JHSS (Journal of Humanities and Social Studies)
https://journal.unpak.ac.id/index.php/jhss
Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

NAVIGATING RISK AND INNOVATION: FRAMEWORK FOR IMPROVING INDONESIA'S DEFENSE INDUSTRY COMPETITIVENESS THROUGH STRATEGIC COLLABORATION

Alradix Djansena [a*)], Sovian Aritonang [a)]

[a)] *Republic of Indonesia Defense University, Citeureup, Indonesia*

[*)]*Corresponding Author: alradix_djansena@doktoral.idu.ac.id*

Article history: *received 21 April 2025; revised 02 May 2025; accepted 24 May 2025* *DOI: https://doi.org/10.33751/jhss.v9i.11961*

Abstract. Indonesia's defense industry faces significant challenges, including heavy reliance on foreign technologies and inconsistent implementation of policies like Law No. 16 of 2012, which hampers progress toward self-reliance. This study aims to develop a comprehensive framework integrating innovation and risk management to enhance the competitiveness and independence of Indonesia's defense sector. Using a qualitative research design, the study draws on extensive literature reviews and secondary data analysis, comparing Indonesia's defense industry with that of other countries like South Korea and Turkey. The findings reveal that international and domestic strategic collaborations are essential for technology transfer, improving local capabilities, and aligning defense production with national security goals. Investing in high-performance work systems (HPWS) and human capital fosters technological innovation and reduces foreign dependency. The study also identifies the need for a more consistent regulatory framework and long-term investment in research and development (R&D) to address supply chain risks and financial constraints. These insights provide practical recommendations for policymakers, emphasizing that sustainable defense industry growth requires a multifaceted approach involving collaboration between government, industry, and research institutions. Ultimately, this research contributes to the strategic roadmap for achieving Indonesia's defense self-sufficiency and competitiveness in the global market.

Keywords: defense industry; self-reliance; strategic collaboration; risk management; innovation

I. INTRODUCTION

The defense industry is vital in supporting national security and economic growth, particularly for countries like Indonesia, which seeks to reduce its dependence on foreign military supplies. Despite significant efforts, Indonesia's defense industry continues to face considerable challenges, including reliance on imported technologies, low levels of domestic innovation, and risks related to supply chain management and project execution (Irfan et al., 2023). Law No. 16 of 2012, which governs the development of Indonesia's defense industry, has laid the groundwork for achieving industrial independence. However, the practical implementation of this policy has been inconsistent, hampering progress toward creating a globally competitive and self-reliant defense sector (Sutadi, 2022). The need for a comprehensive strategic approach that integrates risk management and innovation is evident as Indonesia strives to improve the competitiveness of its defense industry, both regionally and globally (Antai & Hellberg, 2024). This highlights the critical need for a strategic framework emphasizing collaboration, innovation, and risk management. This leads to the question, How can Indonesia's defense industry overcome reliance on imported technologies and establish a more self-reliant and competitive defense sector through innovation and strategic collaboration? Collaborative efforts involving government, industry, and research institutions are essential to overcome these challenges and position Indonesia as a leader in defense technology development.

Despite significant progress in building its defense industry, Indonesia faces numerous challenges that hinder its ability to achieve complete self-reliance. One of the primary issues lies in the country's reliance on imported defense technologies, which limits its capacity to produce high-quality, competitive defense products independently (Irfan et al., 2023). Although the government has introduced several policies, such as Law No. 16 of 2012 and the 2020–2024 Defense Industrial Development Plan, the implementation of these strategies has been inconsistent, leading to inefficiencies in production and a lack of significant technological advancement (Achmadi et al., 2019). Additionally, the absence of comprehensive innovation and risk management frameworks has further impeded progress, making it difficult for Indonesia's defense industry to compete globally (Ferdiyasto, 2023). These challenges highlight the critical need for Indonesia to integrate strategic innovation and risk management practices into its defense sector to achieve greater self-sufficiency and global competitiveness (Irfan et al., 2023).

The primary objective of this research is to develop a comprehensive framework that integrates innovation and risk management strategies to enhance the competitiveness of

Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

Indonesia's defense industry. By focusing on the dynamic challenges faced by the industry, such as reliance on imported technologies and limited local innovation capabilities, this study aims to make actionable strategies for technological independence. The research examines how strategic collaboration between government, industry, and research institutions could drive advancements in defense technology while mitigating supply chain risks (Mahoney, 2021). Moreover, this study will provide a framework that promotes the development of indigenous defense capabilities and helps position Indonesia as a competitive player in the global defense market (Al-Hakim Gobel et al., 2023). The findings expect to contribute to the growing body of literature on defense industry self-reliance and innovation management, particularly in emerging economies (Haryanto et al., 2022).

Despite numerous efforts to enhance self-reliance in the Indonesian defense industry, significant gaps remain in achieving true independence and competitiveness on a global scale. While policies such as Law No. 16 of 2012 and initiatives under the 2020–2024 Defense Industrial Development Plan have been established to promote domestic production, these efforts have been hampered by inconsistent implementation and a reliance on foreign technologies (Ferdiyasto, 2023) (Al-Hakim Gobel et al., 2023). Moreover, the existing literature focuses heavily on defense industry development's technological and manufacturing aspects. Nonetheless, there is a limited exploration of how strategic collaboration and innovation could better mitigate risks and strengthen domestic capabilities (Irfan et al., 2023). The underutilization of supportive industries, such as PT Dirgantara Indonesia, has further exacerbated these gaps, preventing a more cohesive and integrated defense sector (Haryanto et al., 2022). Addressing these deficiencies requires not only focusing on technological advancements but also a more robust framework that incorporates risk management strategies, stakeholder collaboration, and supply chain integration (Xu & Zhang, 2020).

This research offers a novel approach to strengthening Indonesia's defense industry by integrating innovation and risk management through strategic collaboration. While existing literature has explored technological advancements and production capabilities, there is a significant gap in understanding how these can be integrated with risk management strategies to create a more competitive and self-reliant defense industry. The novelty of this study lies in its comprehensive framework that not only addresses technological innovation but also incorporates a multi-stakeholder collaboration model involving government, private industry, and research institutions. This approach goes beyond the traditional focus on production and technology, addressing critical areas such as supply chain resilience and strategic risk management (Al-Hakim Gobel et al., 2023) (Ferdiyasto, 2023). Furthermore, the study is timely, given Indonesia's strategic need to reduce dependency on foreign defense equipment, as highlighted in the context of global defense industrial challenges (Haryanto et al., 2022). This research contributes to the theoretical understanding of defense industry competitiveness by focusing on these aspects. It provides practical insights for policymakers to enhance Indonesia's defense capabilities to face the volatile global landscape. In conclusion, this research offers a strategic roadmap for advancing Indonesia's defense industry through innovation, collaboration, and risk management integration (Gonçalves da Silva & Del Corso, 2023).

II. RESEARCH METHODS

This study employs a qualitative research design, primarily based on an extensive review of existing literature and secondary data sources. The literature review focuses on relevant academic papers, policy documents, and reports that discuss innovation, risk management, and strategic collaboration within the defense industry, particularly in Indonesia. The review aims to identify critical theoretical frameworks and practical case studies that inform the development of a comprehensive model for enhancing competitiveness in the Indonesian defense sector. Relevant global and regional studies are also examined to provide comparative insights and contextual relevance.

The data for this study are collected through secondary sources, such as academic journals. Only peer-reviewed articles and reports from reputable institutions are used to ensure the reliability and validity of the research. Additionally, data from relevant case studies of defense industries in other countries, such as South Korea and China, are analyzed to extract lessons applicable to Indonesia's context (Kim & Kuehn, 2022). Publicly available datasets and policy documents are also sourced to supplement the findings from the literature review.
The collected data are analyzed using thematic analysis to identify recurring themes related to innovation, risk management, and strategic collaboration within defense industries. Key patterns and relationships between these variables are examined to understand their potential impact on enhancing the competitiveness of the Indonesian defense industry. The comparative analysis highlights differences and similarities between Indonesia's approach and other countries with established defense industries. Furthermore, qualitative data coding is conducted to systematically categorize and interpret the findings per the research objectives. The analysis also considers the policy implications and strategic recommendations derived from the identified themes.

III. RESULTS AND DISCUSSION

Technological Innovation and High-Performance Work Systems

The analysis confirms that high-performance work systems (HPWS) and technological innovation play a crucial role in driving the performance of Indonesia's defense industry. Organizations can improve their operational efficiency and innovation capabilities by investing in employee motivation, training, and engagement. These improvements, in turn, foster business model innovation, which has been identified as a critical factor in enhancing organizational competitiveness (Irfan et al., 2023). Similar findings have been reported in studies of other emerging defense industries, such as Turkey and South Korea, where strategic investments in human capital

Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

and innovation have significantly enhanced defense manufacturing capabilities (Seren, 2021) (Choi & Park, 2023). Furthermore, studies on Israel and Singapore highlight how small states with strategic investments in technology and human capital can sustain a high level of defense innovation, positioning themselves as key players in global defense industries (Bitzinger, 2021). These results suggest that adopting HPWS alongside technological advancements can create a sustainable competitive advantage in defense industries, especially in developing countries like Indonesia.

Strategic International Collaboration

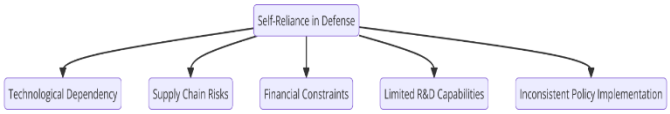
Strategic international partnerships have proven critical in overcoming domestic technological and production limitations. Indonesia's collaboration with the United Kingdom on the AH140 frigate project exemplifies how subcontracting and technology transfer arrangements can build local capacity, boost technological know-how, and enhance the nation's defense industry self-reliance (Al-Hakim Gobel et al., 2023). Similar collaborations, such as South Korea's defense industry partnerships, have been instrumental in building competitive defense sectors by balancing domestic production and strategic foreign partnerships (Choi, 2023). Additionally, there is the role of supporting industries like PT. Dirgantara Indonesia demonstrates how local collaboration can advance technological mastery and reduce dependency on foreign expertise, as seen in various successful European defense strategies (Haryanto et al., 2022) (Ferdiyasto, 2023). Moreover, partnerships with local research institutions promote innovation and the development of defense technologies through collaborative research (Irfan et al., 2023) (Al-Hakim Gobel et al., 2023). These examples indicate that developing solid international ties, especially for technology transfer, remains vital for Indonesia's defense sector growth, as shown in Table 1 below.

Table 1: Strategic Collaborations and Their Impact

Country/Organization	Collaboration Project	Description	Impact	References
United Kingdom	AH140 Frigate Project	Subcontracting and technology transfer project for building frigates.	Improved local capacity and technological expertise in naval defense production.	Gobel et al., 2023
South Korea	Defense Industry Partnership	Collaborative efforts focusing on technology sharing and production.	Strengthened Indonesia's defense manufacturing through technology transfer and partnerships.	Choi & Park, 2023; Seren, 2021
PT Dirgantara Indonesia (Local)	Aircraft Development Collaboration	Collaboration with local companies to build domestic aircraft.	Increased domestic production capabilities and reduced reliance on foreign aircraft technologies.	Haryanto et al., 2022
Research Institutions (Indonesia)	Research and Development (R&D) in Defense Technologies	Strategic partnerships between industry, research institutions, and government for innovation.	Boosted local innovation and advancements in defense technology through shared research efforts.	Irfan et al., 2023; Gobel et al., 2023

Challenges to Self-Reliance

Despite progress in innovation and international collaboration, Indonesia's defense industry still faces significant challenges in achieving complete self-reliance. The reliance on foreign technology and expertise creates barriers to independent production and development capabilities (Czulda, 2020). Through localization policies, Turkey's efforts to reduce foreign dependency demonstrate that self-reliance requires a long-term commitment to building indigenous technological capabilities and supply chains (Seren, 2021). Additionally, financial and technological constraints must be addressed through increased government funding and industrial innovation initiatives (Rohmad & Susilo, 2022). In line with these observations, countries such as Korea have also emphasized the importance of building robust Maintenance, Repair, and Overhaul (MRO) sectors to enhance domestic technological capability, reduce operational costs, and ensure sustainability in the aviation and defense industries (Nam et al., 2023). Then, inconsistent implementation of policies, such as Law No. 16 of 2012, has hindered progress toward achieving defense self-reliance (Sutadi, 2022) (Al-Hakim Gobel et al., 2023). Overcoming these challenges will be essential if Indonesia seeks to reach a more advanced level of defense self-sufficiency.



Graphic 1: Self-Reliance in Defense

Table 2: Key Challenges in Indonesia's Defense Industry

Challenge	Description	References
Technological Dependency	Heavy reliance on foreign technologies limits Indonesia's ability to produce defense equipment independently.	Irfan et al., 2023; Sutadi, 2022
Supply Chain Risks	Risks related to the supply chain, including delays and disruptions in obtaining critical components for defense manufacturing.	Ferdiyasto & Gobel, 2023
Financial Constraints	Limited funding for research and development (R&D) in the defense sector slows innovation and technological advancements.	Ferdiyasto & Gobel, 2023
Limited R&D Capabilities	Insufficient investment in research and development impedes the growth of local innovation in defense technologies.	Haryanto et al., 2022; Irfan et al., 2023
Inconsistent Policy Implementation	Inconsistent application of policies such as Law No. 16 of 2012 hinders progress toward defense self-reliance.	Sutadi, 2022; Gobel et al., 2023

Broader Implications for Defense Policy

These findings suggest that while Indonesia has significantly improved its defense industry's competitiveness, mainly through innovation and international collaboration, areas still require attention. Future policies should promote

Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

stronger ties between industry, academia, and government to foster a more resilient and self-sustaining defense sector. As shown in Turkey and South Korea, the successful growth of a competitive defense sector relies heavily on coordinated efforts across multiple stakeholders, including government-backed research and development programs and partnerships with international organizations (Seren, 2021) (Irfan et al., 2023). The results from this study highlight the need for long-term planning, investment in human capital, and a focus on domestic and international collaboration for Indonesia's defense industry to realize its full potential.

Boosting Defense Competitiveness Using HPWS and Technological Innovation

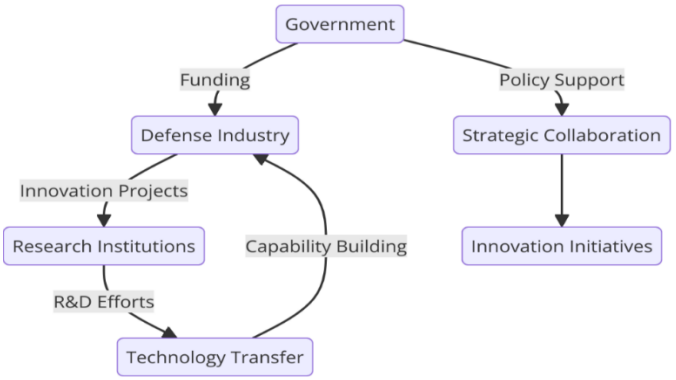
The results of this study confirm that the integration of high-performance work systems (HPWS) and technological innovation significantly enhances the competitiveness of Indonesia's defense industry. These findings align with existing theories that emphasize the critical role of human capital in driving organizational innovation and performance, particularly in technology-intensive sectors like defense (Irfan et al., 2023). The study's findings indicate that by fostering an environment where employee development and engagement are prioritized, defense firms can better adapt to the fast-paced technological changes that characterize the global defense industry. This study is consistent with similar studies in other emerging defense industries, such as South Korea and Turkey, where strategic investments in workforce development and technological innovation have led to notable improvements in defense production capabilities (Choi, 2023) (Seren, 2021). In Indonesia's case, the findings suggest that adopting comprehensive HPWS frameworks could bridge the gap between current capabilities and the demands of a competitive defense market.

Furthermore, the study underscores the importance of continuous technological innovation, which enhances production efficiency and fosters long-term industry resilience. This aligns with broader defense industry trends, where innovation is a crucial driver of competitive advantage in domestic and international markets (Rohmad & Susilo, 2022). By integrating these elements, Indonesia can accelerate its progress toward self-reliance and reduce dependency on foreign suppliers, a critical strategic goal for its defense sector.

The findings of this study contribute to the existing body of literature on defense industry competitiveness by highlighting the critical role of strategic collaboration in enhancing both technological capabilities and risk management frameworks. In theoretical terms, the results extend the current understanding of innovation management in defense industries, particularly by illustrating how strategic partnerships between government, industry, and research institutions can accelerate the adoption of cutting-edge technologies and drive business model innovation (Irfan et al., 2023). These partnerships not only facilitate the transfer of technological expertise but also create a platform for knowledge exchange, thus enriching the innovation ecosystem of the defense sector. Similar patterns have been observed in countries like Turkey and South Korea, where close collaboration between governmental bodies and private defense companies has fostered a more resilient and self-reliant defense industry (Seren, 2021) (Choi, 2023).

Strategic Defense Collaboration Network

From an implementation perspective, these findings suggest that Indonesia's defense industry would benefit significantly from a more structured approach to managing strategic collaborations. The industry could leverage the technological and financial resources necessary for sustained growth more effectively by formalizing partnerships and integrating innovation processes across stakeholders. This approach would mirror successful models in developed defense industries, where collaboration has proven vital in navigating complex technological challenges and fostering national security through domestic production capabilities (Al-Hakim Gobel et al., 2023). Implementing such frameworks could involve strengthening public-private partnerships, incentivizing research and development in key technological areas, and ensuring consistent government support for innovation initiatives. Ultimately, successfully integrating these elements would contribute to achieving the long-term goal of defense industry independence and reducing reliance on foreign suppliers (Czulda, 2020).



Graphic 2: Approach to Manage Strategic Collaboration

While the findings of this study provide valuable insights into the role of innovation and strategic collaboration in enhancing the competitiveness of Indonesia's defense industry, certain limitations must be acknowledged. One of the primary limitations of this research is the reliance on secondary data sources, which may not fully reflect the most current developments in the defense sector. While secondary data enabled the identification of critical trends and comparative analysis with other countries, future research would benefit from incorporating primary data collection, such as interviews with defense industry experts and government officials, to provide more granular insights into the unique challenges facing Indonesia's defense industry (Al-Hakim Gobel et al., 2023).

Technological Innovation Limitations

Another limitation involves the scope of technological innovations considered in this study. Although the analysis focused on high-performance work systems and broader technological advancements, a deeper examination of specific emerging technologies—such as unmanned systems, artificial

Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

intelligence in defense applications, or cyber warfare tools—could yield more precise conclusions on their potential to transform the defense sector (Rohmad & Susilo, 2022). Additionally, while the study draws lessons from the experiences of other developing countries, the applicability of these findings to Indonesia's unique political and economic landscape may be limited due to differences in national defense policies and industrial capacities (Harijanto, 2024).

The lack of longitudinal data limits understanding how Indonesia's defense industry evolves in response to technological and strategic shifts. Given the fast-paced nature of technological advancements and changing global security environments, future research could benefit from long-term studies that track the impact of innovation and collaboration on defense industry competitiveness over multiple years (Irfan et al., 2023) By addressing these limitations in future research, more robust and actionable recommendations could be developed to guide policymakers and industry leaders in fostering a more competitive and self-reliant defense industry.

In Indonesia's defense industry, the limitations in adopting such cutting-edge technologies are not just technological but also structural, involving the need for more consistent policy implementation and industrial capacity building. The lack of cohesive national defense policies prioritizing the development of AI and cyber warfare tools has been a significant barrier. Addressing these issues will require a more integrated approach that includes collaborations with international technology leaders and developing local expertise in AI applications for defense (Shetty et al., 2022). In summary, addressing these technological and structural limitations through international collaboration and domestic policy enhancements is crucial for Indonesia to leverage AI and autonomous systems in its defense sector fully.

Challenges in Self-Reliance

The study also highlights the challenges associated with international defense collaborations. Strategic partnerships with foreign defense contractors often involve transferring sensitive technologies, raising concerns about sovereignty and the potential for dependency on foreign powers. While these collaborations are crucial for enhancing domestic capabilities, they also create vulnerabilities if foreign partners have conflicting strategic interests or seek to leverage their technological advantage for political gain (Harijanto, 2024). Ensuring that transparent and mutually beneficial agreements govern these collaborations is essential to maintaining national security and ethical standards in defense innovation (Al-Hakim Gobel et al., 2023).

From a social perspective, expanding Indonesia's defense industry can stimulate economic growth and create jobs, particularly in high-tech sectors. Evidence from European defense policies, especially in post-Soviet countries like the Czech Republic, highlights the risks of allocating excessive funds to defense at the expense of other social programs, leading to potential imbalances in national development (Dvorak & Pernica, 2021). Furthermore, the ongoing war in Ukraine has demonstrated that excessive prioritization of defense production can strain resources that would otherwise support broader social goals, particularly when nations face competing demands for economic recovery and social infrastructure improvements (Aries et al., 2023). A balanced approach is necessary, ensuring that defense industry growth is aligned with broader social welfare and economic development goals, thus preventing potential negative consequences for societal progress.

International defense collaborations bring opportunities and challenges, especially regarding technology transfer and sovereignty. In Indonesia, these collaborations often result in technology sharing, which enhances domestic capabilities and raises concerns about dependency on foreign technologies. A key challenge for Indonesia has been maintaining its sovereignty while benefiting from these collaborations. For instance, PT Dirgantara Indonesia's involvement in defense projects, such as aerospace and aircraft manufacturing, highlights the importance of minimizing reliance on foreign suppliers. However, limited technology transfer and incomplete implementation of agreements have restricted the effectiveness of these partnerships, emphasizing the need for stronger government oversight and policy enforcement (Haryanto et al., 2022) (Irfan et al., 2023).

Moreover, legal frameworks play a crucial role in determining the success of these collaborations. Indonesia's Law No. 16 of 2012 was designed to promote defense industry independence, yet inconsistencies in its implementation have hindered progress. This regulatory gap has allowed foreign powers to maintain leverage in technology-dependent sectors, particularly in the maintenance and production of defense equipment. To mitigate this challenge, more vital collaboration between research institutions, industries, and government agencies is needed to enhance Indonesia's technological capabilities and reduce its dependency on foreign suppliers (Sutadi, 2022) (Al-Hakim Gobel et al., 2023).

Future Research

Given the limitations identified in this study, several avenues for future research can be explored to deepen our understanding of innovation and strategic collaboration in Indonesia's defense industry. First, future studies should incorporate primary data collection methods, such as interviews with key stakeholders in the defense industry, including policymakers, industry leaders, and defense contractors. This would provide more nuanced insights into the practical challenges and opportunities that may not be fully captured through secondary data sources. By engaging directly with those involved in defense procurement, technology transfer, and production, researchers can offer more detailed recommendations for enhancing industry competitiveness (Al-Hakim Gobel et al., 2023) (Irfan et al., 2023).

Additionally, future research should explore the impact of specific emerging technologies, such as artificial intelligence (AI), unmanned systems, and cyber-defense, on the operational capabilities of Indonesia's defense industry. While this study provided an overview of technological innovation, a more focused investigation of how these cutting-edge technologies can be integrated into domestic production would be invaluable. Countries like Turkey and South Korea have already made significant strides in adopting such technologies, which has bolstered their defense self-sufficiency and global

Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

competitiveness (Seren, 2021). Investigating similar pathways for Indonesia could yield actionable insights for policymakers seeking to future-proof the country's defense capabilities.

Furthermore, longitudinal studies that track the evolution of Indonesia's defense industry over time would provide a clearer understanding of how strategic collaborations and innovation efforts unfold in the long term. As defense industries often operate within rapidly changing technological and geopolitical environments, real-time monitoring of key industry metrics, such as technological adoption rates and collaboration effectiveness, would offer more comprehensive assessments of policy impacts and industry performance (Rohmad & Susilo, 2022). This approach could also highlight how external factors, such as international trade agreements or shifts in global defense spending, influence Indonesia's path to defense self-reliance (Irfan et al., 2023).

The findings of this study not only have significant implications for Indonesia's defense industry but raise essential social and ethical considerations, particularly in the context of strategic collaborations. One key ethical issue is the potential for technological dual-use, where innovations developed for defense purposes may be repurposed for civilian applications or, conversely, where civilian technologies are weaponized. This dual-use dilemma has far-reaching consequences for both security and civil liberties. For instance, advancements in cyber-defense and surveillance technologies, while enhancing national security, also pose risks related to privacy infringement and militarizing civilian spaces (Seren, 2021). Indonesia must, therefore, develop robust regulatory frameworks that ensure technological innovations are used responsibly, balancing the need for security with the protection of individual rights and freedoms.

IV. CONCLUSIONS

This study has explored the critical role of innovation and strategic collaboration in enhancing the competitiveness of Indonesia's defense industry. Indonesia's defense industry can overcome reliance on imported technologies and establish a more self-reliant and competitive defense sector through innovation and strategic collaboration by integrating high-performance work systems (HPWS) and technological innovation. Domestic and international strategic collaborations have proven essential in facilitating technology transfer, enhancing local expertise, and aligning with broader social welfare and economic development goals. Technological and structural limitations that stem from international collaboration and domestic policy enhancements are crucial for Indonesia. These partnerships accelerate technological advancements and create opportunities for Indonesia to establish itself as a more self-reliant and competitive force within the global defense industry.

The research identified several challenges hindering Indonesia's complete self-reliance in defense. One key challenge lies in international defense collaborations, which present opportunities and difficulties, particularly concerning technology transfer and sovereignty. These challenges include ongoing dependence on foreign technologies, limited financial resources, and insufficient integration of emerging technologies. Additionally, the study highlights the need for a more comprehensive approach to managing these partnerships, ensuring they align with Indonesia's strategic goals while safeguarding national sovereignty. Defense independence will require long-term investment in human capital, robust regulatory frameworks, and more vital collaboration between government, industry, and academic institutions. Ultimately, Indonesia's path to defense industry competitiveness and self-reliance necessitates a multifaceted approach that combines innovation, collaboration, regulatory oversight, and human capital development.

REFERENCES

[1] Achmadi, B., Zauhar, S., Sh, B., & Fefta, A. (2019). *The Implementation of the Defense Industrial Base (DIB) a Comparative Study of Indonesia and Brazil*. *22*(2).

[2] Al-Hakim Gobel, R., Royke Deksino, G., Taufiq Ramadhan, M., Nugroho, V. A., Nurfitriani, W., & Wahyu, M. A. (2023). Building The Independence of The Defense Industry Through the Subcontractor System (Study of Indonesian-British Cooperation in The Development of The AH140 Frigate). In *International Journal Of Humanities Education And Social Sciences* (Vol. 3, Issue 3). https://ijhess.com/index.php/ijhess/

[3] Antai, I., & Hellberg, R. (2024). Characterizing the defense industry for risk management: a systems approach. *Journal of Defense Analytics and Logistics*, *8*(1), 38–55. https://doi.org/10.1108/JDAL-08-2023-0008

[4] Aries, H., Giegerich, B., & Lawrenson, T. (2023). The Guns of Europe: Defence-industrial Challenges in a Time of War. *Survival*, *65*(3), 7–24. https://doi.org/10.1080/00396338.2023.2218716

[5] Bitzinger, R. A. (2021). Military-technological innovation in small states: The cases of Israel and Singapore. *Journal of Strategic Studies*, *44*(6), 873–900. https://doi.org/10.1080/01402390.2021.1947252

[6] Choi, C. (2023). *Globalization of Arms Production and Hierarchical Market Economies: Explaining the Transformation of the South Korean Defence Industry Soul Park*.

[7] Czulda, R. (2020). Defence industry in Iran–between needs and real capabilities. *Defense and Security Analysis*, *36*(2), 201–217. https://doi.org/10.1080/14751798.2020.1750184

[8] Dvorak, J., & Pernica, B. (2021). To free or not to free (ride): a comparative analysis of the NATO burden-sharing in the Czech Republic and Lithuania–another insight into the issues of military performance in the Central and Eastern Europe. *Defense and Security Analysis*, *37*(2), 164–176. https://doi.org/10.1080/14751798.2021.1919345

[9] Ferdiyasto, A. (2023). Aries Sudiarso 2) , IB Putra Jandhana 3) , Fatmawati 4) ,Rudy AG Gultom 5) 1. 2.3.4.) Defense Industry Study Program, Faculty

Volume 09, Number 01, Page 269-275
e-ISSN: 2598-120X; p-ISSN: 2598-117X

Defense Sains and Tecnology. In *International Journal Of Humanities Education And Social Sciences* (Vol. 3, Issue 2). https://ijhess.com/index.php/ijhess/

[10] Gonçalves da Silva, M. V., & Del Corso, J. M. (2023). DYNAMIC CAPABILITIES: proposition of an analysis tool for a defense industry in Brazil. *Defence Studies*, *23*(2), 238–253. https://doi.org/10.1080/14702436.2023.2206959

[11] Harijanto, C. (2024). Middle-power behaviours: Australia's status-quoist/Lockean and Indonesia's reformist/Kantian approaches to crises of legitimacy in the Indo-Pacific. *Australian Journal of International Affairs*, *78*(1), 40–57. https://doi.org/10.1080/10357718.2023.2283473

[12] Haryanto, H. I., Hidayat, T., Bainus, A., & Sudirman, A. (2022). Supporting Industrial Cooperation in Independence of PT. Dirgantara Indonesia and Its Contribution to Indonesian Air Power. In *SPECIALUSIS UGDYMAS / SPECIAL EDUCATION* (Vol. 2022, Issue 43).

[13] Irfan, M., Nidar, S. R., Azis, Y., & Widianto, S. (2023). Self-reliant in defense industries: Case study Indonesia. *Cogent Business and Management*, *10*(3). https://doi.org/10.1080/23311975.2023.2262715

[14] Kim, I., & Kuehn, D. (2022). The Ministry of National Defence in South Korea: Military dominance despite civilian supremacy? *Journal of Strategic Studies*, *45*(6–7), 865–892. https://doi.org/10.1080/01402390.2022.2127092

[15] Mahoney, C. W. (2021). Acquire or Expire: Publicly Traded Defense Contractors, Financial Markets, and Consolidation in the U.S. Defense Industry. *Defence and Peace Economics*, *32*(3), 325–342. https://doi.org/10.1080/10242694.2019.1667216

[16] Nam, S., Choi, S., Edell, G., De, A., & Song, W. K. (2023). Comparative Analysis of the Aviation Maintenance, Repair, and Overhaul (MRO) Industry in Northeast Asian Countries: A Suggestion for the Development of Korea's MRO Industry. *Sustainability (Switzerland)*, *15*(2). https://doi.org/10.3390/su15021159

[17] Rohmad, R., & Susilo, E. (2022). Kemandirian Industri Pertahanan dalam Mewujudkan Investasi Pertahanan. *JIIP - Jurnal Ilmiah Ilmu Pendidikan*, *5*(9), 3870–3876. https://doi.org/10.54371/jiip.v5i9.985

[18] Seren, M. (2021). *Politics, Industry and Academia: Examining Dynamics of Turkish Defense Industry's Great Leap Forward in the Post-2002 Era* *.

[19] Shetty, D. K., Prerepa, G., Naik, N., Bhat, R., Sharma, J., & Mehrotra, P. (2022, December 23). Revolutionizing Aerospace and Defense: The Impact of AI and Robotics on Modern Warfare. *ACM International Conference Proceeding Series*. https://doi.org/10.1145/3590837.3590856

[20] Sutadi, S., & #1, N. (2022). Utilization of the Defense Industry in Supporting the Duties of the Navy to Enforce the Law and Maintain Security in Indonesian Waters. *Journal of Industrial Engineering & Management Research*, *3*(6). https://doi.org/10.7777/jiemar

[21] Xu, J., & Zhang, S. (2020). An evaluation study of the capabilities of civilian manufacturing enterprises entering the military products market under the background of China's civil-military integration. *Sustainability (Switzerland)*, *12*(6). https://doi.org/10.3390/su12062416

[22]