expressed a strong interest in deepening bilateral cooperation between the European and South Korean defense industries.⁶¹

4

Poland's Perspective and Prospects for Cooperation with the South Korean Defense Industry

The joint development of weapon systems and cooperation between the Turkish company Otokar and South Korea's Hyundai Rotem exemplify one of many possible scenarios of a country's engagement with a foreign partner. On the other hand, license-based production is a natural choice for countries with limited R&D funding but a sufficient industrial base and workforce that can sustain domestic production once they receive the necessary technology transfer. This approach has been successfully implemented by Poland in 2014. After facing quality-related issues with the indigenous platform, the Polish government opted to acquire a license for manufacturing the K9 chassis for the K21 self-propelled howitzer.⁶² Undeniably, the decision was both reasonable and cost-effective, given that further attempts to improve or redesign the domestically developed chassis could have halted the program for years and possibly led to its failure. Although it is impossible now to estimate the direct impact of the implementation of South Korean technologies on the functioning and other capabilities of the HSW, it seems reasonable to assume that the program was a significant achievement for the Polish company, potentially enabling it to develop new products in the future. One such weapon system might be the planned new heavy infantry vehicle for the Polish Land Forces, which is reportedly going to be based on the technologies used in the K9 chassis, as well as the indigenous ZSSW-30 turret system.⁶³ Nonetheless, license-based production in Poland needs to be analyzed on a case-by-case basis to protect the interests of the Polish

defense industry. The previous ruling party was criticized by some Polish media for purchasing South Korean howitzers instead of domestically produced K21s.⁶⁴ Regardless of the manufacturing capacity of Polish defense contractors and the need to rapidly replace weapon systems donated to Ukraine, the decision to simultaneously produce two types of howitzers in Poland can be considered controversial, especially since the K9 might be viewed as a direct competitor to the Polish K21. On the other hand, the similarities between the two types of self-propelled howitzers and previous technology transfers from South Korea facilitate swift adjustments and maintenance of South Korean systems in Poland without unexpected delays. According to Polish Armament Group (Polska Grupa Zbrojeniowa, PGZ) CEO Krzysztof Trofiniak, HSW will be capable of delivering the necessary maintenance services for the K9 turret system by January 2025. Therefore, one should avoid drawing conclusions based solely on media reports without a deeper understanding of economic and industrial implications of this decision.

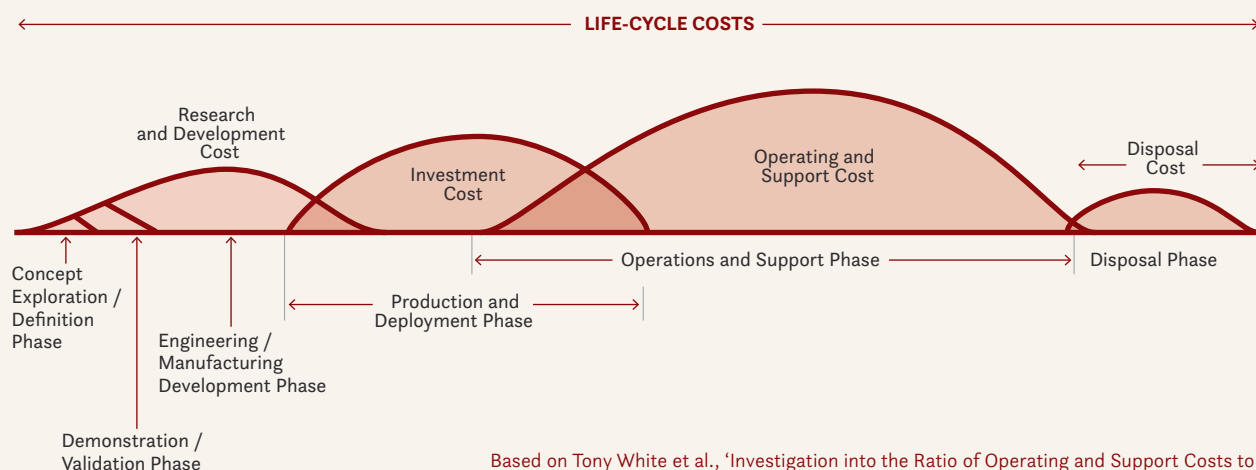
In contrast, the establishment of domestic tank manufacturing capabilities in Poland is free of such controversies, given that no Polish defense company is currently capable of designing and producing such complex weapon systems. In July 2022, Poland's former Deputy Prime Minister Mariusz Błaszczak approved a framework contract for the acquisition of 1,000 K2 main battle tanks, including 820 units in the K2PL variant. To date, Poland has officially procured



only 180 K2s produced by South Korea, and the status and final technical specifications of the K2PL remain unknown. By late 2024, Poland is expected to operate 84 K2s thanks to rapid deliveries from the South Korean industry, with the final 96 units scheduled for delivery in 2025.⁶⁵ Given Poland's need to replace hundreds of post-Soviet T-72s, as well as more modern Polish PT-91s, and the plans to equip two additional divisions, the purchase of a thousand new MBTs is fully justified. **Besides the need to quickly rearm the Polish Armed Forces, such large-scale procurements of main battle tanks and other weapon systems are essential considering the situation in Ukraine, where both sides deployed thousands of various types of heavy vehicles. The simulation conducted by RAND Corporation and Pulaski Foundation in June 2024 indicates that the consistent implementation of the aforementioned procurement programs would have a major impact on Poland's ability to defend its external borders. During the simulation, the Polish Army units equipped with K2 MBTs demonstrated strong operational capability and significantly contributed to the successful defense and counterattack operations.** The current government is determined not only to acquire more tanks but also establish domestic manufacturing capabilities as soon as possible. This view was expressed on several occasions by Deputy Prime Minister and Defense Minister Kosiniak-Kamysz.⁶⁶

It is in the best interest of Polish taxpayers to ensure the involvement of the Polish defense industry in the manufacturing process, as well as to secure the necessary transfer of technology. This will allow for the domestic manufacturing of tank components, their final assembly, and local maintenance in the long run, with full advantages linked to the economy of scale. Given weapon systems' overall life cycle, the most significant portion of all costs, usually estimated at 70 percent, is associated with operating and maintenance of the military equipment.⁶⁷ This clearly indicates that the acquisition of all crucial technologies and the establishment of sustainable supply chains to allow for domestic maintenance of the equipment over the course of 30–40 years should be obligatory, especially considering the scale of Poland's procurement programs. Otherwise, Poland will become dependent on importing all spare parts and services from abroad. Undeniably, this money could be used more effectively to strengthen Poland's economy and boost its GDP growth, supporting Polish producers instead of foreign entities. Beyond the economic benefits of domestic maintenance and production, such a step is crucial for the armed forces during times of war, where the ability to maintain military equipment locally, rather than having to wait months for spare parts or repairs, and swiftly return damaged equipment to the frontlines.

FIGURE 4 Life-Cycle Costs of Weapon Systems.



Based on Tony White et al., 'Investigation into the Ratio of Operating and Support Costs to Life-Cycle Costs for DoD Weapon Systems', Defense ARJ, January 2014, Vol. 21 No. 1: 442–464, www.researchgate.net/publication/264083243.

On July 9, 2024, PGZ and Hyundai Rotem Company signed an agreement to form a Polish-South Korean consortium responsible for negotiating and implementing the next phase of the K2 deal.⁶⁸ This agreement represents a critical step toward establishing the production of modern main battle tanks in Poland, integrating Polish components with the South Korean platform, and potentially exporting MBTs in the future. The agreement was also praised by Marcin Kulasek, State Secretary at Poland's Ministry of State Assets, who emphasized that PGZ is capable of starting K2 production as soon as possible and that the Ministry actively supports the strategic cooperation between Poland and South Korea, which strengthens the security of both nations. In another interview, Minister Kulasek stated that Poland could launch production of MBTs after signing a contract for an additional 180 units. The Ministry of State Assets and PGZ also agree that the deal should not only involve state-owned defense enterprises but also private companies.⁶⁹ It is worth noting that numerous Polish defense companies⁷⁰ could benefit from cooperation with South Korean defense contractors.⁷¹ In August 2024, PGZ CEO Krzysztof Trofiniak stated that the agreement for maintenance, repair, and operations (MRO) services had secured the transfer of necessary know-how to PGZ.⁷² According to Mariusz Cielma, defense expert and editor-in-chief of *Nowa Technika Wojskowa*, the sheer scale of the program should

enable the direct involvement of numerous Polish contractors, despite fierce competition among defense companies to participate in the project and manufacture the Polish variant of K2 MBTs.⁷³ For instance, the HSW, which is a license manufacturer of Leopard 2 120 mm tank guns, could potentially produce guns for Polish K2s. The future K2-related agreements could potentially include transfer of other technologies developed by South Korean companies, such as transmissions and tank engines. Such technology transfers would be essential for ensuring the long-term maintenance of MBTs by the Polish defense industry. The cooperation on the production of engines and transmissions is particularly important in light of other Polish military modernization programs, for example, the procurement of Borsuk ('Badger') Infantry Fighting Vehicles and the future production and maintenance of KRAB self-propelled howitzers. The Polish Armament Group has reportedly explored alternative solutions that could be integrated with these two weapon systems.

Furthermore, **the K2 deal needs to enable future exports, which might require the transfer of additional know-how, institutional changes, as well as improved management practices in the Polish arms industry, given that only a handful of Polish defense companies have successfully exported their products to date.** Undeniably, it is worth considering other,



long-term cooperation frameworks that could elevate the Polish defense industry in the future. Despite joining the North Atlantic Treaty Organization in 1999, the Polish Armed Forces are still in a transition period, with Soviet technologies being gradually replaced with modern combat equipment. Even **some types of relatively modern weapon systems introduced in the past 20 years, such as F-16s, Leopard 2A5, and KTO Rosomak, will eventually require modernization and replacement. All of this coincides with Russia's aggressive stance and a growing global demand for advanced combat equipment. Certainly, this could be an unprecedented opportunity for Polish defense companies, in terms of potential export markets in the region, as well as the establishment of maintenance service hubs in Poland for South**

Korean weapon systems acquired by Poland and other European states.

Another important aspect of Polish-South Korean cooperation is the potential reciprocal purchase of the Polish-made combat equipment. During the Poland-South Korea Strategic Dialogue in June 2024, the representatives from the South Korean administration and industry expressed interest in several weapon systems manufactured in Poland. These include RAK self-propelled mortars, the aforementioned zssw-30 remote-controlled turret systems with 30/40 mm autocannons, as well as unmanned aerial systems (UAS). As of July 2024, the South Korean Ministry of National Defense is reportedly reviewing the possibility of procuring Polish UAS to strengthen the capability of its armed forces.⁷⁴

5

Potential for Poland–South Korea Strategic Cooperation and Joint Development of Weapon Systems

Despite Poland being mostly a recipient of the technology transfers from South Korean companies, the Polish policymakers should realize potential gains from establishing joint development programs and fully utilizing the strategic relationship between the industries of both countries. International cooperation in the defense and aerospace industry is a common practice worldwide, with European manufacturers being a prime example. The European aircraft manufacturer Airbus was founded in 1970 as a Franco-German, and later also a Spanish-British, consortium to compete with American firms that controlled the commercial aircraft market at the time.⁷⁵ Today, the company is the largest manufacturer of jet airliners in the world.⁷⁶ Other examples of successfully implemented international programs that generated billions of dollars for the industry and created tens of thousands of new jobs include the development of the 5th generation F-35 fighter aircraft⁷⁷ and the Eurofighter Typhoon.⁷⁸ The South Korean aerospace company KAI has also pursued this joint development model in the KF-21 aircraft project by teaming with the Indonesian producer PT Dirgantara Indonesia.⁷⁹ **The pooling of resources from two or more nations allows for splitting research and development costs, industrial specialization, and a more effective division of labor. Finally, the joint weapon system development**

and procurement can reduce overall manufacturing costs thanks to the economy of scale. Considering the growing number of such initiatives worldwide, there is no reason why Poland should not pursue a similar policy. However, this requires a general overhaul of the state's economic policy and a change in the mindset of Polish policymakers, who fail to realize the potential of expanding the country's industrial base to transform Poland into a truly advanced economy with innovative sectors driving its future economic growth. According to the World Bank, Poland spent 1.44 percent of its GDP on R&D in 2021, placing it between two wealthier nations, Italy and Spain.⁸⁰ Given that the goal of Poland should be to catch up with the most advanced European economies, it needs to boost its research spending as soon as possible. For comparison, other EU nations such as Belgium, Sweden, Austria, Germany, and Finland spend at least 3 percent of their GDP on research and development, leaving Poland far behind. According to the Congressional Research Service, Poland lags behind other OECD countries in defense R&D. In 2017, Poland spent approximately USD 380 million on military R&D in purchasing parity terms, ranking 8th in the OECD. This places Poland far behind leading countries such as South Korea (USD 3.377 billion), the United Kingdom (USD 2.379 billion), and Turkey (USD 1.35 billion).⁸¹ **(Figures 5 and 6)**

FIGURE 5 Research and Development Spending (% of GDP) of Selected Countries in 2021.

Based on the World Bank Group Database.

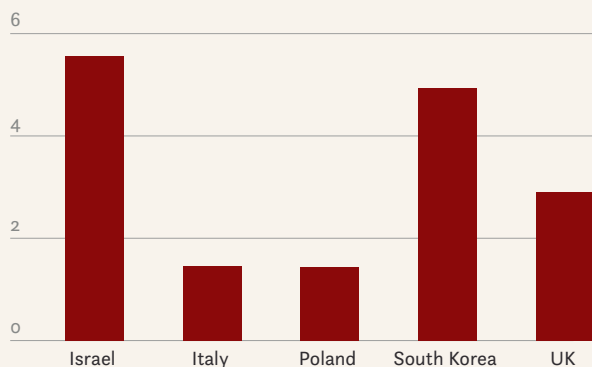
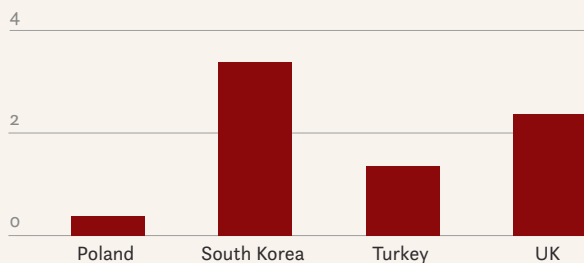


FIGURE 6 Military Research and Development Spending (USD billion, PPP) of Poland, South Korea, Turkey, and the United Kingdom in 2017.

Based on John F. Sargent Jr., 'Government Expenditures on Defense Research and Development by the United States and Other OECD Countries: Fact Sheet', Congressional Research Service, 2020, <https://crsreports.congress.gov/R45441>.



Given Poland's growing defense spending, significant funding should be allocated to R&D programs in the defense industry, especially in areas where it is possible to support the development of dual-use technologies. South Korea, as well as other nations, has proven that such an approach is entirely feasible and highly beneficial for the whole economy in the long run. Teaming with experienced and innovative South Korean companies that are seeking expansion in the European market and elsewhere could provide Poland with a plethora of new business opportunities. **To maximize the economic impact of establishing extensive manufacturing capacities in the land domain, the Polish defense industry should follow the path of South Korean defense firms.** License-based production was just the first step in creating a competitive defense industry, with the ultimate goal of

exporting South Korean products worldwide, and this should also be the long-term objective for Poland's arms industry.

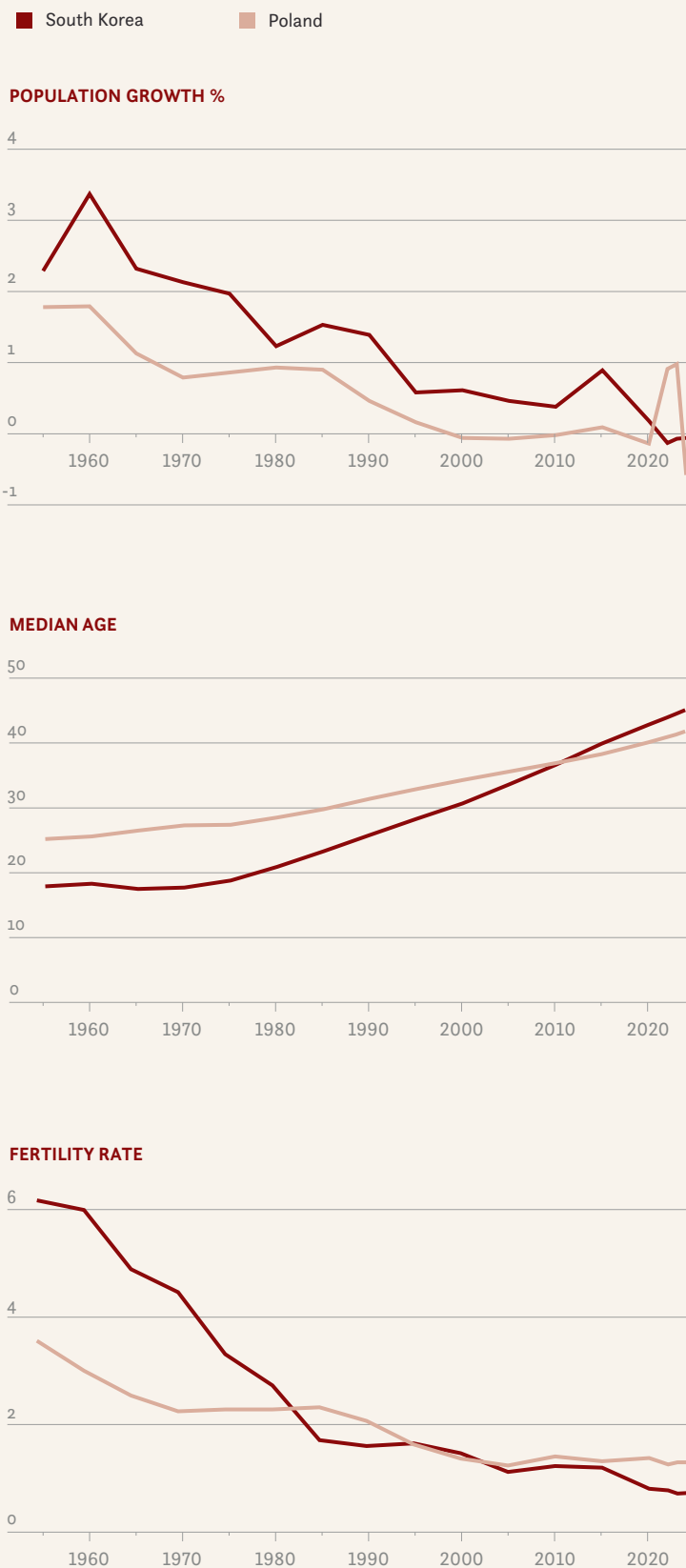
Besides the historical experience and the existential threat posed by aggressive neighbors, Poland and South Korea have much more in common. **One such factor that will play a key role in shaping their future defense policies is their rapidly aging populations,⁸² along with the need to sustain large and powerful military forces. (Figure 7.)** This necessitates a greater emphasis on the future development of highly automated and unmanned combat systems that utilize numerous advanced technologies, such as artificial intelligence, particularly in the land domain. This issue was addressed in the design of the K2 Black Panther by incorporating an automatic ammunition loading system and thus reducing the crew from four—typical for other modern MBTs—to three.⁸³ The same concept is now being applied in the planned upgrade of the K9A2 self-propelled howitzer, which will feature a fully-automated ammunition handling system.⁸⁴ These technological solutions are certainly just the beginning of a new era of more intelligent and autonomous combat systems that will be deployed by the armies of the most advanced nations in the years to come.

Given Poland's strategic position as a gateway to the European market, along with South Korea's willingness to conduct technology transfers and its proven track record of delivering



Photo: plut. Piotr Szafarski, 16 Dywizja Zmechanizowana

FIGURE 7 Fertility Rate, Population Change, and Median Age in Poland and South Korea.



licenses for manufacturing highly advanced solutions to countries such as Poland and Turkey, Warsaw should take this opportunity more seriously by establishing a long-term strategic industrial partnership with South Korea. Nonetheless, this would definitely require direct financial participation of Poland in jointly developing new-generation weapon systems or joining such programs in their early development phase. Moreover, it is essential that long-term planning for the development of the defense industry and related sectors in partnership with South Korea receives bipartisan political support. Polish political elites need to understand that the nation's security should not become another battleground in the ongoing political conflict.

In addition to the narrowly defined defense industries, it is also worth considering cooperation in dual-use technologies, such as hydrogen propulsion systems, artificial intelligence, satellite systems, and semiconductor manufacturing. This approach is one of the foundations of South Korea's success in developing its domestic defense industry. The European Union policy-makers also recognize the need to establish new initiatives to support the development of technologies applicable to both civilian and military purposes.⁸⁵ From the Polish perspective, this could be an opportunity to avoid the middle-income trap and modernize the economy, which still lags behind other more advanced nations in numerous fields. One of the major issues is the country's poor performance in creating innovations, which is undeniably correlated with low R&D spending.⁸⁶ Allocating funding to the development of dual-use technologies and related industries in Poland could alleviate potential negative effects, such as those arising from scenarios where military spending could otherwise be used to develop the country's infrastructure. This approach also allows for strengthening the country's industrial base that could be used if needed, for example, to increase production for military purposes. The defense and dual-use technology sectors also generate more quality, well-paid jobs, especially in the field of science, technology, engineering, and math (STEM).⁸⁷ Finally, the development of the dual-use technology sector could reduce Poland's dependence on foreign suppliers, thereby enhancing the security and stability of supply chains in the defense industry.

6

Conclusion

Over the course of 50 years, South Korea has successfully developed a highly innovative and competitive defense industry capable of manufacturing complex weapon systems in all domains. This achievement would not have been possible without the bipartisan support of South Korean political elites, well-designed long-term industrial policies, perseverance, and significant funding aimed at establishing domestic manufacturing capabilities. These efforts have strengthened the nation's military and elevated South Korea to the position of one of leading arms producers in the world. Seoul has effectively used cooperation with more advanced nations, particularly the United States, to build a robust defense industry from scratch, acquire crucial technologies, and develop the skills and know-how required to become an innovator and an arms exporter. These factors are particularly important given that Poland lacks similar policies, and decisions concerning the procurement of military equipment are often politicized and used by Polish political parties to wage political conflict. The past experiences of both Poland and Türkiye demonstrate that South Korean defense firms are capable of effectively delivering technology transfers, enhancing domestic development capacities, and supporting the establishment of a well-functioning industrial base. Poland's military modernization plans, along with the acquisition of significant quantities of South Korean weapon systems—including K2 main battle tanks, K9 self-propelled howitzers, and K239 rocket artillery systems—should be the foundation for establishing a strategic, long-term partnership with the South Korean defense industry. Cooperation with Seoul presents an opportunity for Warsaw to significantly enhance its national security, modernize the Polish defense industry, and eventually join

other advanced nations capable of designing, developing, manufacturing, servicing, and finally exporting highly sophisticated products of domestic arms producers. The implementation of such partnerships could have a major impact on the Polish defense industry, other interlinked sectors, and the entire Polish economy.

To emulate the South Korean model, Poland could utilize licenses, technology transfers, and other non-technical know-how to rapidly improve the capabilities of Polish arms producers. Nonetheless, to catch up with more advanced economies and foster domestic innovations, the development of the domestic defense industry will require significant R&D funding and long-term planning. To begin with, one of the key areas to analyze is the choice between off-the-shelf military procurement, domestic production based on foreign licenses, and entirely domestic production utilizing national or international research and development projects. The implementation of any of these three options in a given case requires in-depth analysis of security threats, the international situation, economic and financial considerations, national industrial and other strategic interests, and potential long-term export opportunities. These plans should also include the development of dual-use technologies in Poland. International cooperation in the defense industry, exemplified by numerous projects jointly conducted by European arms producers, demonstrates the benefits of shared R&D costs and industrial specialization. Similar cooperation frameworks could be applied by Poland and South Korea in the future. Potential business-related gains for the Polish defense industry include future export opportunities and the reciprocal acquisition of Polish-made weapon systems by the Republic of Korea.



Recommendations

1. Establishing Strategic Partnerships with South Korea

Poland should seek to develop long-term strategic partnerships with South Korean defense companies to facilitate technology transfers and joint development projects. The Polish government needs to pursue reciprocal procurement agreements, where both nations commit to purchasing and integrating each other's defense technologies.

2. Enhancing Domestic Production Capabilities

Warsaw needs to invest in domestic manufacturing infrastructure to enable the local production of key defense components and systems. This requires securing crucial technology transfers from the South Korean defense industry, including comprehensive training and knowledge transfer to Polish companies and their workforce. In the long run, the Polish government and arms producers should do more to seek new export opportunities and promote their defense products. Strategic cooperation with South Korea could provide Poland with access to the export markets where Polish companies have not yet been able to compete. Potentially, Poland could cooperate with South Korean defense companies, such as Hyundai Rotem and Hanwha Aerospace, to jointly manufacture and export South Korean-Polish weapon systems to other European countries. Considering that no Polish company is currently capable of manufacturing main battle tanks, the cooperation with the South Korean defense industry in the K2 program presents an opportunity to re-establish Poland as an MBT producer to meet the needs of the Polish Armed Forces and potentially attract other export customers.

Therefore, the cooperation with the South Korean industry could be highly beneficial for numerous Polish defense companies.

3. Developing the Dual-Use Technology Sector

Poland should follow the example of other industrialized nations that prioritize the development of dual-use technologies, such as hydrogen propulsion systems and semiconductor manufacturing, to enhance both defense capabilities and the long-term growth of civilian sectors. South Korea has shown that cross-sector collaboration between defense and civilian industries can foster innovations and economic resilience.

4. Increasing Military and Non-Military R&D Spending

The development of the defense industry and other innovative sectors of the economy requires increased investment in research and development. Given Poland's ambition to achieve a GDP per capita level comparable to that of more advanced Western European economies, Warsaw should allocate substantial funding to stimulate the development of new technologies in Poland, for example, in the field of dual-use technologies, which can benefit both civilian and military applications. Greater involvement of academia and research institutes in fostering innovations could generate synergistic effects and stimulate the defense industry, as well as Poland's economy. This, in turn, could boost job creation, particularly in high-quality positions related to science and engineering. Such developments could alleviate negative migration trends and attract talents and specialists to work in the Polish industry and research centers.

5. Establishing Poland as an Exporter of Arms and Other Advanced Technologies

To fully benefit from cooperation with the South Korean industry and other strategic partners, Polish policymakers should establish a long-term development strategy focused on the defense industry and other critical sectors. Although it would be naive to assume that Poland could become completely self-sufficient in the future, it is necessary to determine which technologies and capabilities are essential for Poland's security, where such investments are economically justified, and how the development of selected industries could support the Polish economy in the long run.

6. Ensuring Bipartisan Political Support

It is essential to build bipartisan political consensus on the importance of developing the defense industry and modernizing Poland's military. The issues of national security and industrial development require stable and continuous policy support regardless of changes in government. This might require establishing an institutional framework to prevent sudden changes in the national defense policy due to domestic political tensions and rivalries between parties.

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