THE DEVELOPMENT OF INDONESIA'S DEFENSE INDUSTRY ECONOMIC INDEPENDENCE THROUGH OFFSET SCHEMES: LICENSE, CO-PRODUCTION, AND CODEVELOPMENT

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ABSTRACT

The purpose of this study is to discuss the acceleration of the mastery of defence technology in the development of the independence of the Indonesian economic defence industry through offset schemes: license, co-production, and co-development. This research is qualitative and uses a comprehensive analytical study and analytical-normative approach. To be independent in the domestic defence industry, the purchase of a defence equipment product must be accompanied by a technology transfer process through an offset mechanism or the level of technology transfer achievement from foreign producers into the country. The implementation of the defence offset mechanism for the procurement of defence equipment has been ongoing since the early 1960s, although it was the only effectively carried out when PT DI, PT. PAL and PT. PINDAD established cooperation with strategic weapons and industrial producing countries in the mid1970s, with strategic weapons and industry variations, ranging from light weaponry, rockets, helicopters, fast boats, corvettes, to aircraft. The defence offset mechanism in the procurement of defence weapons has been carried out with three offset types: purchasing licenses, co-production, and co-development.

Keywords: *co-development; co-production; defense industry; licensed; offset*

INTRODUCTION

In the mid-19th century, shortly after the first industrial revolution, the modern war equipment industry began to find its form, it was inspired and encouraged by a group of copyrighted entrepreneurs who succeeded in developing knowledge about explosives and weapons. These extraordinary people, who in a number of years succeeded in establishing a number of gigantic companies that produced unparalleled destruction tools, contributed various kinds of knowledge to new industries, and they also provided a Long picture for the future. There are two things that have been very striking since the beginning. First, the development of war equipment is considered inseparable from the entire course of industrial development. Second, the war equipment industry is the largest industry of all industries (Sampson, 1987).

At least in the Southeast Asian Region, Indonesia must be able to build its military in a strong and modern way. According to Andi Widjajanto (Director of IODAS in the Military Transformation Study), seeing the rapid development of weapons technology today, the Indonesian Armed Forces (TNI) can no longer be modernized. So, to realize a strong TNI, there is a need to transform defense equipment. The transformation of the Indonesian Armed Forces defense system is basically aimed at replacing the various main weapons systems of the Indonesian Armed Forces which are generally old and out of date with the latest generation of weapons technology, especially the defense equipment for the Indonesian Air Force and Navy which are loaded with high-tech weapons (Priyatna, 2009).

Currently, the defense economy plays a more independent role as a variable that tends to hamper the development of Indonesia's defense posture. This condition occurred mainly because Indonesia was trapped in a series of mutually reinforcing problems, namely the defense equipment condition, the amount of the defense budget, defense equipment resources, and funding sources for defense equipment procurement (Azzelini & Kanzleiter (Ed.), 2005).

Strategic industry in the defense sector is very important in the development of a country's armed forces. So that the development of the army can be directed to the ability on its own feet, the

independence of the domestic strategic industry is an absolute requirement. For this reason, a common perception is needed about the role of the domestic strategic industry in order to support the needs of the defense equipment of an army. In fact, there are still many parties who have the wrong perception about the existence of a strategic industry in supporting the needs of the Armed Forces equipment. Some parties consider buying war equipment made in the domestic strategic industry, the price will automatically become cheaper. When you see the fact that the price is more expensive than buying from abroad, then what arises is the opinion, why should buy at home if the price is more expensive? Buy from abroad, the price is cheaper, the quality of the goods is even better.

That perception is what impedes the progress of the domestic strategic industry. The problem is, the strategic industry in the early days definitely needed government subsidies, especially the strategic defense industry, because at the beginning, the industry did not yet have a broad market or consumers. Their production cannot be sold cheaply (due to the limited amount of production) as the industry has long been running and has its own market. Not to mention when it is associated with funds for the research and development process. All of that requires a long time before the product is sold to other countries.

When strategic industrial products already have a market and are bought by other countries, that's when the price in the country can be cheaper than the same products made in other countries. At the same time, the Armed Forces could innovate to process homemade defense equipment products, according to certain desired qualities. Thus, to begin with, full support from the government is needed, strong political will, both in the form of policies, subsidies and in the context of their use in the Armed Forces' own combat units (Hartanto, 2013).

Defense Offset is a reciprocal buying or investment process agreed upon by weapons manufacturers or suppliers as a reward for an agreement to purchase military services and goods. The practice of defense offset in defense tool formation provides a perspective that the transfer of defense technology supported by defense offset mechanisms must be supported by the readiness of human resources, budgets, raw materials, and research and development institutions that can facilitate the process of transfer of technology so that it is able to meet the needs of defense equipment (Muradi, 2012).

The implementation of the defense offset mechanism for the procurement of defense equipment has been ongoing since the early 1960s, although it was only effectively carried out when IPTN (PT DI), PT. PAL and PT. PINDAD established cooperation with strategic weapons and industrial producing countries in the mid1970s, with a variety of strategic weapons and industry variations, ranging from light weaponry, rockets, helicopters, fast boats, corvettes, to aircraft. The defense offset mechanism in the procurement of defense weapons has been carried out with three types of offsets: purchasing licenses, co-production, and co-development.

METHOD

The research specifications in this study use descriptive analytics, which describes the results of the study in accordance with the problems and objectives to be achieved and analyze them. Data analysis (analyzing), which describes the data in the form of sentences that are good and correct, so that it is easy to read and given meaning (interpreted) so that the results of data analysis facilitate inductive conclusions. Materials (data) from the results of the processing are analyzed qualitatively and then discussed. Based on the results of the discussion then conclusions were taken as answers to the problems studied.

DISCUSSION

In the matter of mastery of technology, it is assumed that technology is identical to industry. Therefore, to master technology in various fields, one must not forget the development of the industry. Government policy in the framework of mastering technology is a step in realizing the national industrialization program, which in the end through the industrialization program and the skills possessed will be able to deliver our nation into new discoveries both product technology, manufacturing technology and production process technology.

The role of industrial development is very large in the development and development of further development, industrial development must be an integrated effort, including in terms of mastery of technology, and strengthen the process of industrialization in the broadest sense. In an effort to develop thinking to determine the priority of the industry to be developed in Indonesia, the starting point is used in addition to emphasizing the targets

that have been set, also pay attention to the economic problems currently faced, namely the constraints of scarcity of funding sources and the urgency of creating productive employment opportunities for the workforce more and more.

History proves that abundant resources without the support of the ability to master technology can no longer be a mainstay for a nation in carrying out its national development. However, being aware of the large costs involved in conducting research and development as well as the challenges caused by economic globalization as well as the speed of technological development that causes the life cycle of technology to shorten, a tendency arises to carry out joint research and development activities. Each country has different desires in the mastery of technology for their own interests, both as leaders in certain technologies and to be able to master the technology for their own interests because the technology was not developed by other countries. Therefore, each government provides sufficient budget for the purpose of R&D in certain technologies. Other technologies are left to the industry to develop it themselves (Muradi, 2012).

As a consequence of defense globalization is the increasingly widespread production and arms race competition (Hayward, 2000). In addition to past experience, the issue of technology transfer is an important note in purchasing independence. In order to be independent of the domestic defense industry, the purchase of a defense equipment product must be accompanied by a process of technology transfer through an offset mechanism or the level of achievement of technology transfer from foreign producers into the country. The offset mechanism itself is regulated and is mandated by Law Number 16 of 2012 concerning the Defense Industry. Self-reliance in purchasing defense equipment products must also be based on this offset mechanism (Karim, 2014).

There are two types of offsets namely: direct offset and direct offset and indirect offset or indirect offset (Intrilligator, 1990). Direct offset is defined as goods or services directly related to sold military equipment. There are three types of direct offset, namely: First, purchasing a production license (licensed production), which means that the seller of weapons agrees to transfer the technology he has to the purchaser. Thus, all or part of the goods ordered can be produced in the buyer's country. Second, co-production, the meaning of this joint production is that buyers and sellers not only seek to procure military goods, but also joint sellers of buyers try to make goods and services for military equipment, and market them together the same as paying attention to the various agreements of the agreement. In other languages, the purchaser country is a partner of the seller country, and in this case, there is no requirement from the seller country to transfer technology to the seller country. Third, joint development (co-development). In a joint development, the country producing weapons equipment with the purchaser country seeks to develop various defense equipment that has been produced by the selling country, with the hope that a better product will be obtained than the previous product. The advantage of co-development is that the purchaser country actively adopts and transfers various weapons technologies directly or indirectly, so that the gradual improvement in human resource capabilities in the purchaser country can be measured properly.

Meanwhile indirect offset is defined as goods and services that are not directly related to purchases of military products, but are embedded as agreements in the process of buying and selling military and defense equipment. There are at least four types of indirect offsets, namely: first, barter, which is a buying and selling process carried out by two countries or producers and consumers of weapons, accompanied by an agreement that the seller of defense equipment is willing to be paid with non-military products of the buyer's country with an equivalent nominal at the price of defense equipment. Second, the purchase price, namely the supplier of weapons agrees to buy non-military products or find buyers of non-military products with an agreed nominal from the price of weapons supplied. Third, the investment return, ie the arms supplier agrees to get involved or find a third party who wants to invest capital directly in the buyer's country with a certain value from the buying and selling process. The form of investment returns can take the form of building factories, transferring non-military technology, and so forth. Fourth, the return on purchase, the process is somewhat similar to investment returns, only the difference is that weapons suppliers agree to buy back or find a third party to buy military products that sell for a certain period of time (Widjajanto & Keliat, 2006).

According to data released by the Department of Defense's Foreign Trade Control Office (ODTC), in fiscal 1994, US companies received 198 licenses to export weapons and weapons components worth US $ 88.3 million to Indonesia; in the fiscal year the Department issued 248 licenses for similar items worth more than US $ 221 million. Most of these licenses do not end with

real sales; historically only about one-sixth to one-third of the value of licenses granted to a particular country resulted in actual sales. However, even though only US $ 50 to US $ 100 million of the US $ 309 million license approved in 1994-1995 resulted in the transfer of weapons and weapons technology to Indonesia, this was an important impetus for the Indonesian military. Among the items included in the license were millions of dollars in spare parts for Indonesian A-4, F-5, F-16 and C-130 aircraft from the US, parts for armored combat vehicles and Sidewinder missiles; and a small license for night-time sensing devices for US-made rifles, pistols and revolvers and ammunition production (US Department of State, 1995).

The Indonesian Armed Forces have also received special machine guns for light aircraft, the Twin Mag Pod (TMP) FN-762 mm. since the early 80's the weapons system was standard equipment from the BO-105 helicopter made by the German company Messerschmitt *Bolkow Blohm* (now *Eurocopter*) and produced under license in Indonesia by IPTN since 1976. Only rotors and transmissions are the only ones. still sent by Germany. This helicopter is used by the Indonesian Air Force and police. The extended version of the NBO-105 MPDS (multi-purpose delivery system) can carry 50 mm to 81 mm rockets and machine gun support sockets (ENAAT, 1997).

IPTN also received a license from Canada to make approximately 100 NBell-412 Special Performance helicopters. Canadian and Italian (Agusta) standard armaments include a 7.62 mm FN Herstall twin twin arms socket, a 0.50inch FN Herstall single socket, a socket for seven or Nineteen 2.75inch rockets, a 70 mm four FN Herstall rocket launcher gunfire and one 0.50 mm gun or two Giat canon sockets (France) M621 20mm. This rocket buffer socket can also be used with the Indonesian version and is mounted on several helicopters (ENAAT, 1997).

In 1995 Indonesia occupied the sixth place in the Finnish arms export statistics, after Norway, the United States, Austria, Sweden and Italy. In January 1995 President Martti Ahtisaari visited Indonesia. Shortly before this visit the Finnish government issued a permit to the Nokia Telecommunication company to export artillery components and also to the Vammas company to export grenade components. The Indonesian company PT PAL has produced Vammas mortal grenades for its 60mm type Commando mortars under license.

In 1996, Indonesia also ordered Mistral missiles from Matra for its Navy's needs. Samaero, a Eurocopter sub-company in Singapore, is negotiating the sale of several TB and TBM-700 small transport aircraft from the French company Socata to Indonesia. The estimated value of the contract could be US $ 34.6 million. In early January 1997, French Defense Minister Charles Million, announced the signing in Paris of an agreement between GIAT Industries and PT Pindad Indonesia for cooperation in the field of land military equipment. The sale of French weapons to Indonesia not only benefits the French arms industry, but also cooperation between the Defense Forces of the two countries (ENAAT, 1997).

The first step that PT PAL took to initiate the technology transfer program was to purchase a license for a finished product. This is what happened in the process of making a fast patrol boat (FPB 28 and 57). PT PAL explores the possibility of cooperation between Indonesia and Friedrich Luerssen Werft (FLW) in the manufacture of fast patrol boats in Indonesia. In early 1979, the Navy approved a proposal from PT PAL to build eight FPB 57. After negotiations with FLW, a cooperation contract was agreed. In the first stage, PT PAL only assembles and manufactures certain parts, while all designs, from basic ones to manufacturing designs, are made and supplied by FLW. From here PT PAL learned how the ship was assembled. In this collaboration, PT PAL sent a number of its staff members to FLW, Bremen, to study the management of warship production. Even foreman-level employees were also sent to attend training in engineering until establishment (Karim, 2014). In 1981, two of eight FPB 57 began to be built in FLW. PT PAL entered the team that made the ship from the stage of production planning to manufacturing. From this program, they accumulated knowledge to be transformed into the ability to do assembly.

The second experience occurred when Customs and Excise planned to buy 24 FPB 28 from the Belgium shipbuilding Company (BSC) with loan funds from Belgium in 1979. At that time, Habibie lobbied with Customs to allow the order ship to be made at PT PAL. As a result, after negotiating a lot with various parties including BSC and FLW, it was agreed in 1980 that the production of the ship was made in half at PT PAL. A total of 12 units were made at PT PAL with components from Belgium and Germany purchased with soft loans from the two countries (Karim, 2014).

As a customer, the Customs Office was initially hesitant to give trust to PT PAL. However, after seeing the work of PAL, Customs finally recognized the capabilities of PT PAL. In fact, because they felt FPB made by PT PAL was better than made by BSC, Customs then ordered five more FPB 28 directly from PT PAL. With the completion of the shipbuilding, there has been an assimilation process of assembly and manufacturing capabilities at PT PAL.

In 2003 PT PAL received a joint project to manufacture SIGMA corvettes ordered by the Ministry of Defense with the Dutch Schelde Naval Building (SNB). However, due to various HR constraints and budget constraints, the vessel orders were finally done by the SNB. And in the same year an agreement was signed to develop and create a national corvette with the joint development of the Orizzonte Naval System and the Italian Naval Corvette. The creation and development of the national corvette is part of the joint development of the corvette model produced by the two Italian companies to suit the characteristics of the Indonesian region. While in 2005, PT PAL entered into a partnership to build a Landing Platform Dock (LPD) warship with Daewoo International Company (Muradi, 2012).

In 2004, PT Pindad also collaborated with Hyundai Motor to develop an Armored Vehicle in the form of joint production. The results of this collaboration PT Pindad can meet the needs of the domestic Armored Vehicle with various variants and modifications, in addition to exploring the Armored Vehicle market in Asia and Africa with Hyundai Motor. In the next few years PT Pindad was also involved in cooperation with a number of weapons manufacturers from India, Spain and China (Muradi, 2012).

Table 1
Development of the Defense Offset Program in Indonesia

No	Project	Partner	Processing	Offset Model	Status
1	Helicopter BO-105	MBB West Germany-IPTN	1996	Licensed Program	Implemented
2	C-212 Aircrafft	CASA-IPTN	1976	Licensed Program	Implemented
3	Sora-D Rocket	Aerlikon-IPTN	1976	Licensed Program	Implemented
4	FFAR 2.75 Rocket	F.Z. Belgium-IPTN	1976	Licensed Program	Implemented
5	SUT Terpedo	AEG Telefunken-IPTN	1976	Licensed Program	Implemented
6	Helocopter Puma SA-330	Aerspatiale-IPTN	1977	Co-production	Implemented
7	Super Puma AS-332	Aerospatiale-IPTN	1977	Co-production	Implemented
8	CN-235 Aircraft	CASA-IPTN	1979	Co-production	Implemented
9	FPB 57	Friedrich Luerssen Weift (FLW)-PT PAL	1979	Licensed	Implemented
10	FPB 28	FLW-Belgium Shipbuilding Company-PT PAL	1979	Co-production	Implemented
11	Helicopter Bell 412	Bell Helicopter Textron (BHT)-IPTN	1982	Licensed	Implemented
12	Helicopter BK-117	BHT-Kawasaki-IPTN	1982	Licensed	Implemented
13	FNC	Fabrique Nationale Herstal (FNH)	1983	Licensed	Implemented
14	Rear of F-16	General Dynamics/Lockheed Martin-IPTN	1986	Codevelopmetn	Implemented
15	Wing and suitcase of Boeing 737	Boeing-IPTN	1996	Licensed	Implemented
16	AMRAI Assembling	GE-Boeing-IPTN	1996	Assembly/codevelopment	Implemented, but stopped operating since 1998, due to the economic crisis
17	Corvette Sigma	Schelde Naval Shipbuilding-PT PAL	2003	Co-production	Not so, the limitations of HR
18	National Corvette	Orizzonte Sistem Naval & Italian Navy Corvette-PT PAL	2003	Codevelopment	Implemented
19	Warship LPD	Daewoo Internationa-PT PAL	2005	Co-production	Implemented
20	Guided Rocket	COSTIND PRC-PT Pindad	2006	Codevelopment	Implemented
21	Small & Medium Weapons	COSTIND PRC-PT Pindad	2006	Co-production	Implemented
22	-	FSMTC Rusia-Dephan	2006	-	Implemented
23	Armord Vehicle	Hyundai-PT Pindad	2004	Co-production	Implemented
24	Submarine	DAPA, Korea-Dephan			
25	Armord Vehicle, Helicopter	Pemerintah India-PT Pindad-PT Di			
26	Combat-plane, Warship, Armored Vehicle	Pemerintah Spanyol-PT PAL-PT Pindad-PT DI			

The establishment of the Indonesian Design Center (DCI) in the KF-X / IF-X jet production line in cooperation between Indonesia and South Korea is a clear example of the actualization of the capabilities of research and technology development in contemporary Indonesia. The design center functions as a "pool of knowledge" that accommodates, stores, evaluates, and modifies technologies that are obtained or built by domestic actors together with other countries. DCI is an initiative from the government so that Indonesia can map and develop human resource competencies that have been formed during the first phase of KF-X / IF-X development, namely the technology development phase (TDP).

There are 37 Indonesian engineers sent to South Korea to collaborate on the design of the KF-X / IF-X fighter jet. In the long run, DCI has the potential - and indeed is directed to - be a source of information as well as innovation at the technological and managerial level for other defense industry players, including contractors and mid-level and small-scale subcontractors. DCI and similar design centers, for example for joint production of the battle tank media (MBT) between Indonesia and Turkey and the Naval Design Center plan at PT PAL, are important achievements and must be followed up with other policy innovations.

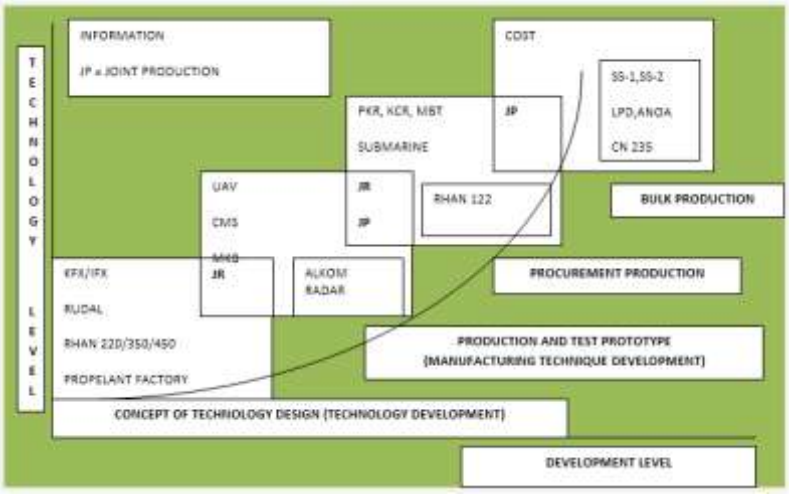

Figure 1
Stages of Development of the Defense Industry Based on Certain Defense Equipment (Yusgiantoro, 2014)

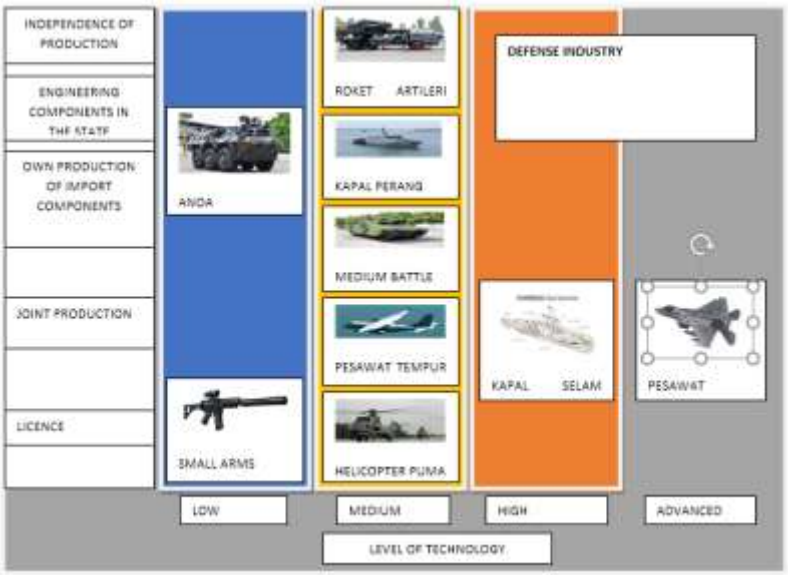

Figure 2
Production independence Phase & Indonesia's Defense Industry Technology

Figure 1 illustrates defense equipment capable of building the Indonesian defense industry, both now and in the future, based on the level of development and the level of technological readiness. The development of the defense equipment is carried out with a collaborative research and production cooperation scheme, in which several defense equipment can be developed, produced and not only used for domestic needs, but can also be exported. Various defense equipment based on the level of development and the level of technological readiness can be summarized as follows:

In the theory of the ladder of production stage, the defense industry, which is still in its initial phase, will only become an end-product assembler producing weapons systems with R&D that is not too sophisticated, relying on more imported components. Stages of the production ladder of several defense equipment produced by the domestic defense industry can be seen in Figure 2 infographic. From this picture, we can also see the extent of our defense industry's technological mastery as well as the level of production independence.

The vertical axis illustrates the independence of production in the category of levels from licensing to self-engineering with almost all components of domestic production. The horizontal axis describes the classification of the level of technological mastery of each defense equipment produced.

A policy that is able to optimize technology transfer with a defense offset mechanism, which in the future will be able to meet the needs of defense equipment, while the policy includes:(Supriyatno, 2014) First, there needs to be commitment from the government to emphasize the importance of defense technology transfer with defense offset mechanisms in the procurement of equipment defense. One of the indicators of this commitment is the formation of commissions that will follow up on every policy from the executive and DOD, with a commitment to further analyze the availability of human resources, raw materials, and seek funding for operations and production other than state sources. So, it is hoped that these companies will be able to focus on conducting joint research and development with DoD Research and Development in formulating various production and development plans.

Second, the government must formulate and prioritize various policies on defense technology transfer by conducting simultaneous guidance to strategic companies, so that they can produce various products, both real and newly designed. So that the government's partisanship to develop its strategic industry, especially in the defense sector, can work. Sending its technicians and the nation's best sons and daughters to study abroad is one of the foundations for efforts to reorganize Indonesia's strategic industry. One thing that must also be considered is the government's efforts to maintain and maintain that the engineers and technicians feel at home and want to work for the country by providing optimal welfare to them.

The three governments must seek alternative budgets for defense funding, especially in defense procurement with offset mechanisms. If all this time these companies have sought their own loans and export credit to a number of foreign banks, then the state must be able to seek funding from domestic banks with government guarantees, or other private banks. In addition, the government must strive for a larger budget for the strengthening and effectiveness of research and development institutions, both at the ministry of defense, TNI headquarters, and other strategic study institutions.

CONCLUSION

The practice of defense offset mechanisms in the procurement of defense equipment provides a perspective that the expected defense technology transfer with defense offset mechanism must be supported by the readiness of human resources, budgets, raw materials, and research and development institutions that will facilitate the process of transfer of technology, which will be able to meeting the need for defense tools, and the key to effective defense offset practices is government policies that facilitate the process. Especially in the context of defense offset, the role of the state is very large to carry out various policies that support the process of defense acquisition and procurement, with an offset mechanism that will transfer defense technology. So that in the future Indonesia will be able to sustain the need for defense equipment and weapons independently, no longer dependent on countries producing military equipment.

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