



RESEARCH ARTICLE

REVISED

South Korean Defence Industry in New Global Order and Implications for Poland

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Sang Chul Park¹, Pawel Pasierbiak ²

¹School of Convergence Technology and Energy, Tech University of Korea, Siheung-si, Gyeonggi-do, South Korea

²Department of World Economy and European Integration, Maria Curie-Skłodowska University in Lublin Institute of Economics and Finance, Lublin, Lublin Voivodeship, Poland

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Abstract

Amid shifts in the global power structure, the defence industry is emerging as a crucial sector for economic development and national security. It is closely related to the industrial structure and developed in the form of the military-industrial complex (MIC). This article examines South Korea's defence industry development strategies to explore actionable insights for Poland. By integrating technological advancement with robust support for the defence sector, South Korea has crafted a unique model that strengthens technological autonomy and security in a volatile global economic and political order. The impact of South Korea's defence industry on its national economy is evident in employment generation, technology innovation, and dynamic partnerships with the private sector, underscoring its role in economic resilience and competitiveness. The article highlights the potential benefits for Poland, which faces its own geopolitical challenges and modernisation needs, in drawing from South Korea's experiences. With a strategic focus on enhancing civil-defence sector cooperation, technological innovation, and international partnerships, Poland could bolster its industrial growth and defence capabilities, contributing to long-term economic security and regional stability.

Keywords

Changing global order, defence industry, economic development, military-industry complex (MIC), national security, Poland, South Korea.

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- Haliza Mohd Zahari** , Universiti Pertahanan Nasional Malaysia, Kuala Lumpur, Malaysia
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- Hemalia Kusumadewi** , Wheelchair and Friendship Center of Asia Indonesia, Jakarta, Indonesia
- Kogila Balakrishnan** , University of Warwick, Coventry, UK
- Łukasz Olejnik** , SGH Warsaw School of Economics, Warsaw, Poland

Any reports and responses or comments on the article can be found at the end of the article.

Corresponding author: Paweł Pasierbiak (pawel.pasierbiak@mail.umcs.pl)

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REVISED Amendments from Version 1

The revised version introduces changes that directly address the reviewers' comments and enhance the paper's analytical coherence and policy relevance. The core argument on defence procurement has been strengthened through a more explicit and critical discussion of offsets, technology transfer, and domestic capability building in Poland. While the original manuscript acknowledged the urgency-driven nature of recent arms purchases from the United States and South Korea, the revised version places greater emphasis on their long-term economic and industrial implications, particularly the costs of the absence of offset mechanisms. This analysis is now more clearly linked to Poland's *raison d'état* and explicitly contrasted with South Korea's development trajectory, where defence procurement contributed to indigenous technological upgrading. Several interpretative and historical clarifications were also introduced. The discussion of the Cold War security environment was reformulated to avoid suggesting exaggerated threats, instead emphasising how external threats legitimised sustained military spending. Likewise, the analysis of post-Cold War defense expenditure was refined to highlight the relatively limited decline in U.S. military spending and to situate it within the transition from a bipolar to a unipolar international system, characterized by U.S. hegemony. The role of the Vietnam War was reassessed to avoid overstating its importance for the development of South Korea's defence industry.

Additionally, the paper's structure and readability were enhanced. The introduction now presents the research motivation, key research questions, and main findings more clearly at an earlier stage, thereby enhancing accessibility for readers. The methodological section was expanded to provide a clearer explanation of the mixed qualitative-quantitative approach, data selection, and the application of empirical evidence within the analytical framework.

Finally, the revised manuscript includes minor terminological corrections and a new subsection on the EU's "Readiness 2030" ("ReArm Europe") initiative, outlining both opportunities and constraints for the Polish defence industry and cooperation with South Korea.

Any further responses from the reviewers can be found at the end of the article

Introduction

Former U.S. Republican President and military leader Dwight D. Eisenhower, in his Farewell Address in 1961, voiced his concern over the consequences of combining a vast military establishment with a powerful arms industry in the USA. He alerted government councils that the nation must be protected against acquiring unwarranted influences from the military-industrial complex (MIC). He also stressed that the potential for a disastrous rise of misplaced power exists and will persist. The notion of the MIC was formulated by social scientists examining the relationship between the state and industry, pointing out that it might result in unilateral decisions serving the interests of coalition members rather than the needs of national security. The coalition between the state and industry was expanded to include not only interests within the military establishment and the arms industries but also within the political organisations. As a result, industrial and military elites and interests formed a state within the state, in which

participants in the MIC share their interests in high military expenditures and the persistence of arms races.¹

The MIC has been seen as a permanent aspect of the Cold War, during which external threats were used to legitimize substantial military spending. After the Cold War, the global security landscape shifted dramatically, deeply affecting the military sector in the post-Cold War period. Significant cuts in defence budgets, along with evolving military needs and technological progress, brought about numerous changes in the Defence Industrial Base (DIB). Consequently, the ties between the DIB, the armed forces, and the legislative branch were also fundamentally reshaped.

World military expenditures and arms exports peaked in the mid-1980s and started to fall gradually due to improved relations between the East and the West. Notably, they generally declined radically with the disintegration of the Soviet Union. However, reductions of military expenditures in the USA were not as significant as in the post-Soviet states; notably, Russia decreased at a catastrophic level, resulting in US dominance in the post-Cold War era.

Yet, even after the Cold War, the fixed costs of R&D for major weapon systems have steadily increased, covering not only platforms but also infrastructure such as satellites and strategic air capabilities. Information systems are likewise essential to enable network-centric warfare, a component of the Revolution in Military Affairs (RMA). These systems traditionally demanded long preparation periods and commitments from government bodies, research teams, and firms, which continuously pushed to produce such weaponry and to assign them operational roles. As a result, there has been constant pressure—especially in the United States—for renewed rises in military spending, alongside opposition to reducing the defence budget.²

Moreover, it became increasingly apparent during the 2000s that the US and Europe, based on NATO, only faced guerrilla-type enemies with more informal asymmetric conflicts that required different weapon systems. This uncertainty regarding potential enemies, combined with the increasing need for homeland security, generated a new type of demand that made

¹ Dwight D. Eisenhower, 'Farewell Address', in *Eisenhower as President*, ed. Dean Albertson (New York: Hill and Wang, 1963); J. P. Dunne, 'The Defence Industrial Base', in *Handbook in Defence Economics*, ed. Keith Hartley and Todd Sandler (Elsevier, 1995), 592–623; J. P. Dunne and Elisabeth Sköns, 'The Military Industrial Complex', in *The Global Arms Trade: A Handbook*, ed. Andrew T. H. Tan (London and New York: Routledge, 2010), 281–92; James M. Cypher, 'The Origins and Evolution of Military Keynesianism in the United States', *Journal of Post-Keynesian Economics* 38, no. 3 (2015): 449–76; M. A. Bernstein and M. R. Wilson, 'New Perspectives on the History of the Military-Industrial Complex', *Enterprise & Society* 12, no. 1 (2015): 1–9; M. R. DeVore, 'Military-Industrial Complexes and Their Variations' (Oxford: Oxford, 2020), <https://oxfordre.com/politics/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-1876>.

² Dunne and Sköns, "The Military Industrial Complex."

communication and surveillance technologies more significant than ever before. At the same time, NATO and EU forces became more engaged in peacekeeping missions across the globe. These shifts in the character and organization of military forces directed demand towards advanced high-technology systems, particularly in the civilian ICT sectors. Thus, a significant qualitative shift has occurred in the relationship between civilian and military technologies, even though many long-term weapon programs launched during the Cold War continue. Consequently, in several fields of advanced technologies, the balance between military and civilian innovation has been reversed, particularly in electronics, which started to take place by the 1990s. Simply put, civilian technology has become more advanced than military technology in some sectors. This was mainly due to the lengthy timelines required for military procurement. Compared to civilian technologies based on the economic market system, many military technologies were obsolete before they came into service.³

Since the changing new global order from the US-dominated unipolar system to the multipolar system started in the late 2010s, the defence industry has been evolving rapidly again, particularly regarding the technology development of civilian and military applications and technology transfer between military and civilian domains. The vague divide between military and civilian sectors has become noticeable, particularly owing to the swift advancement of artificial intelligence (AI), digitalisation, integrated quantum computers, big data networking, etc., regarded as core high-tech areas for the Fourth Industrial Revolution. In parallel with these advances in applied innovation, the organisation and governance of the defence industry are evolving through the growth of public-private partnerships (PPP), which further blur the boundary between the military and civilian spheres.⁴

South Korea tried to develop its defence industry in the 1970s while implementing its Five-Year Economic Development Plans under the military regime due to the severe security environment in the Korean Peninsula, which was divided between the capitalist and socialist regimes since the Second World War. North and South Korea experienced a civil war (1950–1953) and have confronted each other on several occasions since then. Technically, it is still in the war because the two parties did not conclude a peace treaty at the end of the Korean War; instead, they signed only the Korean Armistice Agreement. Additionally, the civil war in Vietnam, which was one of many areas of rivalry between the U.S. and the USSR, ended with the victory of the communist regime in 1976. Therefore, threats

from North Korea, the People's Republic of China, and the USSR led South Korea to develop its own military and civilian industries. Coincidentally, this is a unique case for a then-developing country, but it contributes to creating spin-off effects to develop core technologies on the other side.

Amid the transition from a unipolar to a multipolar global order and the sharp rise in geopolitical uncertainty, defence industries have re-emerged as strategically important not only for national security but also for long-term economic sustainable development. This article is motivated by the question of how defence industry development can function as an instrument of industrial upgrading, technological advancement, and export competitiveness in advanced and catching-up economies. Using South Korea as an analytically instructive reference case, the study asks: (1) what economic and institutional factors have driven the successful development of South Korea's defence industry, (2) how this sector has contributed to broader structural transformation and economic performance, and (3) which elements of this experience offer actionable insights and implications for Poland under current security and industrial policy conditions. The main finding is that South Korea's defence industry has acted as a catalyst for industrial diversification, innovation spill overs, and export expansion, suggesting that – if properly embedded in domestic industrial policy – defence sector development can also strengthen Poland's economic resilience and growth potential.

Various methods are used to meet the research targets, such as a critical analysis of literature, an inference method, a cross-sectional analysis, and a method of quantitative statistical analysis. Thus, the study employs a mixed qualitative–quantitative methodology typical of applied research in economics and finance, particularly within defence economics and industrial policy analysis. The analytical framework combines a critical review of the theoretical and empirical literature on the military-industrial complex, development economics, and industrial upgrading with descriptive and comparative statistical analysis. Empirical data are drawn exclusively from internationally recognised and publicly available sources (including SIPRI, OECD, UNIDO, World Bank, and national statistical offices), selected based on data reliability, cross-country comparability, and relevance for capturing long-term structural and sectoral dynamics. Quantitative indicators of defence production, exports, R&D expenditure, employment, industrial diversification, and macroeconomic performance are analysed using cross-sectional and time-series comparisons to identify patterns and trends rather than to estimate causal relationships. These empirical findings are then interpreted within an economic framework that links defence industry development to industrial structure transformation, technological spill-overs, and export competitiveness, allowing the South Korean experience to serve as a reference point and a role model for drawing economically grounded and policy-relevant implications for Poland.

Theoretical debates

The notion of the MIC (military-industrial complex) continues to describe the policy and financial connections linking the

³ R. Smith, *Military Economics: The Interaction of Power and Money* (Basingstoke: Palgrave Macmillan, 2009); Dunne and Sköns, "The Military Industrial Complex."

⁴ M. Bromley, 'Understanding European Arms Export Control: Material Interests and Competing Norms' (Stockholm University, 2022); M. A. Sezal and F. Guimelli, 'Technology Transfer and Defence Industry Dynamics: The Case of the Netherlands', *European Security* 31, no. 4 (2022): 558–75; L. Newlove-Eriksson and J. Eriksson, 'Conceptualizing the European Military-Civilian-Industrial Complex: The Need for a Helicopter Perspective', *Defence Studies* 23, no. 4 (2023): 561–88.

military, the defence industry, and lawmakers, commonly referred to as the iron triangle. Such relationships encompass political donations, the political endorsement of spending on weapons and warfare, and lobbying to sustain bureaucracies as well as industry shortcomings. Hence, the central issue in any theorising about the MIC is whether the existence of the DIB can merge vested interests.⁵

Smith defines the MIC through a liberal and institutional lens.⁶ He argues that its nature is shaped by competing interest groups and institutional connections. As a result, the MIC functions as an entity that develops a self-sustaining structure reflecting the interests of different segments of society. In this context, the power of vested interests and their rivalry over resources creates internal pressures for higher military spending. At the same time, external threats are frequently intentionally exaggerated to justify the cooperation of the MIC. By doing this action systematically, the MIC imposes unnecessary burdens on the rest of society that cause adverse effects on the civilian sectors. Melman and Dumas explain that the MIC pushes civilian resources out of the companies involved, which leads to inefficiency and waste.⁷ Consequently, firms in the defence sector grow by dependency on military contracts, as they lose competitiveness in civilian markets. Nonetheless, Cypher stresses that in the U.S. context, military waste holds a firmly rooted significance within the ideological and institutional framework of the national economy.⁸

Even from the Marxist perspective, the MIC tends to differ in its treatment of crises. Dunne and Sköns explain that some Marxists regard military expenditure as necessary for capital accumulation.⁹ Baran and Sweezy developed the under-consumption approach.¹⁰ They view military expenditure as essential for averting crises, as it enables the absorption of surpluses without raising wages or government spending, while safeguarding profits. A comparable view, grounded in the logic of the capitalist economy and advanced by Howard and King, interprets overproduction as the basis of the permanent arms economy.¹¹ Thus, they contend that military spending constitutes waste, and that channelling resources into it helps to prevent the national economy from overheating. It means that the inefficiency of the MIC can be seen as a positive factor because it plays a positive role in capitalist development.

According to Fine's criticism, most concepts of the MIC in the Cold War appear descriptive rather than analytical.¹² Accordingly, Smith and Smith concentrate on examining the MIC's dynamics from an empirical perspective.¹³ They maintain that the MIC rests on a coalition of interests and emphasizes the structural connections that have emerged between specific segments of private industry and certain areas of the defence sector. This has inevitably produced shared interests between the two sides. Consequently, it follows logically that the MIC concept continues to serve as a useful framework for understanding the dynamics of today's military sector. Alice adds that the armed forces remain the leading partner in the MIC, as they control the technical requirements, leaving the defence industry in a subordinate role.¹⁴

Paths of economic development strategy and defence environment and industry in South Korea South Korean economic development strategy

Over the past sixty years, South Korea has experienced remarkable economic growth, evolving from a developing nation into an advanced country on the global stage. In 1962, its GDP *per capita* stood at just USD 82, but by 2023 it had risen to USD 50,572 in terms of purchasing power parity (PPP). Fuelled by rapid economic expansion during the 1960s and 1970s, GDP *per capita* climbed to USD 3,000 by 1980, at which point the World Bank and the International Monetary Fund (IMF) classified the country as middle-income. From that time onward, South Korea has maintained consistent growth, with GDP *per capita* reaching USD 30,000 in 2010. Today, it stands as a significant global economic actor, supported by a strong and solid industrial foundation.¹⁵

South Korea's economic transformation is largely the result of industrialisation and globalisation. The industrialisation process was exceptionally dynamic. The contribution of industrial sectors such as manufacturing, construction, and public utilities to total value added more than doubled, rising from 17% in the 1960s to 38% in the 1980s. At the same time, the service sector expanded its share from 41% in the 1960s to 63% in the 2000s. In contrast, the primary sector's share dropped sharply, from 42% to just 3% over the same period.¹⁶

Rapid industrialisation sped up the globalisation of South Korea's economy. The country's total trade volume rose from about 10% of GDP in the 1960s to 90% by 2010. During the same period, cross-border capital flows also expanded significantly. South Korea's integration into the global economy is closely tied to the 1997 Asian Financial Crisis (AFC), which

⁵ Dunne and Sköns, "The Military Industrial Complex."

⁶ R. Smith, "Military Expenditure and Capitalism," *Cambridge Journal of Economics* 1 (1977): 61–76.

⁷ S. Melman, *The Permanent War Economy* (New York: Simon and Schuster, 1985); L. Dumas, *The Overburdened Economy* (Berkeley: University of California Press, 1986).

⁸ James M. Cypher, "Economic Consequences of Armaments Production: Institutional Perspectives of JK Galbraith and TB Veblen," *Journal of Economic Issues* 17, no. 1 (2008): 37–47.

⁹ Dunne and Sköns, "The Military Industrial Complex."

¹⁰ P. Baran and P. Sweezy, *Monopoly Capital* (London: Monthly Review Press, 1966).

¹¹ M. Howard and J. King, *A History of Marxian Economics: Volume 2, 1929–90* (London: Macmillan, 1992).

¹² B. Fine, "The Military Industrial Complex: An Analytical Assessment," *Cyprus Journal of Economics* 6, no. 1 (1993): 26–51.

¹³ R. Smith and D. Smith, *The Economics of Militarism* (London: Pluto Press, 1983).

¹⁴ J. A. Alice, "The Origin and Nature of the US Military Industrial Complex," *Vulcan*, no. 2 (2014): 63–97.

¹⁵ I. Sakong and Y. Koh, *The Korean Economy, Six Decades of Growth and Development* (Seoul: Korea Development Institute, 2010).

¹⁶ Sakong and Koh.

compelled the nation to carry out structural reforms throughout its economy. These reforms were rooted in deregulation and market liberalisation, aimed at fostering greater trade openness.¹⁷

The processes of industrialisation and globalisation in South Korea's economy were deeply interconnected and mutually reinforcing. International trade opened vast global markets for Korean producers, while also allowing them to import intermediate goods and advanced technologies essential for export production. In the 1960s and 1970s, the global division of labour spurred the development of labour-intensive industries where South Korea held a comparative advantage. These industries absorbed surplus labour from rural areas, raising per capita incomes and boosting savings rates. By the 1980s, capital accumulation advanced, and the country's comparative advantage shifted from labour-intensive to capital-intensive sectors. Consequently, per capita income rose rapidly as productivity improved, driven by investments in human capital and R&D.¹⁸

Throughout industrialisation and globalisation, the government's policy approach shifted across different periods. In the 1960s, it launched a systematic drive for economic development, actively supporting exports across all sectors through measures such as tax holidays and subsidies. In the 1970s, policy priorities turned to heavy and chemical industries (HCIs), with government intervention in the market becoming more targeted and selective. At the same time, tighter control over the financial system was imposed to direct resources toward HCIs. However, this state-led HCI strategy also created significant challenges, including severe resource misallocation, persistent high inflation, and growing income inequality.

Consequently, during the 1980s, the government placed greater emphasis on price stability rather than rapid economic growth. It also encouraged private enterprise and initiated a process of market liberalisation. At the same time, increased focus on social policies led to higher public spending on healthcare, welfare, and education. Following the 1997 Asian Financial Crisis, the government advanced liberalisation efforts, particularly in capital markets, while also seeking to modernise prudential regulation and competition policy. With South Korea's growing integration into the global economy, concerns about its long-term growth potential emerged in the 2000s. An economic slowdown had already begun in the 1990s due to the shrinking growth rate of the working-age population. Simultaneously, income inequality started to worsen as the rise of a knowledge-based economy and globalisation placed low-skilled workers at a disadvantage. To address

these challenges, the government in the 2000s focused on bilateral and regional free trade agreements (FTAs) to stimulate economic growth.¹⁹

South Korea's growth strategies played a key role in its economic miracle. During the era of rapid expansion, the government effectively carried out economic and industrial policies to achieve its objectives, while private firms broadened their operations toward both domestic and international markets, committing substantial capital to production, R&D, and the training of skilled labour. This form of corporatism—close cooperation between government and industry to accelerate national development—is characteristic of many Northeast Asian countries.²⁰

Defence environment in the Korean Peninsula and emerging defence industry

Since the Korean War (1950–1953), the Korean Peninsula has been technically at war because North Korea and the United Nations (UN) Command only signed the armistice agreement instead of the agreement on the end of the Korean War. The Korean War was the first war that the UN participated in outside the Western world, and the UN Command in South Korea is still operating. The Korean War caused tension between the two superpowers, the United States and the Soviet Union, because it was a proxy war strategy for them, which was crucial in developing the Cold War. In the aftermath of the war, the U.S. provided significant aid to South Korea under the auspices of the UN's Korean Reconstruction Agency. At the same time, the Soviet Union and China supported North Korea's reconstruction. The war devastated two Koreas, and both suffered from significant damage to their economies and infrastructure as well as at least 2.5 million losses of life in military personnel and civilians during the war.²¹

Since the end of the Korean War in 1953, there have been five dialogues between the two parties to settle the mutually hostile policy into the peaceful negotiation modes that took place in 1972, 1992, 2000, 2007, and 2018. The first inter-Korean dialogue led to the first Joint Statement on reunification under the auspices of the Red Cross in 1972. Since the second dialogue, both parties have officially focused on the denuclearisation of the Korean Peninsula. However, North Korea initiated its nuclear weapons program in the early 1960s and withdrew from the Nuclear Non-proliferation Treaty (NPT) in 2003. Finally, North Korea developed, tested, and produced its nuclear weapons in the middle of the 2010s. Given the estimation of the Stockholm International Peace Research Institute (SIPRI), North Korea may have at least 30 nuclear weapons

¹⁷ Sang Chul Park, "South Korean Trade Strategies in the Post Global Financial Crisis," *Contemporary Issues in Business and Government* 20, no. 1 (2014): 59–76; M. P. Todaro and S. C. Smith, *Economic Development* (Boston: Addison-Wesley, 2012).

¹⁸ Sakong and Koh, *The Korean Economy, Six Decades of Growth and Development*.

¹⁹ Park, "South Korean Trade Strategies in the Post Global Financial Crisis"; Sakong and Koh, *The Korean Economy, Six Decades of Growth and Development*.

²⁰ A. H. Amsden, *The Rise of "The Rest": Challenges to the West from Late-Industrializing Economies* (Oxford: Oxford University Press, 2003).

²¹ C. K. Armstrong, "The Destruction and Reconstruction of North Korea 1950–1960," *The Asia Pacific Journal*, no. 7 (2009): 1–9.

in 2023, which is regarded as the greatest threat to South Korean military security. Due to the strategy of nuclear weapons in North Korea, the inter-Korean trade has declined radically since 2016, and the trade volume has become nearly zero since then (See Figure 1).²²

Within this defence context, the South Korean government has been pivotal in fostering its defence industry since the early 1970s. At the outset, it introduced three key measures: the Special Law on the Defence Industry in 1973, the Force Improvement Plan in 1974 to strengthen the Republic of Korea (ROK) armed forces, and the Defence Tax Law in 1975 to fund the industry's development. The South Korean government supported the defence industry systematically because it was closely related to government policy in the 1970s, which was to attract investments in the core industries, modernising the national industrial base through heavy machinery, shipbuilding, steel, automobiles, and electronics. The expansion of these sectors supported the growth of defence production, as weapons manufacturing became embedded within the wider output of heavy machinery, ships, and electronics. Furthermore, the South Korean government granted defence firms incentives such as low-interest financial loans and military service exemptions for their employees, etc.²³

²² SIPRI, "SIPRI Yearbook: Armaments, Disarmament and International Security" (Stockholm, 2023), <https://www.sipri.org/yearbook/2023/07>; D. Wertz, "Inter-Korean Relations, The National Committee on North Korea," 2023, <https://www.ncnk.org/resources/briefing-papers/all-briefing-papers/inter-korean-relations>; ROK Ministry of Unification, "Inter-Korean Exchanges & Cooperation," 2025, https://www.unikorea.go.kr/eng_unikorea/relations/statistics/exchanges/.

²³ U.S. Congress Office of Technology Assessment, "Global Arms Trade" (Washington D.C., 1991).

During the 1970s and 1980s, pressure and control were equal to government policy incentives for the defence industry. Financing and licensing of commercial production were made contingent on private companies' willingness to participate in defence manufacturing. The South Korean government closely managed production levels, marketing, and weapons and military equipment exports. In addition, the government kept control over defence industry R&D through the Agency for Defence Development (ADD), which was responsible for most of the research and weapon system design, while also overseeing the limited R&D conducted by defence companies.

In the South Korean defence industry, a few conglomerates dominated, already gaining international reputations. These were Samsung, Hyundai, Daewoo, Lucky Goldstar (LG) etc. They produced most systems within the defence industry, although their defence work comprised a small percentage of their business, from 10 to 25 per cent in 1990. The government also tried to foster small and medium-sized companies (SMEs) in the defence field, mainly subcontracting to conglomerates. The South Korean conglomerates spearheaded the defence industry by expanding their R&D, manufacturing new systems, and collaborating with the U.S. and other foreign defence industries.²⁴

Strategy of the defence industry in South Korea

The strategy for developing the defence industry in South Korea was to establish partnerships between Korean firms and

²⁴ M. Howarth, 'Defending the Republic of Korea: Armed Forces and Industry Forge Ahead', *International Defence Review*, no. 2 (1986): 193–97; U.S. Congress Office of Technology Assessment, 'Global Arms Trade', 1991.

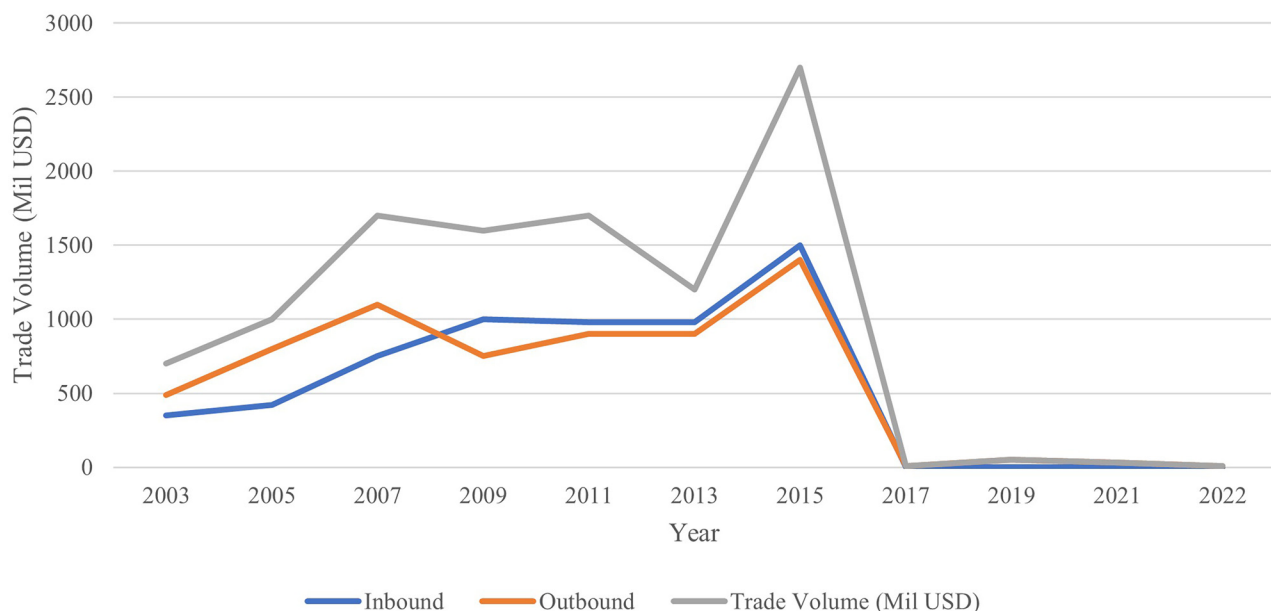


Figure 1. Trends of inter-Korean Trade (As of 2003–2022, USD Millions). Source: ROK Ministry of Unification, 2025.

foreign companies, particularly U.S. companies, in producing weapon systems. It focused on collaborative relationships in which South Korean companies could establish an equal relationship status with U.S. partners. This goal was to be realised by speeding up technology transfer from U.S. firms to South Korean partners, enabling the latter to manufacture more advanced components and complete weapon systems. This means that South Korean companies could provide full services and maintenance to weapon systems in their military arsenal.

The South Korean government defined three key elements in its partnership strategy. The first was to strengthen the role of South Korean firms as suppliers of parts and components for leading U.S. defence corporations such as McDonnell Douglas and General Dynamics, etc., that produced their weapon systems in the USA. It could be a win-win approach because South Korean firms could subcontract economising standard parts and components. U.S. companies could maintain the lead in developing advanced technology despite the declining defence budget. This approach was equally valid for defence companies in Western European countries. Secondly, exports of weapons were integrated into South Korea's defence industry policy. The South Korean defence industry had no alternative except to export its weapon products due to the limited domestic market. Last but not least, the central focus of defence industry policy was technology cooperation in developing weapon systems, aiming to produce more advanced military equipment such as aircraft, missiles, telecommunications devices, and electronics. To achieve this, greater levels of technology transfer from U.S. firms to South Korean companies were required.²⁵ (See Table 1).

As for defence exports, South Korea began selling military equipment abroad in the late 1970s, reaching several hundred million U.S. dollars. By the early 1980s, annual exports stood at about USD 100 million, consisting mostly of munitions and

light naval vessels. Many of these products were designed independently in South Korea without U.S. participation, with the main markets located in the Middle East, Latin America, and Southeast Asia. The South Korean defence industry secured buyers by offering competitive prices—partly due to lower labour costs—while also maintaining strict quality control standards. Moreover, the South Korean government did not enforce major foreign policy restrictions on sales linked to human rights, arms control, or limitations on military conflict. However, exports fell sharply after 1983, as U.S. firms' coproduction agreements led the American defence industry to oppose South Korean overseas sales of U.S.-designed weapons and equipment (See Figure 2).²⁶

South Korea and Japan rank among the key countries participating in the operations of U.S. defence companies in East Asia. American defence firms have carried out substantial business in South Korea, focusing primarily on three areas: direct sales of weapons and other military-related goods, partnerships with South Korean firms through licensing and coproduction for assembly or manufacturing, and contractual agreements for supplying components to U.S. defence companies. These forms of cooperation have frequently been embedded within broader industrial ties between firms from both nations.

U.S. military exports are generally carried out either through commercial channels or under the Foreign Military Sales (FMS) program managed by the Defence Security Assistance Agency (DSAA). In 1978, the U.S. government withdrew South Korea from FMS credit financing. Nonetheless, the South Korean government kept acquiring American weapons through cash-based FMS transactions, as these offered the benefit of U.S. government oversight in dealings between South Korean and U.S. firms. As a result, FMS started to decline heavily from 1978 to 1982, and it stabilised until 1988, while direct commercial sales (DCS) declined until 1982 and later increased rapidly until 1988. This pattern shows that South

²⁵ Y. H. Park, 'ROK-US Defence Industry Cooperation – Past Achievement and Future Tasks', 1990; ROK Ministry of National Defence (MND), 'Defence White Paper' (Seoul, 1990); U.S. Congress Office of Technology Assessment, 'Global Arms Trade', 1991.

²⁶ U.S. Congress Office of Technology Assessment, "Global Arms Trade" (Washington D. C., 1990).

Table 1. South Korean Strategy for the Defence Industry and Key Elements in the Early Stage.

Strategy	Key Elements	Characteristics
Partnership with U.S. and Western European Defence Companies	Suppliers of parts and components	Win-Win approach -Subcontracting economising parts & components (South Korea) -Maintaining an advanced technological lead (USA)
	Exports integrated into defence industry policy	Increasing exports in niche markets
	Technology cooperation	-Developing sophisticated military technology -Upgrading technology transfer

Source: Authors' own adaptation.

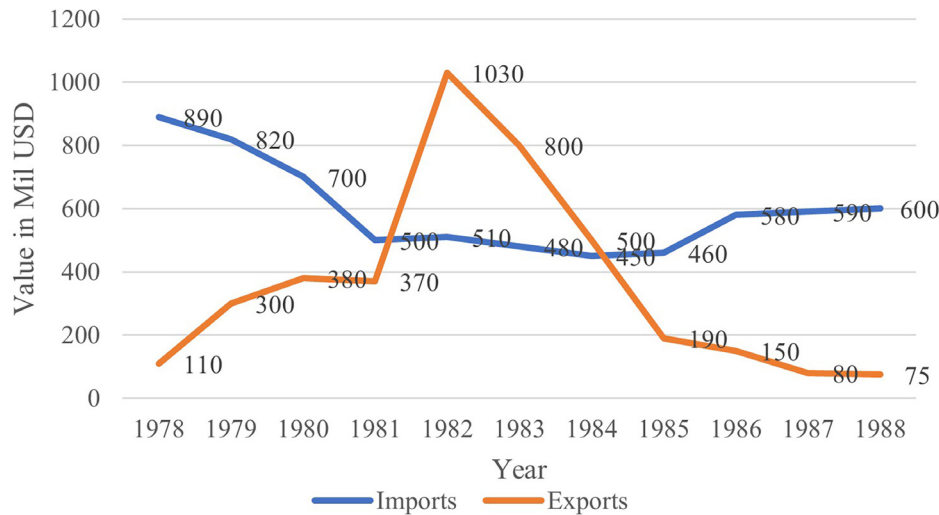


Figure 2. South Korean Arms Trade (As of 1978–1988, USD Millions). Source: U.S. Congress Office of Technology Assessment, 1990.

Korean exports of weapons declined with increasing DCS during the same period²⁷ (See Figure 3).

Impacts of the defence industry on national economic development

Strategic approach of defence industry and export trend

Beginning with the Yul-gok Defence Industrialization Project initiated by the Park Chung Hee administration (1961–1979) in 1974, South Korea's defence industry underwent a striking transformation—from manufacturing licensed small arms to developing into one of the world's most advanced defence industrial bases, an achievement impressive by any measure. This process was driven both by financial limitations and the persistent military threat posed by North Korea. At the same time, the successful transition was made possible through ongoing restructuring and adjustment of the Defence Production Act (DPA) framework, along with supportive government policies.

Since the late 1990s, South Korea's defence industry has advanced from a third-tier to a second-tier arms producer by progressing beyond imitation and assembly toward creative imitation and indigenisation. In the acquisitions mandated by the Defence Reform 2020 plan introduced under the Roh Moo-Hyun government (2003–2007) in 2005, the improvement of the individual and joint C4ISR capabilities of the armed services was mainly focused. With the plan, South Korea anticipated achieving a considerable level of self-sufficiency, intelligent collection capabilities, and constructing real-time, synchronised networks among all the units involved in all kinds of battles, aiming at replacing ageing weapons and equipment by 2020. This reform was modified in the Lee Myung

Bak government (2008–2012) and upgraded to Defence Reform 2.0 in the Moon Jae In government (2017–2022). Additionally, the South Korean government emphasised the acquisition through domestic R&D that encouraged not only domestic procurement of revolution in military affairs (RMA) related assets but also to improve industrial capabilities, particularly in information and aerospace technologies²⁸.

The evolutionary dynamics of defence industrial upgrades in specific sectors, particularly in RMA-related areas such as command, control, communication, intelligence, surveillance, etc. As a result, the defence sector was chosen as an economic growth engine for the overall South Korean economy by the Lee Myung Bak government in 2008. It was believed that a strategic government plan was able to achieve robust economic growth and develop armed forces with cutting-edge technology by promoting the defence industry. Accordingly, most of the administration followed up on comprehensive support for the defence industrial bases to meet the national target²⁹ (See Figure 4).

In the 1980s and 1990s, South Korea experienced high pressure from the U. S. in terms of third-country arms sales

²⁷ U.S. Congress Office of Technology Assessment, "World Military Expenditures and Arms Transfers" (Washington DC, 1989); U.S. Congress Office of Technology Assessment, "Global Arms Trade," 1991.

²⁸ J. I. Moon and J. O. Peak, 'Defence Innovation and Industrialization in South Korea, Study of Innovation and Technology in China (SITC)', *Policy Brief*, no. 14 (2010): 1–6; J. N. Kim, 'Country Report: South Korea', *DGAP Report*, 2022, https://dgap.org/system/files/article_pdfs/DGAP-Report-2022-00-EN-SüdKorea.pdf.

²⁹ C. C. Rim and H. Y. Lee, 'The Effects of Korean Government's Defence Industry Fostering Policy on the Performance of Defence Industry Enterprises', 2008, <https://core.ac.uk/download/51181441.pdf>; U. M. Steindl, 'Between Integration, Indigenization and Internationalization: Defence Innovation Systems in East Asia 1991–2021' (University of Vienna, 2022); U. M. Steindl, 'Geopolitical Instability and Escalating Conflicts: The Impact on East Asian Defence Innovation System', *Vienna Journal of East Asian Studies* 15 (2024): 159–86.

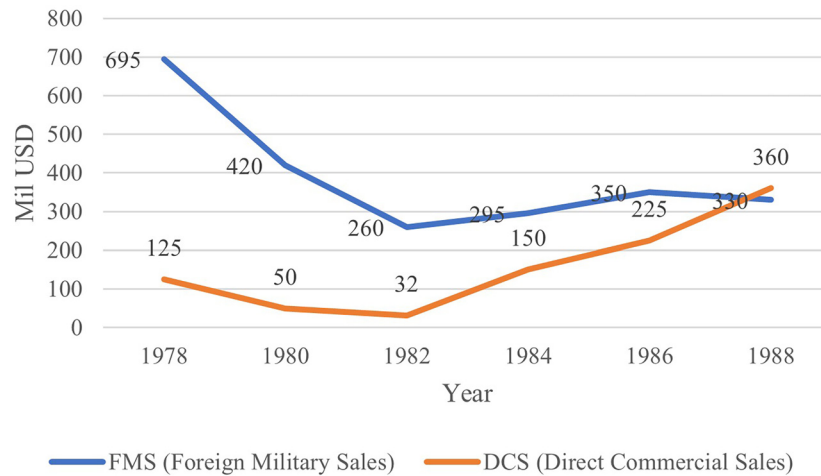


Figure 3. Foreign Military Sales (FMS) and Direct Commercial Sales (DCS) from the USA to South Korea (As of 1978–1988, USD Mil.). Source: U.S. Congress Office of Technology Assessment, 'World Military Expenditures and Arms Transfers'.

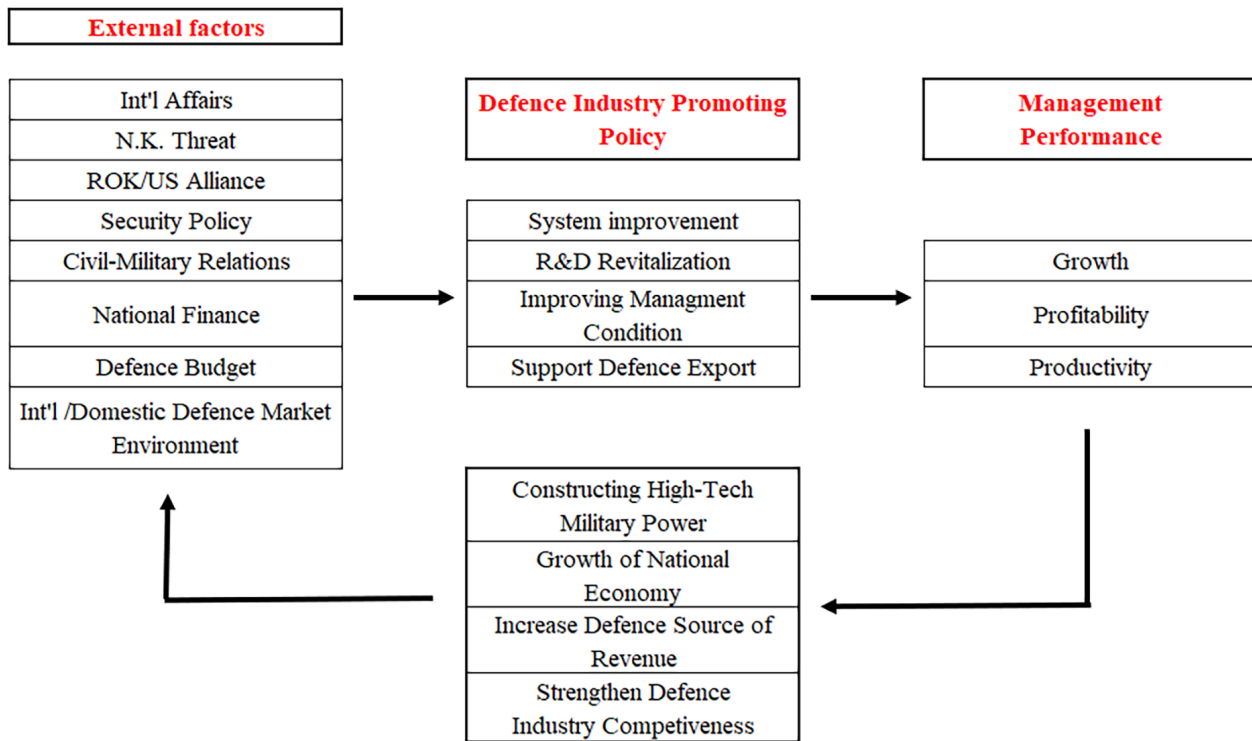


Figure 4. South Korean Model of Defence Industry Development. Source: Rim and Lee, 'The Effects of Korean Government's Defence Industry Fostering Policy on the Performance of Defence Industry Enterprises, 2008.

regulations. Therefore, the South Korean government had to deliberate on producing defence articles through domestic R&D more actively than any other country. Accordingly, the composition of defence exports started to change radically from military uniforms, ammunition, and small arms to aircraft and naval vessels in the late 1990s.

South Korean military exports rose from USD 147 million in 1998 to USD 253 million in 2006 to USD 1.03 billion in 2008. It was a historical turning point for the South Korean military industry to export more than a billion USD in 2008 because it had a USD 330 million contract for technological cooperation on tank development with Turkey. The export

to Turkey was particularly significant because it was not weapons systems but source technology that was the first deal for the South Korean defence industry. As a result, exports of military aircraft and related services became the largest share of 32.1 per cent of total military exports in cumulative terms from 2001 to 2008. Export of ammunition was followed by 22.3 per cent during the same period, and off-set exports and artillery and manoeuvre equipment accounted for 18.3 per cent and 18 per cent, respectively (See Table 2).³⁰

Defence industrial efforts and nurturing policies have continued in the 2010s and the 2020s, making South Korea the fastest-growing arms exporter. Consequently, between 2017 and 2021, South Korea rose to become the world's eighth-largest arms exporter, accounting for 2.8 percent of global exports. In the previous period, 2012–2016, South Korea's global share accounted for only one per cent. The Ukraine War, which started in February 2022, caused a massive increase in military demand in Europe, and South Korean defence exports increased

radically from USD 7.3 billion in 2021 to USD 17.3 billion in 2022 due to major contracts placed by Poland, Egypt, and the United Arab Emirates (UAE). It is regarded as the second quantum leap of the defence industry³¹ (See Figure 5).

The South Korean defence industry has implemented two noticeable trends since the 2000s. Firstly, it has upgraded its export of high-tech items such as aircraft and naval vessels. Secondly, the Koreanization of defence articles was realised due to the high pressure from the U.S. regarding regulating third-country arms sales in the 1980s and 1990s. To meet the national target, South Korea has been more actively producing defence articles through domestic R&D.³²

With a growing global market share of defence exports since the 2010s, South Korea has capitalised on growing global demand in Europe, Southeast Asia, the Middle East, and North Africa. In 2024, its market reached out to extend to Peru in South America, and it concluded Memoranda of Understanding (MOUs) on Defence Cooperation with forty-eight countries, laying the foundation for closer collaboration and opening new export prospects. Furthermore, some NATO member countries lacking industrial capacity in Europe could open more opportunities to the South Korean defence industry.³³

³⁰ Moon and Peak, 'Defence Innovation and Industrialization in South Korea, Study of Innovation and Technology in China (SITC)'.

Table 2. Aggregate Share of Military Export from 2001 to 2008, %.

Rank	Sector	Aggregate Share
1	Military aircraft & related services	32.1
2	Ammunition	22.3
3	Off-set based exports	18.3
4	Artillery & manoeuvre equipment	18.0
5	Others	9.3

Source: Moon and Peak, 2010.

³¹ ROK Ministry of National Defence (MND), '2022 Defence White Paper' (Seoul, 2022), https://www.mnd.go.kr/user/mnd/upload/pblicitn/PBLICTNE-BOOK_202303070948465300.pdf; S-H Choe, 'They're Exporting Billions in Arms. Just Not to Ukraine', *The New York Times*, 3 March 2023, <https://www.nytimes.com/2023/03/05/world/asia/ukraine-south-korea-arms.html>; Steindl, 'Geopolitical Instability and Escalating Conflicts: The Impact on East Asian Defence Innovation System'.

³² Moon and Peak, 'Defence Innovation and Industrialization in South Korea, Study of Innovation and Technology in China (SITC)'.

³³ ROK Ministry of National Defence (MND), '2022 Defence White Paper'; SIPRI, 'Trends in International Arms Transfers' (Stockholm, 2023); Steindl, 'Geopolitical Instability and Escalating Conflicts: The Impact on East Asian Defence Innovation System'.

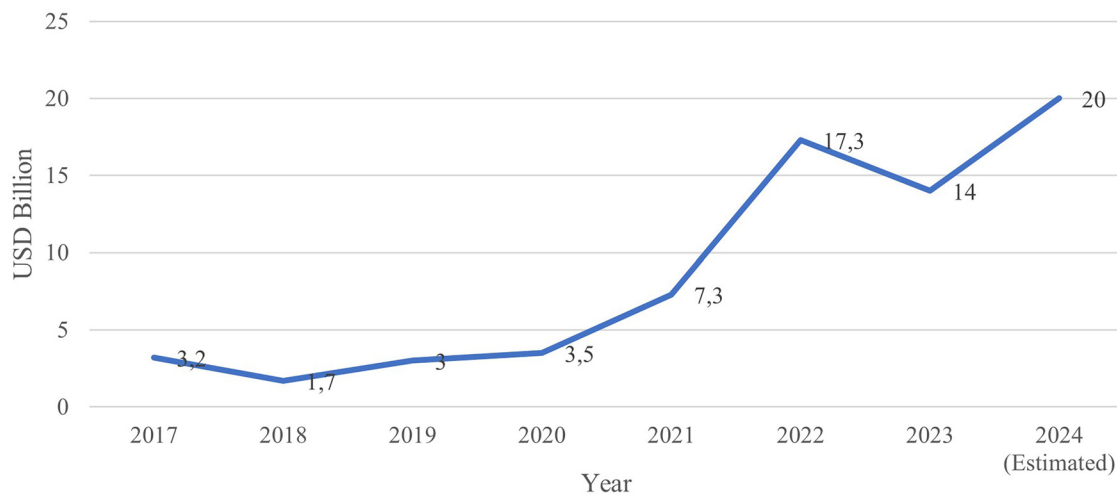


Figure 5. Total Volume of South Korean Arms Export (As of 2017–2024, USD Billion). Source: ROK Ministry of National Defence, 2024.

Impacts of defence industry on economic development

The influence of South Korea's defence industry on the national economy is seen as wide-ranging and substantial. To begin with, it has fostered economic growth and supported the diversification of industrial structures, enhancing global competitiveness in manufacturing sectors. In addition, it has contributed to expanding capital stock, advancing human capital development, and creating new jobs. Finally, it has created technological advances, spill-over effects, and the international arms trade.³⁴

The South Korean economy has generated incredible economic growth since the 1960s, starting with the Five-Year Economic Development Plans that lasted until 1992. Since then, the national economy has grown through the private sector, supported by the government indirectly, based on R&D subsidies, industrial policy, etc. After the government intended to develop the defence industry in the middle of the 1970s, it contributed to positive economic growth. During the 1970s and the 1980s, the economy grew rapidly, and the defence industry also generated high growth rates. Its contribution to economic growth increased from 0.17 per cent in 1975 to 1.17 per cent in 1987 and marked 0.95 per cent in 1989³⁵ (See Table 3).

The South Korean economy has become globalised rapidly since the 1990s and has grown continuously, mainly based on its high-tech sectors, such as the semiconductor industry, aerospace industry, etc. Along with such a trend, the military industry has also upgraded its level by developing its own weapon systems to strengthen its security capacity and increase defence exports. As a result, South Korea became the 10th largest economy in the world for the first time in 2007. The share of the defence industry has accounted for less than one per cent of the GDP since 2011 because its GDP has grown continuously and expanded its size and volume radically compared to the 1990s and the 2000s. Although the portion of the defence industry in the GDP declined compared to the 1970s and the 1980s, it still contributed to increasing the GDP positively³⁶ (See Table 4).

The defence industry has also contributed to diversifying the industrial structure in the 1970s and 1980s and has played a significant role in increasing global competitiveness in manufacturing sectors since the 2010s. Defence industrialisation proved effective solely through the establishment of proper forward and backward linkages with other sectors of industry. During the 1970s, South Korea was losing its competitive

advantage in the light manufacturing sectors due to the wage increase and the increasing protectionist trends among OECD member countries, so the South Korean government needed to develop a capital-intensive heavy industry, generating further economic growth. For it, the government was committed to pursuing defence industrialisation, which resulted in reduced incentives to facilitate the firm's industrial adjustment.

Table 3. The Ratio of Defence Products in GNP (As of 1975-1989, KRW Billion, %).

Year	GDP (A)	Output of Defence Industry (B)	Ratio (%) (B/A)
1975	10,135.8	16.8	0.17
1977	17,806.6	44.2	0.32
1979	39,801.8	203.3	0.67
1980	36,749.7	327.7	0.89
1982	52,182.3	466.0	0.90
1984	70,083.9	602.8	0.86
1986	90,598.7	1,053.2	1.17
1988	126,230.5	1,384.1	1.10
1989	141,794.4	1,343.1	0.95

Source: KIDA, 'Analysis on Defence R&D and Defence Industry in Korea' (Seoul, 1990).

Table 4. The Ratio of the Defence Industry in GDP (As of 2011-2022, KRW Trillion, %).

Year	GDP (A)	Output of Defence Industry (B)	Ratio (%) (B/A)
2011	1,449	9.3	0.64
2012	1,505	9.3	0.62
2013	1,571	10.5	0.67
2014	1,638	12.0	0.73
2015	1,741	14.3	0.82
2016	1,833	14.8	0.81
2017	1,934	12.8	0.66
2018	2,007	13.7	0.68
2019	2,041	14.5	0.71
2020	2,058	15.4	0.75
2021	2,222	15.9	0.72
2022	2,324	16.8	0.72

Source: Bank of Korea, 'Statistics'; Statistics Korea; MOEF (South Korea); MND (South Korea), 'South Korea's National Defence Budget from 2006 to 2024'.

³⁴ Y. H. Lee, *Defence Industry and Its Impacts on Economic Growth in Korea* (Monterey: Naval Postgraduate School, 1992); UNIDO, 'International Yearbook of Industrial Statistics: Global Highlights 2023' (New York, 2023).

³⁵ KIDA, 'Analysis on Defence R&D and Defence Industry in Korea' (Seoul, 1990).

³⁶ Bank of Korea, 'Statistics', 2024, <https://ecos.bok.or.kr/#/SearchStat>; Statistics Korea; MOEF (South Korea); MND (South Korea), 'South Korea's National Defence Budget from 2006 to 2024', Statista, 2024, <https://www.statista.com/statistics/745747/south-korea-national-defence-expenditure/>.

Even though the short-term effects of industrial adjustment were severe, accelerating heavy industrialisation through the drive of defence industry development is considered a positive strategy. Therefore, the government invested over USD 10 billion in the heavy chemical sectors from 1975 to 1984.³⁷

The relationship between the heavy and arms production industries can be the proper object for analysing industrial diversification and global competitiveness in the long term. For this reason, nine International Standard Industrial Classification (ISIC) categories at the three-digit level serve as useful instruments for examining industrial diversification in particular developing countries during the 1970s and 1980s. Each of these nine ISIC codes includes subcategories at the six-digit level, representing the specific items produced by a country. For instance, ISIC code 351 contains 74 subcategories, each corresponding to a distinct chemical product. High numbers represent industrial diversification in these developing countries³⁸ (See Table 5).

Based on the strategic investment in the heavy and chemical industries to upgrade the industrial structure and strengthen the defence industry, the global competitiveness of the manufacturing industries has increased continuously since the 1990s. Given the analysis of the Competitive Industrial Performance (CIP) Index developed by the UNIDO, the South Korean competitiveness of manufacturing industries ranked from third to fifth in the world during the 2011–2021 period, indicates a close correlation between industrial diversification and global competitiveness between the defence industry and the manufacturing industries. It means that both sectors have strongly interacted and generated sufficient synergy effects through feedback from each other³⁹ (See Figure 6).

The defence industry has contributed positively, diversifying the industrial structure and economic growth. It has played significant roles in strengthening the competitiveness of manufacturing sectors in the global market and generated proper economic growth in the 2010s and the early 2020s. The defence budget and expenditure prove these. The former accounted for KRW 31.4 trillion in 2011 and increased to KRW 54.6 trillion, while the latter sustained 2.5 per cent of GDP during the same period. This means that economic growth based on industrial diversification and global competitiveness could cover the increase in the defence budget without burdening

the national economy. Additionally, the revenue of the defence industry increased from KRW 9.3 trillion to KRW 16.9 trillion in the same period⁴⁰ (See Figure 7).

Implications for Polish industrial development

Polish industrial structure

The defense industry covers a comprehensive industrial sector. Thus, countries willing to develop a defense industry should prioritize balanced industrial development. This is also a case of Poland, which could follow the example and role model of South Korea in its complex development of military capabilities.

The structure of the Polish economy is undergoing a transformation that is in line with global trends. The services sector plays the most important role, followed by industry and agriculture.⁴¹ Although the contemporary structure of the Polish economy is based on services, however, the industrial sector still plays an important role. In 2022, industry accounted for 31.5% of the total value added in the Polish economy⁴², employing 31% of the workforce.⁴³ Within the industrial sector, as many as 87.3% of employees worked in *Manufacturing*, while 4% in *Mining and quarrying*, 5.2% in *Water supply*, and 3.5% performed work related to *Electricity, gas, steam and air conditioning supply*.⁴⁴

Due to the sensitive nature of data on the defence sector, all information on this subject is approximate, and its publication is limited. According to estimates, in 2020, the defence sector employed 463,000 people in the European Union. There were 2,500 mainly small and medium-sized enterprises, and the sector turnover in the entire EU amounted to EUR 119 billion.⁴⁵ Since then, these numbers have increased significantly. As for Poland, it plays a significant role in armaments production, including helicopters and artillery. Polish Armament Group

⁴⁰ Bank of Korea, 'Statistics'; Statistics Korea; MOEF (South Korea); MND (South Korea), 'South Korea's National Defence Budget from 2006 to 2024'.

⁴¹ Paweł Pasierbiak and Sebastian Bobowski, "Evolution of Poland's Participation in Global Value Chains Since the Mid-1990s," in *Modeling Economic Growth in Contemporary Poland*, ed. Elżbieta Bukalska, Tomasz Kijek, and B S Sergi (Leeds: Emerald Publishing Limited, 2023), 243, <https://doi.org/10.1108/978-1-83753-654-220231019>.

⁴² UN Trade&Development, "Gross Domestic Product: GDP by Type of Expenditure, VA by Kind of Economic Activity, Total and Shares, Annual," 2024, <https://unctadstat.unctad.org/datacentre/dataviewer/US.GDPComponent>.

⁴³ The World Bank, "World Development Indicators | DataBank," 2024, <https://data.worldbank.org/indicator/SI.LIND.EMPL.ZS?locations=PL>.

⁴⁴ Statistics Poland, "Statistical Yearbook of Industry - Poland" (Warsaw, 2023), 199–201.

⁴⁵ Katarzyna Zarzecka, "Specyfika Sektora Zbrojeniowego w Gospodarce," 2023, <https://www.obserwatorfinansowy.pl/tematyka/makroekonomia/trendy-gospodarcze/specyfika-sektora-zbrojeniowego-w-gospodarce/>.

³⁷ Lee, *Defence Industry and Its Impacts on Economic Growth in Korea*.

³⁸ J. Brauer, 'Arms Industries, Arms Trade, and Developing Countries', in *Handbook of Defence Economics: Defence in a Globalized World*, ed. T. Sandler and K. Hartley (Elsevier, 2007), 973–1015.

³⁹ UNIDO, "International Yearbook of Industrial Statistics: Global Highlights 2023."

Table 5. Arms Producers' Production of Major Developing Countries in ISIC Categories (As of 1975-1984, number of subcategories produced in each particular code).

	351 (74)	352 (12)	371 (32)	372 (36)	381 (15)	382 (59)	383 (27)	384 (21)	385 (6)	Total
Saudi Arabia	2	0	1	0	0	0	0	0	0	3
Malaysia	3	4	5	2	2	0	3	4	0	23
Israel	17	3	1	0	1	5	5	5	5	42
Peru	11	4	4	9	2	3	4	7	0	44
Iran	8	3	2	7	4	10	8	6	0	48
Chile	21	6	10	8	3	6	11	4	0	69
Greece	26	7	10	14	7	21	15	9	0	109
India	55	8	13	22	3	17	10	12	2	142
South Korea	54	8	21	18	6	28	15	11	4	165
Brazil	62	7	22	31	5	41	20	13	4	205

Source: United Nations Yearbook of Industrial Statistics, 1984.

Note: ISIC Codes (351 - Manufacture of industrial chemicals; 352 - Manufacture of other chemical products; 371 - Iron and steel basic industries; 372 - Non-ferrous metal industries; 381 - Manufacture of fabricated metal products, except machinery and equipment; 382 - Manufacture of machinery except electrical; 383 - Manufacture of electrical machinery, apparatus, appliances, and supplies; 384 - Manufacture of transport equipment; 385 - Manufacture of professional and scientific, and measuring and controlling equipment not elsewhere classified, and of photographic and optical goods).

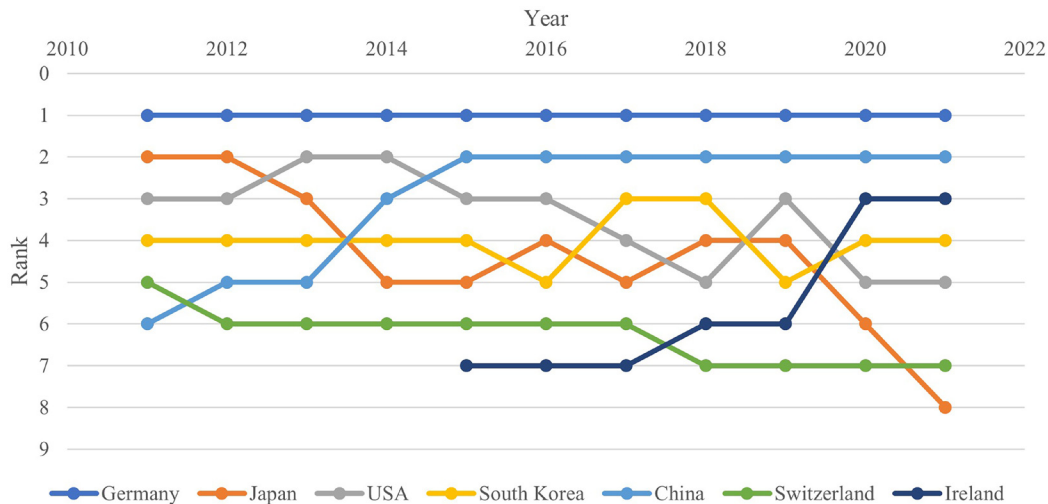


Figure 6. Rank of the World's Major Manufacturing Countries based on the CIP Index (As of 2011-2021). Source: UNIDO, 'International Yearbook of Industrial Statistics: Global Highlights 2023'.

(Polska Grupa Zbrojeniowa – PGZ), which includes several dozen subsidiaries, is among the 100 largest armaments corporations in the world, for several years occupying a place ranging between 70 and 80.⁴⁶ Polish companies offer products and services in all sectors: land, sea, air, space and cyberspace⁴⁷.

⁴⁶ Piotr L. Wilczyński, *Geografia Przemysłu Zbrojeniowego Europy* (Kraków: Polskie Towarzystwo Geopolityczne, 2019), 37; SIPRI, 'SIPRI Arms Industry Database', 2024, <https://www.sipri.org/databases/armsindustry>; ITA, 'Poland - Country Commercial Guide', 2024, <https://www.trade.gov/country-commercial-guides/poland-defence-industry>.

Channels of influence

The impact of the arms sector on the economy is multifaceted. The increase in military spending can accelerate the dynamics of economic growth⁴⁸, and the development of defence-related

⁴⁷ Ministry of National Defence and National Security Bureau, "Polish Defence and Security Equipment Catalogue 2024" (Warsaw, 2024).

⁴⁸ Piotr Krajewski and Katarzyna Pilat, "The Comparison of the Impact of Military and Non-Military Government Spending on GDP and Consumption in Poland," *Optimum. Economic Studies* 2, no. 2(112) (2023): 19–37, <https://doi.org/10.15290/oes.2023.02.112.02>.

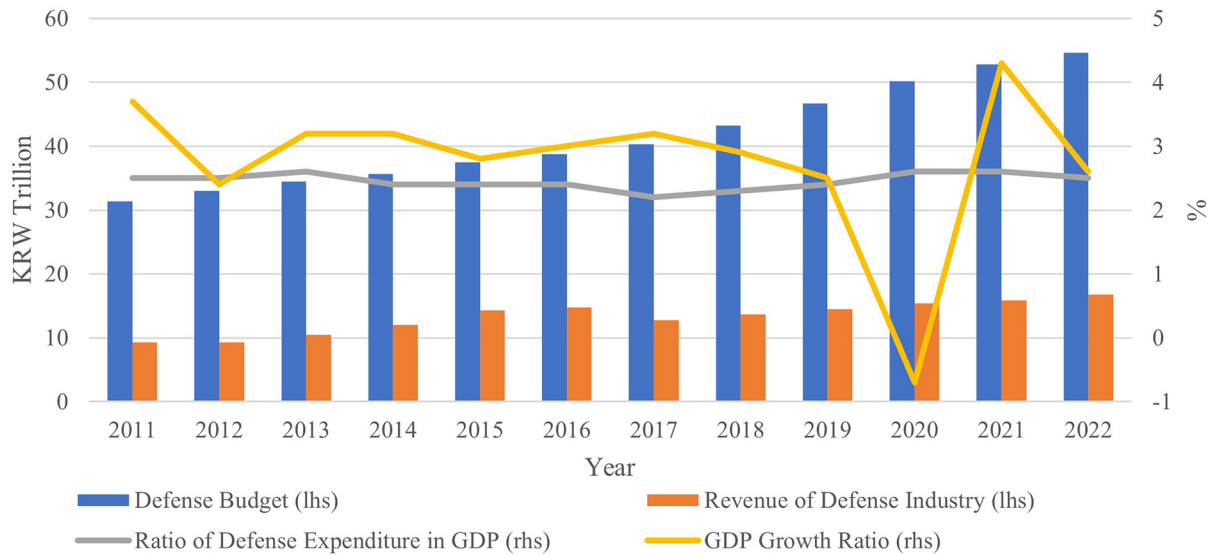


Figure 7. Trends of the Defence Budget, Defence Share of GDP, and Economic Growth Rates (As of 2011–2022, KRW Trillion, %).
Source: Bank of Korea, ‘Statistics’; Statistics Korea; MOEF (South Korea); MND (South Korea), ‘South Korea’s National Defence Budget from 2006 to 2024’.

industries affects modifying the country’s production structure. Expenditures on the arms sector should not be treated solely as costs but to a greater extent as investments because they support introducing new technologies, increasing production potential, and increasing foreign trade turnover.⁴⁹ Since the arms industry is characterised by high expenditure on R&D, its development favours the emergence of modern technologies used not only in the military and defence industry but also in civilian industries, including aviation, medicine, and telecommunications.⁵⁰ This type of technology transfer leads to general technological progress in the economy.

The development of the arms industry leads to direct and indirect job creation. The increase in employment in factories and laboratories (direct jobs) is accompanied by increased employment in related companies supplying parts and components (indirectly created jobs). Additionally, due to the need to meet high quality and safety standards in the arms industry, the general competencies and skills of employees are improving, leading to an upgrade in the quality of the labour factor in the country. If we also consider the impact of the arms indus-

try’s development on infrastructure development, its importance for the national economy is even greater.⁵¹

Table 6 presents the structure of Poland’s defence expenditure in 2014–2023. NATO data indicate that there have been significant changes in the scope of expenditure categories, especially in the last year (2023). While until 2022, the largest share in total expenditure was the *Personnel* category (42–50%), in 2023, its share dropped to 27.5%.

At the same time, a systematic increase was observed in the *Major Equipment, including the related R&D* category, where from 2014 to 2022, the share increased from 18.8% to 32.4%. The year 2023 is specific, with a significant increase in expenditure of this category, up to 53.6% of total spending in the defence sector. This is a consequence of Russia’s military aggression in Ukraine and the need to quickly strengthen Poland’s defence capabilities as a country neighbouring Ukraine. *Infrastructure* expenditure remained stable at around 4% throughout the period.

In the context of the war in Ukraine, it is worth emphasising the importance of the planned modernisation of the Polish armed forces. Poland is implementing the Technical Modernization Plan for its armed forces, which assumes spending approximately USD 131 billion on new equipment in 2021–2035.⁵² The plan rests on three key assumptions: 1) evaluation of Poland’s military requirements, 2) scheduling for equipment delivery, and 3) involvement of Polish industry. The program highlights

⁴⁹ Katarzyna Zarzecka, “Specyfika Sektora Zbrojeniowego w Gospodarcze,” 2023, <https://forsal.pl/swiat/bezpieczenstwo/artykuly/9281101,specyfika-sektora-zbrojeniowego-w-gospodarcze.html>.

⁵⁰ Sylwia Koźmińska, “Przemysł Zbrojeniowy Jako Sektor Dla Rozwoju Biznesu. Na Co Zwracać Uwagę,” 2024, <https://mycompanypolska.pl/artykul/przemysl-zbrojeniowy/15689>; Piotr L. Wilczyński, “Sektor Zbrojeniowy Jako Czynniki Rozwoju Gospodarki Opartej Na Wiedzy,” *Prace Komisji Geografii Przemysłu Polskiego Towarzystwa Geograficznego* 21 (2013): 133–56.

⁵¹ Koźmińska, “Przemysł Zbrojeniowy Jako Sektor Dla Rozwoju Biznesu. Na Co Zwracać Uwagę.”

⁵² ITA, “Poland - Country Commercial Guide.”

Table 6. Distribution of Polish defence expenditure by main category, 2014–2023, %.

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Personnel	51.5	42.0	47.2	50.0	46.0	46.9	44.7	43.6	42.7	27.5
Operations & Maintenance and Other Expenditures	24.2	20.1	26.6	23.7	22.9	25.0	21.7	18.9	20.7	15.0
Infrastructure	5.5	4.7	4.6	4.2	3.5	4.8	4.3	3.7	4.1	4.0
Major Equipment, including related R&D	18.8	33.2	21.6	22.0	27.5	23.4	29.3	33.9	32.4	53.6

Source: NATO, 'The Secretary General's Annual Report 2023' (Brussels, 2024), 164–65, <https://doi.org/10.3934/energy.2024013>.

the utilisation of domestic defence industry capacities, with particular focus on companies within the Polish Armament Group (PGZ).

A significant increase in Poland's defence spending will impact the Polish economy. About 60% of military equipment is expected to come from imports.⁵³ However, the remaining part of the spending will be carried out by domestic companies, which should positively impact the development of local industry, influencing its modernisation. If this were to happen, domestic arms production could play a more significant role in the development process, leading to GDP growth and an increase in Poland's role as an exporter of military equipment. In anticipation of such a scenario, Poland produces and intensively sources such products abroad.

When analyzing the impact of Poland's defense cooperation with South Korea, the broader European context must be considered. Since Russia's aggression against Ukraine, there has been increasing pressure to create its own stable and rapidly producing defense industrial supply chains. The European Commission (EC) has proposed several initiatives aimed at strengthening Europe's defense readiness and increasing investments in the defense sector⁵⁴: the White Paper for European Defense - Readiness 2030⁵⁵; the ReArm Europe plan; and the Defense Readiness Omnibus Simplification. Therefore, certain opportunities for developing defense ties between Poland

and South Korea are emerging and can be strengthened as reliable partners. Firstly, the program's focus on strengthening EU defense industrial capacity may open funding channels for joint ventures, R&D projects, and supply-chain integration that Polish firms can leverage to expand cooperation with South Korea. Secondly, the EU demand for rapid capability upgrades can create additional market space for South Korean technologies (e.g., K2, K9) produced or co-produced in Poland, supporting localization and technology absorption. However, it is difficult to predict whether the opportunities will be used, because there are also some challenges. First, a strong emphasis on "European preference" in defense procurement may limit the eligibility of South Korean technologies and reduce EU co-financing for projects that rely on non-EU partners. Secondly, possible pressure to shift production towards EU-origin systems (e.g., Leopard-2 upgrades, EU missile systems) could constrain long-term Polish–South Korean industrial integration. Last, but not least, stricter EU rules on technology sovereignty may slow approvals for deep technology transfer from South Korean partners.

South Korean-Polish trade in the defence sector

Poland, like most countries in the world, participates in the arms trade. Although it has some traditions in arms production, it is more an importer than an exporter (See Figure 8). Since 2000, almost every year (except 2001), the volume of Polish imports has exceeded that of exports. An exceptionally high volume of imports occurred from 2006 to 2008 when deliveries of American F-16 fighters began. In the following years, imports fell and did not exceed 260 million TIVs. This changed only with the beginning of Russian aggression in Ukraine (2022), and since that year, the volume of imports has increased significantly to 331 million TIVs in 2022 and 1,374 million TIVs in 2023. At the same time, as an arms producer, Poland began to export such products to a greater extent.

While in 2021, Poland's exports amounted to only 3 million TIVs, in 2022, they increased to 419 million, and in the following year, to 499 million TIVs. This was related to the support that Poland provided to the fighting Ukraine. Ukraine became the first recipient of Polish arms exports in 2000–2023, with

⁵³ PKO BP, "Makro Focus: Gospodarcze Implikacje Modernizacji Sił Zbrojnych," 2023, <https://centrumanaliz.pkobp.pl/makroekonomia/makro-focus-gospodarcze-implikacje-modernizacji-sil-zbrojnych>.

⁵⁴ L. Scazzieri, *The EU's Defence Readiness 2030 Roadmap: Ambition and constraints*, 2025, https://www.cer.eu/insights/eu-defence-readiness-2030-roadmap-ambition-and-constraints?utm_source=chatgpt.com, 3.12.2025; European Commission, *EU trade relations with Ukraine*, 2025, https://policy.trade.ec.europa.eu/eu-trade-relationships-country-and-region/countries-and-regions/ukraine_en, 12.01.2025.

⁵⁵ European Commission, *White Paper for European Defence – Readiness 2030*, Brussels 2025, https://defence-industry-space.ec.europa.eu/document/download/3ce35bde-8519-416a-bc89-56a3681629ac_en?filename=WP%20on%20defence%20-%20factsheet%20v23_0.pdf.

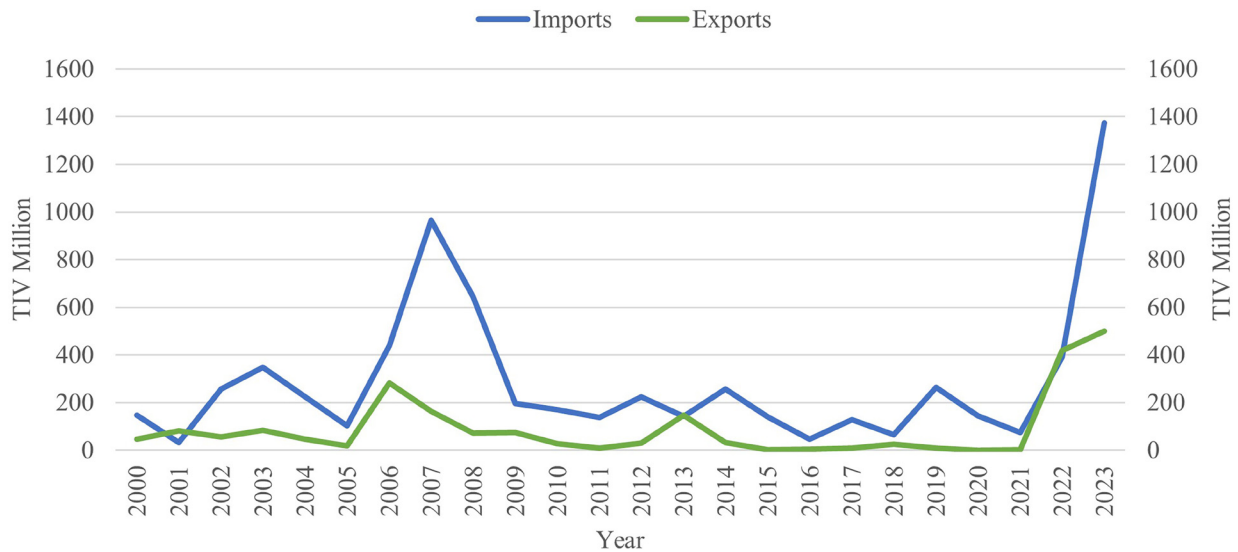


Figure 8. Volume of Exports and Imports of Major Arms by Poland, 2000–2023, in millions of TIVs*. *TIV – SIPRI trend-indicator values. Source: SIPRI, ‘SIPRI Arms Transfers Database’, 2024, <https://armstransfers.sipri.org/ArmsTransfer/>.

a share of 42%.⁵⁶ The following sales markets were India (24%), Malaysia (8.1%), and the United States (7.6%).

The war in Ukraine and growing geopolitical uncertainty resulted in a drastic increase in defence spending. Between 2000 and 2023, the value of military expenditure in Poland increased by 260%, reaching USD 31.7 billion and 3.83% of GDP.⁵⁷ In 2023 alone, it was 106% higher than in the previous year. This situation also meant an increase in arms purchases abroad. For 2000–2023, the leading supplier of arms to Poland was the United States (46%), but South Korea came in second with a share of 11%. Countries such as Germany (11%), Finland (8.2%), Italy (6.6%), Norway (3.5%), and Spain (3.1%) came in further places.⁵⁸

A particularly interesting case is the cooperation with South Korea, which involves a dynamic increase in arms imports from that country, especially in the last two years (See Figure 9).

South Korea is one of the major arms exporters in the world. From 2000 to 2023, it exported such goods with a volume of 7.6 billion TIVs, giving the country 13th place in the global ranking (Poland, with an export volume of 2.2 billion TIVs, took 20th place). The Polish-Korean trade cooperation began in 2016 when Poland imported *Armoured vehicles* for the first time with a volume of 6 million TIVs. In the following

years, the volume of imports of such products increased, but from 2022, *Artillery* also began to be imported, and in 2023, *Aircraft* and *Missiles* were imported. In total, the structure of Poland’s arms imports from South Korea in the years 2000–2023 included *Artillery* (42%), *Armoured vehicles* (25%), *Aircraft* (25%), and *Missiles* (7%). The realised turnover volume in 2000–2023 meant an increase in Poland’s importance as a recipient of South Korean arms to 10.3%. Poland was the third sales market after Indonesia and Turkey. Nevertheless, it is worth emphasising that in 2022–2023, Poland became the primary recipient of Korean arms supplies, receiving 76.5% and 91.8% of total South Korean exports, respectively. Thus, the possibility of the South Korean arms industry’s influence on the Polish industry has significantly increased during the period.

Poland’s defense cooperation with South Korea is developing dynamically, as evidenced by a significant increase in trade turnover (Figure 8), coming particularly from major contracts for the purchase of tanks, howitzers, launchers, and aircrafts. Despite the significant scale of these orders, no assessment was conducted to determine whether a key national security interest existed, which could constitute a basis for applying offsets. Consequently, the contracts do not include commitments regarding technology transfer or the participation of Polish industry in production, which is perceived as a negotiating weakness although Poland received a generous financial support based on bank loan and guarantees (USD 9.2–9.4 billion) from the South Korean government accounted for over 70 percent of the initial deal (USD 12.9 billion).

The case of South Korea’s defense cooperation with the United States is a good example of how mutual benefits can be achieved. It can also serve as an example for Poland and provide guidance for decision-makers on how to approach defense

⁵⁶ SIPRI, “SIPRI Arms Transfers Database,” 2024, <https://armstransfers.sipri.org/ArmsTransfer/>.

⁵⁷ SIPRI, “SIPRI Military Expenditure Database,” 2024, <https://doi.org/https://doi.org/10.55163/CQGC9685>.

⁵⁸ SIPRI, “SIPRI Arms Transfers Database.”



Figure 9. Poland as a Destination for South Korean Exports of Major Arms, 2010–2023, in millions of TIVs and %. Source: Own calculations based on SIPRI, ‘SIPRI Arms Transfers Database’, 2024, <https://armstransfers.sipri.org/ArmsTransfer/>.

spending. In South Korea’s case, cooperation with the United States focused on technology transfer and the development of a domestic production base in order to develop its strategic industries. The goal was not solely to develop the defense industry, but rather to support the broader industrial sectors. This comprehensive strategy brought South Korean economic and industrial success. It seems that Poland has little chance of replicating South Korea’s success. Even if it allocates significant funds to the defense sector (approximately 4.7% of GDP in 2025), these funds are typically not accompanied by offsets or the involvement of Polish industry. Therefore, these expenditures should be treated more as costs than investments. On the other hand, if the assumed goal of achieving a 40% share in military equipment production is achieved, the positive impact on the Polish economy will be visible.

Conclusion

Military expenditures and arms exports peaked in the mid of the 1980s and started to fall gradually with the end of the Cold War era. However, reductions of military expenditures in the United States were not radical, and the US military dominance continued in the post-Cold War era. Particularly, the fixed costs of R&D for major weapon systems have grown continuously, both for platforms and the infrastructure, which is the main reason for the US military to maintain its supremacy.

The South Korean government tried to develop the defence industry in the 1970s under the military regime due to the permanent severe and structural security environment in the Korean Peninsula since the Second World War. At the same time, the defence industry has been a part of strategic industrial

development within the industrialisation process and contributed to upgrading the industrial structure and strengthening its global competitiveness. It has been regarded as a strategic industrial sector since the Lee Myoung-Bak government in 2008. Moreover, it was chosen as a new economic growth engine by the Yoon Suk Ryol government in 2022 because its economy has matured.

After struggling to develop its own weapon system based on R&D activity and continuous investment, South Korea became the world’s 10th largest defence weapon exporter from 2019 to 2023. Its share of government R&D budget allocations for defence accounted for between 13.5 and 16.6 per cent from 2012 to 2022, which is lower than those of the USA (41-47.2 per cent) but much higher than that of France (6.3-10.7 per cent) and Germany (2.7-5.3 per cent). Such a high R&D budget allocation has contributed to the development of the Koreanization of the weapon system and increased the export of defence products. Its share of global arms exports also increased from 1.7 per cent from 2014 to 2018 to 2 per cent from 2019 to 2023.⁵⁹

The impacts of the defence industry on the economy are regarded as broad and positive. First of all, defence technology enabled the South Korean government to invest in basic science, which upgraded the technological capability of industries. Moreover, the output of the defence industry has increased

⁵⁹ OECD, “Main Science and Technology Indicators” (Paris, 2024), <https://data-explorer.oecd.org/>; P. D. Wezeman *et al.*, “Trends in International Arms Transfers” (Stockholm, 2024).

by around one per cent of the GDP and diversified the industrial structure since the 1970s.

It strengthened global competitiveness and became one of the world's top five manufacturing countries from 2011 to 2022. Particularly, the rapid growth of defence exports in 2022 generated around 130,000 new jobs and created USD 34 billion in production inducement effect on other related industries. Overall, its impact on the domestic economy is regarded as significant.

Such effects are also expected in Poland. The country, already experienced in the production and export of arms, can further accelerate the development of the arms sector, thus increasing its military and economic security. Poland currently spends almost 4% of its GDP on defence, and projections indicate an increase in this indicator. It is estimated that the impact of the development of the defence sector can contribute to the acceleration of economic growth in Poland, among others, through the modernisation of the country's economic structure, increased productivity, technological development, and intensified activities in the R&D sphere.

A particular point of reference can be the example of South Korea, which, through appropriate policy and concentration of activities in the defence sector, has advanced to the position of a global leader. The cooperation that Poland has established with South Korea, manifested in the intensive arms trade, can be seen as a step towards ensuring Poland's economic and military security, especially in conditions of great uncertainty related to the situation behind the eastern border.

Data availability

Our article does used data from publicly available databases:

- Bank of Korea. "Statistics," 2024. <https://ecos.bok.or.kr/#/SearchStat>.
- OECD. "Main Science and Technology Indicators." Paris, 2024. <https://data-explorer.oecd.org/>.
- SIPRI. "SIPRI Arms Industry Database," 2024. <https://www.sipri.org/databases/armsindustry>.
- ———. "SIPRI Arms Transfers Database," 2024. <https://armstransfers.sipri.org/ArmsTransfer/>.
- ———. "SIPRI Military Expenditure Database," 2024. <https://doi.org/https://doi.org/10.55163/CQGC9685>.
- ———. "SIPRI Yearbook: Armaments, Disarmament and International Security." Stockholm, 2023. <https://www.sipri.org/yearbook/2023/07>.
- ———. "Trends in International Arms Transfers." Stockholm, 2023.
- Statistics Poland. "Statistical Yearbook of Industry - Poland." Warsaw, 2023.
- The World Bank. "World Development Indicators | Data-Bank," 2024. <https://data.worldbank.org/indicator/SL.IND.EMPL.ZS?locations=PL>.
- UN Trade&Development. "Gross Domestic Product: GDP by Type of Expenditure, VA by Kind of Economic Activity, Total and Shares, Annual," 2024. <https://unctadstat.unctad.org/datacentre/dataviewer/US.GDPComponent>.
- UNIDO. "International Yearbook of Industrial Statistics: Global Highlights 2023." New York, 2023.

Open Peer Review

Current Peer Review Status:



Version 2

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Łukasz Olejnik 

SGH Warsaw School of Economics, Warsaw, Poland

Review of „South Korean Defence Industry in New Global Order and Implications for Poland”

The article examines the development of South Korea’s defence industry in the context of the transition from a US-led unipolar order to a more multipolar global system, arguing that the sector has become not only a pillar of national security but also a catalyst for industrial upgrading and long-term economic growth.

Certainly, one of the strengths of the article is its broad perspective, which includes a description of Korea’s economic history, embeds the defence industry in its historical context, and presents a substantial amount of interesting data. In the peace and defence economics literature, relatively little attention is devoted to South Korea, which is in fact a very interesting case study. In my view, the article is suitable for publication after the introduction of relatively minor changes. I hesitated between recommending a minor revision and a major revision; ultimately, I opted for a major revision.

Major comments:

- The paragraph describing the aim of the article appears only as the eighth paragraph. I suggest mentioning the objective earlier. While I understand the intention to maintain a coherent narrative line, this structure may be unclear to readers.
- On page four, the authors list several methods: critical analysis of literature, inference method, cross-sectional analysis, and quantitative statistical analysis. From an econometric perspective, this is somewhat puzzling. Cross-sectional analysis most often refers to estimations based on panel data, and quantitative methods usually imply more advanced techniques (hypothesis testing, estimations) than the descriptive statistical analysis presented in the paper. I suggest simply leaving “critical analysis of literature and in-depth analysis of descriptive statistics.”
- I am not a leading expert on the South Korean economy, but the literature frequently highlights the importance of land reform carried out under U.S. supervision, which produced positive effects. Economic policy under General Park Chung Hee relied heavily on

industrial policy based on strong export promotion, import restriction (import substitution), and the prioritisation of investment over current consumption. One of the key instruments was the discretionary granting of favourable business conditions to selected industries or firms, combined with high performance expectations. It may be worth mentioning this.

- The authors omit several important academic works on the impact of military expenditure on the economy, for example those by Professor Uk Heo, or the following study: Jung, J., Lee, K., Kim, J., & Yun, J. (2024). A Case Study on Input–Output Analysis in the Defense Industry. *Science, Technology and Society*, 29(2), 242–261. I suggest adding them to the bibliography.
- In Figure 2, it would be recommended to transform the values into percentages of GDP.
- Tables 3 and 4 could be merged and presented as a single figure, with a note at the bottom indicating data gaps.
- In the section “Implications for Polish industrial development,” additional data could certainly be provided, for example:
 - Only PGZ is mentioned, yet there are other private firms playing an increasingly important role (e.g., WB Group).
 - The authors refer to high R&D expenditure in the Polish defence sector; I suggest creating a figure showing the relevant values relative to GDP (Eurostat’s database “GERD by sector of performance and fields of R&D” may be useful).
 - The authors analyse military expenditure according to NATO methodology. This is not incorrect, but it is worth mentioning that this definition is very broad (it includes, for example, military pensions, museums, veterans’ benefits, etc.). Eurostat applies a much narrower definition, so it may be useful to analyse military expenditure according to the COFOG classification (02 Defence).
 - The authors refer to “direct jobs” and “indirect jobs.” This phenomenon is known as the multiplier effect, or more specifically the fiscal multiplier.
 - The authors mention the ReArm Europe programme; it would be worthwhile to elaborate further and refer to the SAFE financial instrument as well as the European Commission’s decisions regarding activation of the national escape clause (NEC), allowing a deviation of up to 1.5% of GDP from the net expenditure path under the EU fiscal framework.
 - It would be useful to provide more detail on the financing of arms purchases from Korean firms (agreements with KEXIM/Eximbank - how have they affected Polish public debt?), as well as on the off-set arrangements offered by Korean companies.
 - Optionally, the authors could review the reports of the Armed Forces Support Fund indebtedness and expenditures; these contain substantial information on Polish arms procurement: <https://www.bgk.pl/bip/informacja-o-realizacji-planu-finansowego-fundusz-wsparcia-sil-zbrojnych/>
- More generally, the article sometimes requires adding more numerical data. The authors frequently state that something increased or decreased without providing precise figures. For example, in the third paragraph: “reductions of military expenditures in the USA were not as significant as in the post-Soviet states; notably, Russia decreased at a catastrophic level.” This statement would benefit from quantitative support.

Nevertheless, the article is already interesting in its current form and, once refined, may constitute a significant contribution to the discussion on Polish defence policy and armament.

Is the work clearly and accurately presented and does it engage with the current literature?

Yes

Is the study design appropriate and does the work have academic merit?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

Are all the source data and materials underlying the results available?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Macroeconomics, Fiscal Policy, Peace and Defence Economics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 24 February 2026

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Kogila Balakrishnan 

University of Warwick, Coventry, UK

It was a pleasure reading this paper, especially of two countries South Korea and Poland who are leading the defence industry reformation of the 21st century.

I will discuss the strength of the paper followed by the gap and challenges. Finally, I shall provide recommendations on how to enhance the paper before it can be indexed.

Strength

The paper is very topical and policy relevant. The paper addresses how defence industry development can be leveraged for security and economic resilience, especially given Poland's post 2022 procurement surge and Europe's rearmament agenda and the 2024 EU Defence Industrial Strategy.

It is a useful reference case to have selected South Korea as a case study to benchmark and learn from in terms of defence industry trajectory and state led industrial upgrading and technological absorption.

Strong concrete Poland and Korean procurement insight with discussions on Poland's major Korean contracts with huge scale and financial structure leading to and the industrial collaboration.

Good use of empirical evidence with sources from SIPRI, World Bank, UNIDO and OECD to provide the cross-sectional comparisons to support the narrative (exports, GDP shares, diversification indicators and procurement trends).

Version 2 clearly demonstrates improvement in the narrative compared to version 1 and this is evidenced from the comments from R1 and R2.

Gap and Challenges

Title : The title used for this paper – the word new global order does seem too ambitious. A key reviewer had pointed out that the paper refers to the shift but does not operationalise the ' new global order' as an analytic variable beyond the narrative. This makes the title misleading.

Fix : Review the title to reflect the content along the line of

South Korea's Defence Industrial Development: Policy lessons for Poland's defence sector

Or align the narrative to add explicit framework and indicators on fragmentation of supply chains, EU defence industrial policy realignment, demand shock from Ukraine and demonstrate how these factors condition Korea-Poland industrial options

Introduction

The introduction is too abstract and does not directly address the problem. Why is this study important? What are the challenges with Poland building its defence industrial sector ?

Fix: Poland stuck with NATO compliance framework and EU DIB rules which restricts its autonomy to build its DIB. While, ROK does not have similar issues and is export led – hence Poland needs alternative pathways to industrialise. ROK may be a good example to emulate. Then build a clear case to why ROK - both front-line security states, both influenced heavily by US technology, use offsets and state funded industrial policy but at different stages of maturity. Will be useful to compare how the geopolitics of both states is driving its DIB.

Methodology

The paper seems to develop a causation, but this is not the case as this is pattern or trend focused.

Fix: Hence, important to ensure the correct language is used to ensure policy relevance.

Theory

Military industrial complex has been heavily used in the paper. The discussion is informative but not sure how it connects to industrial policy and technology transfer. The framework sits in isolation from the paper (R1 mentioned this). MIC is mainly a governance, political and incentive risks rather than a constructive industrial upgrading pathway. The theory perhaps should only be used in this context. If you will want to use MIC as a central theory, then the discussions should centre on procurement bias towards incumbents, the political economy of offsets and alliance pressure.

Fix: You could consider other theories such as the National Innovation system, absorptive capacity – refer to Chapter 2 , Kogila Balakrishnan, technology offsets in International defence

procurement, Routledge, 2018

Findings

Poland implications

Fix: the section need a more concrete and actionable laying out trade-offs giving options through a table - UOR, hybrid – licensed production and MRO and subsystem localisation, co-development or full indigenisation

Make EU constraints explicit and what this means for Korea Poland collaborative pathway.

Deepen the offsets section with concrete levers – triggers including multipliers, IP, certification.

Conclusion

The current conclusion is too broad and less concrete.

Fix Conclusion – Sharpen the conclusion and include several policy options or recommendation. more concrete on 3 to 4 lessons on what Poland can learn from ROK to use procurement and DIB to build its industrial capability and export:

Recommendation:

The paper can be indexed with moderate revisions mainly framing the alignment and tightening the methodology and stringer policy recommendation.

Two reviewers approve V2 and one with reservations centered on presentation and methods transparency.

The core empirical policy contribution comparing ROK and Poland is valuable and comparatively distinctive.

The remaining issues can be addressed without redesigning the study.

Is the work clearly and accurately presented and does it engage with the current literature?

Partly

Is the study design appropriate and does the work have academic merit?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

Are all the source data and materials underlying the results available?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Defence and dual-use Technology and Industrial policy, defence procurement, technology offsets, technology transfer and sovereign industrial capability

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 21 January 2026

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Hemalia Kusumadewi 

Wheelchair and Friendship Center of Asia Indonesia, Jakarta, Indonesia

The paper has become significantly clearer in its intent compared to the previous version. The intention to put MIC and global context as an introduction has become clearer with more connected explanations in the Discussion sections, as we could see how they introduce the importance of South Korea's history and Poland's situation. There is no visible issue with this paper to be indexed.

Thank you.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Defense and Security; Conflict and War; International Relations

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Reviewer Report 15 January 2026

<https://doi.org/10.21956/stomiedintrelat.19636.r30205>

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Łukasz Jureńczyk 

Kazimierz Wielki University, Bydgoszcz, Poland

The authors have fully addressed the comments from the previous review and have made the required changes and additions. I approve the indexing of the paper in its current form.

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: security policy; international military relations

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 11 November 2025

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Hemalia Kusumadewi 

Wheelchair and Friendship Center of Asia Indonesia, Jakarta, Indonesia

The paper's focus is everywhere and nowhere at the same times. So many things are happening, but the paper's logical flow and transition is very jumpy from one topic to another, which sometimes simply do not coincide.

The paper cited its purpose as 'examines South Korea's defence industry development strategies to explore actionable insights for Poland', which I don't think was fulfilled, as one of the most basic requirement for this analysis to manifest, which is to explain the red line between SK and Poland, was never there.

Is this paper trying to give a comparative case of SK-Poland? or explaining the whole MIC context of both? or the significance of defense trade between SK-Poland? or showing the influence of defense to SK's economic development? or figuring out SK's defense pattern? Too many things were happening and nothing was truly concluded either. Even the supposed 'theoretical debate' did not show up at all within the discussion and result.

This paper should rethink and refigure its purpose, focuses on what matters, choose a framework that will actually be used within the analysis, justify the usage of such theory, and draw all the lines needed to make the readers able to understand the connection between everything.

References

1. Grimes C: Defense Sector Politics. *Studies in Comparative International Development*. 2021; **56** (4): 463-484 [Publisher Full Text](#)
2. Weida W, Gertcher F: The Political Economy of National Defense. 2019. [Publisher Full Text](#)

Is the work clearly and accurately presented and does it engage with the current literature?

Partly

Is the study design appropriate and does the work have academic merit?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Not applicable

Are all the source data and materials underlying the results available?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Not applicable

Are the conclusions drawn adequately supported by the results?

No

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Defense and Security; Conflict and War; International Relations

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Author Response 19 Dec 2025

Pawel Pasierbiak

Thank you very much for your careful reading of the manuscript and for taking the time to share your comments. We appreciate the reviewer's engagement and the opportunity to further clarify the scope and analytical logic of the paper. First, we would like to stress that the paper is firmly grounded in the discipline of economics and finance, rather than in security studies or military science. Accordingly, the analytical objective is not to provide a comprehensive comparative assessment of military-industrial complexes or defense doctrines, but to examine defense industry development as an economic and industrial policy phenomenon, with particular attention to structural, institutional, and trade-related mechanisms that may generate transferable insights for Poland. Regarding the purpose of the paper, the intention was not to establish a strict one-to-one comparison between South Korea and Poland, nor to analyse the entire defence sector of both countries. Instead, South Korea is treated as a reference case illustrating a specific development trajectory of a defence industry embedded in broader processes of industrial upgrading, export expansion, and state-business coordination. From this perspective, the "red line" between South Korea and Poland is analytical rather than descriptive and relates to the economic logic of capability building, scale effects, and industrial spillovers, which are discussed within the framework of economics. Once again, we are grateful for the reviewer's constructive remarks, which will help us improve the clarity and coherence of the paper while preserving its intended contribution within the field of economics and finance.

Competing Interests: No competing interests were disclosed.

Reviewer Report 07 November 2025

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Łukasz Jureńczyk

Kazimierz Wielki University, Bydgoszcz, Poland

The dynamic growth in defense spending, intensified after the outbreak of the full-scale war in Ukraine, provides a basis for the accelerated modernization of the Polish Armed Forces. This modernization is primarily based on purchases of weapons and military equipment from abroad, mainly from the United States and the Republic of Korea. Contracts concluded with these countries in recent years mostly share a common flaw: the lack of offset agreements and, consequently, the lack of technology transfer to the Polish defense industry. In the case of the large contracts from Korea for the purchase of K2 tanks, K9 self-propelled howitzers, K239 multiple rocket launchers, and FA-50 aircraft, no assessment of the existence of a fundamental national security interest was conducted. Therefore, there was no basis for applying offsets to their purchases. Polish authorities explained this primarily by stating that these were urgent purchases, necessary to ensure Poland's military security during a period of rapidly growing threats from Russia. They also argued that this made the military systems procured cheaper. However, such justifications are not a sufficient justification, as building the potential of the Polish defence sector is an element of the Polish *raison d'état* in the long term.

The analysis presented in this article is of high professional quality and is multifaceted, encompassing issues from the disciplines of economics, security studies, and international relations. The article is based on solid literature on the subject and reliable sources. The authors have duly considered conditions, primarily economic, but also military, at the national (South Korea and Poland) and regional (Central and Eastern European security, Northeast Asian security), as well as global levels. However, the authors have provided limited analysis of the development of the New Global Order, both in economic and security terms, so in the reviewer's opinion, including this aspect in the article's title is unwarranted (For this reason, the question in the review questionnaire, "Is the study design appropriate and does the work have academic merit?" was answered with "Partly"). While the authors have highlighted the crucial importance of the war in Ukraine in accelerating the development of South Korea's defense industry and increasing Polish arms purchases, this war is merely one element of the global rivalry between great powers within the broader context of the formation of the New Global Order. I therefore propose modifying the article's title, for example, to: "Development of South Korea's Defense Industry: Implications and Conclusions (or Recommendations) for Poland." This is merely a proposed title, which the authors can, of course, modify in a different way by removing the phrase "New Global Order."

The initial thesis outlined in the introduction, that threats were exaggerated during the Cold War to legitimize significant US military spending, is unfounded, as the threat of aggression by the USSR and the Warsaw Pact against US NATO allies actually existed, as confirmed even by Soviet doctrinal documents from the 1980s. Only after the Cold War was the perception of Western political and academic elites flawed, assuming that Russia would be a constructive partner and pillar of Euro-Atlantic security, thus preventing a high-intensity war in Europe. The exploitation of

the so-called "peace dividend" caused European states to rapidly disarm their heavy military equipment. Today, we are witnessing the negative consequences of this post-Cold War trend. A more accurate criticism would be the links within the military-industrial complex (MIC) and its influence on the outbreak of the Iraq War in 2003, and more broadly the way the global war on terror is being conducted, with a clear emphasis on military action.

It is also worth modifying the following fragment of the article: "However, reductions of military expenditures in the USA were not as radical as in the post-Soviet states; notably, Russia decreased at a catastrophic level, resulting in US dominance in the post-Cold War era." It should be noted that American reductions were significantly smaller than those of almost all European countries, not just post-Soviet states. It is also worth emphasizing here that this was not just US "dominance," but a shift in the global security system from bipolar to unipolar, in which the USA achieved hegemon status. The role of hegemon is associated with specific tasks, the implementation of which requires maintaining high military spending, and American administrations, starting with George Bush Sr.'s administration, have declared the strategic goal of maintaining global hegemony.

In discussing the causes of South Korea's dynamic economic growth, the authors rightly cited two main processes: industrialization and globalization, which opened up opportunities for Korea to expand its trade into global markets. They also interestingly juxtaposed the liberalization efforts of the Korean market with efforts to control inflation and, on the other hand, increased social spending.

The authors competently discussed the incentives provided by the South Korean government, which led to the dynamic development of the defense sector from the 1970s to the present. They aptly highlighted and discussed the partnerships between Korean companies and foreign companies, primarily American, in the field of arms production. The authors emphasized the Korean government's ability to convince Americans to transfer military technology to the Korean defense industry, enabling the servicing of weapon systems manufactured under American licenses, as well as the supply of components for systems manufactured by American companies. Consequently, this enabled Korea to rapidly develop its own military engineering, spurred by the establishment of partnerships between Korean and American companies to acquire modern technologies. This gradually allowed Korea to become an export powerhouse, as its army has limited demand for military equipment. These activities were implemented on a win-win basis, i.e., mutually beneficial for South Korea and the United States. Over time, however, South Korea became a competitor to the United States on global markets, which was halted in 1983 by American legislation restricting Korea's right to export weapons manufactured using American technologies.

The authors convincingly presented the impact of South Korea's military modernization, including its computerization, on the technological development of the Korean defense industry, and consequently, the growing importance of the defense industry in the country's overall economic development. They rightly emphasized that restrictions imposed by the United States in the 1980s resulted in a shift in emphasis toward Korea developing its own weapons technologies in increasingly advanced areas of arms production. Another significant development stimulus was the outbreak of a full-scale war in Ukraine and a massive increase in demand for arms, including large arms contracts signed with Poland. The positive contribution of South Korea's defense industry and the profits it generated made it easier for Korea to finance increased defense spending (as well as social objectives). From the perspective of Poland, which has been rapidly increasing its defense spending in recent years, such a solution would be much needed. However, the problem lies in years of neglect in the arms production sector and an excessive focus on procurement, without due regard for attracting modern technologies and foreign investment.

It's fair to say that spending on the defense sector is not just a cost but also an investment in the economy, provided, however, that it actually involves the transfer of modern technologies and the development of a domestic production base. Unlike in South Korea, this is limited in Poland. If the projected 40% domestic military equipment production target is achieved and further increased in the future, the positive impact on the Polish economy will be significant. However, the sharp increase in the import of South Korean arms, coupled with the lack of offset agreements, does not inspire optimism in this regard.

Additional detailed notes:

- In the seventh paragraph of the introduction, instead of "the agreement..." it should read "a peace treaty..."

- The statement „Additionally, the civil war in Vietnam ended with the victory of the communist regime in 1976. Therefore, South Korea had to develop its military and civilian industries.” does not seem accurate, as South Korea had to develop its defense industry primarily due to the threat from North Korea, the People's Republic of China, and the USSR, and the Vietnam War was just one area of rivalry between the US and the USSR. Besides South Korea benefited to some extent from the Vietnam War, as American orders for military equipment in Korea provided impetus for the development of its arms industry. It is therefore unclear why, according to the authors, the outcome of that war is highlighted as the reason for the development of South Korea's arms industry, especially since there was a very clear rift between the USSR and China during this period, and US-Chinese relations were normalizing. Unless the authors are referring to building China's position in Southeast Asia, as evidenced by the military intervention in Vietnam in 1979. However, it is worth considering this issue again.

- it is worth writing at least a few sentences about whether the European Union's "Readiness 2030" ("ReArm Europe") program creates any opportunities or, on the contrary, whether it may cause barriers to the development of the Polish military industry and military technology based on cooperation with South Korea.

Is the work clearly and accurately presented and does it engage with the current literature?

Yes

Is the study design appropriate and does the work have academic merit?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

Are all the source data and materials underlying the results available?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: security policy; international military relations

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 19 Dec 2025

Pawel Pasierbiak

We would like to sincerely thank the Reviewer for the detailed, substantive, and constructive comments. We highly appreciate the overall positive assessment of the article's academic quality, use of reliable sources, and its interdisciplinary scope, as well as the careful reading reflected in the detailed remarks. Below, we respond point by point and indicate how the manuscript was revised accordingly. First, we fully share the Reviewer's concern regarding the limited role of offsets and technology transfer in recent Polish defence procurement, particularly in contracts concluded with the United States and the Republic of Korea. We agree that the absence of offset mechanisms weakens the long-term development potential of the Polish defence industry and may undermine Poland's strategic economic interests. While the article acknowledges the urgency-driven rationale behind these purchases, we accept the Reviewer's argument that such justifications are insufficient from a long-term economic and industrial policy perspective. In the revised version, the paper has been enhanced with the addition of appropriate analysis and assessment, concerning the discussion on offsets, technology transfer, and domestic capability building, explicitly linking them to Poland's *raison d'état* and drawing a clearer contrast with the South Korean development path. Second, regarding the use of the term "New Global Order" in the title, we acknowledge the Reviewer's reservation. While the manuscript refers to shifts in global power structures, great-power rivalry, and the war in Ukraine, we agree that this aspect is not analysed as extensively as defence industry development itself. However, we still believe that this aspect is present in the paper (e.g., the introductory part). This extremely important issue warrants further research, especially in light of the new US National Security Strategy released in December 2025. Third, we thank the Reviewer for the clarification concerning the Cold War security environment. We accept the critique that the formulation suggesting exaggerated threats during the Cold War may be misleading. In the revised manuscript, we reformulated this argument, showing that external threats were used to legitimize substantial military spending. Relatedly, we agree with the Reviewer's proposed refinement of the discussion on post-Cold War military spending. We revised the relevant passage to emphasise that U.S. defence spending declined far less than that of most European countries and that the post-Cold War period marked a transition from a bipolar to a unipolar system, in which the United States assumed the role of hegemon. We also explicitly linked this role to the strategic necessity of maintaining high defence expenditures. Fourth, we appreciate the Reviewer's positive evaluation of the analysis of South Korea's economic growth, industrialisation, globalisation, and defence-industry incentives. We are particularly grateful for the recognition of the discussion on technology transfer, U.S.-Korean cooperation, and the win-win nature of early partnerships. We agree that the U.S. restrictions imposed in the early 1980s represent a crucial turning point, further highlighting how these constraints accelerated Korea's push toward indigenous defence technologies. Fifth, we concur with the Reviewer's assessment that defence

spending should be treated as an investment rather than a cost – provided it supports domestic production and technology absorption. We fully agree that Poland currently falls short in this respect and that the lack of offsets in South Korean arms imports raises justified concerns. The revised version more explicitly stresses the conditional nature of positive economic effects from defence spending and the risks associated with excessive import dependence. Finally, we accept all additional detailed remarks. They were incorporated into the paper as follows:

- Replacement of “the agreement” with “a peace treaty” in the introduction;
- Revise the discussion of the Vietnam War to avoid overstating its role as a driver of South Korea’s defence industry development;
- Addition of a dedicated subsection discussing the EU’s “Readiness 2030” (“ReArm Europe”) initiative, outlining both potential opportunities and constraints for Polish defence industry development and cooperation with South Korea.

Once again, we are grateful to the Reviewer for the depth and quality of the comments. We are confident that addressing these remarks significantly strengthened the analytical clarity, historical accuracy, and policy relevance of the article.

Competing Interests: No competing interests were disclosed.

Reviewer Report 30 October 2025

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Haliza Mohd Zahari

Universiti Pertahanan Nasional Malaysia, Kuala Lumpur, Malaysia

The paper has merit in terms of content and ideas, but the presentation could be made more engaging. The writing builds up rather slowly, which may delay the reader’s sense of connection or excitement about the subject. A more dynamic narrative flow and stronger opening could enhance the reader’s engagement.

While the paper outlines the methodology, it does not provide enough explanation of the methods used. More detail on the research design, and analytical procedures would help readers better understand how the findings were derived and enhance the study’s transparency.

Overall, this paper presents a relevant and meaningful topic with solid potential to contribute to the field. The paper demonstrates a good understanding of the subject matter and contains valuable insights.

Is the work clearly and accurately presented and does it engage with the current literature?

Yes

Is the study design appropriate and does the work have academic merit?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

Are all the source data and materials underlying the results available?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Not applicable

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Defence management, Defence logistics, Disaster management, Humanitarian logistics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 19 Dec 2025

Pawel Pasierbiak

We would like to sincerely thank the Reviewer for the positive and encouraging assessment of the paper's relevance, conceptual merit, and potential contribution to the field. We particularly appreciate the recognition of the paper's substantive value and its grounding in a meaningful and timely research topic. Regarding the comment on the narrative flow and reader engagement, we acknowledge that the paper adopts a deliberately analytical and cumulative structure, characteristic of research conducted within the discipline of economics and finance. The gradual build-up reflects an intention to anchor the analysis firmly in historical, structural, and institutional contexts before moving to policy implications. Nevertheless, we agree that the presentation can be further improved. In the revised version, the introduction is strengthened by more explicitly highlighting the core research motivation, key research questions, and main findings at an earlier stage, thereby enhancing the paper's accessibility and engagement for a broader readership. We also appreciate the Reviewer's suggestion to provide a more detailed explanation of the methodology. The study employs a mixed qualitative–quantitative approach typical for applied economic analysis in defence economics and industrial policy research. As indicated in the manuscript, the research design combines critical literature analysis, comparative institutional analysis, descriptive statistical methods, and cross-sectional examination of macroeconomic and sectoral indicators drawn from internationally recognised databases (e.g., SIPRI, OECD, UNIDO, World Bank). In response to the Reviewer's comment, the methodological section has been expanded to provide a clearer description of the analytical

procedures, the rationale behind data selection, and the manner in which empirical evidence is used to support the interpretative economic framework. This enhances transparency, making the research process more transparent and easier to follow. At the same time, we would like to emphasise that the paper's primary contribution lies not in methodological innovation *per se*, but in synthesising economic evidence to explain defence industry development as a component of long-term industrial upgrading, export competitiveness, and structural transformation. This perspective is consistent with established traditions in economics and finance, particularly within the fields of defence economics, development economics, and industrial policy analysis. Once again, we thank the Reviewer for the constructive and well-balanced feedback. We believe that the suggested revisions will further improve the clarity, readability, and overall quality of the paper, while preserving its analytical focus and contribution to the economics and finance literature.

Competing Interests: No competing interests were disclosed.