

The Role of the Defense Industry in Supporting Economic Growth: A Comparison Between Global Trends and Indonesia's Challenges

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HISTORY

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ABSTRACT

Purpose: This study aims to analyze and compare the role of the defense industry in supporting economic growth, focusing on the gap between global trends and the realities faced in Indonesia.

Method: A systematic literature review (SLR) following the PRISMA protocol was employed for this research. It analyzes 48 articles from 2014 to 2024 using both descriptive and bibliometric methods to synthesize the findings.

Results: A significant gap between global trends and Indonesia's reality is evident. While the defense industry globally has consistently been a key economic driver through increased exports, investment, and innovation, in Indonesia, its role remains largely untapped. The industry is hindered by various challenges, such as a high dependence on imported weapons and components, which limits export capabilities, suboptimal human resources, inconsistent domestic orders, and a minimal R&D budget that drains resources without fostering competitive innovation.

Practical Implications for Economic Growth and Development: This study offers an evidence-based diagnosis of the main challenges the Indonesian government must address. The findings can inform the development of more effective policies to promote the defense industry's independence, enabling its transition from a potential contributor to a real driver of economic growth and development.

Originality/Value: This study is novel in two ways: first, it is the first SLR comparing the global and Indonesian contexts, and second, it uniquely applies the "industrialization by invitation" framework. This theoretical lens sheds light on Indonesia's performance gap by mapping its structural challenges, providing a deeper analytical understanding of the issue.

Keywords: *Indonesia, Global Economic Growth, Industrialization by Invitation, Defense Industry Independence, Systematic Literature Review*

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INTRODUCTION

The hope for a peaceful existence without armed conflict for the global population after the World Wars and the Cold War has not come to fruition. Herre (2024) reveals that from the end of the Cold War in 1989 until 2024, 3.9 million people, including both combatants and civilians, fell victim to armed conflicts. This accounts for 5.57% of the 70 million casualties of World War II (O'Neill, 2025) in the post-World War era. This ongoing situation poses a serious threat, compelling nations—both those directly involved in armed conflicts and those not, such as Indonesia—to strengthen their defense posture. As a result, defense spending has significantly increased worldwide to safeguard national security. According to SIPRI, global defense spending has risen annually, continuing this upward trend from 2015 to 2024. In 2024, defense spending reached \$2,718 billion, marking the largest annual increase in the past decade (2015–2024), with a 9.4% rise from 2023 and a 37% increase from \$1,955 billion in 2015 (Liang et al., 2025).

The rise in defense spending has implications not only for national security but also for the economy. Modern defense strategies have evolved. While strengthening defense once relied heavily on arms imports, the focus has gradually shifted toward utilizing the national defense industry, which is now seen as a potential driver of economic growth. In 2023, the top 100 global defense companies reported a total revenue of \$631.9 billion in arms sales, a 4.2% increase from \$606.6 billion in 2022 (Lorenzo et al., 2024).

In 2024, the defense industry's role as an economic pillar in developed countries is becoming more pronounced. Of the 100 largest defense companies, 83 are based in developed nations, with the United States dominating, accounting for 41 of these companies (Lorenzo et al., 2024). In contrast, the remaining 17 companies are based in developing countries, including China (9), Turkey (3), India (3), Ukraine (1), and Taiwan (1) (Lorenzo et al., 2024). According to the World Bank (2025) classification, China, Turkey, and Ukraine are considered upper-middle-income countries, while India is classified as lower-middle income.

As of the end of 2024, the global arms export market remains largely dominated by developed countries. The United States leads with a 39% share of global exports, followed by Russia (15%), France (9.1%), Germany (5.6%), the United Kingdom (3.6%), Italy (3.4%), and South Korea (2.1%) (SIPRI, 2025). Meanwhile, China, an upper-middle-income country, plays a significant role, with a 6% market share and nine companies listed among the top 100 largest defense companies in 2023 (SIPRI, 2025).

Several previous studies have explored the role of the defense industry in the economies of various countries. For example, research by Krč & Hynková (2024) on several developed nations found that increased arms exports significantly contributed to economic growth through GDP expansion, job creation, and technological innovation. Conversely, a case study by Jan & Su (2023) on China demonstrated how a developing country can transform its defense industry into an engine of economic growth by investing heavily and leveraging dual-use technology strategies.

In the Indonesian context, various studies have highlighted the specific challenges faced by the defense industry. Several studies point to a gap between policies supporting self-reliance and their inconsistent implementation, resulting in a negligible impact on the national economy (Damanik et al., 2024). This finding is supported by other research, which empirically shows that trade performance remains weak, marked by stagnant exports and rising imports (Ramadhoni et al., 2024). Institutional challenges, such as the lack of government commitment to fostering collaboration between state-owned enterprises (SOEs) and the private sector, have also been a major concern (Nurfitriani et al., 2023). Moreover, much of the research in Indonesia tends to focus on specific case studies, such as policy analysis at PT Pindad (Mulyani et al., 2022) or supply chain challenges (Nursalam & Yunanda, 2023). While these studies provide valuable insights into their respective issues, they have not systematically compared these domestic conditions with global trends.

To frame the various challenges identified in these case studies, this study will adopt the "industrialization by invitation" theoretical framework. Pioneered by Sir Arthur Lewis, this

theory offers a practical approach for developing countries facing challenges such as overpopulation, capital and technology shortages, and limited export market access, by inviting foreign investors to boost national industrial capabilities (Farrell, 1980; Girvan, 2005; McKenzie, 2005; Ingham & Mosley, 2013). This framework is particularly relevant for analyzing the economic performance of Indonesia's defense industry, which heavily relies on foreign capital and technology. It also helps explain why the anticipated economic impacts, such as increases in GDP and exports, often fail to materialize fully. This is due to the inherent dependency on other countries in this model, where a significant portion of the economic value added may ultimately return to the investor nations.

A paradox emerges from these facts: Indonesia is classified as an upper-middle-income country with a GNI per capita higher than India's, yet it lacks a single defense company listed among the top 100 largest arms sellers globally. While numerous case studies exist at both global and domestic levels, there has been no systematic literature review that comprehensively maps and compares the expected role of the defense industry on the global stage with the specific challenges faced in Indonesia. To address this gap, this study presents the first systematic literature review (SLR). Its novelty lies in two aspects: methodologically, it synthesizes 48 articles comprehensively, and analytically, it uses the "industrialization by invitation" theoretical framework. This framework not only helps map existing structural challenges, such as import dependency and minimal R&D budgets but also theoretically explains why the gap between the potential and actual performance of Indonesia's defense industry persists.

Thus, the study aims to analyze and compare the role of the defense industry in fostering economic growth, focusing on the disparity between global trends and the challenges faced by Indonesia. Based on this framework, the study has two objectives: First, it explores the role of the defense industry in promoting economic growth globally and in Indonesia. Second, it identifies the key differences and disparities between the role of the global defense industry and Indonesia's defense industry in supporting economic growth.

METHOD

This study employs the Systematic Literature Review (SLR) method, which involves addressing specifically formulated research questions through structured and transparent processes for searching, selecting, and critically appraising relevant studies, as well as analyzing the data from those studies (Moher et al., 2009). The SLR process consists of three stages: Planning, Conducting, and Reporting (Quezada-Sarmiento et al., 2020). To ensure the research questions are precisely formulated, the Population, Intervention, Comparison, Outcomes, Context (PICOC) framework is used (Booth et al., 2016). This framework is outlined in Table 1.

The study follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol to minimize the risk of bias and errors during the literature review process (Shamseer et al., 2015). The next section describes the process of selecting relevant articles and the extraction procedure used to obtain the most pertinent and high-quality studies.

Table 1. Overview of the PICOC Framework

PICOC Element	Details
P (Population)	- Defense Industry - Military Industry - Defence Industry
I (Intervention)	- Economic growth or economic expansion - GDP - The role or function of the defense industry in Indonesia and Developing Countries

PICOC Element	Details
	- Impact or Influence of the defense Industry in Indonesia and Developing Countries
C (Comparison)	A self-sufficient and exemplary defense industry, especially Indonesia.
O (Outcomes)	The disparity in the advancement of Indonesia's defense sector relative to those of other nations.
C (Context)	- Indonesia and Developing Countries. - The main information comes from journals relevant to the topic, in Indonesian and English, preferably open access journals published from 2014 to 2024.

Source: Developed by the authors (2025)

This study utilizes secondary data sources in the form of articles, primarily selected from the Scopus and Google Scholar databases through Publish or Perish (PoP) Software, as well as directly from the Google Scholar website. After formulating the research questions, a data search was conducted using several strategies, including combinations of English keywords with Boolean operators such as AND and OR. Additionally, Indonesian keywords were used, as the topic of the Indonesian defense industry's role in economic growth has not been widely published in Scopus-indexed articles. The search results are summarized in Table 2.

Table 2. Search Strategy and Results for Articles

Search Strategy	Search Year	Search Field	Search Channel	Scopus	Google Scholar
"Defen* Industr*" AND Econom* OR GDP	2014-2024	Keywords	PoP Software	92	-
"Militer* Industr*" AND Econom* OR GDP	2014-2024	Keywords	PoP Software	43	-
"Industri Pertahanan" AND "Pertumbuhan ekonomi" OR PDB OR "Produk Domestik Bruto"	2014-2024	Keywords	PoP Software	-	120
Peran Industri Pertahanan dalam Pertumbuhan Ekonomi	2014-2024	Title	Google Scholar Website	-	58
Total Articles				135	178

Source: Processed data (2025)

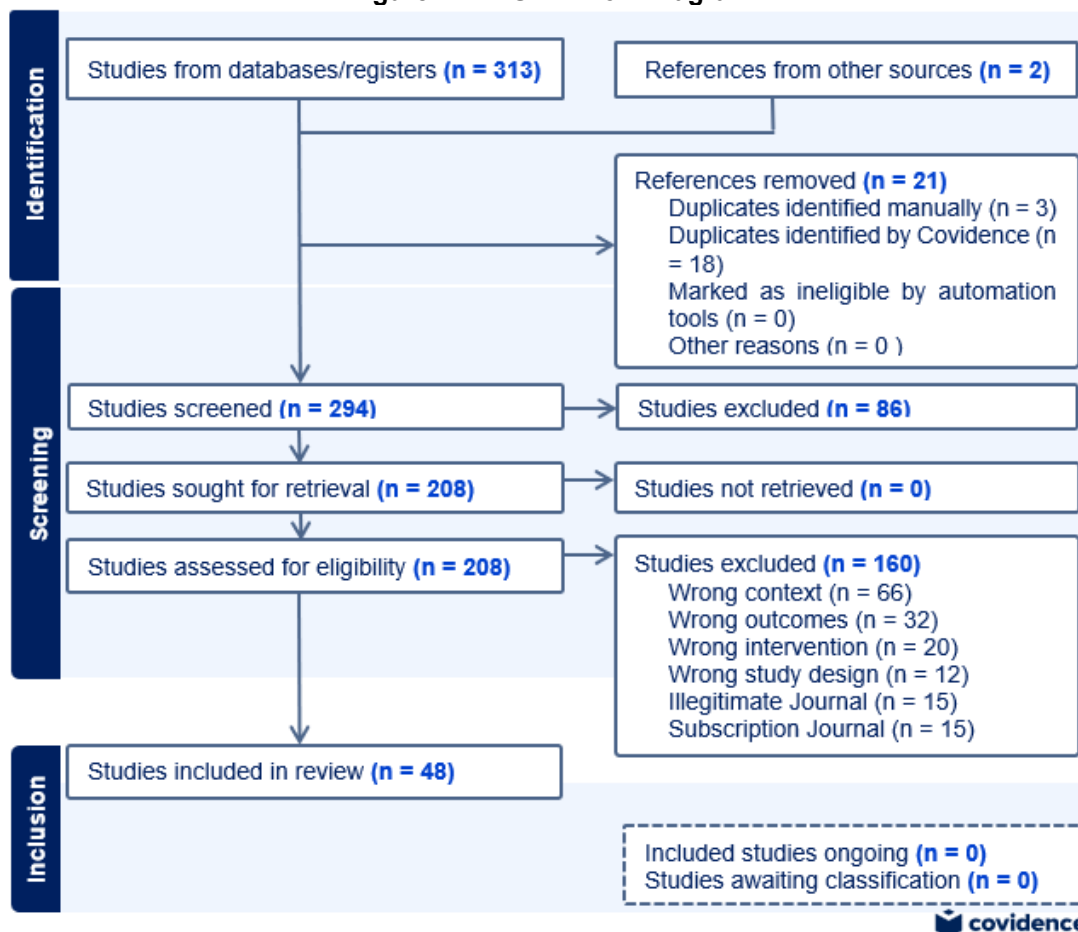
The selection of relevant articles followed the PRISMA protocol, as outlined in the previous section. The process began with the identification of articles, as shown in Table 2, where academic database searches yielded a total of 313 publications. Additionally, two other sources, reports published by Laboratorium Indonesia 1945 (Lab 45), were identified through a search of the Lab 45 website. During the article selection process, specific inclusion and exclusion criteria were applied. Exclusion criteria included articles unrelated to the defense or military industry or the influence of the defense industry on economic growth. The inclusion criteria focused on articles published between 2014 and 2024, written in English or Indonesian, with a preference for open access journals that provided complete citation information.

After the initial identification, duplicates were removed, leaving 294 articles. These articles then underwent title and abstract screening based on the inclusion and exclusion criteria, followed by full-text reviews to identify high-quality, relevant articles for extraction and synthesis. After applying all eligibility criteria, 48 articles were deemed suitable. The PRISMA protocol was executed using Covidence software, and the resulting PRISMA flow diagram is shown in Figure 1.

Once the 48 articles were selected, a two-stage data analysis was conducted. First, a descriptive analysis was performed to map the general characteristics of the reviewed literature. This analysis included the distribution of publications by year, geographical context, and journal scope (national/international), providing a general overview of the research landscape. A thematic synthesis was also conducted to identify the most dominant key phrases, which were then visualized using a word cloud.

Second, a bibliometric analysis was carried out using VOSviewer software to generate a network visualization. McBurney & Novak (2002) explain that bibliometrics combines qualitative and quantitative techniques to assess the quality of content and the maturity stage of the available literature. This analysis focused on the co-occurrence of keywords to identify major thematic clusters and the relationships between concepts in the literature.

Figure 1. PRISMA Flow Diagram



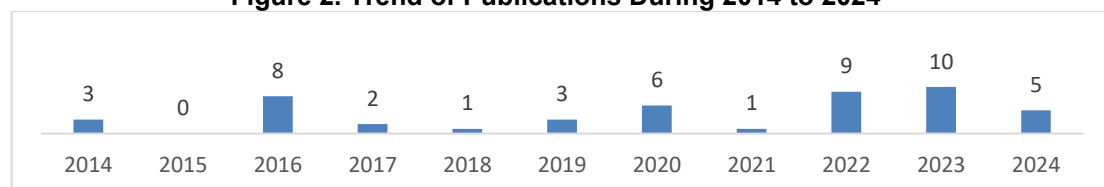
Source: The Covidence software (2025)

RESULT AND DISCUSSION

Descriptive Analysis

The analysis of the distribution of the 48 selected articles by publication year (Figure 2) reveals a growing academic interest in the role of the defense industry in the economy over the past decade (2014-2024). This trend indicates that the topic has become increasingly relevant and significant in scholarly research. Notably, the period from 2022 to 2023 was the most productive, with 19 articles published, accounting for approximately 39.58% of the total literature reviewed. This surge can be attributed to regulatory changes in Indonesia's defense industry between 2020 and 2022, particularly the enactment of *Undang-Undang Republik Indonesia Nomor 11 Tahun 2020 Tentang Cipta Kerja* (the Omnibus Law), later replaced by *Undang-Undang RI Nomor 6 Tahun 2023 Tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 2 Tahun 2022 Tentang Cipta Kerja* (Law No. 6 of 2023). These changes transformed the investment landscape by enabling greater private sector participation, thereby promoting investment and fostering self-sufficiency within the defense industry.

Figure 2. Trend of Publications During 2014 to 2024



Source: Processed data (2025)

Next, a geographical distribution analysis was conducted to map the countries most frequently discussed in the 48 articles, excluding Indonesia, which is the primary focus of this study. The results (Figure 3) reveal that the research also highlights the role of major powers such as the United States, Russia, and China, which were featured in 5, 4, and 4 articles, respectively, indicating their central position in global defense industry dynamics. The analysis further identifies research focusing on NATO member countries, a group of Middle Eastern nations, and countries in South America. This suggests that the studies also explore the issue from the perspectives of alliances, regional contexts, and comparisons between countries with similar characteristics, such as developed nations or groupings by income.

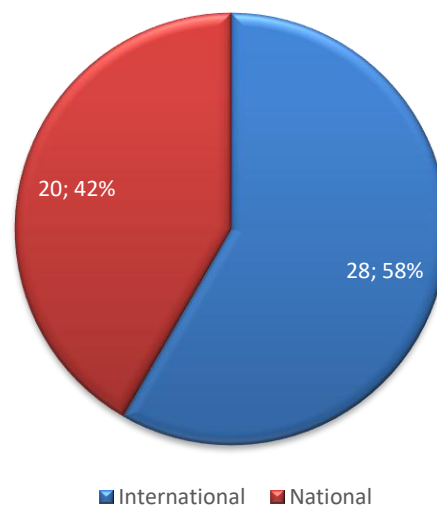
Figure 3. Distribution of Publications by Country



Source: Processed data (2025)

The 48 analyzed articles were categorized by their publication scope into national and international articles to assess the extent to which this topic is discussed in both local and global academic studies. The analysis (Figure 4) reveals that international articles dominate the literature, comprising 28 articles, or 58% of the total. This dominance suggests that the role of the defense industry in economic growth is a key topic in global discourse, attracting the attention of researchers from various countries and providing a basis for referring to international best practices. In contrast, the 42% of national articles highlights the strong relevance of the topic to specific issues in Indonesia. These national publications play a crucial role in bridging global theories with local practices and in identifying challenges at the national level.

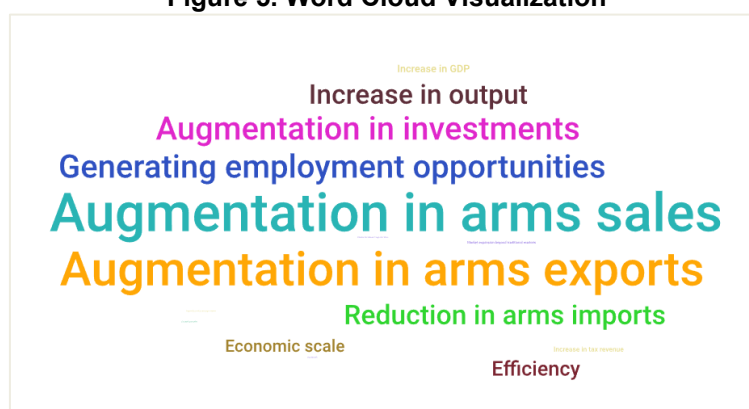
Figure 4. Proportion of National and International Publications



Source: Processed data (2025)

As the culmination of the descriptive analysis, 15 key phrases representing the most dominant themes in the literature were identified. These phrases were subsequently visualized in a word cloud (Figure 5) to illustrate the frequency with which each theme appeared.

Figure 5. Word Cloud Visualization



Source: Processed data (2025)

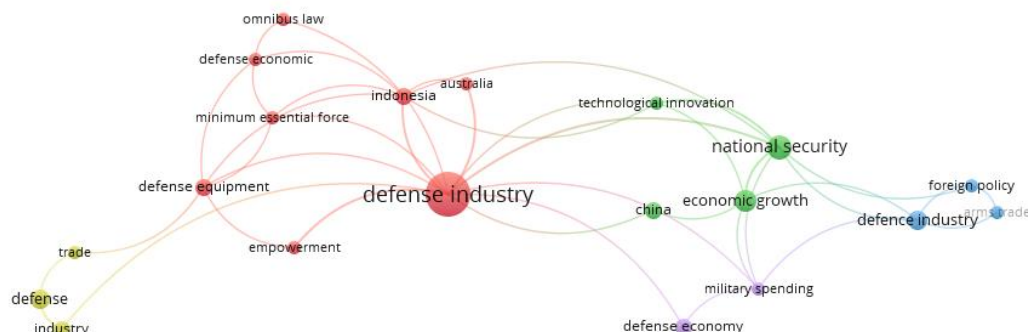
The analysis in Figure 5 reveals that the word cloud visualization prominently highlights the most discussed phrases, including the role of the defense industry in "augmentation in arms sales" and "augmentation in arms exports." The larger size of these phrases indicates that much of the academic discourse centers on how the defense industry can enhance a country's trade balance by reducing arms imports and actively increasing revenue through exports. In addition to trade, another key theme is the direct impact of the defense industry on the domestic economy. Phrases such as "augmentation in investments," "generating employment opportunities," and "increase in output" suggest that the defense industry is viewed as a strategic sector capable of stimulating real economic activity within the country.

The word cloud also illustrates the relationship between the defense industry and macroeconomic indicators. Phrases like "increase in GDP," "increase in tax revenue," and "economic scale" indicate that the literature discusses how the performance of the defense industry can contribute to national growth and revenue. Additionally, the appearance of the phrase "efficiency" suggests ongoing discussions about optimizing resources within the defense industry to reduce production costs and compete globally with high-quality products.

Bibliometric Analysis

The size of each circle represents the frequency of a keyword's appearance in the literature, while the connecting lines illustrate the strength of the relationship between keywords. As shown in Figure 6, 'defense industry' is the central and largest node, indicating that the 48 articles primarily focus on the defense industry's role in the economy. Its central position underscores its role as a key link connecting various thematic research clusters.

Figure 6. Co-occurrence Network Map of Keywords



Source: Processed data (2025)

Figure 6 also reveals five distinct clusters, each representing a key theme discussed in the literature. First, the red cluster highlights the strong relationship between 'defense industry' and terms such as 'Indonesia,' 'omnibus law,' 'minimum essential force,' 'defense equipment,' 'empowerment,' and 'defense economy.' This cluster suggests that global academic discussions on the defense industry's economic role are being applied in Indonesia, particularly through policies like the Omnibus Law and the implementation of the Minimum Essential Force (MEF) program. These initiatives include efforts toward self-reliance in the defense industry. Furthermore, Indonesia's defense policy has fostered strategic cooperation with countries such as Australia.

Second, the green cluster connects 'national security,' 'economic growth,' 'technological innovation,' and 'China.' This cluster implies that the defense industry contributes to economic growth in two significant ways: by ensuring national security, it creates a stable environment

for investment and economic activities, and it serves as a catalyst for technological innovation, which spills over into the civilian sector, enhancing the nation's economic competitiveness. China, as a major global power, offers a benchmark for Indonesia's security and economic strategies. Third, the purple cluster links 'military spending' with 'defense economy,' illustrating how high military expenditure can drain state resources that could otherwise be allocated to sectors such as education, healthcare, or infrastructure. This cluster visually supports the 'resource drain' argument.

Fourth, the blue cluster connects 'foreign policy,' 'defense industry,' and 'arms trade,' showing how the defense industry is leveraged as an instrument in foreign policy, defense diplomacy, the formation of strategic alliances, and the enhancement of a country's geopolitical influence and participation in the international arms trade. Finally, the yellow cluster, though small, links 'industry,' 'defense,' and 'trade.' It emphasizes the commercial aspect of the defense industry, highlighting its role as a sector beyond its national defense functions.

The Role of the Defense Industry in Global Economic Growth

A synthesis of the global literature (Table 3) consistently highlights the positive role of the defense industry in driving economic growth through increased exports, investment, and technological innovation. Of the 48 articles analyzed, the majority focus on the role and independence of the defense industry within the economy. Specifically, 24 articles examine 23 countries (excluding Indonesia), while the remaining 24 articles focus on Indonesia. A more detailed breakdown of these findings, as previously discussed in the descriptive and bibliometric analysis sections, is provided in Tables 3 and 4.

Table 3. Synthesis of Findings: The Role of the Defense Industry at the Global Level (23 Countries)

Geographical Context	Key Findings	References
China	augmentation in arms sales, reduction in arms imports, increase in output, generating employment opportunities, augmentation in investments, increase in GDP, augmentation in arms exports, and creating economic scale.	Bitzinger (2016); Jan & Su (2023); Kar & Çetenak (2022)
Russia	increase in GDP, augmentation in arms sales, augmentation in arms exports, increase in output, generating employment opportunities, augmentation in investments, and economic scale.	Blank (2016); Malle & Cooper (2014); Marshall (2014); Martynenko & Parkhitko (2018)
United States	increase in GDP, augmentation in arms sales, augmentation in arms exports, efficiency, increase in output, generating employment opportunities, augmentation in investments, economic scale.	Hensel (2016); Maye (2017); Soshkin (2016); (Ambros, 2017)
Ukraine	augmentation in arms exports, generating employment opportunities.	Zhuravlov et al. (2020)
Brazil	reduction in arms imports, generating employment opportunities, augmentation in investments.	Silva & Olavo-Quandt (2019)
Canada	augmentation in arms sales, augmentation in arms exports, generating employment opportunities,	Guterman & Lane (2017)

Geographical Context	Key Findings	References
	augmentation in investments, economic scale, market expansion beyond traditional markets.	
Turkey	increase in GDP, augmentation in arms sales, augmentation in arms exports, reduction in arms imports, generating employment opportunities, augmentation in investments.	Kar & Çetenak (2022)
Turkey & China	augmentation in investments.	Sürücü et al (2022)
Australia	augmentation in arms exports, generating employment opportunities.	Troath (2023)
Nigeria	reduction in arms imports.	Aminu & Bakar (2016)
United States, UK, Russia, Germany, Israel	increase in GDP, augmentation in arms sales, reduction in arms imports, efficiency; increase in output; generating employment opportunities, augmentation in investments.	Sarjito (2024)
Arab Saudi, Uni Emirat Arab, Qatar	augmentation in arms exports, economic scale	Soubrier (2020)
Czech Republic, Slovak Republic, Bulgaria, Hungaria, Finland, Italy, Spain, UK, Germany, France, USA	increase in GDP, augmentation in arms sales, augmentation in arms exports, increase in output, generating employment opportunities, augmentation in investments.	Krč & Hynková (2024)
South American Countries	augmentation in arms sales, augmentation in arms exports, reduction in arms imports, efficiency, increase in output, augmentation in investments, economic scale.	Aita et al. (2017)
Developed Countries	Efficiency.	Hartley (2022)
By Income Group	augmentation in arms sales, augmentation in investment especially for high-income countries.	Kollias & Paleologou (2019)
NATO (Global)	efficiency, increase in output, economic scale.	Esitashvili & Martín (2020)

Source: Processed data (2025)

The analysis of the literature, summarized in Table 3, consistently highlights the positive role of the defense industry in the global economy. The most dominant theme is the industry's ability to drive 'augmentation in arms sales and exports,' which serves as a key strategy for countries like Russia to fund domestic production and achieve economies of scale (Blank, 2016). On the other hand, China has successfully reduced its arms imports, demonstrating its achievement of industrial self-reliance (Bitzinger, 2016; Jan & Su, 2023). Additionally, cooperation within alliances like NATO enhances efficiency and provides economic benefits for member states by integrating research, design, development, and production of weapons—especially considering the rising costs of fighter aircraft production, as outlined by Augustine's Law (Hartley, 2022).

Domestically, the defense industry has proven to be a major job creator, with Russia and China employing millions in this sector (Martynenko & Parkhitko, 2018). In the United States,

the defense industry significantly contributes to GDP at the state level and provides a substantial number of high-paying jobs (Hensel, 2016; Soshkin, 2016).

Beyond direct economic stimulation through GDP, the defense industry's most significant contribution often lies in innovation and its multiplier effects. China employs a 'Multiplier-Accelerator' model, where defense investment drives economic growth, which in turn generates further investment (Jan & Su, 2023). Similarly, in both Russia and the United States, defense R&D generates dual-use technologies that spill over into civilian sectors, such as aerospace, medicine, and electronics. These innovations ultimately foster economic growth through the sale of value-added products derived from technological advancements (Ambros, 2017; Hensel, 2016; Martynenko & Parkhitko, 2018; Soshkin, 2016).

The Role of the National Defense Industry in Supporting Indonesia's Economic Growth

Conversely, the defense industry's role in the economy remains a hopeful prospect for many developing countries, including Indonesia. While there are high expectations for the defense sector to become an economic driver, various studies indicate that, in practice, the defense industry in Indonesia has yet to make a significant impact on the national economy. The main challenges identified include import dependency, a minimal R&D budget, and inconsistent domestic orders. A more detailed description of these findings is provided in Table 4.

Table 4. Synthesis of Findings: Economic Contribution of the Indonesian Defense Industry

Main Theme	Key Findings	References
Macroeconomic Contribution	In general, the impact of the defense industry on the national economy is considered not yet significant. However, several companies like PT Pindad and Sritex (a private firm), before it eventually went bankrupt in 2025, were proven to have made direct positive contributions to the regional economy through tax payments, job creation, and the opening of business opportunities.	(Damanik et al., 2024), (Ramadhoni et al., 2024), (Rafsanjani et al., 2023), (Yulivan et al., 2022), (Ahmad & Hartika, 2023), (Salsabiela, 2018)
Improvement of Trade Balance & Foreign Exchange	The import level of weapons and components remains high and tends to increase, placing Indonesia as one of the largest arms importing countries. Export performance is still low, stagnant, and dominated by state-owned enterprises (SOEs) with limited product types, thus unable to significantly improve the trade balance. Although there have been some export successes, such as PT PAL's ships and PT Pindad's small arms, the majority of users of Indonesia's defense products are from the domestic market.	(Nurfutriani et al., 2023), (Ramadhoni et al., 2024), (Sabana, Ramadhan, 2023), (Prihandoko et al., 2023), (Arhan et al., 2022), (Nugroho, 2022), (Arifin et al., 2019), (Nurpatria et al., 2022)
Domestic Industrial Growth	A recurring primary challenge is the high dependency on imported raw materials and key components for the production process. The Local Content Level (TKDN) for the majority of defense products is still low and often below government-set standards, although some flagship products have surpassed 40%. The budget for research and development (R&D) is very minimal, and inconsistent orders from the government complicate the sustainability of	(Nursalam & Yunanda, 2023). (Dwiguna et al., 2022), (Amarilia et al., 2023), (Sumarlan et al., 2019), (Nurpatria et al., 2022), (Sabana, Ramadhan, 2023),

Main Theme	Key Findings	References
	production lines and investment in innovation. Human resources (HR) are considered not yet optimal, and collaboration between SOEs and private defense industries has not been maximized by the government.	(Prihandoko et al., 2023), (Susdarwono, 2020), (Arhan et al., 2022), (Nurfitriani et al., 2023), (Yulivan et al., 2024)
Market Expansion & Efficiency	The Indonesian defense industry market is still heavily oriented towards fulfilling domestic needs (TNI/Police). To date, no Indonesian defense company has entered the list of the world's top 100 largest, and participation in the global supply chain remains minimal. Nevertheless, there are positive examples, such as PT Dirgantara Indonesia, which has successfully become a component supplier for global aerospace companies like Airbus and Boeing. Production efficiency is a challenge due to aging production facilities, the inability to purchase raw materials in bulk to reduce prices due to regulations, and domestic logistics costs that are sometimes more expensive than importing.	(Rafsanjani et al., 2023), (Prihandoko et al., 2023), (Sabana, Ramadhan, 2023), (Mulyani et al., 2022), (Susdarwono, 2021), (Sudirman et al., 2023), (Sumarlan et al., 2019), (Susdarwono & Anis, 2020)

Source: Processed data (2025)

Discussion

The findings of this research clearly highlight a significant gap between the role of the defense industry globally and in Indonesia. While in developed countries this sector serves as a key economic driver, in Indonesia, its role remains potential and hindered. Using the industrialization by invitation theory, the key challenges identified in Table 4 can be understood not as isolated issues, but rather as outcomes of the suboptimal application of this theory. For instance, the high dependency on imported weapons and components/raw materials is a logical consequence of implementing this theory from a weak bargaining position, resulting in limited technology transfer and minimal economic value-added (Prihandoko et al., 2023). This condition is further exacerbated by a minimal R&D budget, which, as global studies have shown, is crucial for driving innovation and multiplier effects in countries like the US and China (Jan & Su, 2023; Sarjito, 2024). The continued dependency on imported technology and the lack of domestic innovation explain why globally dominant key phrases, such as 'augmentation in arms sales' and 'augmentation in arms exports' (Figure 5), have not been significantly realized in Indonesia.

To provide a richer context for the challenges faced by Indonesia's defense industry, such as import dependency, inconsistent government orders, and low R&D funding (Nurpatria et al., 2022; Prihandoko et al., 2023; Sabana, Ramadhan, 2023; Susdarwono, 2020), it is insightful to compare Indonesia with other developing countries that share similar ambitions, such as India and Brazil. Although not included in the articles reviewed in this SLR, other literature indicates that India still faces a high dependency on imports for critical weaponry and lacks sufficient R&D funding to meet its ambition of becoming a global leader in defense technology (Yadav, 2024). Similarly, Brazil's government struggles to guarantee the purchase of domestically developed defense products, thus creating financial risks for its national defense industry (Fernandes et al., 2020).

The key difference between Indonesia, India, and Brazil lies in their policy approaches. India, through progressive policy reforms since 2001, and especially after the 'Make in India' policy in 2014, has actively encouraged 100% private sector participation, raised the Foreign Direct

Investment (FDI) limit, and simplified processes to foster healthy competition between state-owned enterprises (SOEs) and private companies. This policy shift has led to the private sector accounting for about 20% of all Indian defense sales by 2022 (Yadav, 2024). In contrast, Indonesia only began increasing private sector involvement in 2020 through the Omnibus Law (Arhan et al., 2022). Furthermore, India has developed a robust domestic defense innovation ecosystem by promoting private sector participation, startups, and academic collaboration through schemes like iDEX, TDF, and the Make Category (Yadav, 2024). On the other hand, Brazil's strong export orientation, exemplified by its aviation company Embraer, has been successful, with the company delivering over 8,000 aircraft to more than 100 countries, contributing billions of dollars to Brazil's trade balance and providing stability during economic downturns (Junior & Viagi, 2024).

These differences in policy approaches help explain the interpretation of the bibliometric map (Figure 6). The minimal connection between the Omnibus Law policy cluster (red) and the innovation and economic growth cluster (green) visually indicates that the industrialization by invitation applied in Indonesia has not been as effective as the approach adopted by India, which focuses on domestic reform, or Brazil, which emphasizes exports. Therefore, the findings regarding structural challenges—such as inconsistent domestic orders, import dependency, minimal R&D budgets, suboptimal collaboration between SOEs and the private sector, and the minimal role of the private sector—are crucial. Without a stable domestic market and a strong industrial base supported by an innovation ecosystem, Indonesia will always remain in a weak 'inviter' position, with limited capacity for technology absorption, making it difficult to convert potential into tangible economic contributions. This aligns with the argument by Kollias & Paleologou (2019) that the economic benefits of the defense industry are most pronounced in countries (especially developed ones) that have achieved a certain level of self-sufficiency.

CONCLUSION

This study aimed to examine the role of Indonesia's national defense industry in driving economic growth, comparing it to the global landscape. The results of a systematic literature review of 48 articles reveal a clear gap. While the defense industry globally has consistently proven to be an economic driver, in Indonesia, its role remains largely potential and has not yet made a significant impact. Using the industrialization by invitation theoretical framework, the study concludes that this disparity stems from Indonesia's position as a 'weak inviter.' This position is influenced by interconnected structural challenges, such as a high dependency on imported weapons and components/raw materials, which hampers export capabilities, suboptimal human resources, inconsistent domestic orders, and a minimal R&D budget. Without a solid domestic foundation, defense investments risk becoming a resource drain without fostering competitive innovations.

The practical implication of this research provides an evidence-based diagnosis for the Government of Indonesia. The comparison with India and Brazil highlights that the key lesson lies not only in the policy strategies that can be emulated but also in the level of commitment to their implementation. India's success in empowering the private sector and Brazil's focus on promoting an export-oriented defense industry demonstrate the importance of focused and sustained policy execution—an area that should be a primary focus for Indonesia.

While this SLR offers a comprehensive overview, the study has limitations, as it only analyzes literature available up to 2024. Therefore, future research is encouraged to further explore one of the main findings: the minimal R&D budget. A time-series analysis using a Vector Autoregression (VAR) model could be employed to identify the factors influencing R&D budget allocation and measure its causal impact on economic growth. This would provide a more complete understanding of the economic consequences of low investment in defense innovation in Indonesia.

REFERENCES

- Ahmad, U. S., & Hartika, A. S. (2023). Peran industri strategis dalam mendukung ketahanan nasional melalui peningkatan perekonomian nasional. *Brilliant: Journal of Islamic Economics and Finance*, 1(2). <https://journal.yibri.id/index.php/brijief/article/view/16>
- Aita, E., Vasconcelos, Á., & Guedes de Oliveira, M. A. (2017). Current overview and future perspectives on integrated defense logistics in South America: Opportunities for the regional defence industry. *AUSTRAL: Brazilian Journal of Strategy & International Relations*, 5(10), 199–228. <https://doi.org/10.22456/2238-6912.69387>
- Amarilia, I. O., Anu, S., Ainie, R., Inzany, R., Muh, A., & Ranggong, A. (2023). Kesiapan Pt Pindad dalam memproduksi alutsista guna mewujudkan kemandirian industri pertahanan. *Journal of Creative Student Research (JCSR)*, 1(2), 58–72. <https://doi.org/10.55606/jcsrpolitama.v1i2.1140>
- Ambros, C. C. (2017). Defense and development industry: Theoretical controversies and implications in industrial policy. *AUSTRAL: Brazilian Journal of Strategy & International Relations*, 6(11), 132–153. <https://doi.org/10.22456/2238-6912.74955>
- Aminu, M. U., & Bakar, A. S. A. (2016). The interactional impact of defense expenditure and arms importation on economic growth in Nigeria: An autoregressive approach. *International Journal of Economics and Financial Issues*, 6(2), 538–543. <https://www.econjournals.com/index.php/ijefi/article/view/1848>
- Araujo Junior, A. H. de, & Viagi, A. F. (2024). The development and importance of the Brazilian aeronautical industry. *Revista Ciências Exatas*, 30(2). <https://doi.org/10.69609/1516-2893.2024.v30.n2.a3937>
- Arhan, M. R., Navalino, D. A., & Ali, Y. (2022). Akuisisi pertahanan dan ekspor senjata pasca revisi UU industri pertahanan dalam omnibus law serta potensi dan kerawannya bagi ekonomi pertahanan. *Jurnal Cafetaria*, 3(1), 105–112. <https://ejurnal.universitaskarimun.ac.id/index.php/akuntansi/article/view/512/345>
- Arifin, Z., Suman, A., & Khusaini, M. (2019). Countertrade mechanism of global arms trade: Case study of Indonesia. *International Journal of Financial Research*, 11(1), 307–317. <https://doi.org/10.5430/ijfr.v11n1p307>
- Bitzinger, R. A. (2016). Reforming China's defense industry. *Journal of Strategic Studies*, 39(5–6), 762–789. <https://doi.org/10.1080/01402390.2016.1221819>
- Blank, S. (2016). Russian arms sales and defense industries: Facing new challenges. *Korean Journal of Defense Analysis*, 28(3), 403–428. https://www.kci.go.kr/kciportal/landing/article.kci?arti_id=ART002138705
- Booth, A., Sutton, A., & Papaioannou, D. (2016). Systematic approaches to a successful literature review. *Journal of the Canadian Health Libraries Association / Journal de l'Association des bibliothèques de la santé du Canada*, 34(2). <https://doi.org/10.5596/c13-009>
- Damanik, S. C., Tarigan, H., Sumarno, A. P., & Almubaroq, Z. (2024). Investment dynamics in the Indonesian defense industry: A literature study analysis. *International Journal Of Humanities Education And Social Sciences (IJHESS)*, 3(4), 1992–1998. <https://ijhess.com/index.php/ijhess/>
- Dwiguna, A. R., Subroto, A., & Sanusi, A. (2022). Analisis kompetitif industri pertahanan nasional: Prospek dan tantangan pasca revisi Undang-Undang Nomor 16 Tahun 2012 tentang Industri Pertahanan. *Jurnal Manajemen Strategi Dan Aplikasi Bisnis*, 5(1), 43–58. <https://doi.org/10.36407/jmsab.v5i1.415>
- Esitashvili, N. G., & Martín, F. (2020). NATO's internal deepening, endurance, and expansion: Economic incentives and gains as an explanatory complement to realist alliance theory. *Journal of Strategic Security*, 13(3), 17–45. <https://doi.org/10.5038/1944-0472.13.3.1828>
- Farrell, T. (1980). RTHUR LEWIS AND THE CASE FOR CARIBBEAN INDUSTRIALISATION. *Social and Economic Studies*, 29(4), 52–75. <http://www.jstor.org/stable/27861908>
- Fernandes, L. L., Rosa, G. F., Araújo, L. O. De, & Júnior, J. L. A. (2020). The triple helix approach in the defence industry: A case study at the Brazilian Army. *World Review of Science, Technology and Sust. Development*, 16(1), 22–43.

- Girvan, N. (2005). W.A. Lewis, the plantation school and dependency: An interpretation. *Social and Economic Studies*, 54(3), 198–221. <http://www.jstor.org/stable/27866435>
- Gutterman, E., & Lane, A. (2017). Beyond LAVs: Corruption, commercialization and the Canadian defence industry. *Canadian Foreign Policy Journal*, 23(1), 77–92. <https://doi.org/10.1080/11926422.2016.1254663>
- Hartley, K. (2022). Augustine, costs, and defense industries. *The Economics of Peace and Security Journal*, 17(1), 30–36. <https://doi.org/10.15355/epsj.17.1.30>
- Hensel, N. (2016). The defense industry: Tradeoffs between fiscal constraints and national security challenges. *Business Economics*, 51(2), 111–122. <https://doi.org/10.1057/be.2016.16>
- Herre, B. (2024). Millions have died in conflicts since the Cold War; most of them in Africa and intrastate conflicts. Published online at *OurWorldinData.Org*. <https://ourworldindata.org/conflict-deaths-breakdown>
- Ingham, B., & Mosley, P. (2013). Sir Arthur Lewis. In *Sir Arthur Lewis*. Palgrave Macmillan UK. <https://doi.org/10.1057/9781137366436>
- Jan, C. G., & Su, M. (2023). China's defense industry development policy—with focus on the implications using the dynamic model. *Korean Journal of Defense Analysis*, 35(1), 111–140. <https://doi.org/10.22883/kjda.2023.35.1.006>
- Kar, M., & Çetenak, Ö. Ö. (2022). Transformation and economic effects of the Turkish aerospace and defense industry. In *TÜBA* (pp. 549–572). TÜBA - TURKISH ACADEMY OF SCIENCES. <https://doi.org/10.53478/tuba.978-625-8352-17-7.ch27>
- Kollias, C., & Paleologou, S.-M. (2019). Military spending, economic growth, and investment: A disaggregated analysis by income group. *Empirical Economics*, 56(3), 935–958. <https://doi.org/10.1007/s00181-017-1379-2>
- Krč, M., & Hynková, V. (2024). Exploring the defence industry's macroeconomic and microeconomic perspectives under new security conditions. *Challenges to National Defence in Contemporary Geopolitical Situation*, 1(1), 597–602. <https://doi.org/10.3849/cndcgs.2024.597>
- Liang, X., Tian, N., Lopes da Silva, D., Scarazzato, L., Karim, Z. A., & Guiberteau Ricard, J. (2025). Trends in world military expenditure, 2024 (Issue April). <https://doi.org/10.55163/AVEC8366>
- Lorenzo, S., Nan, T., Silva, D. L., Djokic, K., & Liang, X. (2024). The SIPRI top 100 arms-producing and military services companies, 2023 (Issue December). <https://www.sipri.org/visualizations/2024/sipri-top-100-arms-producing-and-military-services-companies-world-2023>
- Malle, S., & Cooper, J. (2014). The pendulum moves from Europe to Asia. Modernizing Siberia and the Far East: Economic and security issues. *Journal of Eurasian Studies*, 5(1), 21–38. <https://doi.org/10.1016/j.euras.2013.10.004>
- Marshall, J. A. (2014). Russia's struggle for military reform: A breakdown in conversion capabilities. *The Journal of Slavic Military Studies*, 27(2), 189–209. <https://doi.org/10.1080/13518046.2013.844488>
- Martynenko, E. V., & Parkhitko, N. P. (2018). Implementation of the Russian state armaments program 2011–2020: Economic and financial analysis. *European Research Studies Journal*, 21(2), 506–517. <https://ersj.eu/journal/1277>
- Maye, D. (2017). Autarky or interdependence: U.S. vs. European security and defense industries in a globalized market. *Journal of Strategic Security*, 10(2), 33–47. <https://doi.org/10.5038/1944-0472.10.2.1597>
- McBurney, M. K., & Novak, P. L. (2002). What is bibliometrics and why should you care? *Proceedings, IEEE International Professional Communication Conference*, 108–114. <https://doi.org/10.1109/IPCC.2002.1049094>
- Mckenzie, R. A. (2005). Theoretical approaches to social & economic development in the Caribbean. 1–38. <https://www2.cavehill.uwi.edu/salises/conferences/past-conferences/2005/structuralistapproachestosocialandcaribbeaneconomi.aspx>
- Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J. A., Clark, J., Clarke, M., Cook, D., D'Amico, R., Deeks, J. J., Devereaux, P. J., Dickersin, K., Egger, M., Ernst, E., Gøtzsche, P. C., ... Tugwell,

- P. (2009). Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. *PLoS Medicine*, 6(7).
<https://doi.org/10.1371/journal.pmed.1000097>
- Mulyani, E. G., Saputro, & Deksin, G. R. (2022). Peningkatan ekonomi pertahanan negara melalui implementasi kebijakan produksi kendaraan tempur Anoa PT PINDAD (Persero). *Jurnal Inovasi Penelitian*, 2(9), 2907–2916.
<https://ejournal.stpmataram.ac.id/JIP/article/view/1232>
- Nugroho, A. (2022). Perkembangan industri pertahanan di Indonesia. *JlIP - Jurnal Ilmiah Ilmu Pendidikan*, 5(11), 4729–4733.
<https://doi.org/https://doi.org/10.54371/jiip.v5i11.1073>
- Nurfitriani, W., Nugroho, V., Afriyanto, & Deksin, G. R. (2023). Empowering the Association of Indonesian National Private Defense Industries (Pinhantanas) to build the independence of the defense industry. *Jurnal Pertahanan: Media Informasi Ttg Kajian & Strategi Pertahanan Yang Mengedepankan Identity, Nasionalism & Integrity*, 9(2), 388–396. <https://doi.org/10.33172/jp.v9i2.15820>
- Nurpatria, B., Ras, A. R., & Supriyadi, I. (2022). Analisis substitusi impor guna mendukung kemandirian industri kendaraan taktis di bidang pertahanan dan keamanan Indonesia. *Analisis Substitusi Impor Guna Mendukung Kemandirian Industri Kendaraan Taktis Di Bidang Pertahanan Dan Keamanan Indonesia*, 107–133.
https://www.researchgate.net/publication/363470605_ANALISIS_SUBSTITUSI_IMPOR_GUNA_MENDUKUNG_KEMANDIRIAN_INDUSTRI_KENDARAAN_TAKTIS_DI_BIDANG_PERTAHANAN_DAN_KEAMANAN_INDONESIA
- Nursalam, F., & Yunanda, W. W. (2023). Analisis SWOT dalam manajemen rantai pasok industri pertahanan Indonesia. *Jurnal Teknik Industri: Jurnal Hasil Penelitian Dan Karya Ilmiah Dalam Bidang Teknik Industri*, 9(1), 331.
<https://doi.org/10.24014/jti.v9i1.21820>
- O'Neill, A. (2025). Estimated number of military and civilian fatalities due to the Second World War per country or region between 1939 and 1945. *Statista*.
<https://www.statista.com/statistics/1293510/second-world-war-fatalities-per-country/>
- Prihandoko, R. T., Triantama, F., Wahyudi, A. H., & Priamarizki, A. (2023). *Optimasi industri pertahanan nasional guna mendorong transformasi militer Indonesia* (1st ed.). Laboratorium Indonesia 2045. <https://www.lab45.id/detail/256/optimasi-industri-pertahanan-nasional-nbsp-guna-mendorong-transformasi-militer-indonesia>
- Quezada-Sarmiento, P. A., Elorriaga, J. A., Arruarte, A., & Washizaki, H. (2020). Open BOK on software engineering educational context: A systematic literature review. *Sustainability*, 12(17). <https://doi.org/10.3390/SU12176858>
- Rafsanjani, M. Z. M., Suhirwan, & Navalino, D. A. (2023). Produksi alutsista dalam mendukung pendapatan negara di PT PINDAD dan PT LEN. *El-Mal: Jurnal Kajian Ekonomi & Bisnis Islam*, 4(5), 1395–1402.
<https://journal.laaroiba.com/index.php/elmal/article/view/3321>
- Ramadhoni, M. B. E., Siahaan, T., Khaerudin, & Jandhan, I. P. (2024). The impact of war on the global economy: Challenges and opportunities for the Indonesian defense industry. *Jurnal Multidisiplin Madani*, 4(7), 908–918.
<https://doi.org/10.55927/mudima.v4i7.9752>
- Sabana, D., Ramadhan, D., et al. (2023). Tren pasar senjata global dan pengembangan industri pertahanan Indonesia. In *LAB 45 Monograf*. Laboratorium Indonesia 2045.
<https://img.lab45.id/images/article/2023/11/28/259/7721tren-pasar-senjata-global-dan-pengembangan-industri-pertahanan-indonesia.pdf>
- Salsabiela, B. F. (2018). Analisis akuisisi teknologi industri pertahanan Indonesia: Studi kasus pengembangan pesawat tempur Korean Fighter Xperiment/ Indonesian Fighter Xperiment (KfX/IFX). *Jurnal Pertahanan & Bela Negara*, 6(2), 51–74.
<https://www.neliti.com/id/publications/359896/analisis-akuisisi-teknologi-industri-pertahanan-indonesia-studi-kasus-pengembang>
- Sarjito, A. (2024). Kebijakan pertahanan strategis: Mendefinisikan ulang pengadaan alat peralatan pertahanan dan keamanan sebagai investasi, bukan pemborosan. *Journal*

- of Government Science Studies*, 3(2), 61–76.
<https://doi.org/10.30598/jgssvol3issue2page61-69>
- Shamseer, L., Moher, D., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L. A., Altman, D. G., Booth, A., Chan, A. W., Chang, S., Clifford, T., Dickersin, K., Egger, M., Gøtzsche, P. C., Grimshaw, J. M., Groves, T., Helfand, M., ... Whitlock, E. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: Elaboration and explanation. *BMJ (Online)*, 349(January), 1–25. <https://doi.org/10.1136/bmj.g7647>
- Silva, M. V. G. da, & Olavo-Quandt, C. (2019). Defense system, industry and academy: The conceptual model of innovation of the Brazilian Army. *Journal of Technology Management & Innovation*, 14(1), 53–62. <https://doi.org/10.4067/S0718-27242019000100053>
- Soshkin, M. (2016). The US aerospace industry: A manufacturing powerhouse. *Business Economics*, 51(3), 166–180. <https://doi.org/10.1057/s11369-016-0008-y>
- Soubrier, E. (2020). The weaponized Gulf riyal politik(s) and shifting dynamics of the global arms trade. *The Economics of Peace and Security Journal*, 15(1), 49–57. <https://doi.org/10.15355/epsj.15.1.49>
- Stockholm International Peace Research Institute (SIPRI). (2025). SIPRI arms transfers database 2015-2024. *SIPRI Databases*.
<https://www.sipri.org/databases/armstransfers>
- Sudirman, A., Djuyandi, Y., & Pratama, F. S. G. (2023). Memahami dinamika kerjasama industri pertahanan dalam kerangka Indonesia Australia Defence Security Dialogue. *Journal of Political Issues*, 4(2), 120–136. <https://doi.org/10.33019/jpi.v4i2.82>
- Sumarlan, S., Widodo, P., & Valdano Akbar, F. (2019). Kebijakan politik penjualan senjata api kecil & ringan Indonesia dalam perdagangan senjata global. *Jurnal Program Studi Universitas Pertahanan*, 1(1), 47–74.
<https://jurnalprodi.idu.ac.id/index.php/IP/article/view/456/JIPV1N1>
- Sürücü, L., Eminer, F., & Sağbaş, M. (2022). The relationship of defense expenditures and economic growth: Examples of Turkey and China (2000-2020). *Güvenlik Stratejileri Dergisi*, 18(41), 171–199. <https://doi.org/10.17752/guvenlikstrj.1026084>
- Susdarwono, E. T. (2020). Research and development (R & D) sebagai pilar utama dalam membangun ekonomi industri pertahanan Indonesia. *Madani: Indonesian Journal of Civil Society*, 2(2), 57–70. <https://doi.org/10.35970/madani.v2i2.278>
- Susdarwono, E. T. (2021). Ekonomi industri pertahanan: Konsep dual-use technologies (spin on & spin off) sebagai upaya percepatan kemandirian industri pertahanan Indonesia. *ECODUCATION Economics & Education Journal*, 3(2), 135–153.
<http://ejurnal.budiutomomalang.ac.id/index.php/ecoducation>
- Susdarwono, E. T., & Anis, A. (2020). Potensi industri Bregasmalang – Petanglong dalam mendukung terciptanya kluster pendukung dan bahan baku industri pertahanan Indonesia. *Jurnal Litbang Kota Pekalongan*, 18(1), 36–55.
<https://doi.org/https://doi.org/10.54911/litbang.v18i0.118>
- Troath, S. (2023). The political economy of Australian militarism: On the emergent military–industrial–academic complex. *Journal of Global Security Studies*, 8(4), 1–16.
<https://doi.org/10.1093/jogss/ogad018>
- Undang Undang RI Nomor 11 Tahun 2020 Tentang Cipta Kerja (The Omnibus Law), 1 (2020). <https://peraturan.bpk.go.id/Details/149750/uu-no-11-tahun-2020>
- Undang-Undang RI Nomor 6 Tahun 2023 Tentang Penetapan Peraturan Pemerintah Pengganti Undang-Undang Nomor 2 Tahun 2022 Tentang Cipta Kerja, Pub. L. No. 6 Tahun 2023 (2023). <https://peraturan.bpk.go.id/Details/246523/uu-no-6-tahun-2023>
- World Bank. (2025). GNI per capita, atlas method (current dollar).
<https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?utm>
- Yadav, A. (2024). India's defense industry: The rise and the transformation. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.4771042>
- Yulivan, I., Ahmad, A., Arifin, A., Dewi, G. S., Putri, I. A., Utami, W. F., Hermanto, D., Suwarno, P., & Purwantoro, S. A. (2022). Peran PT Pindad dalam ekonomi

- pertahanan di Jawa Timur. *Jurnal Inovasi Penelitian*, 9(11), 356–363.
<https://ejournal.stpmataram.ac.id/JIP/article/view/1461>
- Yulivan, I., Mahroza, J., Rianto, R., Prakoso, L. Y., & Setiadi, M. I. (2024). Defense entrepreneurship a solution to RI limited defense budget. *Indonesian Journal of Interdisciplinary Research in Science and Technology*, 2(1), 71–80.
<https://doi.org/10.55927/marcopolo.v2i1.7710>
- Zhuravlov, D., Anishchuk, V., Chyzhov, D., Pashynskyi, V., & Zaitsev, M. (2020). The defense-industrial complex as the basis of the national security of the state. *Journal of Security and Sustainability Issues*, 9(3), 829–842.
[https://doi.org/10.9770/jssi.2020.9.3\(9\)](https://doi.org/10.9770/jssi.2020.9.3(9))