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Analysis of the Performance of Indonesia's Defense Offset Policy and Its Development Strategy Using SWOT Analysis

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A B S T R A C T

The research evaluates the implementation of offset policies in Indonesia's defense sector, focusing on its role in advancing domestic industries and technology transfer. Using a qualitative descriptive approach with SWOT analysis, this study examines secondary data, including global best practices and Indonesia's collaborative efforts with France, Germany, UAE, and Russia. Findings reveal Indonesia's potential in leveraging offsets for industrial growth but highlight regulatory, monitoring, and resource challenges. The study concludes that clear regulations, enhanced R&D investment, and structured offset mechanisms are critical for maximizing benefits. Strategic recommendations include establishing a dedicated offset agency and fostering international partnerships. These insights contribute to academic knowledge and offer actionable strategies for Indonesia's defense and economic resilience.

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INTRODUCTION

Offset policy refers to a mechanism in international trade contracts, particularly in the defense sector, where the seller of goods or services (usually a foreign supplier) is required to fulfill certain conditions that provide additional benefits to the buyer. This compensation can take the form of technology transfer, workforce training, investment in local industry, or other benefits. This shows that offsets are not just ordinary buying and selling transactions but involve reciprocity that strengthens the buyer's capacity beyond the direct economic aspect. This policy is often applied in large transactions between a country's government and foreign suppliers, such as purchasing defense equipment or weapons systems (Tippe, 2014).

This policy aims to obtain technology transfer, increased industrial capacity, or other economic benefits in exchange for purchasing defense products. This aims to help the country reduce dependence on imported defense equipment and encourage the development of the domestic defense industry. Offsets can encourage domestic production of defense equipment, which in turn reduces dependence on imports. By producing defense equipment locally, the country can reduce spending on imports and reduce pressure on the currency exchange rate and trade balance, thereby reducing the burden on the trade balance (Indrawan & Widiyanto, 2016).

Offsets can be divided into two main categories, direct offsets and indirect offsets. Direct offsets relate directly to goods or services exported or to be exported pursuant to a military sales agreement. Examples include co-development, co-production, and Transfer of Technology (ToT). Direct offsets are often used as a means to facilitate technology transfer and build the capabilities of the purchasing country's domestic defense industry.

Indirect offsets are not directly related to products or services exported pursuant to a military sales agreement. This type of offset can include various activities such as purchasing domestic products by foreign parties to increase exports, investment, training, financing activities, marketing/export assistance, and technology transfer. Indirect offsets can be further divided into two sub categories: defense-related indirect offsets and non-defense-related indirect offsets. The aim of indirect offsets is often to support the development of a particular economy or industry that is not directly related to the defense sector (Ungaro, 2013).

Offset policies in the defense sector have developed significantly in recent decades. Initially, the offset concept emerged in the United States in the 1970s as an effort to balance the interests of development and environmental conservation. Then it developed and was adopted by countries in the Middle East, especially when they made large-scale purchases of defense equipment from Western countries (including the US) during the cold war era. Offset was then widely adopted by many countries around the world (Willett & Anthony, 1998).

The development of offset policies in the world can be seen from the increasing number of countries adopting this practice. Until now, countries have implemented offset policies in various forms, both through law and policy. The

practice of offsets is also increasingly popular among governments, international institutions, NGOs and companies. Typically, offsets are used in the context of buying and selling defense-related goods and services. This could also include investment in additional, local projects into the domestic industrial base to enable recipient countries to offset defense procurement costs (Gunawan et al., 2024).

Over time, offset policy has become an important tool in international trade relations, not only in the defense sector, but also as a means of strengthening economic development and creating jobs. Developing countries, in particular, are increasingly using offsets to attract foreign direct investment (FDI) and gain technology transfer. In the 21st century, this policy has become an important instrument in global economic policy, used by countries to stimulate innovation and improve their domestic industrial sectors.

Indonesia has also implemented offset policies in several strategic sectors, but its implementation has not yet reached its maximum potential. This research is interesting because offset policies have a very important role in a country's economic development and defense, while other countries have previously implemented similar policies with significant results. With its resource capacity, Indonesia should be able to maximize this policy to obtain various benefits, such as developing domestic industry, improving technology and strengthening economic resilience.

Therefore, this research aims to evaluate the implementation of the offset policy that has been implemented in Indonesia, as well as to identify strategic steps that can be taken so that this policy can provide more optimal results for the country. The urgency of this research lies in the importance of maximizing the potential of offset policies which so far have not been fully implemented optimally, especially in terms of technology transfer, developing local industrial capacity, and reducing dependence on imported defense equipment. By analyzing best practices from other countries and shortcomings in domestic policies, it is hoped that this research can enrich academic knowledge while providing applicable strategic recommendations for developing offset policies in Indonesia.

THEORETICAL REVIEW

Industrial Policy Theory is what underlies industrial policy, encompassing an approach to understanding when and how the state should intervene in the economy to support certain industrial sectors. There are 3 approaches to the concept of industrial policy theory, namely the neoclassical approach which focuses on market failure for reasons of intervention, the structuralist approach which involves evolutionary economics, and the pragmatic approach based on new growth which emphasizes innovation. (Cohen, 2009). This theory emphasizes the role of the state in designing strategic policies to develop key sectors, such as defense, through direct intervention in the market to encourage economic growth and industrial independence. In the context of offset policy, this theory is relevant for evaluating the effectiveness of the government's role in maximizing the benefits of technology transfer, investment and strengthening local industrial capacity (Hartley, 1995).

H1: Implementation of the offset policy accompanied by clear regulations and strict monitoring will contribute to the independence of the national defense industry.

Meanwhile, Technology Transfer theory explains the process of moving technology, knowledge and innovation from one party or entity to another, which often involves crossing national borders. Widman et al. (1988) defines technology transfer as the transfer of technology across national territories which aims to increase human capabilities in production and fulfill needs through controlling the material and symbolic environment. This concept is rooted in various theories, such as international trade theory, foreign direct investment (FDI), resource-based perspective, and organizational learning. The focus is to utilize technology as a strategic resource that provides competitive advantages to its recipients. Technology transfer is a key element of offsets because it allows recipient countries to develop local capacities, reduce dependencies, and accelerate military modernization (Wahab et al., 2012).

H2: An offset policy designed with a structured technology transfer mechanism will significantly increase the capacity of the local defense industry.

METHODOLOGY

This research uses a qualitative approach with descriptive analysis methods to evaluate the implementation of offset policies in Indonesia. The data source used in this research is secondary data obtained through literature review, including books, academic journals, published articles, as well as policy reports related to offset policy. The literature analyzed was selected systematically based on its relevance to the research topic, validity, and contribution in providing an empirical and theoretical picture regarding the implementation of offset policies in various countries, including Indonesia.

As a first step, this research also uses SWOT analysis (Strengths, Weaknesses, Opportunities, Threats) to analyze strengths, weaknesses, opportunities and threats in implementing offset policy in Indonesia. This SWOT analysis is used to identify internal and external factors that influence the success of offset policies, as well as being the basis for formulating more effective strategies. This approach aims to identify challenges, opportunities and strategic recommendations to increase the effectiveness of offset policies in supporting the independence of the national defense industry.

RESULTS

Countries in the World that have Implemented Offset Policies

Many developing countries in the world have implemented this policy. Such as the United States, European Union countries, and several Asian countries, have successfully implemented offset policies in their defense industry trade to support the development of their domestic industry. The US signed 31 new offset agreements worth $8.2 billion, equivalent to 62.5% of the value of defense export contracts, 419 offset transactions with an actual value of $5.2 billion and direct offsets accounting for 26.14% of the value of transactions in 2019. Long-term trends show increased involvement of certain industrial sectors

such as missile manufacturing, aircraft components, and navigation systems (Delvaux, 2017).

Colombia is also implementing an offset policy of cooperation with the EADS-CASA company, which is part of the Airbus Military Group. Colombia purchased military aircraft from Spain and received various technology transfers. Colombia achieved increased technological capacity through the creation of an Airworthiness Department, the development of aircraft maintenance centers, training of technicians in UAV production, as well as the operation of computer-based training platforms. In addition, Colombia also receives technology transfers in the fields of metrology and leishmaniasis research to support national security and human development (Larrú, 2013). Apart from that, our neighboring country Malaysia has obtained 43 defense equipment involving 430 offset projects. Local defense companies are the largest beneficiaries (40%). More than 50% of offset projects are directed at human resource training in high-tech fields, such as aerospace and information technology (Balakrishnan, 2008).

However, there are also several countries that have implemented it but the implementation has been less successful. The offset policy in India started in 2005 through the Defense Procurement Procedure (DPP) which requires 30% of the contract value of ₹3 billion or more. India collaborates with countries like Russia, Israel, the United States and France to supply their defense systems. However, offsets in India have not gone well. The failure of the offset policy in India was mainly due to limited technology transfer which only covered basic designs without in-depth development of manufacturing capabilities, as well as weak policy support such as too strict FDI restrictions and industrial licensing which became obstacles for domestic companies. Apart from that, the lack of capacity of the Defense Offset Facilitation Agency (DOFA), the short validity of the banking offset credits system, and the lack of integrated R&D infrastructure further hamper the successful implementation of this policy. (Kumar Behera, 2009).

Furthermore, in the case of the Czech Republic, the most well-known offset program is the Gripen program, where the Czech Republic collaborates with Gripen International. This program has an offset value of 130% of the contract value, which reaches CZK 19,650 billion. Apart from that, the Czech Republic is also involved in various offset projects involving technology transfer and collaboration with third parties. Although the Gripen program achieved an offset value of CZK 6.6 billion or 26% of the obligations, approximately 75% of the total program value has not been realized. Some challenges include the difficulty of monitoring whether offset transactions comply with regulations, evaluating their contribution to long-term defense and economic policy objectives, as well as the absence of specific regulations in the Czech Republic, which is regulated only through government decrees, giving rise to uncertainty.

Implementation of Offset Policy in Indonesia

Based on the paper from Anggun and Maharani, Indonesia has long implemented an offset policy. The offset policy plan has been around since the

1960s but only became effective in the 1970s. The following are several examples of Indonesian offset cooperation with several foreign parties.

Indonesia's cooperation with France

Indonesia's collaboration with France regarding the purchase of Rafale jets was carried out in early 2022, when the French Minister of Defense, Florence Parly, visited Indonesia on February 10 2022. The form of offset cooperation in Indonesia's defense industry collaboration with France for Rafale jets includes several main aspects. First, there is an offset scheme for sending Indonesian human resources (HR) to study and do internships in the development industry, which in this case is the French defense industry which produces Rafale jets. This aims to improve the quality of Indonesia's human resources in the defense sector. Second, this collaboration also includes an offset scheme for aircraft component production in Indonesia, which aims to support the national defense industry. Apart from that, it is hoped that this collaboration will open up new opportunities for Indonesia in developing anti-air missile systems and radar systems. This offset cooperation is part of the offset mechanism agreed with France, with the target of producing a greater number of technicians and instructors who understand fighter jet platforms such as the Rafale (Taufik Budi, 2023).

PT Pindad Collaboration with Germany

Apart from that, the offset implementation that has been carried out by PT Pindad (Persero) includes collaboration with foreign industry in acquiring technology through the defense offset mechanism. For example, PT. Pindad (Persero) collaborated with Siemens, Germany to purchase generator licenses and also developed Armored Vehicles with Hyundai Motor through joint production in 2004. In addition, PT. Pindad (Persero) is also committed to building an independent defense industry through implementing offsets as a form of adaptation to the digital era and technological advances. These collaborations enable PT Pindad (Persero) to develop more independent and sophisticated production capabilities and defense technology (Savira Ayu, 2021).

Indonesia's cooperation with the United Arab Emirates

There is also offset cooperation between Indonesia and the United Arab Emirates (UAE), including cooperation between three Indonesian Defense Industry BUMNs with the UAE government and Calidus LLC. This collaboration involves PT PAL with the UAE government, as well as PT Dirgantara Indonesia (PTDI) and PT Pindad with Calidus LLC. This collaboration includes joint marketing for the CN235 multipurpose transport aircraft and N219 light passenger aircraft, joint development for upgraded versions of the N219 aircraft and the MALE Black Eagle drone, as well as cooperation in the fields of engineering, design and flight test work packages for each joint product development.

From the offset cooperation between Indonesia and the United Arab Emirates, Indonesia has received several benefits, including joint marketing for the CN 235 multipurpose transport aircraft and the N219 light passenger aircraft. Furthermore, joint development of an upgraded version of the N219 aircraft and

the MALE Black Eagle drone. This collaboration involves joint development of new technologies and products, which can improve the defense industrial capabilities of both countries. Then there is also cooperation in the fields of engineering, design and flight test work packages for each joint product development. This enables the transfer of knowledge and technology between the two countries, as well as strengthening design and engineering capacity in the Indonesian defense industry. This collaboration not only strengthens bilateral relations between Indonesia and the United Arab Emirates in the defense sector, but also provides economic and technological benefits for Indonesia, assists in the development of the national defense industry and increases the country's defense capabilities.

Indonesia's Cooperation with Russia

The implementation of the offset policy between Indonesia and Russia can be seen in the purchase of the S-400 air defense system and Su-35 fighter aircraft. As part of this agreement, Indonesia received significant offset benefits, in the form of technology transfer and development of the domestic defense sector, including the construction of maintenance and training facilities to support the maintenance of the defense equipment. Apart from that, military technical cooperation between Indonesia and Russia also includes the purchase of Sukhoi-30 fighter aircraft and the signing of a memorandum of understanding covering the fields of economics, energy, transportation and satellite launches. This cooperation was further strengthened by the provision of soft credit worth 1 billion US dollars from Russia to Indonesia, which was used to purchase weapons, creating a mutually beneficial relationship based on friendly relations that had existed since the 1950s and 1960s. (Suoth et al., 2018).

The Influence of Offset Policy on the Indonesian Economy

The benefits of the offset policy for economic progress are quite significant, especially in the context of defense industrial cooperation (Curie Maharani 2023). Offset policies can provide economic benefits in several ways:

a. Increasing Local Industrial Capacity: Offset policies often require foreign companies that win contracts to invest in local industry or to form partnerships with local companies. This can increase the capacity and capabilities of local industry, including in the fields of advanced technology and manufacturing.
b. Technology Transfer : One of the main components of many offset agreements is the transfer of technology to the recipient country. This allows these countries to advance their own industries and technologies, which in turn can increase their economic competitiveness in the global market.
c. Job Creation : Implementation of offset projects often requires local workforce, which means the creation of new jobs. This not only helps reduce unemployment but also improves the skills of the local workforce.
d. Economic Development : By increasing production capacity and technology transfer, countries can develop new economic sectors or

improve existing sectors. This can help diversify the economy and reduce dependence on imports.

e. Increased Exports: By increasing industrial capacity and capabilities, countries can increase their exports, both in the defense sector and other sectors. This can help improve the trade balance and generate foreign exchange earnings.

Overall, offset policy can play an important role in advancing a country's economy by increasing state capacity so that a country's economy will also improve.

Evaluation of Offsets that are Already Underway in Indonesia

A program must have been prepared as well as possible, but there are definitely still gaps that can be developed at a later date. Evaluation of the offset policy that has been carried out in Indonesia shows several important findings. First, the implementation of the offset policy in the Indonesian defense industry sector has provided many benefits for the Indonesian defense industry, however, Indonesia is still very dependent on the procurement of defense equipment from other countries, which shows the low competitiveness of the defense industry in Indonesia. This is caused by the low quality of human resources, lack of research and development programs in the defense industry, and lack of legal protection in defense offset policies.

Further to the lack of clarity in regulations, the newly introduced offset policy by Indonesia suffers from a lack of clarity, especially regarding contract requirements, monitoring mechanisms and sanctions. This causes confusion among overseas vendors and hinders offset negotiations. Apart from that, this lack of clarity will create ambiguity so that implementation will not be optimal and it will be difficult to prosecute if it is not in accordance with the initial agreement.

The success of the performance of the offset policy has also not been optimal, although a relatively high target offset quota value has been agreed, the agreement is not the same as its implementation. Only two relatively small offset programs out of a total of 31 programs have been completed, indicating that offset-induced success remains a long-term ambition. There are also inefficiencies in the implementation of offset policies, including cases where offsets are only considered after a procurement contract is signed, which weakens the bargaining position of offset authorities. Low procurement scale and vendor export credits also reduce Indonesia's ability to negotiate attractive offset deals.

Technical obstacles also often occur in implementing offsets in Indonesia. Technology transfer and the establishment of local production facilities often require large investments and do not always occur smoothly due to financial and technical constraints. Foreign companies may also be unwilling to transfer the newest or most advanced technology. Apart from that, there are also difficulties in measurement and evaluation to assess the effectiveness of the program. In the absence of accurate and systematic measurements, assessing the effectiveness and impact of defense offset policies can be difficult. Good evaluation is needed to ensure that the policy actually achieves its objectives.

Furthermore, job creation has not yet materialized as originally planned. One of the main priorities of the offset policy is job creation, but this is minimal in almost all of Indonesia's offset programs. Additionally, offsets do not contribute to the development of local supply chains, with high-value work packages continuing to be imported from overseas suppliers. Although the offset policy is expected to be a catalyst for defense industrialization, challenges in implementing and evaluating the policy indicate that there is still much work to be done to achieve this goal (Curie Maharani, 2023).

SWOT analysis of offset policies that have been implemented in Indonesia

Strengths	**Weaknesses**
1. Technology Transfer. The offset policy allows Indonesia to obtain advanced technology through technology transfer mechanisms from foreign countries or companies. 2. Increasing Local Industrial Capacity. Through offset cooperation, such as with PT Pindad, PT PAL, and Dirgantara Indonesia, local industry can produce important components and develop more independent manufacturing capabilities. 3. Human Resources Development (HR). Offset enables technical training and internships for Indonesian workers, improving their skills in the defense sector. 4. Economic Diversification. This policy helps reduce dependence on imported defense equipment and triggers the development of other related economic sectors.	1. Dependence on Foreign Countries. Even though the offset aims to reduce dependency, the implementation of this policy has not been successful in completely reducing foreign domination in the procurement of defense equipment. 2. Weaknesses in Regulation and Monitoring. The absence of clear guidelines and regulations causes policy implementation to be suboptimal and difficult to monitor. 3. Lack of Research and Development (R&D) Infrastructure. Indonesia's defense industry has limited capacity to absorb new technologies due to minimal investment in R&D. 4. Minimal Job Creation. One of the main objectives of the offset policy, namely creating new jobs, has not yet been fully realized.
Opportunities	**Threats**
1. Partnership with Other Countries. Offset opens up	1. Lack of Commitment from Foreign Partners. Some foreign

opportunities for Indonesia to collaborate with developed countries such as France, the United Arab Emirates and Russia, which have the latest defense technology. 2. Strengthening Local Supply Chains. Offset policies can be directed at building stronger local supply chains, which in turn support national industrial growth. 3. Defense Industry Modernization. With proper implementation, offsets can be a tool to modernize the defense sector and strengthen Indonesia's position in global competition. 4. Increasing Competitiveness in the Export Market. Developing local manufacturing capabilities can help Indonesia compete in the defense product export market.	partners are reluctant to provide advanced technology or provide only limited technology transfer. 2. Implementation Inefficiencies. Slow and unstructured implementation processes can reduce the benefits of offset policies. 3. Regional Competition. Neighboring countries such as Malaysia have more organized offset programs, creating challenges for Indonesia to remain competitive. 4. Economic and Political Uncertainty. External factors, such as changes in global policies or economic conditions, may affect the sustainability of offset programs.

DISCUSSION

Based on the SWOT analysis and the description above, we can take the relationship so that we can provide recommendations for strategies that can be implemented to improve offset policy in Indonesia. This is also in line with research from (Maharani & Matthews, 2023), (Situmeang et al., 2020), (Indrawan & Widiyanto, 2016).

Aspects of Government Policy

To increase the effectiveness of offset policies in Indonesia, the government needs to develop clear and transparent guidelines that include monitoring, evaluation and sanctions mechanisms to ensure compliance and successful implementation. This can strengthen Indonesia's bargaining power in negotiations with foreign suppliers, especially by ensuring that local content is met at a minimum of 35% in accordance with Law no. 16 of 2012 concerning the Defense Industry. In addition, the government needs to develop a roadmap for implementing offsets in stages until full independence is achieved in the main weapons system (alutsista). Regular monitoring and auditing of the progress of offset obligations must also be carried out, including evaluating the contribution of the defense industry and supporting MSMEs. Regular interactions between the Ministry of Defense and stakeholders should be encouraged to create

stronger strategic partnerships. The government must also involve strengthening Small and Medium Industries (IKM) so that they can become part of the strategic supply chain, so that the positive impact of offsets on the domestic economy becomes increasingly significant.

Human Resource Development Aspect

The development of offset policies in the human resources (HR) aspect must take advantage of the demographic bonus to encourage workforce regeneration in the defense industry through targeted education and training. Strategic steps include sending local workers abroad to gain technical training and experience, as well as bringing in foreign experts to provide training to domestic workers. In addition, the government can attract Indonesian experts who work abroad by offering incentives such as competitive salaries and promising career opportunities within the country. Diversification into the civil-military sector also needs to be carried out, by integrating defense technology and products for civilian applications, thereby creating wider economic benefits and maximizing the impact of the offset program for the Indonesian people.

Defense Industry Infrastructure Aspects

Offset development in the defense industry infrastructure aspect can begin with modernization of production equipment and the adoption of advanced technology is also needed to increase production capacity and industrial efficiency. In addition, research and development (R&D) must be a priority by encouraging international collaboration to access the latest technology. Strategic investment in the defense industry is also important to create a competitive ecosystem in the global market. Furthermore, Indonesia needs to increase local technological capacity (absorptive capacity) through workforce training, R&D investment, and development of production infrastructure, so that technology transfer from the offset program can be utilized optimally to encourage the independence and competitiveness of the national defense industry. Supporting facilities such as testing and quality control laboratories, both in the public and private sectors also need to be developed to ensure international standards are met.

International Cooperation

The strategy to increase the effectiveness of offset policies in Indonesia through international cooperation is to maximize collaboration with global companies in joint product development and access to international manufacturing networks. This collaboration can provide opportunities for Indonesia to obtain cutting-edge technology, increase production capabilities, and expand the market for defense products to a global level. In addition, building strategic partnerships with developed countries that have superior defense industries can help accelerate technology transfer and increase the competitiveness of domestic industry. Active participation in international exhibitions is also very important to promote Indonesian defense products,

strengthen relations with foreign partners, and open new collaboration opportunities that can have an economic and strategic impact on the country.

Improved Offset Planning

To increase the effectiveness of offsets in Indonesia, improvements in planning are needed that focus on increasing local added value by creating high-value domestic supply chains, thereby reducing dependence on imports of important components and supporting the production of the main weapons system equipment (alutsista) independently. Offsets must also be integrated into long-term strategic plans, such as strategic technology roadmaps, so that the resulting investment is in line with national industrial development needs. In addition, the scale and scope of offset investment needs to be expanded, including technical training, building modern production facilities, developing advanced technology systems, and opening up export opportunities through the global Original Equipment Manufacturer (OEM) network. With this approach, offsets can make a significant contribution to strengthening Indonesia's defense industry and economy in a sustainable manner.

CONCLUSIONS AND RECOMMENDATIONS

Offset is a policy that is Indonesia's strategy in developing its defense industry. Offset is a contractual agreement that requires the seller of goods or services to provide more benefits to the country that buys their products in the form of benefits other than the goods such as co-development, co-production, and Transfer of Technology, common markets, investment, training, financing activities , marketing/export assistance, etc. This offset policy has been implemented in Indonesia since 1970 and is still running in several companies such as PT Pindad, PT PAL, Dirgantara, etc.

However, in its implementation there are still several shortcomings that can be developed further, one of which is that the development of the defense industry in Indonesia has not been optimal and has even led to dependence on foreign parties. To increase the effectiveness of the offset policy in Indonesia, the following recommendations can be considered to realize an offset policy with clear regulations and strict monitoring to contribute to the independence of the defense industry

1. Need for Firmer and Transparent Regulations: Implementation of offset policies requires a stricter regulatory framework, which includes clarity on contract requirements, evaluation mechanisms, and sanctions to ensure compliance from foreign partners.
2. Intensive Supervision and Monitoring: Increased supervision involving special institutions or independent offset bodies can ensure that each offset agreement runs according to strategic targets and reduces dependence on foreign parties.
3. Effectiveness in Implementation and Evaluation: Implementation of offsets planned from pre-contract allows better achievement of strategic objectives, creating opportunities to encourage defense equipment independence.

4. Establishment of a Special Offset Agency: Indonesia is advised to immediately establish a special agency responsible for planning, negotiating, implementing, supervising and evaluating offset programs. The agency will also play a role in record keeping and knowledge transfer between stakeholder organizations to improve offset practices in the future.
5. Development of Offset Guidelines: There needs to be clear offset guidelines for foreign vendors, so that they understand the basic rules and feel confident to propose long-term programs. These guidelines will also assist in the preparation of human resources required for offset implementation.
6. Pre-Contract Offset Planning: Indonesia needs to strengthen offset management through pre-contract offset planning and preparation of practical guidelines for offset stakeholders. This includes identifying potential offsets in procurement, estimating offset premium costs, and enabling industry participation early in the offset cycle.

Meanwhile, how does a structured technology transfer mechanism increase local industrial capacity, as follows:

1. Strengthening Industrial Technology Absorption Capabilities: Indonesia must strengthen technology absorption capabilities in industry to maintain the benefits of offsets. This includes increasing R&D and reducing dependence on foreign components in the supply chain.
2. Sustainable Technology Transfer: Offset implementation should emphasize deep technology transfer, encompassing not only licensing, but also manufacturing capabilities and product innovation.
3. Increasing HR and R&D Capacity: Increasing training of local workers and investment in research and development (R&D) must be a priority to increase the absorptive capacity of local industry.
4. Integration with Local Supply Chains: Encouraging the establishment of strong local supply chains can support technology transfer and strengthen national industrial competitiveness.

By implementing these recommendations, Indonesia can improve the results of its offset policy and can provide benefits for the development of the defense industry in Indonesia so that it will have an impact on other sectors such as the country's economic growth.

FURTHER STUDY

This research has limitations because it only uses secondary data, without involving primary data such as interviews with policy makers or industry players, which can provide a more in-depth perspective. In addition, its focus on the Indonesian context makes the results less relevant for international generalization. Future research is recommended to integrate primary data and compare the implementation of offset policies in various countries, as well as

develop quantitative models to evaluate the impact of policies in a more measurable manner.

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REFERENCES

Arsita, S. A. (n.d.). Implementation of Trade-off, Local Component, and Offset Policy Pt. Pindad (Persero) in Supporting the Defense Economy. *Journal of Economics, Management and Trade*. Retrieved March 15, 2024, from https://www.academia.edu/56496906/Implementation_of_Trade_off_Local_Component_and_Offset_Policy_Pt_Pindad_Persero_in_Supporting_the_Defense_Economy

Arian, et all. (2023). *Indonesian Defense Industrial Cooperation With The United Arab Emirates In A Defense Economic Perspective | Return: Study of Management, Economic and Bussines*. https://return.publikasikupublisher.com/index.php/return/article/view/109

Cahyana, T. B., Wardana, A., Tahdi, H., & Yogaswara, Y. H. (2023). Strategy for Accelerating the Mastery of Defense Technology in the Procurement of Dassault Rafale Combat Aircraft. *International Journal of Social Science Research and Review*, *6*(2), Article 2. https://doi.org/10.47814/ijssrr.v6i2.825

Cohen, E. (2009). Theoretical foundations of industrial policy. *EIB Papers*, Article 4/2006. https://ideas.repec.org//p/ris/eibpap/2006_004.htmlhttps://doi.org/10.1080/10646178809359671

Maharani, C., & Matthews, R. (2023). The Role of Offset in the Enduring Gestation of Indonesia's Strategic Industries. *Defence and Peace Economics*, *34*(7), 981–1002. https://doi.org/10.1080/10242694.2022.2065423

Savitri, C. M. (2016). *Contribution of offset to defence industrialisation in Indonesia*. https://dspace.lib.cranfield.ac.uk/handle/1826/10263

Situmeang, F., Suyudi, I., & Susilo, A. K. (2020). DEFENSE OFFSET STRATEGY FOR DEVELOPMENT OF THE NATIONAL DEFENSE INDUSTRY IN INDONESIA. *Journal of Defense Resources Management*, *11*(1), 108–123.

Tippe, S. (2014). Defense Offset Policy in Indonesia. *Business & Bureaucracy*

Journal, *20*(2). https://doi.org/10.20476/jbb.v20i2.3069

Ungaro, A. (2013). *Trends in the Defence Offsets Market* (SSRN Scholarly Paper 2386528). https://doi.org/10.2139/ssrn.2386528

Balakrishnan, K. (2008). *Evaluating the Effectiveness of Offsets as a Mechanism for Promoting Malaysian Defence Industrial and Technological Development*. https://consensus.app/papers/evaluating-the-effectiveness-of-offsets-as-a-mechanism-for-balakrishnan/408c36215edf562a85a23141e069c669/

Cohen, E. (2009). Theoretical foundations of industrial policy. *EIB Papers*, Article 4/2006. https://ideas.repec.org//p/ris/eibpap/2006_004.html

Delvaux, C.S.L. (2017). *America's Perpetual "Offset."*

Gunawan, H., Khaerudin, K., Deksino, G. R., & Gultom, R. A. (2024). The Optimising Offset Defence Implementation as Fulfilment Efforts in Fighters Aircraft Materials and Technology. *International Journal Of Humanities Education and Social Sciences*, *3*(4). https://doi.org/10.55227/ijhess.v3i4.724

Hartley, K. (1995). Chapter 16 Industrial policies in the defense sector. In *Handbook of Defense Economics* (Vol. 1, pp. 459–489). Elsevier. https://doi.org/10.1016/S1574-0013(05)80018-3

Indrawan, R. M. J., & Widiyanto, B. (2016). Offset Policy in Building National Defense Independence. *Journal of Defense and National Defense*, *6*(2), 29–50. https://doi.org/10.33172/jpbh.v6i2.306

Kumar Behera, L. (2009). India's Defence Offset Policy. *Strategic Analysis*, *33*(2), 242–253. https://doi.org/10.1080/09700160802518718

Larrú, J. M. (2013). The developmental contribution of the Offset Agreements: The case of Colombia. *MPRA Paper*, Article 51456. https://ideas.repec.org//p/pra/mprapa/51456.html

Maharani, C., & Matthews, R. (2023). The Role of Offset in the Enduring Gestation of Indonesia's Strategic Industries. *Defence and Peace Economics*, *34*(7), 981–1002. https://doi.org/10.1080/10242694.2022.2065423

Situmeang, F., Suyudi, I., & Susilo, A. K. (2020). DEFENSE OFFSET STRATEGY FOR DEVELOPMENT OF THE NATIONAL DEFENSE INDUSTRY IN INDONESIA. *Journal of Defense Resources Management*, *11*(1), 108–123.

Suoth, R. S., Mamentu, M., & Help, T. (2018). *INDONESIAN-RUSSIAN COOPERATION IN THE MILITARY FIELD IN THE CONTEXT OF IMPROVING DEFENSE AND SECURITY*. *1*.

Tippe, S. (2014). Defense Offset Policy in Indonesia. *Business & Bureaucracy Journal*, *20*(2). https://doi.org/10.20476/jbb.v20i2.3069

Ungaro, A. (2013). *Trends in the Defence Offsets Market* (SSRN Scholarly Paper 2386528). https://doi.org/10.2139/ssrn.2386528

Wahab, S. A., Rose, R. C., & Osman, S. I. W. (2012). The Theoretical Perspectives Underlying Technology Transfer: A Literature Review. *International Journal of Business and Management*, *7*(2), Article 2. https://doi.org/10.5539/ijbm.v7n2p277

Widman, T., Jasko, S. A., & Pilotta, J. J. (1988). Technology transfer: Theory and outline of a research model for managing cultural change. *Howard Journal of Communications*. https://doi.org/10.1080/10646178809359671

Willett, S., & Anthony, I. (1998). *Countertrade and Offsets Policies and Practices in the Arms Trade*. Copenhagen Peace Research Institute.