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Defence Industry Policy of Indonesia: A Lesson Learned from India

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Abstract

National defence industry self-reliance has become a strategic imperative for states globally, particularly in an international system characterized by anarchy and self-help dynamics. Within this context, the state emerges as the central actor in safeguarding its sovereignty, and the pursuit of defence industry autonomy represents a key survival strategy. This study analyzes Indonesia's defence industry policy through the theoretical lenses of realism, the developmental state, and the triple helix framework, drawing comparative insights from India, a country widely regarded as more advanced in this sector. Both Indonesia and India are major emerging powers in the Global South with shared ambitions for defence self-reliance, yet they demonstrate divergent trajectories in institutional capacity and policy outcomes, making them suitable for comparative analysis. Employing a qualitative case study design, the research utilizes secondary data from official documents, academic literature, research institute reports, and credible media sources. The findings indicate that while Indonesia benefits from a solid legal foundation (notably Law No. 16/2012) and political commitment, its defence industrial development is hindered by limited fiscal allocations, the dominance of state-owned enterprises, underdeveloped industrial research capabilities, and weak synergy

within the triple helix model. Conversely, India has advanced its defence sector through strategic initiatives such as Make in India and Atmanirbhar Bharat, underpinned by fiscal incentives, deregulation, increased private sector engagement, enhanced research through the Defence Research and Development Organisation (DRDO), and a well-integrated triple helix innovation ecosystem. These comparative insights underscore the need for Indonesia to reform its policy paradigm by strengthening its industrial roadmap, fostering private sector participation, enhancing government–industry–academia collaboration, and pursuing export-oriented and technology transfer strategies. Theoretically, the study contributes to the growing literature on defence industry development in emerging states; practically, it offers policy recommendations aimed at improving Indonesia's defence industrial ecosystem, enhancing global competitiveness, and reducing import dependency through innovation-led self-reliance.

Keywords: India; Indonesia; Defence Industry; Policy; Self-Reliance

INTRODUCTION

The anarchic and unpredictable nature of the international system compels sovereign states to independently ensure their national security and sovereignty (Lechner, 2017). One of the key instruments used by states to achieve this objective is the development of an autonomous and competitive national defence industry. Indonesia and India, both classified as developing countries, occupy strategically important positions in their respective regions. Indonesia is located in Southeast Asia and the Indo-Pacific areas marked by increasingly complex geopolitical dynamics - while India faces threats from neighboring countries, particularly Pakistan and China, with whom it shares a long history of tension and conflict (Bhadauriya, 2025; Council on Foreign Relations, 2025).

Both nations share a historical reliance on imported defence equipment. Indonesia experienced a military embargo imposed by the United States-its primary arms supplier at the time between 1991 and 2005. This embargo led to the paralysis of Indonesia's weapons systems and significantly hampered the modernization of its national armed forces (Saptohutomo, 2023). Similarly, India has historically depended heavily on Russian arms supplies. However, its efforts to achieve self-reliance in defence production have been further motivated by the ongoing Russia-Ukraine conflict, which has created uncertainty in

the delivery of military systems to India (Stein, 2023). Both countries have sought to develop independent defence industries in order to safeguard national interests, reduce foreign dependence, and avoid the risks posed by embargoes or external political pressures. And it is interesting to knowing if two countries have the same historical struggle in terms of defence industry.

To successfully advance the development of self-reliant defence industries, it is essential to establish well-designed and coherent policies. Indonesia has strengthened its legal framework through Law No. 16 of 2012 on the Defence Industry, and has adopted policies such as offsets, local content requirements, and technology transfers to encourage domestic defence production. In a similar vein, India has launched the "Make in India" and "Atmanirbhar Bharat" initiatives to reduce reliance on imports and bolster its domestic defence sector (Sharma, 2024).

The strategic importance of defence industry self-reliance is emphasized by heightened geopolitical tensions worldwide and also to gain national interest through economic growth, which necessitate nations to bolster their defence capabilities without excessive reliance on foreign technology and suppliers (Pedah et al., 2025). Self-reliance in the defence sector enhances a nation's strategic autonomy and allows for tailored responses to unique security challenges, for example influenced by geography, foreign policy, alliances, etc. This is particularly relevant in the context of emerging powers like Indonesia and India, where the drive for self- sufficiency reflects broader global trends aimed at reducing dependence on foreign military technologies, which can expose nations to vulnerabilities during geopolitical friction (Béraud-Sudreau et al., 2022). Recent policy shifts in both countries emphasize indigenization and the development of local defence industries, aiming to cultivate a robust military- industrial complex capable of independently meeting national defence needs (Surahman et al., 2024).

This article examines Indonesia's defence industry policy by drawing lessons from India's experiences, focusing on efforts to achieve greater self-reliance in the defence sector. India is selected as the case study because its policy framework and implementation strategies are considered more advanced than those of Indonesia. By analyzing the key drivers, policy initiatives, and the integration of a more cohesive triple helix ecosystem in India, the study seeks to generate insights applicable to Indonesia. Familiarity with India's flagship initiatives, such as Make in India and Atmanirbhar Bharat, provides a valuable

reference for Indonesian policymakers and scholars in reassessing existing strategies and designing more effective measures. Ultimately, the study contributes to the discourse on strengthening Indonesia's defence industry in line with military modernization agendas and the evolving challenges of the global strategic environment.

Realism in International Relations and Defence Industry Self-Reliance

The development of a national defence industry is an integral component of a state's strategy to preserve its sovereignty and ensure national security. From the perspective of international relations, both classical realism and neorealism assert that the state is the principal actor within an anarchic international system, where no supranational authority exists to guarantee security except the state itself. Consequently, the establishment of military strength-including through a self-reliant defence industry, is a rational imperative for every state seeking to safeguard its existence. Morgenthau emphasized that national interest, rooted in the pursuit of power and security, serves as the fundamental guideline for shaping both foreign and defence policy (Navari, 2016). Within this context, the development of a domestic defence industry is understood as a strategic instrument to protect vital national interests, reduce reliance on external suppliers, and enhance national capacity in the face of external threats.

Self-reliance has become increasingly central to modern defence strategies, in which states are expected to independently develop their defence production capabilities to ensure the operational sustainability of their military forces-regardless of the political conditions of supplier countries (Schmid, 2018). To advance this objective, Chalmers Johnson's concept of the developmental state provides a relevant analytical lens. It emphasizes the active role of the state as the principal driver of economic development and strategic industrialization through well-planned policies, selective market interventions, and targeted support for priority sectors, including defence (Singh & Ovadia, 2018). Central to this model are a strong bureaucracy, consistent industrial policies, and close state-industry partnerships aimed at fostering technological advancement and production capacity.

The dynamics of defence innovation can also be understood through the Triple Helix model by Etzkowitz and Leydesdorff, which underscores the interaction between three key actors: government, industry, and universities or research institutions (Martinez & Perez, 2022). Within the defence sector, the government functions as a policymaker and provider of incentives, industry serves as the producer and commercializer of technologies,

while universities act as hubs for research and human capital development. Effective collaboration among these three actors is expected to accelerate innovation, broaden the national technological base, and establish a globally competitive defence ecosystem.

Both Indonesia and India represent developing states that have historically relied on defence imports but, in recent decades, have sought greater autonomy through strategic policy measures. Indonesia has enacted Law No. 16/2012 alongside offset and technology-transfer policies, while India has advanced its defence self-reliance through policies initiatives such as Make in India and Atmanirbhar Bharat. As Bitzinger (2015) argues, the effectiveness of such strategies depends largely on policy consistency, industrial capacity, and sustained partnerships among government, state-owned enterprises, private actors, and research institutions. In practice, India's defence industrial policy demonstrates a stronger integration of developmental state principles and the Triple Helix model, thereby reducing import dependence and expanding defence exports. This trajectory offers valuable lessons for Indonesia in its pursuit of defence industry self-reliance.

METHODS

This study utilizes a qualitative research methodology to conduct an analysis of the policy of Indonesia's defence industry and lesson learned from India especially those related to develop a self-reliance defence industry. The qualitative approach is most suitable as it allows for an in-depth exploration of complex social and political phenomena within their real-world context.

Research Design

Specifically, this research employs a case study design. This design was chosen because it provides a structured framework for an in-depth investigation of a contemporary phenomenon-the development of a self-reliant defence industry-within two distinct, "bounded systems" or cases: Indonesia and India (Creswell & Poth, 2018; Yin, 2018). By systematically looking to these two cases, the study aims to identify, analyze, and explain the lesson that Indonesia can learned from India.

The two cases were selected based on several criteria: both are major developing nations in strategically vital regions, share a history of reliance on foreign arms imports, and have explicitly articulated national policies aimed at achieving defence industry self-reliance.

India was selected as a model case because it demonstrates a more advanced capacity in formulating defence industry policies and in establishing an ecosystem that enables those policies to operate effectively and generate more substantial outcomes.

Data Collection and Sources

Consistent with a case study design, this research relies on the collection and analysis of multiple sources of secondary data. A comprehensive document analysis was conducted to gather rich, descriptive data on the research topic. The data sources were systematically collected and cataloged, including:

1. Official Government Documents: Policy papers, legislative acts (e.g., Indonesia's Law No. 16 of 2012, India's Defence Acquisition Procedure 2020), and official publications from the Ministries of Defence of both countries.

2. Academic and Scholarly Literature: Peer-reviewed journal articles, books, and dissertations focusing on defence economics, international relations, security studies, and the specific defence industries of Indonesia and India.

3. Reports from Think Tanks and Research Institutions: In-depth reports and analyses from credible organizations such as the Stockholm International Peace Research Institute (SIPRI), the Military Balance, and other regional security-focused institutions.

4. Reputable News Media and Industry Publications: Articles and reports from established international and national news outlets that provide contemporary context and track recent developments.

Data Analysis

The data were analyzed through a structured, three-stage process based on thematic analysis.

1. Organization and Familiarization: All documents were grouped into two datasets, one for Indonesia and one for India. Each dataset was reviewed carefully to build a solid understanding of the context.

2. Coding and Categorization: The two cases were examined separately using open coding. Key details such as policies, concepts, and events were identified and labeled. These codes were then clustered into broader categories, including legal frameworks, private sector involvement, research and development capacity, and export performance.

3. Theme Development and Cross-Case Examination: The categories were refined into broader analytical themes, such as geopolitical urgency, policy formulation, the triple helix ecosystem, enabling and constraining factors, and achievements. After analyzing each country, the study examined how Indonesia can draw lessons from India in strengthening defense industry self-reliance. This stage focused on policies, implementation patterns (through the triple helix framework), and the outcomes in both contexts. The aim was to identify Indonesia's challenges and India's strengths, which then shaped the "Lesson Learned from India" section. Throughout this process, the analysis was guided by the theoretical lenses of realism, the developmental state, and the triple helix model.

RESULTS

This section presents key findings from this study regarding the policies or initiatives adopted by Indonesia and India in developing their defence industries. These findings are based on an analysis of relevant literature and documents, which outline the view of realism in the international arena as a driving factor in defence industry development, policy initiatives, government-industry-research institution collaboration, and the achievements of both countries in their efforts to achieve defence industry independence. The results of this study will then be used as material for discussion in the next section on the important lessons Indonesia can learn from India to develop its defence industry independence.

Development of Indonesia's Defence Industry

Indonesia occupies a strategic position in Southeast Asia and the Indo-Pacific, where increased military activity by major countries, particularly in the South China Sea, poses significant challenges. The urgency of defence industry self-reliance for Indonesia is further reinforced by the historical experience of the United States arms embargo between 1995 and 2005, which significantly disrupted military modernization and crippled its weapons systems. These issues underscore the critical need to reduce dependence on imports to ensure Indonesia's readiness in facing various threats.

The development of Indonesia's defence industry still strongly reflects the characteristics of a developmental state, in which the state holds primary control over policy formation and development direction. This is clearly evident in Law No. 16 of 2012 on the Defence Industry, which affirms that defence industry independence is part of the

national sovereignty strategy. This law serves as the main legal basis, promoting independence, competitiveness, and sustainability by mandating the use of domestic products and through mechanisms such as technology transfer (ToT), offset arrangements, and local content requirements. Institutionally, the Defence Industry Policy Committee (KKIP) was formed as a forum for inter-ministerial coordination and to oversee the direction and evaluation of related policies.

Several driving factors have been identified in Indonesia's efforts to achieve defence industry independence, including the anarchic nature of the international system (the principle of self-reliance), geopolitical threats, vulnerability to external pressure and embargoes, and a strong political commitment demonstrated through regulations and strategic initiatives. However, Indonesia faces several obstacles, one of the main challenges being a limited defence budget, which is still below 1% of GDP. Indonesia's defence budget for 2025 is 165 trillion rupiah, or around 10.2 billion USD. This budget is only about 0.7% of GDP in 2025, and still lags behind the defence budgets of a number of countries around the world, which range from 1-2% of GDP. Furthermore, a significant portion of this budget is allocated to personnel expenses, which indirectly limits investment in defence research and development.

From an industrial perspective, state-owned enterprises still dominate, especially companies that are part of the DEFEND ID holding company, such as PT Dahana, PT Pindad, PT Dirgantara Indonesia, PT PAL, and PT LEN, so that the role of the private sector is still limited and does not yet have a significant role in R&D or production. This confirms the state-driven industry orientation typical of a developmental state. The role of universities and research institutions, such as BRIN, the Defence University, and a number of technical colleges, is still limited to basic research and is not yet fully connected to the needs of the defence industry. This reflects the weak collaboration between the government, industry, and research institutions/universities, which will be elaborated in the triple helix model of Etzkowitz & Leydesdorff in the following discussion.

Table 1 Defence Industry Policy in the Perspective of the Developmental State & Triple Helix in Indonesia

Aspect	Findings
Role of the State (Developmental State)	Law No. 16 of 2012; Establishment of KKIP; Establishment of DEFEND ID Holding;
Industry	Dominated by state-owned enterprises; limited private sector
Research Institutions/Universities	Research institutions such as BRIN and universities such as UNHAN are involved in basic research, but research and industry contributions on a production scale are still weak
Triple Helix Synergy	Weak; academic research is rarely connected to industrial needs; private sector is passive; state policies have not fully facilitated collaboration between the three helixes

Development of India's Defence Industry

India faces a tense geopolitical environment, particularly with Pakistan and China, both of which continue to modernize their military capabilities. This directly and indirectly compels India to undertake similar modernization efforts to protect its sovereignty and assert its national interests. The COVID-19 pandemic and the Russia-Ukraine conflict have further highlighted the vulnerability of global supply chains, especially as India still relies on Russian military equipment. This confirms that global uncertainty and regional security dynamics are key drivers behind India's efforts to achieve defence industrial self-reliance as a core element of its national interest agenda.

India began its industrial reforms with the liberalization of the defence sector in the early 2000s. Key initiatives such as Make in India (2014) and Atmanirbhar Bharat (2020) were launched to reduce import dependence and encourage domestic manufacturing through government-funded, industry-led projects, most of which are ToT-based. These initiatives are supported by a significant defence budget, which in 2024 ranks sixth in the world in terms of defence spending. India's defence budget for FY 2025-2026 is expected to reach USD 77.4 billion. The Defence Acquisition Procedure (DAP) 2020 and Positive Indigenization List (PIL) 2020 further emphasize local production and procurement from domestic manufacturers. The Indian government also provides incentives to attract private investment and supports research and development institutions such as the Defence Research and Development Organization (DRDO) and the Indian Institute of Technology

(IIT). Overall, India's defence industry autonomy is led by the state, supported by a comprehensive policy framework and development initiatives.

Unlike Indonesia, India displays a combination of a strong developmental state and a more mature collaborative ecosystem. The state plays an active role in creating a conducive regulatory climate while providing incentives for private involvement. The Ministry of Defence (MoD) is the driving force behind policy coordination, demonstrating the characteristics of a developmental state capable of directing the industrialization of strategic sectors. On the industrial side, India has successfully involved both defence state-owned enterprises (DPSUs) and large private sector companies such as Tata, Mahindra, and Larsen & Toubro, even in joint venture schemes with global companies. This shows that the state not only dominates but also encourages private participation through deregulation and partnership- . The role of universities and research institutions is particularly prominent through the Defence Research and Development Organization (DRDO), which systematically collaborates with the Indian Institutes of Technology (IITs) to produce defence innovations. The triple helix synergy in India works better, marked by an integrated flow of research to industry and the existence of state policies that are oriented towards domestic innovation.

Table 2. Defence Industry Policy in the Perspective of the Developmental State & Triple Helix in India

Aspect	Findings
Role of the State (Developmental State)	Make in India & Atmanirbhar Bharat policies; DAP 2020; Increased FDI (Foreign Direct Investment); and so on
Industry	DPSUs (Defence Public Sector Undertakings) + private sector (Tata, Mahindra, Larsen & Tourbo, etc) are actively involved
Research Institutions/Universities	DRDO is integrated with IITs; research is oriented towards defence needs
Triple Helix Synergy	Strong; industry-linked research; active private sector; state policy encourages third helix collaboration.

DISCUSSION

Indonesia's defence industry policy stems from the strategic awareness that dependence on external parties for the fulfillment of major weaponry systems (alutsista) threatens national security. Within the framework of realism theory, the state is the main actor that must ensure its survival in an anarchic and unpredictable international system. In

this context, strengthening the defence industry is a rational step for Indonesia to minimize external dependence and maximize domestic capacity in responding to conventional and non-conventional military threats. The government's decision to develop defence independence is reflected in strategic policies such as Law No. 16 of 2012 on the Defence Industry, which establishes the principle of self-reliance as the basis for building national defence capabilities (Susdarwono et al., 2020). Through this law, the state affirms its position as the main actor in the development of this strategic sector. This legal framework reflects the logic of the developmental state, in which the government not only sets policy direction but also functions as a regulator, the main funder, and the controller of the defence supply chain.

In terms of budget, the Indonesian government has actually made efforts to increase the share of the defence budget in the Gross Domestic Product (GDP). By 2025, Indonesia's defence allocation will be 165 trillion rupiah or around 10.2 billion USD (The International Institute for Strategic Studies, 2025), which is estimated to be around 0.7% of Indonesia's GDP, relatively low compared to other countries in the world. Although this figure seems significant, and the Ministry of Defence is one of the ministries with the largest budget, when the distribution of its use is detailed in the 2025 State Budget Meeting, it shows a classic trend: most of the budget is allocated for modernization, maintenance, and soldier welfare, while the portion for research and development (R&D) in the defence industry is relatively small (Grevatt & MacDonald, 2024). Only around 1.6 trillion rupiah is specifically allocated to support research and development in this sector. This budget priority gap shows that the long-term goal of technological independence is still being sidelined by short-term needs for equipment modernization and military posture strengthening.

To understand these dynamics more deeply, the developmental state approach offers a powerful lens. Chalmers Johnson explains that developing countries can achieve significant progress in strategic sectors through active state intervention and the existence of an autonomous and professional bureaucracy (Singh & Ovadia, 2018). In the Indonesian context, the state's role in the defence industry can be seen in its ownership and management of a number of strategic state-owned enterprises such as PT Pindad, PT PAL, PT Dirgantara Indonesia, PT Dahana, and PT LEN, which are members of the DEFEND ID holding company. The government not only acts as a regulator but also as the main driver of defence industrialization. The establishment of the Defence Industry Policy

Committee (KKIP) is one example of the government's role in navigating the development of the national defence industry. This institution has a role in planning and supervising the implementation of Law No. 16 of 2012 (Zakaria et al., 2022). Through the KKIP, the government is trying to build a centralized and integrated policy-making system between the defence and economic sectors (Kusumanegara, 2024).

However, the nature of Indonesian bureaucracy, which is not yet fully autonomous and efficient, often acts as an obstacle. Institutional fragmentation between the Ministry of Defence, the Ministry of State-Owned Enterprises, the Ministry of Research and Technology/BRIN, and a number of other related institutions has led to overlapping policies and weak coordination (Surahman et al., 2024). This makes it difficult to achieve long-term goals within the framework of an ideal developmental state, which requires strong synergy between technocratic planning and field implementation. Furthermore, limitations in creating domestic technological innovation indicate a weak research and development (R&D) ecosystem in the defence industry. This is a relevant entry point for using the Triple Helix Model approach, which emphasizes collaboration between three key actors in national innovation: government, industry, and universities/research institutions. In the case of Indonesia, this collaboration is still partial and has not been institutionalized systematically. Although there have been sporadic initiatives, such as the involvement of research institutions such as BRIN in the development of rocket and unmanned aircraft technology, R&D activities that support the defence industry have not been integrated into a sustainable national strategy (Ard, 2023; Sarjito, 2024).

The weak interconnection between research institutions/universities and industry also results in low absorptive capacity for technology transferred through foreign cooperation. Law No. 11 of 2019 concerning the National Science and Technology System actually mandates the integration of national research with the needs of the industrial sector, including defence. However, in practice, defence research is still trapped in a slow bureaucratic structure and is not yet fully driven by the operational needs of the TNI or the country's defence strategy (Nugroho, 2022). The low absorption of technology is also related to the suboptimal quality of research human resources and the lack of strong incentive mechanisms for innovators in the defence sector. With an R&D budget that is still far below 1% of GDP-below the average of other developing countries-domestic innovation capabilities are difficult to develop (Sarjito, 2024). In fact, the Triple Helix requires co-evolution from three actors: the state creates incentives and regulations;

industry adapts to market and operational needs; while research institutions/universities provide a foundation of knowledge and qualified experts.

In developing the domestic defence industry, it is still dominated by state-owned enterprises (SOEs)-especially those affiliated with the DEFEND ID holding company. Through these SOEs, Indonesia has entered into a number of international collaborations and remains heavily dependent on technology transfer from these collaborations rather than on the independent innovation of domestic institutions (Haryono et al., 2022). Although these collaborations contribute to efforts to increase the independence of the defence industry, they only result in a partial transfer of technology, which is often limited to the integration or assembly process and generally remains dependent on core technology from other countries. According to Irfan et al., there are concerns that this will increase dependence rather than build true independence, especially if domestic R&D and industrial integration cannot catch up (Irfan et al., 2023). Examples of this international cooperation include that between IPTN (now PT Dirgantara Indonesia) and CASA from Spain for the CN-235 aircraft, the collaboration between PT PAL and Daewoo from South Korea to build Landing Platform Dock (LPD) warships, and the joint development of the KFX/IFX multi-role fighter jet with South Korea, each of which integrates joint development, joint funding, and gradual transfer of technical knowledge (Nugroho, 2022).

Despite facing challenges in enhancing efforts to integrate the triple helix model in the development of Indonesia's defence industry, Indonesia continues to make gradual improvements and show progress. The establishment of the Defence Technology Research Center under BRIN and the strengthening of cooperation between the TNI and state universities are the first steps towards institutionalizing the Triple Helix model in the defence sector. However, this initiative still requires sustainability, clarity of financing structures, and intellectual property protection guarantees to strengthen innovation motivation in this sector (Widyatmoko et al., 2022). Overall, Indonesia's defence industry policy is in a dilemma: on the one hand, there is a strong normative framework and strategic intent, but on the other hand, its implementation is still limited by institutional structures, technological capacity, and budgetary politics that are not yet conducive to long-term development. From a realist perspective, this indicates that the state is not yet fully capable of converting its strategic intent into real power. Meanwhile, from the developmental state and Triple Helix approaches, institutional alignment, increased

research investment, and systemic integration of key actors are still needed for Indonesia's defence industry to develop independently, competitively, and sustainably.

Despite structural limitations, Indonesia's defence industry has made significant achievements. The CN-235 aircraft, produced in collaboration with Spain, is now operated by several countries, including South Korea, the UAE, and Thailand. The domestically designed Anoa armored vehicle, developed by PT Pindad in collaboration with Renault of France, has been used in UN peacekeeping missions and purchased by Malaysia. PT PAL has successfully exported naval vessels to the Philippines and Timor Leste, while PT Sritex supplies NATO-standard combat uniforms to more than 16 countries. Although still small in scale, these developments underscore the increasing competence and commercial credibility in certain sectors (Nugroho, 2022).

India's Steps in Defence Industry Development Efforts

After looking at Indonesia's defence industry policy, we will move to India's defence industry policy. India's defence industry policy is the product of pragmatic and in-depth realism calculations, as is the case with Indonesia and other countries around the world that are always trying to secure their position. For India, external threats such as border conflicts with China and Pakistan strengthen the justification for modernizing and strengthening the domestic defence industry (Bhadauriya, 2025; Council on Foreign Relations, 2025). In line with the realist approach, the state acts as a rational actor that maximizes its power in order to survive in an anarchic international system.

India's defence policy over the past two decades has shown a systematic effort to build independence. From the outset, the development of India's defence industry has been navigated by the state, as mentioned by Chalmers Johnson in the concept of the developmental state-the state as the main navigator and facilitator. For some time after independence, India's defence industry production model was built around a state-centered framework dominated by public sector enterprises such as Hindustan Aeronautics Limited (HAL), Ordnance Factory Board (OFB), and the Defence Research and Development Organization (DRDO) (Das, 2019). Recognizing the limitations of a closed and heavily state-dominated defence sector, India initiated policy reforms aimed at liberalization and diversification. A key moment came in 2001, when the government opened defence production to private sector participation and allowed up to 26% Foreign Direct Investment.

A significant momentum for India's defence industry came with the launch of the "Make in India" campaign in 2014 and its strategic expansion, "Atmanirbhar Bharat" (Self-Reliant India) in 2020, which encouraged domestic industry involvement and increased the role of the private sector in defence equipment production (Karanth & Bhat, 2024; Press Information Bureau, 2025). Under the Atmanirbhar Bharat program, India increased the foreign ownership limit in its defence industry to 74% through the automatic route and over 74% through the government route, to attract investment and technology transfer from strategic partners such as France, the United States, and other countries (Sinha, 2023) . These initiatives redefine India's defence industry policy by placing local manufacturing and innovation at its core.

Currently, the DRDO, as a public R&D agency, leads an extensive network of more than 50 research laboratories that develop systems such as the Agni series of ballistic missiles, the Arjun main battle tank, and the Tejas fighter jet. While public sector enterprises still dominate the landscape, accounting for about 80% of defence production, private players such as Tata Advanced Systems, Larsen & Toubro, Bharat Forge, and Mahindra Defence are becoming increasingly influential. These companies have contributed to various projects ranging from artillery systems and naval platforms to unmanned aerial vehicles (UAVs) and defence electronics. The Defence Acquisition Procedure (DAP) 2020 further strengthens indigenization by prioritizing procurement from Indian vendors, particularly through the "Buy India - IDDM" (Indigenously Designed, Developed, and Manufactured) and "Make India" categories.

Complementary schemes such as the iDEX (Innovation for Defence Excellence) initiative, the Strategic Partnership Model, and the Technology Development Fund have opened new channels for startups, small and medium-sized enterprises (SMEs), and academic institutions to participate in defence innovation (Nishith Desai Associates, 2023). Another Indian government policy that increasingly supports the development of the Indian defence industry is the Defence Procurement Procedure (DPP), which explicitly prioritizes the purchase of domestic products, ensuring a stable market for local manufacturers. The Indian government created the Positive Indigenization List (PIL), which is an official list of items prioritized for local production by the Indian defence industry. The government periodically releases the PIL list, encouraging state-owned enterprises and the private sector to develop and produce items on the list. The supports the Aatmanirbhar Bharat initiative and reduces dependence on imports (Ministry of

Defence India, 2022). Furthermore, India has established defence industry corridors in Uttar Pradesh and Tamil Nadu that provide state-of-the-art infrastructure, fast licensing, and financial incentives. These corridors aim to attract investment, encourage collaboration between state-owned enterprises, private companies, SMEs, and research institutions, and develop a defence innovation ecosystem. This helps achieve greater defence production targets and strengthens India's position as a global manufacturer (Pannu, 2025).

In addition to creating various supporting initiatives and policies, the budget is also crucial. Financially, India has shown an unwavering commitment to strengthening its defence capabilities. The country ranks sixth in the world in terms of defence budget according to Military Balance 2025. Its defence budget reached ₹6.81 lakh crore (± USD 77.4 billion) in fiscal year 2025-26, an increase of 9.5% from the previous year's budget (Press Information Bureau, 2025). This budget amounts to 1.9% of India's GDP. This budget is allocated mostly for revenue expenditure (46%); which includes personnel salaries and allowances and operational readiness. A total of 26% is directed towards capital expenditure for the purchase of new equipment (with 75% of the modernization budget allocated specifically for domestic procurement), pensions account for 24% of the total defence budget, and 4% for civil organizations (Hooda, 2025). Specifically, the budget allocated to DRDO is worth ₹26,817 crore (± USD 3.04 billion) - an increase of 12.4% compared to the fiscal year 2024-25 budget. Although this is only about 3.94% of the total defence budget and is still considered small to fund research and development, the government continues to strive to make improvements and pay attention to this aspect.

The implementation of the Triple Helix model in India demonstrates a coordinated effort between government, industry, and research in the defence innovation ecosystem. The government (first helix), through the DRDO, acts as a link between military requirements and national research capabilities. The DRDO has an extensive network of laboratories and actively collaborates with universities and leading research institutions, such as the Indian Institutes of Technology (IITs), to develop critical technologies (Sinha, 2023). Industry (the second helix), which was initially dominated by DPSUs, is now increasingly open to the private sector. Initiatives such as Innovations for Defence Excellence (iDEX) serve as an effective bridge to channel military technology needs to start-ups and SMEs, encouraging bottom-up innovation. This collaboration between the

government and private sector's is supported by policies that provide fiscal incentives and flexible regulations, facilitating knowledge transfer and production.

Universities and research institutions (the third helix) in India also play a role not only as providers of human resources, but also as active partners in strategic projects. Many major defence projects, such as the development of ballistic missiles, involve contributions from academics and researchers at renowned universities. This collaboration is often supported by research funds from the DRDO, which ensures that academic research is directly relevant to national defence needs (Bitzinger, 2015). This approach allows India to independently improve its absorptive capacity, rather than merely being an assembler. For example, in the Tejas fighter jet development project, despite facing many challenges, collaboration between the DRDO, HAL, and various academic institutions has succeeded in building a fundamental knowledge base in aerospace technology (Das, 2019).

In 2025, under the Minister of Education, IIT (Indian Institutes of Technology) Guwahati led a national strategic initiative to establish Manekshaw Centres for Defence and Security Research, a network of defence research centers at leading academic institutions in India, such as various IIT campuses, IISc (Indian Institute of Science), IIIT (Indian Institutes of Information Technology), and NIT (National Institutes of Technology) (Times of India, 2025). This program serves as a platform connecting the armed forces, security agencies, and research institutions to foster a defence innovation ecosystem. Its main objective is to bridge the gap between academics and the Indian armed forces in formulating and designing systems that meet national security needs, in line with the vision of "Atmanirbhar Bharat" (Self-Reliant India).

A comprehensive defence industry development policy, supported by efforts to gradually build an adequate collaborative ecosystem, has led India to success. India has shown substantial progress in defence exports. According to the Indian Ministry of Defence, the country's defence exports surged to approximately US$2.8 billion in 2024-2025, marking a 34-fold increase since 2013-2014. India now exports products such as drones, radar systems, and missile technology to more than 85 countries (Press Information Bureau, 2025). The Make in India and Atmanirbhar Bharat initiatives have successfully encouraged private sector participation and increased investment in defence research and development. SIPRI data for 2025 shows a 9.3% decline in India's arms imports between 2015-2019 and

2020-2024, underscoring the real progress in achieving self-reliance in the defence sector (SIPRI, 2025).

Lessons Learned for Indonesia

The transformation of India's defence industry policy in the last decade provides a number of important lessons for Indonesia, particularly in the context of the developmental state and triple helix. Although both countries are developing countries with a great need for defence modernization and strategic independence, India's approach shows differences that can be used as a reference. These lessons can be categorized into three main dimensions: (1) the role of the state as a director (developmental state), (2) the orchestration of a triple helix-based innovation ecosystem, and (3) internationalization strategies through exports and technology transfer.

1. The Role of the State as a Facilitator (Developmental State)

India has successfully combined the role of the state as the main driver and facilitator in defence industry development through integrated policies such as "Make in India" and "Atmanirbhar Bharat." The state not only establishes regulations and fiscal policies, but also actively encourages private involvement and expands the capacity of state-owned enterprises (DPSUs). The Indian government continues to increase its defence budget, which is oriented towards domestic technology development, strengthening oversight, and providing incentives for innovation. This developmental state strategy shows that the advancement of the defence industry requires strong intervention from the government as a director and regulator as well as a facilitator, which can be an important lesson for Indonesia in strengthening the role of the state in directing and synergizing various actors in the defence sector.

2. Orchestrating a Triple Helix-Based Innovation Ecosystem

India has successfully integrated the government, industry, and research institutions/universities into a better defence ecosystem. The DRDO, for example, leads a network of research laboratories connected to leading universities such as the IIT to develop cutting-edge technology. Initiatives such as iDEX also encourage the participation of the private sector, startups, and SMEs in defence innovation, as well as strengthening research and production collaboration. This helix synergy strengthens research capabilities and the absorptive capacity of cutting-edge technology, in contrast to Indonesia's weak in terms of research and industry integration and triple helix collaboration. Therefore,

Indonesia can learn from India to build a more organized and institutionalized collaboration network so that research innovation can be more effective and have a direct impact on defence production.

3. Internationalization Strategy through Exports and Technology Transfer

India is aggressively developing its global defence product export capacity, supported by domestic procurement policies such as the Positive Indigenization List (PIL) and the 2020 Defence Acquisition Procedure (DAP), which prioritize domestic products. In addition, defence industry corridors in various regions of India provide an innovation ecosystem that supports domestic investment and international collaboration, which increases production capacity and technology transfer. This strategy not only reduces import dependency but also creates a strong export market. Indonesia can learn from this by strengthening its export policies and technology transfer agreements through global strategic partnerships, as well as developing industrial corridors and local production ecosystems to promote independence and international competitiveness.

CONCLUSION

This study confirms that the development of the defence industry is a strategic instrument for developing countries such as Indonesia and India to strengthen their independence and reduce their dependence on imports of defence equipment. From a realist perspective, this step is a logical consequence of the anarchic nature of the international system, in which every country is required to ensure its survival. By analyzing the defence policies of the two countries, it can be seen that despite facing similar challenges in the form of embargoes, geopolitical pressure, and historical dependence on foreign suppliers, India has been more successful in creating comprehensive and progressive defence industrialization policies.

Indonesia, through Law No. 16 of 2012, has established an important legal foundation, but the implementation of its policies still faces significant obstacles. Limited defence budgets, the dominance of state-owned enterprises, and weak research integration through the triple helix model are the main obstacles. Meanwhile, India displays a combination of a developmental state approach and a more mature innovation ecosystem. The Make in India and Atmanirbhar Bharat policies, supported by a large budget, fiscal incentives, and private sector involvement, have been able to drive increased domestic

capacity, reduced import dependence, and even expanded the global defence export market.

The important lessons Indonesia can learn from India include three main points. First, the country needs to strengthen its role as a leader with consistent policies, efficient bureaucracy, and a larger budget allocation for research and development. Second, triple helix synergy must be institutionalized through close collaboration between the government, industry, universities, and research institutions to increase domestic technological capacity. Third, an internationalization strategy needs to be developed through export promotion, the development of defence industry corridors, and technology transfer agreements oriented towards increasing domestic capacity. By adopting lessons from India, Indonesia can strengthen the independence of its defence industry, not only to ensure national security, but also as a driver of economic development and increased competitiveness at the global level.

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