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# The Important Role of the Defense Industry in Supporting National Defense

Febryano Handayani Pedah[1]*, George Royke Deksino[2], I Nengah Putra A[3], Sri Yanto[4], Aldian Hein Octavianus Luntungan[5]
[1,2,3,4]Defense Industry, Faculty of Defense Science and Technology, Republic of Indonesia Defense University
[5]Leadership and Policy Innovation Study Program, Graduate School of Gadjah Mada University
**Corresponding Author:** Febryano Handayani Pedah febryano.pedah@gmail.com

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A B S T R A C T

National defense requires the availability of defense and security equipment. The defense industry has an important role in supporting and strengthening a country's defense. This research is to find out how far the defense industry plays a role in supporting national defense. The research was conducted using secondary data. Data is collected from various sources of literature related to the subject matter. The domestic defense industry is very important in contributing to the country's defense. The domestic defense industry needs to increase the mastery of the raw material industry in supporting the national defense industry to produce strategic defense equipment products.

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## INTRODUCTION

National defense is all efforts to defend the sovereignty of the state, the territorial integrity of a country and the safety of the entire nation from threats and disturbances to the integrity of the nation and the unitary state of the Republic of Indonesia. National defense requires the availability of defense and security equipment and is supported by the ability of an independent domestic defense industry, both State-Owned Enterprises (BUMN) and Privately Owned Enterprises (BUMS) to achieve national goals.

According to Setiadji in his book The Direction of Defense Self-Reliance quoting Banlaoi (2009) states that "The Defense Industry is an industry involved in the production of weapons, equipment, devices and military machinery, as well as raw materials needed to produce military products." Then according to Kuah and Loo (2004) argue the defense industry as "The aggregate capability to provide manufacturing, production, technology, research, development, and resources necessary to produce materials for the common defense." Another view of the defense industry is from the UK Ministry of Defense which states that "The defense industry includes all defense suppliers (national and foreign owned) that create value, jobs, technology or intellectual assets in the country." (Setiadji, 2020).

The defense industry has an important role in supporting and strengthening a country's defense, especially in today's modern era which is characterized by increasingly complex and unpredictable threat dynamics. In order to develop the capabilities of the defense industry, the self-reliance of the defense industry is a necessity. It is not easy to realize the self-reliance of the national defense industry, but it is not impossible for Indonesia to compete with advanced defense industry countries such as the United States, Russia, China, Sweden, Norway, Turky, and South Korea.

## THEORETICAL OVERVIEW

### *Defense Industry*

According to Law Number 16 of 2012 concerning the Defense Industry, the definition of the Defense Industry is a national industry consisting of State-Owned Enterprises and Private-Owned Enterprises either individually or in groups determined by the government to partially or wholly produce defense and security equipment, maintenance services to meet strategic interests in the field of defense and security located in the territory of the Unitary State of the Republic of Indonesia consisting of the main equipment industry, the main and/or supporting component industry, the component and/or supporting industry (supplies) and the raw material industry.

### *National Defense*

According to the Minister of Defense Regulation No. 16/2012, national defense is all efforts to uphold the sovereignty of the state, the territorial integrity of the Unitary State of the Republic of Indonesia, and the safety of the entire nation. The state defense effort is carried out by considering the dynamics of the form of threats faced. The development of the strategic

environment always brings changes to the complexity of threats, both and non-military threats. State defense functions to realize and maintain the entire territory of the Unitary State of the Republic of Indonesia as a defense unit. State defense is organized by the government and prepared early with a state defense system through building and fostering the capabilities and deterrence of the state and nation and overcoming any threats.

### *Defense Industry Self-Reliance*

According to Silmy Karim, the self-reliance of the defense industry is the key to strengthening the country's sovereignty as well as driving national economic progress. In his book "Building the Self-Reliance of Indonesia's Defense Industry", he emphasizes that an independent defense industry will reduce dependence on defense equipment imports, create jobs, and spur technological innovation in the country. However, he also highlights the importance of full support from the government through policies that support the development of production capacity, investment and technological research. This self-reliance, according to him, not only supports national security but also strengthens Indonesia's position in global competition in the defense sector (Karim, 2014).

## METHODOLOGY

This research was conducted using secondary data. Data was collected from various literature sources related to the subject matter, such as books, research articles, scientific journals, and several other sources related to defense and the defense industry. Secondary data is sourced from a review of related literature in creating a theoretical framework and discussion of the research. According to Zed (2008), the library research method is a research method carried out by utilizing library sources as the main data that aims to explore relevant information from various literatures in order to answer research questions or build a strong theoretical foundation.

The main purpose of this study is to provide a conceptual view of the importance of the role of the defense industry in supporting national defense.

## RESULTS AND DISCUSSION

### *The Role of the Defense Industry in Supporting National Defense*

The defense industry is one of the main policies in national defense, the policy direction is aimed at building an advanced, strong, independent, and competitive industry that can support national defense, as well as support the development of national economic growth.

Law No. 16/2012 on the Defense Industry explains that the role of the defense industry is to build the ability to produce Defense and Security Equipment (Alpalhankam). In addition, the defense industry also plays a role in conducting research and development of defense technology. Article 4 of Law No. 16/2012 mandates that the implementation of the defense industry functions, among others, to be independent in developing defense industry

technology that is beneficial for defense, security, and the interests of society as well as to be independent of the country's defense and security system.

Haryono (2022) explains that the defense industry plays a role in building an industrial ecosystem and cooperating in R&D activities and joint production. The development of the defense industry is directed towards achieving a professional, effective, efficient and integrated defense industry. (Ditjakstarahan Kemhan, 2020). To achieve this, several policies are taken, including implementing and encouraging related ministries or institutions to use domestic defense industry products, if the domestic industry is capable of producing.

The Defense Industry is needed to support the interests of national defense, as well as to encourage the growth of the national economy which is part of sustainable development. The Defense Industry was built by the government to meet the needs of the main weaponry system (alutsista), and equipment for the defense and security sector as well as to encourage the development of other industries which as a whole will drive the national economy through additional production of goods and services, increased employment opportunities, increased foreign exchange through exports of defense and security products and increase Indonesia's competitiveness and bargaining position in the international world.

The development of the defense industry encourages the defense industry to carry out cooperation with foreign defense industries, in developing defense industry technology, through technology transfer and transfer of defense equipment knowledge, through research and development cooperation, and production cooperation.

The defense industry drives and spearheads technological innovation and research & development (R&D). Technologies originally developed for military needs often find applications in the civilian sector, having a broad positive impact on areas such as communications, transportation and healthcare. Investments in defense industry R&D also encourage the birth of new technologies that can increase the country's competitiveness in the international arena, while strengthening the domestic knowledge and skills base (Zakariansyach, 2023).

The defense industry has a significant impact on the national economy through job creation and the strengthening of related industrial sectors. As one of the sectors with high added value, the defense industry drives economic growth by creating quality employment opportunities, both in manufacturing, technology and services. In addition, the existence of a competitive defense industry can open up opportunities for defense equipment exports, increase the competitiveness of national industries in the global market, and strengthen the country's economic base (Setjen Kemhan, 2022). Recognizing the defense industry and taking advantage of these opportunities can drive collaborative initiatives towards greater success and impact for the progress of a nation (Jupriyanto et al., 2024).

In an increasingly complex digital era, threats to national defense and security are no longer limited to physical attacks, but also include cyberattacks

that can damage critical infrastructure. The defense industry plays a crucial role in developing technologies and systems capable of protecting the country from cyberattacks, by ensuring that critical infrastructure, such as communication networks, energy systems and military facilities, are protected from hacking and sabotage attempts. Thus, strengthening cyber defense capabilities is one of the top priorities in the development of a modern defense industry (Zakariansyach, 2023).

The defense industry is a crucial pillar in supporting and strengthening national defense through the provision of essential equipment, technology, and infrastructure (Hartati et al., 2014). In addition, it plays a significant role in driving economic growth, particularly in crisis situations such as the COVID-19 pandemic, where broader economic awareness and resource mobilization become increasingly important (Saputro, 2022). However, Indonesia's defense industry faces significant challenges, including budget constraints, resource and technology shortages, and a high dependence on imported raw materials (Kasim & Deksino, 2022).

One vital sector, the steel industry, which is a major component in the defense sector, is still unable to meet domestic needs, where more than half of the 16 million tons of steel required must be imported (Ahmad & Fahri, 2021). To overcome these obstacles, proposed solutions include the implementation of relevant laws, promotion of defense product innovation through exhibitions, and increased involvement of private industry in strategic defense development. These efforts aim to improve military operational readiness, achieve self-reliance in defense, and ultimately strengthen national sovereignty (Kasim & Deksino, 2022).

In the context of collaborative defense technology innovation as part of efforts to increase the role of the defense industry, there are two things that should be analyzed, namely challenges that need to be overcome and opportunities that can be utilized. Some of the challenges include the silo effect, lack of funding alternatives provided by the government, cultural/value gaps within the bureaucracy, and insufficient integration between civilian and military innovation. These challenges require careful consideration for successful collaboration in defense technology innovation. On the other hand, opportunity factors that can be leveraged are expanding the scope of collaboration, improving effectiveness and efficiency, crisis response capabilities, addressing more complex knowledge and challenges, and fostering an innovative defense industry rational structure.

The defense industry plays a central role in the development and production of key weapons systems essential to a country's armed forces. The scope of this responsibility includes the production of weapons, combat vehicles, warships, fighter aircraft and advanced air defense systems. The existence of a defense industry capable of meeting national defense equipment needs not only strengthens military capabilities, but also ensures that the state has the resources needed to defend national sovereignty and security in increasingly complex and dynamic situations (Zakariansyach, 2023).

The development of an independent defense industry is essential to reduce dependence on imports of military technology and equipment from abroad. Excessive dependence on other countries to fulfill military technology needs can pose risks to national sovereignty and security, especially in situations of international crisis or conflict. By developing its own technology, the state can ensure that its defense equipment is not only suitable for specific needs, but can also be produced and repaired without external intervention, thus strengthening its bargaining position in the global geopolitical arena (Ramadhan, 2019).

***The Role of the Norwegian Defense Industry (Best Practice and Lesson Learn)***

The Norwegian defense industry plays a strategic role in supporting national security while driving economic growth. The sector not only serves as the main support for the country's defense, but is also an important source for the development of dual-use technologies that benefit civilian industries. The technologies produced by the Norwegian defense industry have shown great potential in international applications beyond their domestic application (Norwegian Ministry of Defence, 2021). This reflects the industry's ability to adapt and meet the needs of the global market, while strengthening national competitiveness in the international arena.

The Norwegian defense industry contributes significantly to the country's defense readiness, security and capabilities. About 30% of the materiel purchased by the Norwegian Armed Forces is supplied by domestic companies, which also excel in key technologies and globally. The defense industry is a strategic resource for Norway as it is innovative and competitive in national and international markets. Therefore, the government's defense industrial strategy makes Norwegian companies an integral part of the country's defense and security policy (Norwegian Ministry of Defence, 2021). Although most materiel is acquired from international contractors, the Norwegian defense industry provides advanced technologies and specialized services that strengthen the capabilities of the Armed Forces. The strategy aims to maintain international competitiveness and ensure Norway is able to develop, produce and support defense equipment according to national needs.

The defense industry in Norway has a long list of high-tech products that are competitive on the international market. This success would not be possible without close collaboration between user groups in the Armed Forces, the Norwegian defense industry and the Norwegian Defence Research Establishment (FFI). The Naval Strike Missile (NSM) anti-ship missile system is used in Norwegian coastal frigates and corvettes. The system has also been purchased by the United States, Poland and Malaysia, and several other countries are in the process of acquisition or evaluation. This success is the result of a long-term commitment to developing missiles originally optimized for Norwegian coastal operations, which began in the 1950s and 1960s when the Terne and Penguin missiles were developed to counter potential naval invasions during the Cold War.

Norway has several key defense industries that play a strategic role in strengthening its national defense while contributing significantly to global security. One of the leading players is Kongsberg Defence & Aerospace, which is Norway's largest defense contractor. The company is widely recognized for its development of advanced weapon systems, including anti-ship missiles, land attack missiles, remote weapon stations and air defense systems. These innovations not only support Norway's military capabilities but also strengthen the country's position in the international defense market (Svensgard, 2022).

In addition, Nammo plays a key role in the Norwegian defense industry with its specialization in the production of ammunition and rocket motors. Nammo has built a reputation as a provider of advanced ammunition and propulsion systems that are relied upon in various military operations (Svensgard, 2022). Another company, Norsk Titanium, stands out as a leader in additive manufacturing, specifically in the production of titanium components for aerospace and defense applications. This additive manufacturing technology enables the production of components with high efficiency and precision, which is particularly important in industries that demand very strict quality standards (International Trade Administration, 2024).

Thales Norway and Raufoss Technology are also important pillars in the Norwegian defense industry ecosystem. Thales Norway, as part of the global Thales Group, focuses on developing tactical communication systems, military simulations and training systems that support military operational readiness (Global Data, 2023). Meanwhile, Raufoss Technology is known for the production of advanced ammunition and other defense-related technologies (Svensgard, 2022). These companies not only strengthen Norway's defense capabilities, but also play an important role in enhancing global security through the deployment of their innovative technologies and products in international markets.

Norwegian defense industrial policies, such as offsets and discriminatory procurement practices, are seen as an integral part of the national security strategy. These policies, depending on their objectives, can make a significant contribution to the protection of sovereignty and the enhancement of the country's military capabilities. Offsets, which are reciprocal agreements in international trade, as well as a focus on core competence development and research and development (R&D) activities, have been key factors in the export success of Norwegian defense companies (Fevolden & Tvetbråten, 2016). In addition, the close interaction between defense companies and the public R&D system has created an ecosystem that supports continuous innovation and adaptation to evolving market needs (Castellacci & Fevolden, 2014).

These findings show that Norway's defense industrial policy not only strengthens military capabilities, but also provides significant economic benefits to civil society. Dual-use technologies resulting from R&D activities in the defense sector have made a substantial contribution to national economic security, by expanding the application of technology to non-military sectors. Thus, the Norwegian defense industry serves not only as a guardian of the

country's sovereignty, but also as a key driver of innovation and sustainable economic growth.

***Realizing the Self-Reliance of the Domestic Defense Industry***

The defense industry is an activity that relates between producers and consumers of defense products and their supporting industries and through support from the government in the form of policies, making rules and regulations with the aim of supporting its national interests. The three pillars of defense self-reliance, namely the government, the defense industry and the military as users, have a mutually supportive role to produce reliable and independent defense products. Independent is not the same as self-sufficiency, independent emphasizes more on sovereignty in building defense equipment without pressure and control from other parties, while self-sufficiency is self-sufficient through internal capabilities and support (Setiadji, 2020:376).

How Indonesia can realize the independence of the national defense industry, it is necessary to learn from countries that have advanced and independent first. The book The Defense Industrial Triptych. Government as Customer, Sponsor and Regulator (Henrik H. et al., 2013) is one of the materials to understand the development of the national defense industry in developed countries such as the United States, United Kingdom and Germany. The three developed countries are major players in the international arms trade. Capitalizing on innovation, human resource capabilities, and close relations with the government, the defense industry in the three countries produces various high-tech weapons products to supply national needs and export to other countries (M. Haripin, 2014).

In realizing the self-reliance of the national defense industry, mastery of technology is a very important thing and determines the self-reliance of the defense industry. The Indonesian Ministry of Defense has attempted to realize and implement the mastery of technology that has been carried out by institutions related to the Indonesian defense industry. The mastery of technology refers to the 10 National Priority Programs for the defense industry as the basis for developing innovation in the face of market competition. The realization steps that have been taken are such as conducting principal technology cooperation by applying several criteria to partners. The desired partner criteria look at several aspects such as G2G relationships, technical capabilities, consideration of technology transfer, partner financial stability, and strategic complementarity.

In making efforts to master technology, it is necessary to apply strategies in order to achieve optimal results. The strategy for mastering defense technology can be divided into three, namely through defense industry participation, foreign cooperation, and National Research and Development, and Design and Engineering (Litbangyasa). The strategy of mastering technology through defense industry participation can be carried out through the implementation of the Imbalance Trade in Local Content and Offset (IDKLO) program in the procurement of defense equipment from abroad. Examples of applications that have been running are through the

implementation of IDKLO on radars and missiles. IDKLO can be done in several ways, namely education and training, joint development, joint production, design and build, subcontracting, through global supply chains, and technology transfer. The implementation of the IDKLO policy is also carried out so that the results of cooperation with foreign entities can increase the capacity of the upstream defense industry in supplying the needs of the national defense industry as a whole.

Then the second technology mastery strategy is through foreign cooperation. Implementations that have been running are through joint development (fighter aircraft and medium tanks), joint ventures (propellants and gunpowder), and joint production (submarines and PKR). In addition, cooperation that has been carried out with various foreign defense industry entities includes joint investment in the construction of production/manufacturing facilities. And no less important is the strategy of mastering technology that can be done through National R&D. Related to this strategy, technology mastery will be carried out by elements of R&D institutions, users, and the main equipment industry coordinated by the Defense Industry Policy Committee (KKIP).

***Challenges Facing the Domestic Defense Industry to Face Global Competition***

The global defense industry is experiencing significant growth and transformation, driven by geopolitical tensions and technological advances. Major players such as the United States, China and Russia continue to dominate the market, with huge investments in modernizing their military capabilities. Emerging markets, including India and some Middle Eastern countries, are also increasing their defense spending to enhance their strategic autonomy. The industry is characterized by a strong workforce, with over 11 million employees worldwide, and a high level of innovation, as evidenced by the numerous patents and grants awarded to defense entities (StartUs Insights, 2024). The integration of digital technologies and advanced manufacturing processes is expected to drive further growth and efficiency in the sector.

One of the critical challenges facing the defense industry is the supply of propellant powder, which is essential for ammunition and missile systems. Production of propellant powder has been hampered by a shortage of nitrocellulose, a key ingredient derived from cotton. This shortage is mainly due to increased demand from ongoing conflicts and limited factory capacity to produce defense-grade nitrocellulose (Marbut, 2024). Bottlenecks in nitrocellulose production have led to delays and increased costs in ammunition manufacturing, affecting both military and civilian markets. Efforts to address these issues include expanding production capacity and exploring alternative raw material sources.

Another component is copper, as an important raw material for the defense industry, which is used extensively in electrical systems, ammunition casings, and various other applications. The global copper market has faced challenges due to fluctuating prices and supply chain disruptions. Copper is

typically extracted from sulfide and oxide ores, with major producers including Chile, the United States, and China (Cavette, 2024). The refining process involves several stages, from mining and crushing the ore to smelting and re-refining, to produce high-purity copper. Ensuring a steady supply of copper is critical to sustaining the production of defense equipment and infrastructure.

The challenges of the domestic Defense Industry to face global competition are not easy. So far, the defense equipment procurement process is still not transparent, while the transparency of long-term defense equipment procurement planning is needed by industry players, so that the industry can anticipate the needs of defense products that will be produced and used by users because the mismatch of defense equipment needs is also one of the obstacles because of the backwardness and dependence of defense equipment on other countries. For this reason, synergy is needed from various main lines, especially in terms of research and technology development. In addition, it is important for users (government) to be able to coordinate with industry players in planning defense equipment needs. Procurement of defense equipment also needs to have standards that reflect the transparency, accountability and integrity of industry players. Support through budget increases is also needed in the development of the defense industry and the coordination of all relevant stakeholders (Commission I DPR-RI).

## CONCLUSIONS AND RECOMMENDATIONS

The defense industry in Indonesia faces significant challenges, especially in its role as an integrator in the broader defense ecosystem. Despite efforts to increase self-reliance and reduce dependence on foreign technologies, the industry struggles with limited access to critical components and advanced technologies. These limitations are compounded by the global nature of the defense supply chain, where key materials and technologies are often controlled by a few dominant players. As an integrator, Indonesia's defense industry must navigate a complex regulatory environment and geopolitical dynamics to obtain necessary inputs, which can lead to delays and increased costs. In addition, the industry's capacity to innovate and develop local solutions is hampered by a lack of investment in research and development, as well as a shortage of skilled personnel.

The domestic defense industry is very important and strategic in contributing to national defense. The domestic defense industry needs to increase mastery of the raw material industry in order to support the national defense industry to produce strategic defense equipment products. Many raw materials, processed materials and semi-finished materials are indispensable for industries that produce defense equipment components. The domestic defense industry, both BUMN and BUMS, needs to continue to improve the control of the raw material industry as expected by the government on the importance of downstreaming. Synergy between the government, industry players and users is needed and supported by the role of academics who conduct research and development of the defense industry in collaboration with developed countries, in various joint development programs (fighter aircraft and medium tanks),

joint ventures (propellants and gunpowder), and joint production (submarines and PKR) and joint investment, it is not impossible for the Indonesian nation to realize the independence of the defense industry in the future in Indonesia's golden year 2045.

## FURTHER STUDY

Further studies can focus on strategies to accelerate the independence of Indonesia's defense industry through optimizing the downstreaming of raw materials, increasing investment in research and development (R&D), and strengthening more strategic international cooperation. The research can explore the policies needed to reduce reliance on imports of critical components, including incentives for domestic industries to master core technologies. In addition, studies on the effectiveness of joint development and joint venture schemes in technology transfer and improving the competence of experts are also important aspects. By analyzing global supply chain dynamics and geopolitical influences, this study can produce concrete recommendations to build a more independent and competitive defense industry towards a Golden Indonesia 2045.

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