

Domestic Defense Industry Policy in Indonesia to Realize Independence in TNI AU Defense Systems

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ABSTRACT

This study explores the importance of the Indonesian Air Force's defense equipment independence as a key pillar in maintaining national sovereignty and security amidst increasingly complex global threats. A qualitative method was used, employing library research and case study approaches focused on defense policy analysis. The results indicate that strong collaboration between the government, industry, and academic institutions is essential in driving innovation and the production of defense equipment that aligns with national strategic needs. The discussion highlights the significance of synergy among key actors in establishing sustainable defense industry policies. In conclusion, effective and collaborative policy implementation is necessary to enhance the independence of the Indonesian Air Force's defense systems and support Indonesia's long-term defense strategy.

INTRODUCTION

The domestic defense industry has a strategic role in ensuring the independence of a country in facing various security threats and challenges. In Indonesia, the development of the defense industry is one of the main focuses of the government in order to realize the independence of the main weapons system (*alutsista*) of the Indonesian Air Force (AU). Along with geopolitical developments and regional and global security dynamics, the need to have modern and independent defense equipment is increasingly urgent. Indonesia, as the largest archipelagic country in the world with a strategic position connecting two continents and two oceans, faces various potential threats, both from within and outside the country. The complex geographical conditions and vast jurisdictional areas demand reliable defense readiness and capabilities. In this context, the development of the domestic defense industry not only functions to meet the needs of defense equipment, but also as an effort to improve national technological and industrial capabilities.

The history of the development of the Indonesian defense industry shows a significant dependence on imported defense equipment. This dependence has several weaknesses, including limited access to the latest technology, the risk of embargoes, and uncertainty in the supply of spare parts. Therefore, the Indonesian government has taken strategic steps to reduce this dependence through various policies and regulations that support the development of the domestic defense industry. One significant step is to encourage the role of State-Owned Enterprises (BUMN) such as PT Dirgantara Indonesia (PTDI) in producing and developing defense equipment needed by the Indonesian Air Force. In addition, cooperation with other countries in technology transfer and the construction of domestic production facilities is also an important part of this strategy. This policy is expected to not only be able to meet the needs of the Indonesian Air Force defense equipment independently, but also increase the competitiveness of the national defense industry in the global market.

With this background, this thesis will discuss in depth the Indonesian domestic defense industry policy in order to realize the independence of the Indonesian Air Force's defense equipment. The main focus will be on policy analysis, implementation, and challenges faced in the process of developing an independent defense industry. The defense industry is a strategic sector that is crucial to the sovereignty and security of a country. In Indonesia, the development of the domestic defense industry has become the government's main priority in an effort to realize the independence of the main weapons system (*alutsista*) of the Indonesian Air Force (AU). This situation arises along with the increasing security challenges and complex threats both from within and outside the country.

Indonesia, with its strategic geographical position and vast jurisdiction, faces various potential threats that require strong defense readiness. The need for modern and reliable defense equipment is becoming increasingly urgent to ensure optimal defense capabilities. However, over the past few decades, Indonesia has still faced various obstacles in achieving defense equipment independence, especially due to significant dependence on imported products.

This dependence not only limits access to advanced technology, but also poses risks related to supply uncertainty and potential embargoes from supplier countries. This condition strengthens the urgency for Indonesia to develop its own defense equipment production capabilities. The Indonesian government, through various policies and regulations, seeks to encourage the development of the domestic defense industry to overcome this dependence.

The existing phenomenon shows an increasing attention to the role of State-Owned Enterprises (BUMN) such as PT Dirgantara Indonesia (PTDI) in producing and developing defense equipment needed by the Indonesian Air Force. In addition, strategic steps such as international cooperation for technology transfer and the construction of domestic production facilities are also being intensified. This phenomenon reflects the government's serious efforts to build independence in the defense sector, which not only aims to meet national needs but also increase the competitiveness of the Indonesian defense industry in the global arena. This context places the domestic defense industry as a key element in efforts to maintain national sovereignty and security. In this increasingly complex era, the independence of defense equipment is a non-negotiable priority. Existing policies are expected to be able to answer existing challenges and encourage the creation of a strong and independent defense industry.

The independence of the TNI AU's main weapon system is a vital aspect in maintaining the sovereignty and security of the Indonesian state. To achieve the desired level of independence, the role of the domestic defense industry is crucial in supporting the provision and development of defense equipment according to the needs of the TNI AU. In this context, the domestic defense industry policy plays an important role as a strategic foundation in achieving the goal of the independence of the TNI AU's defense equipment. Therefore, this study aims to identify strategies and policies that can be implemented to increase the role of the domestic defense industry in supporting the independence of the TNI AU's defense equipment. By understanding the complexity of the challenges and opportunities that exist, it is hoped that this study can provide valuable insights to create an effective and sustainable policy framework in supporting the independence of the TNI AU's defense equipment through the development of the domestic defense industry. From the background above, the formulation of the problem of this thesis is how "How is the **domestic defense industry policy to realize the independence of the TNI AU's defense equipment**"

LITERATURE REVIEW

Theory of Independence

Independence is an important concept in the context of national defense, which refers to a country's ability to produce and develop the main defense system (alutsista) independently, without relying on other countries. In the literature, independence is often associated with increasing the capacity of local industry, developing technological innovation, and strengthening state sovereignty. According to Fatchurrahman (2019) in his journal "Alutsista Independence: Challenges and Opportunities," the independence of defense

equipment not only reduces defense costs but also increases military reliability and readiness. In addition, independence in the defense sector contributes to job creation and drives domestic economic growth (Susanto, 2020, "Defense Industry Independence Strategy"). Therefore, it is important for the government to implement policies that support the development of the defense industry in order to achieve sustainable independence. Defense equipment independence means the country's ability to produce, maintain, and develop defense equipment without relying on other countries. This is important to ensure national sovereignty and security. According to Wibowo (2019), defense equipment independence can be achieved through investment in research and development (R&D), human resource training, and increasing the production capacity of the defense industry.

Collaboration Theory

Collaboration theory emphasizes the importance of cooperation between various actors, including government, industry, and research institutions, to achieve common goals, especially in the context of technology development and innovation. According to Huxham and Vangen (2005) in their book "*Managing to Collaborate: The Theory and Practice of Collaborative Advantage*," collaboration enables efficient utilization of resources and creates added value that cannot be achieved individually. In the defense sector, this collaboration is very important to face complex challenges and accelerate innovation. For example, Jatnika (2018) in his article "The Role of Collaboration in Defense Technology Development" shows that collaboration between academic institutions and the defense industry is able to produce innovative solutions that meet strategic needs. Thus, effective collaboration is key to building a strong and adaptive defense system.

Theory of Technological Innovation

The theory of technological innovation focuses on the process of creating and implementing new ideas to improve the efficiency, effectiveness, and competitiveness of an organization or sector. According to Schumpeter (1934) in his classic work "The Theory of Economic Development," innovation is the driving force of economic change, where the introduction of new products, processes, or methods can bring significant competitive advantages. In the context of the defense industry, technological innovation is essential to developing a more sophisticated and responsive defense system to changing threats. For example, in a study by Arifin (2020) entitled "Technological Innovation in the Defense Sector: Challenges and Solutions," it is explained that investment in research and development (R&D) and collaboration between the public and private sectors can accelerate the innovation process and produce more effective defense equipment. Thus, technological innovation is an important pillar in increasing the independence and capacity of national defense.

Defense Industrial Policy Theory

The theory of defense industry policy refers to a series of strategic steps taken by the government to develop and manage the defense industry, with the aim of increasing national independence in meeting defense equipment needs.

According to Kmentt (2016) in his article "Defense Industry Policy: A Comparative Analysis," effective policies include financial support, supportive regulations, and cooperation between the public and private sectors. In the Indonesian context, defense industry policy plays an important role in creating an ecosystem that encourages innovation and domestic technological development. Research by Wibowo (2021) in the journal "Defense and Industrial Policy: Welcoming Defense Equipment Independence" emphasizes that holistic and sustainable policy implementation can strengthen Indonesia's position on the global defense industry map. Therefore, a deep understanding of this policy is essential to achieving better national defense goals. Defense industry policy is a series of government regulations and initiatives aimed at developing national capabilities in producing and maintaining defense equipment. According to Presidential Regulation No. 8 of 2021 concerning General State Defense Policy, this policy includes technological improvements, international cooperation, and financial support for the domestic defense industry. Yudo (2018) emphasized that a comprehensive policy is needed to create an ecosystem that supports innovation and independence of the defense industry.

METHODOLOGY

This study will use a qualitative approach with library research and case studies at PT Dirgantara Indonesia (PT DI) to explore and analyze domestic defense industry policies in realizing the independence of TNI AU defense equipment. Data will be collected through a comprehensive literature review, in-depth interviews with experts in the defense industry, and relevant policy analysis. This approach aims to gain an in-depth understanding of the dynamics and challenges faced by PT DI in its efforts to achieve defense equipment independence, as well as to formulate policy recommendations that can improve the effectiveness of the national defense industry strategy.

In accordance with the objectives of the study above, to obtain more accurate data, the author will focus on research at PT. Dirgantara Indonesia, the Directorate General of Defense Potential of the Indonesian Ministry of Defense and KKIP. This is done because the object of the study has competence in problems related to defense industry policies in the aerospace sector and as one of the policy makers in the defense industry. However, if during the interview new information is found that requires additional data sources, the researcher will search for information related to the problem to other data sources. This is also done in order to obtain complete and valid information, so that the problem can be known clearly and definitely.

The selection of data sources is based on the interests and capacity of mastering the issues that are the topic of research. Some of the data sources that researchers will interview are as follows:

- 1) The Director of Defense Industry Technology, Ministry of Defense of the Republic of Indonesia, is the official who handles the defense industry and is a member of the Defense Industry Supervisory Board, whose address is Jl. Tanah Abang Timur No. 8, Central Jakarta.

- 2) The Head of the KKIP Secretariat is the official responsible for assisting in determining policies related to the defense industry, which is currently located at Jl. Tanah Abang Timur No. 8, Central Jakarta.
- 3) The President Director of PT. Dirgantara Indonesia is the official who is authorized and responsible for carrying out activities at PT. Dirgantara Indonesia, located at Jl. Pajajaran No. 154, Husein Sastranegara, Cicendo, Bandung City, West Java.

RESEARCH RESULT

Domestic defense industry policies are formulated and implemented to support the independence of the Indonesian Air Force's defense equipment at PT Dirgantara Indonesia.

PT Dirgantara Indonesia faces significant challenges, including dependence on foreign technology and components, as well as limitations in production and innovation capacity. Although there have been efforts to increase defense equipment production capabilities, there are still obstacles in terms of research and development (R&D), as well as collaboration with other parties in the defense industry. In formulating an ideal policy, it is hoped that PT Dirgantara Indonesia can transform into an independent defense equipment innovation and production center. This includes strengthening investment in R&D, increasing cooperation between the government and the private sector, and developing regulations that support the domestic defense industry. This policy should also include training and human resource development programs to ensure the necessary expertise in modern defense technology.

The results of the study show that domestic defense industry policies, especially those related to the independence of the TNI AU's defense equipment at PT DI, are formulated through a comprehensive approach and involve various stakeholders. One of the main policies that plays a central role is the Defense Industry Policy Committee (KKIP), which is under the coordination of the President and the Minister of Defense. KKIP aims to advance the domestic defense industry by directing macro policies that support the increase in independent defense equipment production. This KKIP provides a strong foundation for achieving defense industry independence, which in turn will strengthen national defense capabilities.

The National Defense Implementation Policy for the 2020-2024 period is also an important foundation in the development of the defense industry. This policy covers various aspects such as the development and development of capabilities, deployment and use of force, to regulations, budgets, and supervision. With this structured policy, the Indonesian Air Force together with PT DI are expected to be able to focus more on developing the latest defense technology and in accordance with operational needs. In addition, this policy also emphasizes the importance of synergy between the government, users, and the defense industry to ensure that the defense equipment produced meets the required standards.

Government Regulation Number 141 of 2015 emphasizes the importance of integration between human resources, technology, and facilities and infrastructure in the defense industry. This regulation requires readiness from all

related parties to develop and master high technology in the field of defense and security. The defense industry is also encouraged to increase the Domestic Content Level (TKDN) to be more independent and less dependent on imports. Evaluations conducted on the defense industry also show that continuous coaching and development are essential to ensure that the products produced not only meet quality standards, but are also able to compete globally

Challenges and obstacles faced by PT Dirgantara Indonesia in realizing the independence of the Indonesian Air Force's defense equipment.

Currently, PT Dirgantara Indonesia faces various challenges that hinder its efforts to achieve defense equipment independence. Some of the main challenges include dependence on foreign components and technology, limitations in production and innovation capacity, and lack of adequate regulatory support. In addition, there are problems in terms of investment, where the allocation of funds for research and development (R&D) is still low, as well as challenges in building effective collaboration networks with other industries and research institutions. In an ideal context, PT Dirgantara Indonesia should become a center for innovation and production of defense equipment that is independent and competitive. This includes the need to increase investment in R&D, build stronger partnerships with the government and private sector, and create an environment that supports technological innovation. In addition, there needs to be the development of policies that facilitate the growth of the domestic defense industry, including training and development of human resources to ensure relevant expertise.

The results of the study show that PT Dirgantara Indonesia (PT DI) faces a number of significant technical and non-technical obstacles in the production and development process of the main defense system equipment (alutsista) for the Indonesian Air Force. From a technical perspective, the challenges faced include the development of high technology and innovation, which requires large investment and quality human resources. In addition, maintaining product quality that meets international standards is also a challenge that must be overcome through strict quality control. PT DI also faces obstacles in ensuring the availability of components and materials through a local supply chain that is guaranteed to be of high quality, as well as meeting strict testing and certification requirements to ensure the reliability and safety of the defense equipment. From a non-technical perspective, PT DI must adapt to changes in government policies and regulations that can affect the production and development process of defense equipment. In addition, strengthening partnerships with the private sector, government, and research institutions is very important in supporting the development of defense equipment, although this is not always easy to do. The limited workforce that is qualified and experienced in the defense industry, as well as challenges in financing the development of defense equipment, are also non-technical obstacles that must be overcome by PT DI.

In addition, PT DI is also faced with limited resources in terms of human resources, technology, and finances to develop defense equipment that meets modern military standards. Dependence on foreign technology in the defense equipment production process is another obstacle that can hamper efforts to

achieve full independence. Increasing global competition in the defense industry also adds to the complexity of the challenges faced by PT DI in marketing and developing defense equipment products independently.

The government's suboptimal policy in supporting the domestic defense industry is also a significant obstacle for PT DI. Policies that are not in line with the needs of the industry can slow down efforts to achieve defense equipment independence and hinder the development of the domestic defense industry. Therefore, improvements are needed in regulations and policies that support the defense industry to create a more conducive business environment for PT DI.

To overcome these challenges, strategic steps are needed that involve investment in human resource development and technology to increase production capacity and innovation in the defense industry. Strong collaboration between PT DI, the government, research institutions, and the Indonesian Air Force is very important in overcoming existing obstacles. In addition, efforts to reduce dependence on foreign technology by increasing domestic research and technology development capabilities are also key to achieving independence of the Indonesian Air Force's defense equipment at PT DI. Continuous evaluation of the challenges faced and implementation of appropriate solutions will be the determining factors in the success of this strategy.

The impact of domestic defense industry policies on the performance and capabilities of PT Dirgantara Indonesia in producing defense equipment that meets the needs of the Indonesian Air Force

Currently, the performance of PT Dirgantara Indonesia is influenced by various existing policies, but the impact is still limited. Although there are several policies that support the development of the defense industry, challenges such as dependence on foreign technology, low investment in R&D, and lack of effective collaboration with related parties are still obstacles. As a result, PT Dirgantara Indonesia's ability to produce defense equipment that meets the needs of the Indonesian Air Force has not been fully optimized, resulting in delays in the procurement and development of the necessary technology. In an ideal context, defense industry policies should be able to encourage the performance and capabilities of PT Dirgantara Indonesia to produce quality defense equipment that meets the standards set by the Indonesian Air Force. More targeted and sustainable policies need to include increased investment in innovation, the formation of strong partnerships between government and industry, and the development of training programs to improve workforce skills. With supportive policies, it is hoped that PT Dirgantara Indonesia can transform into an independent, responsive, and innovative defense equipment producer, so that it can meet national defense needs effectively.

The impact of domestic defense industry policies on the performance and capabilities of PT Dirgantara Indonesia (PT DI) in producing defense equipment for the Indonesian Air Force has shown significant results. These policies have driven an increase in PT DI's production performance, enabling them to produce defense equipment that meets the standards and needs of the Indonesian Air Force. Through the support of these policies, PT DI has been able to optimize its

production process, ensuring that the defense equipment produced is of high quality and can be relied upon to support military operations.

In addition to improving production performance, domestic defense industry policies have also had a positive impact on PT DI's technological capabilities. Support for domestic technology development has enabled PT DI to improve its technological capabilities, thus being able to produce more sophisticated and modern defense equipment. This is very important in the context of defense, where the need for sophisticated defense equipment continues to increase along with the development of global military threats and technology. Furthermore, policies that encourage domestic procurement of defense equipment have helped PT DI increase its independence. With this policy, PT DI is able to reduce dependence on foreign products, which not only increases independence but also provides greater control over the quality and availability of defense equipment. This independence is very important in ensuring the readiness and reliability of the defense equipment used by the Indonesian Air Force.

Overall, the domestic defense industry policy has had a major positive impact on PT DI's performance and capabilities. With policies that continue to support growth and innovation in the defense industry, PT DI is expected to continue to increase its production capacity and meet the needs of the Indonesian Air Force with high-quality defense equipment. This positive impact is not only felt by PT DI, but also strengthens the country's overall defense capabilities, making Indonesia more independent in the defense sector.

Recommendations that can be given to improve the effectiveness and efficiency of domestic defense industry policies based on the Perthahelix theory (government, industry, academics/PT, and military) in order to realize the independence of the Indonesian Air Force's defense equipment

Currently, collaboration between government, industry, academia, and the military (quadruple helix) are still less than optimal. Although there are several initiatives, challenges such as lack of effective communication, limitations in technology transfer, and low involvement of academics in the development of the defense industry are obstacles. As a result, existing policies have not been fully able to encourage innovation and independence of the Indonesian Air Force's defense equipment. In an ideal context, defense industry policy needs to create stronger synergy between government, industry, academia, and the military within the Perthahelix model framework. To achieve this, several policy recommendations can be implemented. First, strengthening strategic partnerships between government and industry is important for sharing resources and information, which will build a more effective collaboration network. Furthermore, support for research and development (R&D) must be increased, involving academics to produce technological innovations that are relevant to the needs of the Indonesian Air Force. In addition, joint training programs involving industry and academics are needed to improve the skills of the workforce, so that they can contribute better to the defense equipment production process. Supporting regulations must also be formulated to facilitate collaboration between sectors and encourage the defense industry to be more

independent and innovative. Finally, it is important to establish an effective monitoring and evaluation mechanism to assess the effectiveness of the policy periodically, allowing for adjustments in accordance with existing developments. By implementing this recommendation, it is hoped that the effectiveness and efficiency of domestic defense industry policies can be increased, supporting the independence of the TNI AU's defense equipment more comprehensively.

The results of this study identify several policy recommendations that can improve the effectiveness and efficiency of domestic defense industry policies based on the Pentahelix theory. First, the importance of strengthening collaboration between government, industry, academia, communities, and the military to create an ecosystem that supports the development of defense equipment. The government must facilitate more intensive dialogue and cooperation between these five actors, provide incentives and regulations that support innovation and investment in the defense industry. This will strengthen the integration between public policy and market needs, and facilitate adaptation to changes in technology and defense strategy.

Second, the defense industry needs to adopt an innovative approach by leveraging the knowledge and research produced by academics. This collaboration can be done through joint research programs, development of new technologies, and enhancement of production capabilities that are in accordance with international standards. Through collaboration with higher education institutions and research institutions, the industry can access cutting-edge knowledge and advanced technologies that can improve the efficiency and effectiveness of defense equipment production.

Third, academics and research institutions should play an active role in providing data-based recommendations and current studies on the needs and challenges of the defense industry. They can be involved in developing curricula that are relevant to industry needs, as well as providing the necessary training and certification for the defense workforce. In doing so, academics will help ensure that the skills and knowledge needed are in line with technological developments and military needs.

Fourth, communities, including the general public and non-governmental organizations, can play a role in supporting defense industry policies through participation in social dialogue and feedback on the social impacts of defense policies. Communities can provide useful perspectives in ensuring that policies implemented are not only efficient but also sustainable and accepted by the public. This will help build trust and support for the domestic defense industry.

Fifth, the military must be actively involved in the policy development and implementation process by providing clear feedback on their operational and technical needs. This collaboration will ensure that the defense equipment developed is in accordance with actual needs in the field, increasing combat readiness and operational effectiveness. In addition, the military can also play a role in testing and evaluating new technologies, as well as providing practical input for continuous improvement of existing defense policies and products. By implementing these recommendations, it is hoped that domestic defense

industry policies can become more effective and efficient in supporting the independence of the TNI AU defense equipment, while strengthening an integrated innovation ecosystem between various stakeholders.

CONCLUSIONS AND RECOMMENDATIONS

Domestic defense industry policy is formulated and implemented with a focus on strengthening regulations, providing incentives, increasing collaboration between government and industry, and investing in research and development (R&D) to support the independence of TNI AU defense equipment at PT Dirgantara Indonesia (PT DI). These steps include revising and harmonizing regulations to eliminate bureaucratic obstacles, providing fiscal and non-fiscal incentives to spur industrial growth, and encouraging cooperation with the private sector and research institutions to improve PT DI's technological and production capabilities. Thus, PT DI can produce more sophisticated defense equipment that meets TNI AU's needs, while reducing dependence on imported products.

PT Dirgantara Indonesia (PT DI) faces various challenges and obstacles in realizing the independence of the TNI AU defense equipment, including technical constraints such as limited technology and innovation, product quality and standard issues, and dependence on an unstable local supply chain. In addition, non-technical challenges such as changes in government policy, limited skilled human resources, and financing issues also hamper PT DI's efforts to develop independent defense equipment. Dependence on foreign technology and intense global competition add to the complexity of achieving this goal. .

The impact of domestic defense industry policies on the performance and capabilities of PT Dirgantara Indonesia (PT DI) shows that although challenges such as dependence on foreign technology and low investment in R&D still exist, policies that support the development of the defense industry have brought significant positive results. This policy not only encourages increased production performance, but also strengthens PT DI's technological capabilities, enabling them to produce more sophisticated defense equipment that meets the needs of the Indonesian Air Force. With continued support for the development of technology and procurement of domestic defense equipment, PT DI is increasingly able to reduce dependence on foreign products, increase independence, and ensure the quality and availability of defense equipment. Overall, the positive impact of this policy not only improves PT DI's capabilities, but also strengthens Indonesia's national defense, making the country more independent and ready to face future challenges.

Policy recommendations to improve the effectiveness and efficiency of domestic defense industry policies, based on the Pentahelix theory, include strengthening collaboration between government, industry, academia, community, and the military. The government must facilitate cross-sector collaboration by providing supportive regulations, incentives, and financial support for research and development. The defense industry needs to work with academia to integrate the latest technology and innovation into defense equipment products. Academia must be actively involved in supplying relevant knowledge and research, while the community plays a role in supporting policies

through social participation and feedback. The military must provide clear input on operational needs and challenges to ensure that defense equipment development is in accordance with needs in the field. The implementation of these recommendations is expected to strengthen the independence of the TNI AU defense equipment by creating a synergistic and sustainable ecosystem.

ADVANCED RESEARCH

Future research can explore the development of an integrated innovation ecosystem model based on the Pentahelix collaboration framework to accelerate the technological independence of PT Dirgantara Indonesia (PT DI) in producing advanced defense equipment for the Indonesian Air Force. This includes analyzing mechanisms for effective knowledge transfer between academia and industry, evaluating policy instruments that successfully incentivize domestic R&D, and designing adaptive governance models that can respond to dynamic global defense challenges. Additionally, research should investigate strategies for strengthening the local defense supply chain and reducing technological dependency through dual-use technology development and sustainable investment schemes. By focusing on these areas, future studies can contribute to building a resilient, self-sufficient defense industrial base that aligns with national defense objectives and long-term sovereignty goals.

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