Optimizing Local Resources in the Development of the Maritime Defense Industry Ecosystem in Indonesia

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Abstract

The development of the maritime defense industry ecosystem is a strategic step in increasing national defense independence. This research aims to optimize the use of local resources in the maritime defense industry to reduce dependence on imports and increase the competitiveness of the domestic industry. The methods used include descriptive-qualitative analysis with a literature study approach, interviews with stakeholders, and case studies on the application of local technologies and materials in the maritime defense industry. The results of the study show that local resources, natural fiber-based composite materials, domestically produced high-strength steel, as well as experts in the field of maritime engineering, have great potential in supporting the defense industrial ecosystem. However, the challenges of limited technology, infrastructure and regulations have not fully supported it, so it is still an obstacle. In conclusion, the optimization of local resources can be carried out through synergy between the government, industry, and research institutions in technology development, human resource capacity building, and policies that support innovation and investment. The strategic implications of the research on defense policy are that the maritime defense industry based on local resources is a solution in maintaining national maritime sovereignty and security.

Keywords: *Maritime Defense Industry, Innovation, Policy, Independence, Local Resources.*

A. INTRODUCTION

The use of local technology and innovation in the development of the maritime defense industry ecosystem is enhanced through greater investment in maritime technology research. Smith (2020), defines local resources as domestic assets that include skilled labor, raw materials, and locally developed technology used to support operations and production in the defense industry. Strengthening research and development (R&D) through collaboration between industry, academia and government is a tactical step in accelerating innovation. The development of warship and weapons system technology is projected on the use of domestic technology when producing warships, submarines and weapons systems. This is accompanied by digitalization and automation of the maritime defense industry for efficiency and effectiveness of production and increasing human resource capabilities. Johnson & Robinson (2020), defines ecosystem development as a collaborative process between various entities in the defense industry to create an environment that supports innovation and operational efficiency.

Optimizing human resources in building an independent maritime defense industry through educational and training facilities through certification programs

and the development of centers of excellence. Collaboration between universities and research institutions encourages industry in maritime technology innovation. Internship and scholarship programs in the maritime defense industry are one step in producing a competent and competitive workforce. Smith (2020), defines the maritime defense industry as the sector involved in the design, construction and maintenance of naval platforms and associated weapons systems to ensure maritime superiority.

The use of domestic raw materials to reduce dependence on imports is carried out by developing domestically available raw materials, in the form of steel, electronic components and composite materials for the needs of the maritime industry. Strengthening the domestic supply chain is carried out by strengthening domestic supporting industries and building an integrated ecosystem from upstream to downstream so that the production chain is more efficient and effective. Singh & Patel (2021), stated that the defense industry involves complex supply chain management to ensure the availability of materials and components needed in the production of military equipment.

National policy synergy is a major supporter in the development of a maritime defense industry based on local resources. Regulations and incentives for the defense industry are implemented to ensure sustainable growth. Policies for locally based industries are strengthened by incentives for domestic industries to increase competitiveness. The role of State-Owned Enterprises (SOE) and the private sector is very strategic in maritime defense innovation and production in order to create an independent ecosystem. Kim (2019), stated that ecosystem development involves the creation of networks that support sustainable practices and resource efficiency in the defense industry.

The integration of national defense strategy in strengthening the maritime defense industry ecosystem from the aspect of national defense doctrine is adjusted to national defense policy. The defense ecosystem is developed to support maritime operations effectively through regional and international cooperation. This includes cooperation with friendly countries in technology transfer and export of defense products. The existence of the maritime defense industry is used as national defense diplomacy to strengthen the country's strategic position at the global level. Smith (2019), defines the defense industry as a sector that includes companies and organizations involved in the development and production of military equipment and related technologies to support a country's defense capabilities.

Table1 World Importers and Major Suppliers of Defense Equipment

Rank	Importer	Share of global arms imports (%)		Per cent change from 2013–17 to 2018–22[a]	Main suppliers and their share of importer's total imports (%), 2018–22					
		2018–22	2013–17		1st		2nd		3rd	
1	India	11	12	–11	Russia	45	France	29	USA	11
2	Saudi Arabia	9.6	10	–8.7	USA	78	France	6.4	Spain	4.9
3	Qatar	6.4	1.5	311	USA	42	France	29	Italy	14
4	Australia	4.7	3.6	23	USA	73	Spain	19	Switzerland	3.0
5	China	4.6	4.2	4.1	Russia	83	France	8.1	Ukraine	5.6
6	Egypt	4.5	4.5	–5.3	Russia	34	Italy	19	France	19
7	South Korea	3.7	2.2	61	USA	71	Germany	19	France	7.9
8	Pakistan	3.7	3.0	14	China	77	Sweden	5.1	Russia	3.6
9	Japan	3.5	1.2	171	USA	97	UK	1.9	Sweden	0.3
10	United States	2.7	2.0	31	UK	24	Netherlands	13	France	11
11	UAE	2.7	4.1	–38	USA	66	Türkiye	7.4	Russia	5.4
12	Kuwait	2.4	0.9	146	USA	78	Italy	10	France	9.0
13	United Kingdom	2.3	1.7	31	USA	81	South Korea	13	Israel	2.8
14	Ukraine	2.0	<0.05	8 631	USA	34	Poland	17	Germany	11
15	Norway	2.0	0.5	285	USA	86	South Korea	8.2	Italy	3.5
16	Israel	1.9	1.8	2.9	USA	79	Germany	20	Italy	0.2
17	Netherlands	1.9	0.4	307	USA	95	Germany	3.9	Finland	0.6
18	Algeria	1.8	4.1	–58	Russia	73	Germany	10	France	5.2
19	Türkiye	1.3	2.4	–49	Italy	35	Spain	20	Russia	19
20	Singapore	1.3	1.4	–14	France	52	USA	26	UK	7.6
21	Thailand	1.0	0.9	1.1	South Korea	33	China	14	USA	10
22	Brazil	0.9	0.6	48	France	39	UK	14	Sweden	13
23	Philippines	0.9	0.5	64	South Korea	42	Israel	22	USA	15
24	Indonesia	0.9	2.7	–69	South Korea	32	USA	26	France	12
25	Bangladesh	0.9	1.6	–48	China	74	UK	5.8	Türkiye	4.5
26	Poland	0.9	0.5	64	USA	56	South Korea	17	Germany	6.5
27	Viet Nam	0.8	2.8	–72	Russia	55	Israel	16	Belarus	10
28	Italy	0.8	1.3	–41	USA	92	Israel	4.4	France	2.0
29	Morocco	0.8	1.1	–30	USA	76	France	15	China	6.8
30	Myanmar	0.8	0.8	–3.0	Russia	42	China	29	India	14
31	NATO[b]	0.7	<0.05	2 700	France	66	USA	18	UK	15
32	Afghanistan	0.7	0.8	–11	USA	96	Brazil	2.6	Belarus	1.4
33	Canada	0.7	1.1	–36	USA	32	Australia	27	Spain	15
34	Greece	0.7	0.9	–26	France	48	USA	29	UK	12
35	Kazakhstan	0.6	0.8	–22	Russia	94	China	2.6	South Africa	1.8
36	Belarus	0.6	0.3	55	Russia	100	China	0.1	. .	. .
37	Serbia	0.5	0.1	743	China	43	Russia	31	Belarus	20
38	Chile	0.5	0.3	56	UK	38	Australia	36	USA	10
39	Jordan	0.5	0.8	–39	USA	40	UAE	20	Russia	17
40	Bahrain	0.5	0.1	380	USA	83	UK	7.0	Italy	4.1

Source: Stockholm International Peace Research Institute, (2022)

However, in real conditions, the use of local technology and innovation in the development of the maritime defense industry ecosystem is not fully enhanced through investment in maritime technology research. Brown & Green (2021), local resources are components and services provided by domestic suppliers that contribute to the efficiency and independence of the defense industry supply chain. Strengthening research and development (R&D) is not carried out through comprehensive collaboration between industry stakeholders, academics and the government which has an impact on slow innovation. The development of warship technology and weapons systems still relies on imported production without utilizing domestic technology in production. On the other hand, the era of digitalization and automation in the maritime defense industry has not been implemented optimally, so that the efficiency and effectiveness of production and the improvement of human resource capabilities are in a status quo condition.

The utilization of human resources in the independent maritime defense industry is not carried out through specific educational and training institutions, and there is no certification program accredited as a center of excellence. Universities and research institutions are still running independently and are not encouraged to support maritime technology innovation. Internship and scholarship programs in the maritime defense industry are not implemented in a programmed manner that does not create a competent and qualified workforce. Smith (2021) states that ecosystem development involves the formation of integrated networks between producers, suppliers and research institutions to increase industrial competitiveness.

The utilization of domestic raw materials in order to reduce dependence on imports has not been fully implemented due to several considerations, so that the raw materials available domestically cannot develop optimally. The existence of the domestic supply chain is not carried out with good management, so that the production ecosystem is not integrated from upstream to downstream which causes the production chain to be inefficient and ineffective. Brown & Green (2019) stated that the maritime defense industry includes the development and integration of advanced technologies in warships and maritime detection systems to enhance naval capabilities.

National policies have not fully supported the development of a maritime defense industry based on local resources. Regulations and incentives for the defense industry are not implemented seriously, so that industrial growth is not sustainable. Local industrial policies are not fully supported by maximum incentives which causes competitiveness to remain low. The condition of SOE and BUMS is still individual in the construction of warships so that the defense industry ecosystem remains stagnant and less independent. Nguyen (2018) stated that the defense industry is a key component of the national security strategy, providing the equipment and technology necessary to defend the country's sovereignty.

The integration of national defense doctrine in order to strengthen the maritime defense industry ecosystem is not adjusted to the general national defense policy. The existence of a defense ecosystem in maritime operations has not been implemented effectively by strengthening regional and international cooperation. This reduces the spirit of cooperation with friendly countries in technology transfer and export of defense products. The existence of the maritime defense industry is not utilized as national defense diplomacy, so that the country's strategic position at the global level does not increase. Peterson (2020). describes the defense industry as a sector that drives technological progress through investment in research and development to create more effective defense systems.

This research is important because it aims to optimize local resources in the development of the maritime defense industry ecosystem, which plays a role in increasing national defense independence, reducing dependence on imports, and strengthening the competitiveness of domestic industries. Wang & Li (2021), describes the maritime defense industry as a manufacturing sector that focuses on the production of primary naval weapon systems and their supporting equipment. A good understanding of the optimization of local resources in the maritime defense industry ecosystem will enable the formulation of effective strategies in the utilization of raw materials, experts, and domestic technological innovation. In addition, this study will also identify challenges and opportunities in the application of local resources in order to provide maximum contribution to economic growth, job creation, and strengthening collaboration between government, industry, and academics in supporting a sustainable maritime defense industry. Martinez (2020), defines ecosystem development as the creation of an environment that supports collaboration and innovation to achieve competitive advantage.

Therefore, this research aims to explore how optimizing local resources in the development of the maritime defense industry ecosystem can strengthen national defense independence, reduce dependence on imported technology and raw materials, and increase the competitiveness of domestic industries. Garcia & Lopez (2022), defines local resources as all forms of human and material capital originating from within the country that are used to support national defense capabilities.

By examining various local potentials, such as raw materials, experts, and technological innovation, this research will explore strategies that can be applied to create a more sustainable maritime defense industry ecosystem. In addition, this research will also examine the impact of optimizing local resources on economic growth, job creation, and strengthening synergies between government, industry, and academics in supporting the development of the national maritime defense industry. O'Connor (2017), the defense industry involves private sector participation in the production of military equipment and the development of defense technology, working with the government to meet national security needs.

B. METHOD

This study uses a qualitative approach by analyzing literature, reports and relevant documents, in-depth interviews with various stakeholders involved in the defense industry in Indonesia, including government representatives, defense companies, research institutions and related civil society organizations. The collected data is analyzed thematically to identify changes in global and regional geopolitics and their implications on the defense industry ecosystem.

C. RESULTS AND DISCUSSION

1. Utilization of Local Technology and Innovation

In an effort to increase the independence and competitiveness of the maritime defense industry, the use of local technology and innovation is a determining factor. Kim, S. (2019), defines local resources as assets and capabilities available domestically that are used to ensure the sustainability of the defense industry. Optimizing local resources will reduce dependence on imports and increase production efficiency in mastering technology. The use of local technology and innovation is realized through strengthening research and development (R&D) and integrated technology development. Wang, H. (2019), states that local resources include domestic research and development capacity, production facilities, and technical know-how available domestically for defense innovation.

a. Strengthening Research and Development (R&D)

Investment in maritime technology research and development is a fundamental step in strengthening the national defense industry sector. Rahman, A. (2022), defines local resources as domestically developed technologies and materials for use in advanced defense systems. This is inseparable from the budget that supports it. Increasing the budget allocation for R&D will ensure the maritime defense industry in developing more advanced technologies according to operational defense needs.

O'Connor, P. & Evans, D. (2019), defines ecosystem development as the formation of collaborative networks that support the development and commercialization of advanced technologies.

Investments consist of lighter and stronger ship materials, artificial intelligence-based navigation systems, and integration of modern weapons technology systems. Through increased investment in R&D will produce competitive and innovative products. Brown, LM (2020), The defense industry is a complex network of prime contractors, suppliers, and subcontractors working together to produce weapons systems and support services for the armed forces.

Collaboration between industry, academia and government ensures the creation of a sustainable innovation ecosystem. Universities and research institutions play a role in providing basic research and development of new technologies for the defense industry. Rossi, F., & Bianchi, M. (2017). defines the defense industry as a sector that contributes to economic development through infrastructure development, workforce skills development, and technology transfer. While the government plays a role in providing supportive regulations and providing incentives in the development of defense technology. Close cooperation between the three elements, innovation will develop faster and independently to meet the needs of national defense equipment. Garcia, M. & Lopez, R. (2022). defines ecosystem development as the creation of an environment that supports technological growth through collaboration between government, industry, and academia.

b. Development of Warship Technology and Weapons Systems

The use of domestic technology in the production of maritime defense equipment is a priority agenda in optimizing the maritime defense sector. Indonesia will reduce dependence on imported components that are expensive and have limited access in an effort to achieve national defense independence and create jobs for local experts in the defense industry. Kumar, S. (2020). stated that the maritime defense industry involves complex supply chain management to ensure the availability of critical components in the manufacture and maintenance of military ships. On the other hand, digitalization and automation of the maritime defense industry in implementing artificial intelligence (AI) technology, Internet of Things (IoT) digital-based manufacturing simplifies real-time monitoring and maintenance. Automation in the production process has a significant impact on reducing operational costs and the final quality of products from the national defense industry. Lee, JH (2022). stated that the maritime defense industry includes the adoption of digital technology in the design and production of warships and navigation systems.

The implementation of digital technology in the integration of various maritime defense equipment components is optimized through the use of big data and machine learning, so that warships can operate in various defense scenarios. Technological improvements make Indonesia more prepared to face geopolitical challenges and its strategic position in the global defense industry. Garcia, R., & Lee, S. (2018). describes the defense industry as a sector that focuses on technological innovation to create effective and efficient defense solutions, including the

development of military hardware and software. The use of local technology and innovation in the maritime defense industry is a strategic step that continues to be developed and supported. Hernandez, L. (2021), states that local resources include domestic assets that are integrated into the defense system to increase national independence.

Through R&D optimization, accelerate technology development and strengthen the independence of the maritime defense industry in the industrial ecosystem at the global level. The successful implementation of this strategy has a positive impact on the defense sector and national economic growth through job creation and increasing domestic industrial capacity. Garcia, M., & Lopez, R. (2022). defines the maritime defense industry as an industry that integrates sustainable practices in the production and maintenance of maritime defense assets.

2. Human Resource Optimization

Optimization of human resources in the maritime defense industry is a leading factor in the sustainability and competitiveness of the industry. Competent and globally competitive workforce capacity is needed to face the challenges of technology and geopolitical dynamics that continue to develop. A workforce education and training strategy is needed through increased collaboration with universities and research institutions. Wang, L. & Chen, Y. (2019). describes ecosystem development as a strategic effort to integrate internal and external resources to strengthen defense capabilities.

a. Workforce Education and Training

Training that is oriented towards technical and managerial skills so that the workforce has the competencies according to industry needs. The training program includes warship design, weapons system technology, maritime maintenance and operations. Lee, J. (2022), states that local resources include domestically available materials, labor, and technology used in the design and construction of warships. Thus, the workforce can be better prepared to face challenges in the maritime defense industry. Standardization of competency through nationally and internationally recognized certification is a guarantee of the quality of the workforce in the industry. Certification is in the form of technical expertise that includes aspects of security, work efficiency and understanding of maritime defense industry regulations. Nguyen, TA (2021). describes the maritime defense industry as a sector that emphasizes the development of skilled human resources for the operation and maintenance of maritime defense systems.

Development of a center of excellence for the maritime defense industry as a strategic step in promoting the quality of human resources. The center of excellence functions as a means of research, training and innovation that provides facilities for workers, academics and industry players to develop technology and skills in the maritime defense sector. Davies, J. & Clark, H. (2020), local resources are domestic materials and labor used to reduce production costs in the defense industry. The existence of centers of excellence, knowledge and technology transfer is carried out

more effectively, accelerating innovation solely to create a reliable defense industry ecosystem. Nguyen, T. (2021). describes ecosystem development as facilitating interactions between various stakeholders to drive innovation and efficiency in the defense sector.

b. Collaboration with Universities and Research Institutions

Cooperation between academics and industry in developing maritime technology is a strategy to create a competent and innovative workforce. Universities and research institutions play a role in providing a scientific basis in developing technology adopted by the maritime defense industry. Close collaboration between these entities will accelerate research and innovation according to market needs. This collaboration is realized in the form of joint research, development of industry-based curriculum and establishment of research laboratories oriented to national defense needs. Zhang, Y. & Li, X. (2020), refers to local resources as capabilities and assets available domestically that are used to develop national defense capacity. Thus, college graduates will be better prepared to enter the maritime defense industry with their skills in accordance with the latest technological developments.

Internship and scholarship programs in the maritime defense industry as another alternative to strengthen human resources. Internship programs provide opportunities for students to gain direct experience in the industrial field, so that they can develop practical skills about industrial processes in depth. Meanwhile, scholarships offered by the industry to outstanding students will encourage more young talents to be interested and contribute to the maritime defense industry sector. Martinez, AR (2020). defines the maritime defense industry as a sector that contributes significantly to the economy through job creation and technological innovation in the maritime sector.

The synergy between universities and industry is strengthened through joint training programs, maritime technology seminars and discussion forums involving various stakeholders. This step ensures academic research on real applications in industry and addresses specific challenges in the maritime defense sector. Optimizing human resources through education, training and close collaboration, the Indonesian maritime defense industry can be more independent and competitive at the global level. This effort provides long-term benefits for the defense sector and national economic growth as well as strengthening Indonesia's position as a strong sovereign maritime nation. Hernandez, L. (2021). states that the defense industry involves the development of human capital through training and education to ensure a skilled and competent workforce.

3. Utilization of Domestic Raw Materials

Utilization of domestic raw materials for independence and reducing dependence on imports is import substitution with local products and strengthening the domestic supply chain. Singh, R. & Patel, M. (2021), refers to local resources as components and services provided by domestic entities that support defense supply chain operations.

a. Import Substitution with Local Products

The challenge in the maritime defense industry is the dependence on imported raw materials. It is necessary to develop alternative raw materials domestically as a substitute for imported products such as steel, electronic components, and composite materials used in the production of warships and weapons systems. Kumar (2020), refers to local resources as domestically produced materials and components used in the manufacture of primary weapons systems. The development of high-quality domestic steel to support the production of warships and submarines needs to be strengthened with cutting-edge technology to produce corrosion-resistant, lightweight and high-strength steel in accordance with defense industry standards. Davies & Clark (2020). defines the defense industry as a sector that requires effective cost management strategies to manage large and complex budgets in the production of military equipment.

Development of composite materials as an alternative to conventional materials to improve the efficiency and durability of maritime products. On the other hand, the electronic component industry to support navigation systems, communications and warship weapons needs investment in research and innovation of maritime electronic technology towards the independence of the defense industry. Zhang, Y., & Chen, L. (2020). defines the maritime defense industry as a sector that relies on strategic partnerships for the development and production of advanced maritime defense systems.

b. Strengthening Domestic Supply Chains

To strengthen import substitution, domestic supply chain strengthening is maximized to improve the efficiency and sustainability of the maritime defense industry. By building a solid supply chain from upstream to downstream, the maritime defense industry can ensure the availability of stable raw material stocks, reduce production costs and of course accelerate the manufacturing process. O'Connor, P. & Evans, D. (2019), local resources are capabilities and assets available domestically that are used to drive innovation in the defense sector. Domestic supporting industries in the form of machinery, component manufacturing and strategic raw material providers are strengthened to support the main industry. Martinez, A. (2020), defines local resources as sustainable domestic assets, including environmentally friendly materials and skilled labor, used in the defense industry. An efficient supply chain can reduce the risk of production delays due to limited imported raw materials. In addition, empowering small and medium industries (SMEs) in the supply chain will increase the involvement of the domestic sector as a creator of new jobs. Nguyen, T. (2021), defines local resources as domestic assets, including labor, technology, and materials, that are utilized to enhance the competitiveness of the defense industry.

An integrated industrial ecosystem from upstream to downstream ensures synergy between various industry players such as government, academics and the private sector. Incentive policies for local industries, development of manufacturing

infrastructure and increased production capacity will strengthen the domestic supply chain. Singh, R. & Patel, M. (2021). describes ecosystem development as the formation of an integrated supply network to improve the efficiency and resilience of the defense supply chain. Optimizing the use of domestic raw materials in the maritime defense industry brings long-term benefits in increasing competitiveness, production efficiency, and strengthening national defense independence. This step should continue to be supported by policies that favor domestic industry and sustainable investment in research and development of strategic raw materials. Kim, SY (2019). states that the maritime defense industry involves environmental considerations in the production and operational processes of military vessels.

4. Synergy with National Policy

Synergy of maritime defense industry with national policy is a strategic issue in building a strong, sustainable and independent industrial ecosystem. Appropriate regulation and incentives will guarantee significant growth of local-based industry and increase State-Owned Enterprises (SOE) and private industry in accelerating technology development and production of maritime defense equipment domestically. Wang, H., & Zhang, Y. (2019). defense industry as a sector consisting of various entities that collaborate internationally to develop and produce military technology and equipment.

a. Regulation and Incentives for the Maritime Defense Industry

Implementation of policies that support the local-based defense industry as a strategic step in creating a conducive industrial ecosystem. The government plays a strategic role in formulating regulations for the sustainability of the maritime defense industry that protect, encourage and strengthen domestic production. Kim, S. (2019). describes the defense industry as a sector that is beginning to integrate sustainable practices into its operations, including energy efficiency and waste management. Regulations require the use of local products in national defense projects to create easy access in responding to the global market. Providing incentives for the defense industry to increase competitiveness and accelerate technological innovation in the form of tax breaks, research and development (R&D) subsidies and low-interest loan support for defense industry companies. Davies, J. & Clark, H. (2020). defines ecosystem development as the formation of collaborative relationships that reduce production costs through synergies and operational efficiencies. With the right incentives, domestic companies will focus on increasing production capacity or developing more advanced technologies. Hernandez, LM (2021). describes the maritime defense industry as a sector regulated by a policy framework to ensure compliance and operational effectiveness.

b. Increasing the Role of State-Owned Enterprises (SOEs) and the Private Sector

SOE plays a dominant role in Indonesia's maritime defense industry in the production and development of warships and weapons systems. PT PAL Indonesia must continue to be optimized in order to accelerate the mastery of technology for various other main maritime weapons systems (alutsista). Kumar, P. (2021). defense

industry as an economic sector that plays a role in the production and distribution of military equipment, ranging from light weapons to sophisticated weapons systems, as well as related services. Strengthening the role of SOE, the national maritime defense industry will be more independent in meeting defense equipment needs without relying on imports. The involvement of private industry that has high flexibility in innovation, production efficiency and adaptation to global technological developments. The synergy between SOE and private industry is a strategic step in accelerating the independence of the maritime defense industry. Rahman, A. (2022). describes the defense industry as a sector that continues to adapt to new technologies, such as artificial intelligence and autonomous systems, to enhance defense capabilities.

The government should always encourage the role of the private sector through strategic partnership schemes, technology transfer and opening market access for local companies. Martinez, A. (2020). defines the defense industry as a sector that has a significant impact on the economy through job creation, technological innovation, and contribution to gross domestic product. The synergy of national policies in the maritime defense industry is monumental in building a strong and independent industrial ecosystem. Supportive regulations, incentives and optimization of the role of state-owned enterprises and the private sector will develop rapidly and contribute significantly to national defense independence and domestic economic growth. Kumar, S. (2020). states that ecosystem development involves the formation of strategic alliances and adaptive supply networks to increase market responsiveness.

5. Integration with National Defense Strategy

The integration of the maritime defense industry with the national defense strategy is designed to realize strong and independent maritime resilience. Strengthening maritime capabilities in the national defense doctrine and regional and international cooperation ensure the effectiveness of the sustainability of the maritime defense industry ecosystem. O'Connor, P., & Evans, D. (2019). defines the maritime defense industry as a sector that relies on international collaboration for the development and production of cutting-edge naval technology.

a. Strengthening Maritime Capabilities in National Defense Doctrine

The maritime defense industry development strategy is aligned with the state defense policy in order to be able to support operational needs effectively. Preparation of defense doctrine by taking into account maritime threats, domestic industrial capacity and national strategic needs. Rahman, A. (2022). stated that ecosystem development involves the creation of an environment that supports the development and application of advanced technology in the defense sector. With this adjustment, Indonesia will be able to ensure that every defense equipment produced is relevant to the geographical conditions and security challenges faced. The development of a defense ecosystem that effectively supports maritime operations has an impact on increasing maritime defense capabilities. Zhang, Y. & Li, X. (2020). defines ecosystem development as the creation of a network that supports the development of defense

capacity and capabilities through collaboration and innovation. The ecosystem includes the integration of industry, technology and logistics systems that support higher combat readiness. With the support of integrated technology and systems, the maritime defense industry will improve the ability to monitor, detect and respond to potential threats in national waters. Lee, J. (2022). states that ecosystem development in the maritime context involves integration between industry, government and communities to ensure the sustainability and growth of the maritime sector.

b. Regional and International Cooperation

In responding to the dynamics of global maritime security, regional and international cooperation plays a strategic role in increasing the capabilities of the national maritime defense industry. One form of cooperation is technology transfer from friendly countries that have more advanced defense industries. With technology transfer, domestic industries can accelerate the mastery of military equipment technology needed to defend Indonesia's maritime sovereignty. Singh, R., & Patel, M. (2021). describes the maritime defense industry as a sector that requires effective risk management in the development and implementation of maritime defense projects. From the export side, maritime defense products will also be increased. A competitive maritime defense industry at the global level is a source of state revenue and strengthens diplomatic relations with other countries. By utilizing the maritime defense industry as part of national defense diplomacy, Indonesia can strengthen its position in geopolitical affairs and build strategic alliances that support regional security stability. Rahman, A. (2022). stated that the maritime defense industry includes the development of new technologies such as autonomous systems and artificial intelligence for military applications at sea. Integration of the maritime defense industry with the national defense strategy is an essential step in building a strong and sustainable defense ecosystem. By adjusting industrial policies with the national defense doctrine plus strengthening regional and international cooperation, Indonesia's maritime defense industry will develop significantly and contribute to national independence and resilience in the maritime sector. Hernandez, L. (2021). describes ecosystem development as an effort to integrate various defense components into a cohesive and efficient system.

D. CONCLUSION

Optimizing local resources in the maritime defense industry ecosystem plays a strategic role in strengthening national defense resilience and independence by utilizing domestic raw materials, experts and technology to reduce dependence on high-cost and difficult-to-access imports. Independence will increase operational effectiveness and encourage innovation in defense technology. Reducing imports of technology and raw materials creates a more sustainable industrial ecosystem by increasing domestic production capacity, strengthening control over the supply chain and reducing the risk of external disruption.

Optimization of local resources contributes to the competitiveness of domestic industries through increased investment in research and development (R&D) and

collaboration between industry, academia and government in producing competitive innovations in the global market. A strong maritime defense industry supports technology transfer and improving the quality of the workforce so that it is able to compete in the production of maritime defense equipment. Another impact is economic growth and job creation through supporting sectors such as manufacturing, machinery and logistics opening up new job opportunities in improving people's welfare. Therefore, the strategy of optimizing local resources needs to be maximally supported by policies that encourage investment, innovation and strong partnerships between government, industry and academia. So that the national maritime defense industry will grow sustainably and become a main pillar in maintaining Indonesia's maritime sovereignty. Optimization of local resources in the maritime defense industry can be realized maximally to support national defense independence and reduce dependence on imported technology and raw materials. Through an integrated strategy, the maritime defense industry ecosystem will grow sustainably and contribute to national resilience and sovereignty.

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