



Indonesian Air Defence: The Role of Stakeholders and the Development of Indonesia's Air Defence Supporting Industry

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Abstract

Threats to national security are not only present on the mainland, but also can happen in the air. Any kind of threats which appear on the air must be detected and handled as early as possible to avoid material loss, damage or loss of life. Air defence power is an important thing and needs to be continuously built to avoid threats that come from the air, Air defence power is an important thing and needs to be continuously built to avoid defence threats that come from the air, and efforts to build air defence power can be done by building a strategic air defence industry through cooperation between the Indonesian Air Force and other stakeholders, such as with national aerospace technology industry. This research used qualitative method, data obtained from interviews with some informants and secondary data, through media, and meeting reports, data obtained then validated by triangulation technique. This research has pointed to the important of armament independence to optimize Indonesia's air defence power. The role of the defence industry is getting stronger in line with the military industrial complex (MIC) theory. The three main pillars of the defence industry which consist of the Government, the defence industry and the TNI as users must work hand in hand to support the independence of the defence industry.

Keywords

National security, Air Defence, Defence Industry, Aerospace Technology

JEL Classifications: J11, F43

1. Introduction

Air power is an integral part of the national potential that can be used for the national interest in the field of defence and security as well as for the welfare of the people. State-owned enterprises can manage air power, private companies, and the military. Air power managed by the state and private sector benefit people's welfare. Meanwhile, air power managed by the military is the core strength of all national air power in its function as a defence and security forces. In a state of peace, the air power managed by the military can also be utilized to benefit the people's welfare.

Generally, the components of national air power differ from country to country depending on the preferences of national interests and the applicable laws in that country. In Indonesia, the air power component is divided into two types: first, the air force, which is the core component of the power to defend the country's sovereignty; second, the air fleet and supporting facilities belonging to various agencies outside the air force that act as reserve components which can be mobilized at any time to enlarge and strengthen the core components.

The national strategic industry plays an important role in developing Indonesian air power, especially the aerospace industry. Focusing on developing a strong and reliable aerospace industry is the key to meeting domestic needs and being a foreign exchange earner for the country that can sustain the upholding of state sovereignty and the honour of a nation in terms of security and welfare aspects. For Indonesia, one of the policy priorities in the development of air power is the empowerment of all national industrial capabilities to support the potential of aerospace which is prepared early with the target of achieving survival-ability and sustainability as regulated in laws and regulations.

In simple terms, the progress of Indonesia's air defence is determined not only by the air defence industry but also by stakeholders and the air defence supporting industry. In this study, the air defence industry in question is PT Dirgantara Indonesia, a state-owned company (BUMN) in the aircraft industry. The stakeholders in question include the Ministry of Defence of the Republic of Indonesia, the Defence Industry Policy Committee (KKIP), the TNI General Planning Staff (Srenum TNI), and the Indonesian Air Force. Meanwhile, the air defence supporting industry in question is PT. Info Global Universe, PT. Sari Bahari, PT. Nexus Tama Semesta is needed in the process of modernizing the main tools of the Indonesian weapon system. Despite various attempts made by Indonesia, the current conditions generally lead to an estimate that in the next 10 to 20 years, the capability of Indonesia's national defence industry (PT. Dirgantara Indonesia)

will remain in place. In addition, Indonesia is also expected to remain a consumer of foreign defence equipment products. Therefore, it is necessary to hold a national consensus of the defence industry to empower the capabilities of supporting industries and to organize all stakeholders in the context of achieving national air defence independence and as an example of good human resource management.

The independence of the defence industry or the ability to produce its military equipment without relying on other countries is one of the targets of the Indonesian government in the defence sector. However, there are still some challenges in balancing military needs with the defence industry's capacity. Indonesia currently has not been able to optimize the Minimum Essential Forces (MEF), namely the modernizing the main tools of the Indonesian weapons system, which the government launched in 2007. This program develops the main weapons system tools through not only procurement but also the empowerment of the defence industry. Domestically to build self-reliance. Briefly, the progress of Indonesia's MEF from 2010-2019 can be seen in the following table.

Based on the table above, it can be seen that in stages I and II, the fulfilment of the main tools of the TNI's weapon system has not fully met the MEF's achievement targets. The air dimension in strategic plan-II achieved 44.4% of the MEF target. The fulfilment of the main weapon system equipment in Strategic Plan II is still very far from the specified target. The procurement of radar, missiles and air attack deterrents (PSU) has not been fulfilled in this strategic plan II period (Directorate General of Defence of the Ministry of Defence: 2019).

The independence of armament is needed to optimize Indonesia's air defence, one of which is in buying independence, which means a country has the right to buy the main weapon system equipment without pressure from other countries. This independence in buying is important for Indonesia, which is not an alliance of any country in the world. Historically, Indonesia has purchased several Sukhoi 27/30 aircraft from Russia after the embargo from America and Britain. The issue of technology transfer is an important note in the independence to buy. In order to achieve the independence of the domestic defence industry, the purchase of a product of the main weapon system equipment must be accompanied by a technology transfer process through an offset mechanism or the level of achievement of technology transfer from foreign to domestic producers.

The independence of the defence industry is important to be optimized by a country to avoid dependence on the supply of weapons, equipment and military equipment from other countries. Suppose a country has independence in procuring the domestic defence industry and can sell products to other countries. In that case, it benefits the country from an economic perspective by increasing foreign exchange and investment. This study aims to identify the condition of Indonesia's air defence, especially from the aspect of stakeholders and air defence supporting industries, to understand the extent of Indonesia's achievements and the direction of Indonesia's air defence.

Table 1. The Progress of Minimum Essential Forces 2010 – 2019

No.	Description	Before MEF	MEF 2010-2014		MEF 2015-2019				MEF 2020-2024	Ideal Posture	
			Total	%	Total		%	Total	Total	%	
			MEF-I	MEF-I	Plan	Achieved	MEF-II	MEF-II			MEF-III
1	Army (TNI AD)			64,9%				74,6%			49,3%
	a. Small Arms	92.155	613.043	84,7%	128.417	36.019	649.062	89,7%	723.564	783.462	82,8%
	b. Cannon / Rocket / Missiles	962	1.144	84,4%	3.035	227	1.371	101,26	1.354	2.162	63,4%
	c. Combat Vehicles	1.321	1.641	43,9%	730	359	2000	53,5%	3.738	4.854	41,1%
	d. Aircrafts	67	104	46,6%	77	17	121	54,0%	224	1.224	9,8%
2	Navy (TNI AL)			55,5%				68,7%			45,4%
	a. Navy Ships	144	146	80,2%	46	35	161	88,5%	182	262	61,4%
	b. Submarines	2	2	25,0%	3	2	4	50,0%	8	12	33,3%
	c. Aircrafts	62	72	72,0%	16	13	85	85,0%	100	160	53,1%
	d. Marine Combat Vehicles	413	440	44,9%	46	0	503	51,4%	978	1.481	33,9%
3	Air Force (TNI AU)			44%				44,4%			32,6%
	a. Aircrafts	211	261	75,8%	301	6	267	77,6%	344	469	56,9%
	b. Radar	17	20	62,5%	27	0	20	62,5%	32	32	62,5%
	c. Missiles	0	0	0,0%	18	0	0	0,0%	72	96	0,0%
	d. Air Strike Cannon (PSU)	20	24	37,5%	36	0	24	37,5%	64	216	11,1%
	Percentage	41,9%		54,8%				62,6%			42,5%

Source: Directorate General of Defence 2019

The basic regulations regarding the Indonesian defence industry can be seen in Law no. 16 of 2012, which regulates the defence industry's objectives, functions and scope. This law also regulates matters relating to institutions, the Defence Industry Policy Committee (KKIP), the management of the defence industry, and the marketing of products produced from the entire production process. In addition, this law forms the basis for the efforts to develop and utilize production products to meet the needs and maintenance services for defence and security equipment, institutions and parties permitted to lead an independent domestic defence industry. In order to understand the extent to which Indonesia has achieved achievements in the air defence industry, it is also important to understand the basis for regulating the roles of all stakeholders involved in the production activities of the defence industry in order to understand the synergies that have been formed and see whether these roles have been optimally developed and utilized.

A state defence and security system capable of protecting the entire Indonesian nation and the entire homeland of Indonesia, as well as being able to defend the sovereignty of the state and the territorial integrity of the Republic of Indonesia, requires the availability of optimal defence and security equipment. So far, the provisions of laws and regulations in the defence industry have not fully encouraged and promoted industrial growth and the superiority of human resources capable of achieving independence in meeting the needs of defence and security equipment. In addition, to realize the availability of defence and security equipment independently supported by the capabilities of the defence industry, visionary management is needed by paying attention to good governance, relying on human resources which have high idealism and intellectualism at various management levels, so that they can keep up with the times.

The writing of this article is supported by several references in the form of previous research, which according to the researcher, can perfect the ideas of this research, including journals on the development of air defence technology, such as (Evans, 2015; Faishal et al., 2020; Lutfiyannah et al., 2017; Rachmat, 2014). These studies contain advances in science and technology that have greatly affected national defence. Reflecting on this, Indonesia is developing defence technology to build capabilities and produce superior defence equipment. The Indonesian defence system, which involves defence equipment, is the main agenda in improving the strength of Indonesia's defence posture in dealing with various potential threats. Fighter aircraft simulator technology is one of the key technologies used in various aspects of aviation. Simulators simulate conditions such as the physical system, layout, and environment. It is hoped that the maturity of technology and production of national fighter aircraft can provide a multiplier effect for the domestic industry, especially simulator technology, where one of the impacts is that simulator technology can be used by various parties, both the user, in this case, the TNI, the defence industry, government, and educational institutions. Science and technology in nation-building cannot be mastered and developed just like that. It is even more for the Indonesian nation, whose level of human resources and technological

capability is still relatively underdeveloped. In simple terms, the strategic defence industry is the entire potential of national industry, both government and private, whose existence is very important, and its products are in the form of equipment for the benefit of state defence and security so as not to depend on foreign products. The independence of the strategic defence industry is a basic prerequisite for a country's military strength.

Other researchers have also written about the military-industrial complex, such as (Ansell & Cox, 2019; Cox, 2014; Dunlap, 2011; Light, 2019). These studies state that for the independence of the strategic defence industry, it is necessary to "merge" with supporting industries to strengthen the strategic industry that has been built so that it can function as a supporter in the national strategic industry. Defence independence is characterized by the ability of the state to make and prepare the main equipment needs of its defence weapon system without relying on the main weapon system product from other countries. In other words, defence independence relies on the domestic defence industry's ability to manufacture and produce the main weapon system equipment that meets the minimum essential force (MEF) with quality and technology by operational needs. Efforts towards defence independence can be started by encouraging the active involvement of domestic defence industry players. Policy support and synergy between state-owned enterprises and privately owned companies are expected to be a strategic step towards the independence of the defence industry. The independence of the defence industry will reduce dependence on the main weapons system equipment, minimize the risks and vulnerabilities and the scarcity of the main weapons system equipment caused by the embargo and simultaneously increase the deterrent effect of national defence. Procurement of the TNI's main weapon system equipment from abroad should be avoided if the national defence industry can produce the main weapon system equipment and main equipment.

The relationship between the main objectives of this research and several previous articles is that the author will discuss the supporting industries that have been able to make components, produce and maintain defence and security equipment but have not been fully utilized by the main Indonesian air defence industry, namely PT. Indonesian Aerospace. So that until now, in the defence industry, Lead Integrator for aerospace, PT. Indonesian Aerospace has not been able to be independent in the manufacture and maintenance of defence equipment which is interesting to the researcher in making a study. Later, by identifying an in-depth analysis of the stakeholder and supporting industry aspects of air defence, readers will be able to understand terms of ToT, human resources, research and implementation of government policies in shaping the achievement of air defence in Indonesia.

2. Literature Review

2.1 Air Defence

In recent decades, the air defence concept has become much more complex. Previously, countries' air defences were designed to counter conventional foreign threats consisting of attacks by large, fast military aircraft, helicopters and missiles. Meanwhile, contemporary air defence systems are designed to deal with threats after strategic warning efficiently and are sensitive to the onset of combat. Contemporary air defence also pays special attention to monitoring airspace in peacetime, identifying, and, where necessary, intercepting and destroying intruders (Evans, 2015). Air defence must be able to balance the results achieved with large procurement, maintenance and repair costs. Some of the keys to tackling this challenge are 1. Invest in the serious research required for the conception of low-cost mid-term and long-term systems; 2. Gradually introduce solutions that are consistent with the lifecycle replacement of existing equipment. For the country, the most urgently needed investment in surveillance radar technology will make it possible to design future systems on high-endurance and long-lasting UAVs and satellites while avoiding large mains power requirements. In addition, the gradual introduction of new capabilities to further secure civilian aircraft (e.g., electronic locks, automatic roaming at the start of a hijack attempt) is an example of a long-term phased introduction consistent with aircraft and the evolution of ATC systems. The key to both approaches is a flexible decision strategy while avoiding the country from spiralling up too expensive and prematurely (Evans, 2015).

The independence of a country in the field of air defence increases the opportunities for establishing state sovereignty and the nation's honour both from the aspect of security and welfare. In realizing superior contemporary air defence at a cost that fits the state budget, it is important to optimize the role of the aerospace industry and its supporting industries. Focusing on developing a strong and reliable aerospace industry will meet national needs while opening up opportunities for exporting technology and finished goods from within the country.

2.2 Military Industrial Complex

In their writings, (Dunne & Paul, 1993; Rundquist, 1978; Smith et al., 1997) explained the term military-industrial complex, which was popularized, President of the United States on January 17, 1961, in his farewell address to the country, President Eisenhower reminded the people of the United States about the relationship between the military and industry. The defence is considered to have reached a dangerous stage. It was revealed as a speechwriter for President Eisenhower by looking at the number of retired American military officers who became officials in the defence industry there. Malcolm C. Moos assumes that many retired military officers influence active military officers who are juniors who serve in military organizations to buy military equipment products in the defence industry in America. Another opinion of Moos is that there are still strong relationships and mutual influence in the military equipment procurement system. In response, several civilians and former military officials denied what a concern for Moos, where the

influence on the decision to procure military equipment no longer existed. The term military-industrial complex (MIC) can be understood as a strong and entrenched informal network between the military forces and the defence industry in the United States. Since the 1960s, this condition has occurred and has penetrated the field of development and procurement of weapons with technology. Increasing the defence budget and gaining public support are the main objectives to influence public policy and meet the needs of military operations.

Three groups are believed to be involved in an attempt at this MIC conspiracy, including the military, business and political leadership. The connection between the industrial world and the military is undeniable because the defence industry is the breath of life that depends on contracts from the military (Gay & William, 2018; Light, 2019; Wehrle, 2003).

explained that the military-industrial complex that lasted for years threatened democracy and the free market, which became a big engine in the hierarchical social structure of absolute power (Smith et al., 1997). stated that defence contractors have a relationship with the US government in shaping foreign policy strategies, military equipment procurement allocation policies and budget allocations for strategic threats. The military-industrial complex was even used to increase the military budget after 9/11 in pursuit of the US militarization agenda (Cox, 2014).

The state is a source of inefficiency. Politics is one of the failure factors in creating efficiency (the science of political failure). It is because partner selection in politics is not based entirely on comparative and competitive advantages and objective economic criteria. It further shows that political factors cannot be ruled out even though the cost factor is the main factor for a country to cooperate with the defence industry and other supporting industries (Hartley & Braddon, 2014). MIC illustrates that collaboration will not escape the analysis of political factors, even though, ideally, the public choice should be based on considerations or preferences for cost-effectiveness.

(Muhammad & Mahar, 2017) argue that the military-industrial complex shows the existence of informal cooperation between a country and defence industrial contractors that produce weapons for war. It is very likely to happen because both parties, both the government and the contractors, benefit from this economic activity in the arms sector. Arms manufacturers make a profit from selling weapons in countries that are in armed conflict. On the other hand, the state also benefits from taxes obtained from selling these weapons. This symbiotic mutualism cooperation causes the arms manufacturers to ask the state to make policies that can directly or indirectly support the continuation of the war. In other words, MIC also explained that the war's end was not what the parties involved wanted.

2.3 Supporting Industry

The government of a country must understand that in addition to the industry in the state-owned defence and security sector, there are opportunities, implications

and choices that arise from the rapid development of technology that offers sophisticated access and benefits. These opportunities are offered through procurement by high-value private and public investors. One element of this opportunity is the supporting industry and partner companies that offer access to technology and a capable network. On the other hand, the state must also be able to consider the escalation of threats which also increases along with technological advances.

In the air defence industry, there is a defence industry cluster concept which means the existence of interdependence and mutual support between the upstream industry, downstream industry, supporting industry and related industries in creating competitiveness to improve the national industry. The success of the defence industry's independence effort is very dependent on the running of the cluster concept in mutually supportive industrial sectors (Wibowo, 2016).

All countries need to achieve the goal of having an independent defence industry. The grouping of defence companies and supporting industries is an important tool in enhancing the capability of the national defence industry. The formation of clusters supported by linkages with government agencies, public institutions and universities are very important. In this case, the importance of defence clusters to achieve a strong independent defence industry is strongly emphasized by the development carried out through the collaboration of practitioners and academics

3. Research Method

The writing of this article was carried out using qualitative research methods with the descriptive analysis used as the basis of this research allowing researchers to describe how the behaviour, perceptions, motivations, actions and so on of the object of research lead to efforts in realizing an understanding of the achievements of Indonesian air defence, particularly related to with stakeholders and supporting industries. Based on an assessment of the aspects studied, which include the current condition of the air defence industry, the condition of the air defence supporting industry, and how stakeholders, with their ability to direct state policies, can play a role in the progress of national air defence. The research subjects in this article include PT. Dirgantara Indonesia, KKIP officials, Ministry of defence officials, TNI Headquarters officials and TNI AU Headquarters officials. The qualitative interviews in this article are conducted on the basis that understanding can be obtained by or without associating oneself with the object of research to make observations.

4. Discussion

To support the independence of the defence industry, the ministry of defence carries out a process of fostering the defence industry at the national level so that the goal of self-sufficiency in the production and maintenance of defence and security equipment can be achieved. The Ministry of Defence always encourages development

cooperation, as well as trade and local content and offsets in supporting industries and encourages the occurrence of a defence industry ecosystem that has not yet been formed and there, are ideas or ideas from the two agencies, namely by mapping the functions of the defence industry that will be involved or placed in accordance with the function of the product, whether the main tools or supporting components and others to raw materials and accessories, besides that to make defence industry policies, both production to produce defence and security equipment and maintenance services to meet strategic interests in the defence sector and security, as outlined in the roadmap policy for the development of the defence industry.

To build the strength of the TNI, the policy that has been carried out by the TNI Headquarters in the procurement of the main weapons system equipment, especially the Air Force, as in the opinion of an informant from the TNI Srenum, namely Lt. Col. Subagyo, stated that the TNI's policy in procurement was carried out in accordance with the Regulation of the Minister of Defence Number 16 of 2019 concerning the Implementation of Procurement. defence and security equipment within the ministry of defence and the TNI as well as the Minister of Defence Number 14 of 2020 concerning Amendments to the Minister of Defence Number 16 of 2019 concerning the Implementation of the Procurement of defence and security equipment within the Ministry of defence and the TNI. As an agency that uses TNI forces, TNI Headquarters continues to empower the defence industry in procuring the main equipment for the TNI's weapon system, as stated by the opinion of an informant from the TNI Srenum, namely Lt. Col. Subagyo, based on the Decree of the TNI Commander Number Kep/981/XI/2021 dated November 8, 2021 Regarding Reference Instructions for presentations, demonstrations and trials of materials/services within the TNI, TNI Headquarters has empowered the defence industry by providing requirements for prospective providers in the initial procurement process to be registered as a defence industry. The independence of the defence industry is highly expected, so that the steps taken by the TNI Headquarters in empowering supporting/component industries, as in the opinion of an informant from the TNI Srenum, namely Marsma TNI Wayan Superman (Waasrenum TNI), which is based on the work program of the Srenum TNI FY 2021, one of the Srenum work programs. TNI is a visit to the defence industry, both BUMN and BUMS. Through these activities, it is hoped that the empowerment of supporting/component industries can be optimized by the defence industry which produces the main tools of the TNI's weapon system.

Meanwhile, TNI AU Headquarters as a force builder, requires steps to participate in accelerating the independence of the defence industry, especially PT. Dirgantara Indonesia, as stated by Asrena Kasau Marsda TNI Dr. Ir. Purwoko Aji Prabowo, M.M., M.D.S, namely the Indonesian Air Force (TNI AU) strongly supports the government's efforts to realize the independence of the defence industry, including PT. Indonesian Aerospace. As a force builder, the steps of the Indonesian Air Force in participating in accelerating the independence of the defence industry include:

a. In meeting the needs for defence and security equipment, the Indonesian Air Force prioritizes goods produced by the domestic defence industry, while still paying attention to the fulfillment of operational requirements and technical specifications required by the Indonesian Air Force.

b. Carry out R&D cooperation with the defence industry in order to fulfill the need for spare parts for the Indonesian Air Force's defence and security equipment, with the hope that the defence industry can produce its own spare parts needs.

c. Carry out maintenance and repair of the Indonesian Air Force's defence and security equipment at domestic defence industry facilities, in accordance with its capabilities.

d. Carry out assistance and evaluation in the production process and product development, so that the defence industry can produce the main weapon system tools that are in accordance with the needs of the Indonesian Air Force.

Inter-Agency Synergy in Developing Air Defence Industry

In the defence industry, as previously stated by the defence minister, Ryamizard Ryacudu, that synergy between institutions is very necessary in building a national defence industry. The defence industry will not progress if there is no support from the government and educational institutions. The defence industry and universities cooperate in research, development and engineering needed to improve their skills and abilities, and the government supports the activities carried out through the policies issued. In terms of synergy with universities, it has been going well and there have been many examples, including the development of unmanned aircraft/drones. In an effort to advance the defence industry so that it can be independent to meet domestic needs and participate in supplying the foreign defence industry.

Efforts in realizing the independence of PT. Indonesian Aerospace as a defence industry, must have a benchmark for the concept of the three pillars of defence industry players and the concept of the defence industry cluster. The concept of defence industry clusters can mean interdependence and mutual support between upstream industries, downstream industries, supporting industries and related industries to create competitiveness in improving the defence industry. Supporting industries, both BUMN/BUMS, which produce spare parts for the main weapon system equipment, spare parts for the main components in producing supply products. Associated with the analysis of researchers in the study that many supporting industries have been able to contribute and collaborate/cooperate in the realization of the independence of PT. Indonesian Aerospace. The Law of the Republic of Indonesia number 16 of 2012 concerning the Defence Industry which includes the obligation to use the main tool of domestically produced weapon systems is one of the legal umbrellas in terms of regulation. The Defence Industry Law also contains technology transfer, as well as funding in the form of offsets and trade offsets in producing defence and security equipment from abroad because the domestic defence industry has not been able to manufacture them. In addition, Government Regulation of the Republic of Indonesia number 74 of 2014 also regulates the Trade-

off Mechanism in the Procurement of Defence and Security Equipment from Abroad as a manifestation of the independence of the defence industry (Wibowo, 2016).

The contribution that has been made by the Indonesian Air Force in supporting the independence of the defence industry is that the Indonesian Air Force has several times collaborated with several local defence industries so that the Indonesian Air Force is committed to strengthening transparency and accountability in the process of procuring the main weapons system equipment, in addition to the TNI AU providing feedback to the defence industry regarding the products produced so that the defence industry can evaluate and improve the quality of its production. In addition, it is expected that PT. Dirgantara Indonesia carried out internal management improvements by placing TNI AU personnel in accordance with their abilities and fields of duty in order to provide technical assistance, involving PT. Dirgantara Indonesia as the main contractor in the procurement of the H 225M Heavy Transport Heli simulator and the Indonesian Air Force are committed to maximizing the use of domestic production.

Empowerment of the national defence industry will be directed at supporting and enhancing military defence capabilities (HR) that are more than minimal strength, and have a vibrating effect, as well as prioritizing the main tools of the TNI's modern, up-to-date, and independent weapon system. Some of these priorities include: (1) the Ministry of Defence's research and development (R&D) program related to defence equipment; (2) development of Defence Technology and Industry/main equipment products of domestic industrial weapons systems; (3) selective synergy of the three pillars of science and technology actors, namely universities and research and development institutions; industry; and user (TNI as user); (4) R&D cooperation in the field of science and technology and domestic and foreign defence industries (Prasetyo et al., 2015). In addition, the development of human resources, quality strategic superior programs in the field of engineering design and technology as well as the priority of technology transfer that is needed continue to be carried out. Human resources are potential workers who can be relied upon in the administration of the defence industry which consists of elements of expertise, expertise, competence and organization, as well as intellectual property and information. Each element of these human resources must be continuously improved in terms of efficiency and value in accordance with standards, requirements, and certification of expertise and professional codes of ethics (Hidayat, 2018).

5. Conclusion

The role of the defence industry is getting stronger in line with the military industrial complex (MIC) theory. The three main pillars of the defence industry which consist of the Government, the defence industry and the TNI as users must work hand in hand to support the independence of the defence industry. With the independence of the defence industry, it is hoped that it will trigger national economic

development and will contribute to Indonesia's air power, although no defence industry in the world can be one hundred percent independent in meeting the needs of the main weapon system equipment.

The Air Force Headquarters as a force builder strongly supports the government's efforts in realizing the independence of PT. Indonesian Aerospace as defence industry. The steps taken in participating in accelerating the independence of the defence industry are to prioritize goods produced by the domestic defence industry, while still paying attention to the fulfillment of operational requirements and technical specifications need for spare parts for defence equipment. and security in the hope that the defence industry can produce its own spare parts needs, carry out maintenance and repair of the main weapons system equipment at domestic defence industry facilities, in accordance with its capabilities, carry out assistance and evaluation in the production process and product development, so that the defence industry can produce main weapon system that suits your needs.

References

- Ansell, A., & Cox, W. (2019). The Military-Industrial Complex and U.S. Foreign Policy: Institutionalizing the New Right Agenda in the Post-Cold War Period. *In Unraveling the Right*. <https://doi.org/10.4324/9780429503313-10>
- Cox, R. (2014). The Military-Industrial Complex and US Military Spending After 9/11. *Class Race Corporate Power*. <https://doi.org/10.25148/crcp.2.2.6092117>
- Dunlap, C. (2011). The Military-Industrial Complex. *140*(3), 135–147.
- Dunne, & Paul, J. (1993). The changing military industrial complex in the UK. *Defence Economics*, *4*(2), 91–111. <https://doi.org/10.1080/10430719308404753>
- Evans, D. (2015). Journal of the International Relations and Affairs Group. *Matondang*, *5*(2).
- Faishal, I., Oktovianus, R., & Bura, H. (2020). Multiple Effect Analisis Of Simulator Technology fighter aircraft 4,5 Generation For Supporting National Defence System *Jurnal Teknologi Daya Gerak*, 51–72.
- Gay, & William. (2018). The military-industrial complex. *In The Routledge Handbook of Pacifism and Nonviolence*. <https://doi.org/10.4324/9781315638751>
- Hartley, K., & Braddon, D. (2014). Collaborative projects and the number of partner nations *Defence and Peace Economics*. <https://doi.org/10.1080/10242694.2014.886434>
- Hidayat, S. (2018). Peningkatan SDM Pertahanan Indonesia Untuk Menghadapi Revolution In Military Affairs. *Jurnal Pertahanan & Bela Negara*, *5*(1), 1-45. <https://doi.org/10.33172/jpbh.v5i1.348>
- Light, P. (2019). The Government-Industrial Complex. *Oxford University Press*. <https://doi.org/10.1093/oso/9780190851798.001.0001>

- Lutfiyannah, S., Jupriyanto, D., & Sulisty, A. (2017). Implementation On Offset Stages On Procurement Of Simulas And Degaussing In The Republik Of Indonesia's Ministry Of Defence *In Ekonomi Pertahanan*, 3(1).
- Muhammad, A., & Mahar. (2017). Peran American Military Industrial Complex dalam Konflik Bersenjata di Timur Tengah. 45–64.
- Prasetyo, Budi, Triyoga, Berantas, & Sugeng. (2015). Peningkatan Kualitas SDM Di Bidang Industri Pertahanan Menuju Pertahanan Negara Yang Tangguh Improving The Quality Of Human Resources InThe Field Of Defence Industry Towards Aformidable State Defence. 5.
- Rachmat, A. (2014). Tantangan dan Peluang Perkembangan Teknologi Pertahanan Global Bagi Pembangunan Kekuatan Pertahanan Indonesia. *Jurnal Transformasi Global*, 1(2), 199–212.
- Rundquist, S. (1978). Industrial Complex Theory. 6(1), 29–53.
- Smith, Roe, Merritt, Wein, & Peter. (1997). Military Industrial Complex. (1989), 1198–1200. https://doi.org/10.1057/9780230513525_7
- Wehrle, F. (2003). Welfare and Warfare: American Organized Labor Approaches the Military-Industrial Complex, 1949-1964. *Armed Forces & Society*. <https://doi.org/10.1177/0095327X0302900404>
- Wibowo, R. (2016). Permasalahan dalam Mewujudkan Kemandirian Industri Pertahanan. 1(2), 43–48.