

RESEARCH

Policy Study on Research Management in Defense and Security

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Abstract

As a sovereign nation, Indonesia has a strategy to defend itself against threats from outside and within the country. That requires a strong defense, both in terms of the number of military personnel and the number of defense equipment. So far, we have mostly the weaponry purchased and hung from abroad. This paper discusses the results of the study several policies and government regulations in defense and security in Indonesia. The methodology used is the start of data collection both primary data and secondary data, and from these data calculated the ideal number of military personnel and defense equipment. From the analysis of the data can be identified that one of the obstacles faced by Indonesian defense is the ratio of the number of military personnel to the personnel composition of the population as well as Army, Navy, and Air Force are still not ideal as well as the number of defense equipment owned is but below standard. In addition, the documents are not MP3EI clear roadmap on the development, engineering, and purchases of defense equipment and targets each year. Another problem is the absence of good coordination on defense research consortium activities. For that recommended the need for cooperation between military R & D, universities, and other research institutions under one umbrella defense research resulting in better research synergy.

Keywords: review, policy, research management, defense equipment

1. Introduction

Political, economic, and sovereign issues are the most important and strategic factors in terms of the Defense and Security of a nation. Those are closely interrelated and influential to national condition of a state.

Indonesia is an archipelagic country, thus has a great risk of outside threats. Based on the data of International Maritime Bureau (IMB) (2010) Kuala Lumpur in 2001, of 213 reports on the pirating and pillaging in Asian water and Indian Ocean area, 91 cases occurred in Indonesian water. While from the data issued by the Navy, in 2001 there were 61 cases purely categorized as the pirating and pillaging in the Indonesian water. Although the number is different, the data remain showing violations by the foreign party to Indonesian territory. This is a notably serious threat, thus need to be immediately handled.

In terms of strategic context, in the 'White papers' of the Department of Defense (2008) it is predicted that the threat and violation to the defense interest of Indonesia in the future can be international terrorism, separatist movement, radicalism, communal conflict, across-nations crimes, illegal immigration, maritime security disturbances, disruption of air safety, environmental destruction, and natural disasters. All are impacting the safety of the nation.

Based on the threat prediction, as well as Indonesia's national interests, the interests of state defense strategy in the future cover permanent and urgent strategic interests, as well as international cooperation in the field of defense and security.

In order to defend the sovereignty of the state, there are five factors that construct the strength of the nation, namely economy, military, critical-mass, strategy, and achievement of targets (Cline, 1975). Seeing the threat and disruption to the defense

interests of Indonesia as described above, the military factor becomes the most crucial and must be addressed. This factor includes the number of military personnel and the armament system, or better known as alutsista (instrumental weaponry system/defense equipment).

Currently the Indonesian Military (TNI) has 376,000 personnel consisting of 288,000 personnel of the Army, 59,000 personnel of the Navy, and 28,000 personnel of the Air Force (Harsono, 2009; Purwanto, 2011). Ideally the ratio of the number of military personnel to population is 1: 629 (Bakrie, 2007). The calculation of the ideal number of military personnel is different from other countries. The percentage of ideal military personnel is only 0.15% of the population. While in Singapore it is 20% of the population, whereas the population of Singapore is only 1.89% of the total population of Indonesia (Bakrie, 2007).

In terms of defense equipment, the problem encountered so far is Indonesia always buy weapon equipment from abroad, such as cannons, missiles/guided missiles, as well as other equipment. This makes Indonesia notably dependent on foreign exporter; whereas Defense Industry Policy Committee has formulated a strategy for defense industry, including the policies on the research, development and engineering, funding, marketing strategies, training, empowerment, improvement of human resources, and international cooperation in the defense industry.

Mirdanies (2013) in his study outlines several factors that must be considered in making decisions related to defense and security, namely the problem of budget constraints, the firmness of the policy, and determine the focus of research. The three factors are crucial to achieve the technological independence in the field of defense and security.

From the background and the problems mentioned above, we require an in-depth study of the needs, domestic abilities, and defense and security policies to establish a strong military; the military factor is the main factor of the strength of the nation

This paper aims to provide recommendations through a policy to conduct research and development in defense and security, in order to reduce the dependence on foreign products and to support the growth of armaments industry in the country.

2. Research Method

The methodology used in this paper are:

a. Data collection

Data were collected from various sources. The data used are primary and secondary data. Primary data were obtained from the results of visits and

limited discussions with related party. Further discussions with the larger scope of participants (round table discussion) were conducted, inviting speakers from various agencies such as Army and Navy Training Center, PT. PINDAD, KKIP, Ministry of Research and Technology, and private sectors working in the field of defense and security. The discussion was directed to better focus the necessary policy direction for defense and security. Meanwhile, the secondary data were taken from the internet, books, and Ministerial documents. The types of documents obtained include the theory of state defense, the National Research Agenda, the National Medium Term Development Plan, the White Paper of Defense and Security, the Presidential Regulation No. 42 of 2010, and the Master Plan for the Acceleration and Expansion of Indonesian Economic Development.

b. Data analysis

The existing literatures were analyzed to obtain a necessary measure to reduce the dependence on foreign defense equipment products. Based on the data obtained on the number of personnel and defense equipment needs, I then made the calculation of the ideal number of military personnel in ratio to by the number of population. In addition, the calculation is also made of ideal number of defense equipment in ratio to the number of military personnel. The total area of Indonesia is mostly composed of water; thus I then made the ideal ratio between the number of personnel of the Navy, Army and Air Force. Furthermore, I also analyze the defense and security policies from the documents in the white papers of Defense & Security and Research & Technology, as well as from the documents of MP3EI

c. Recommendation

From the results of the analysis, the recommendations that will support and benefit further defense and security policy can then be determined. From further analysis a recommendation is made to get the ideal conditions

3. Results and Discussions

According to Cline (1975) the link between civilian and military policies can be understood by a model of national power. Cline filed an abstract model of the achievement of national power. According to him, the national power (P) is formed by five factors, namely the economy (E), military (M), critical-mass (Cm), strategy (S), and natural-will (W). Factor E, F, and Cm is said to be its hardware, while the S and W is said to be non-physical factors.

As one of the non-physical factors, the natural will 'W' or natural resources are needed to reach the ideals of Pancasila and the Constitution so that all Indonesian people are prosperous, intelligent and

peaceful. To achieve the targets 'W', the right and mature Strategy 'S' is required. To create the right 'S', the supports of Cultural Value, Economic System, and Laws/Regulations are required. While Cm is the critical mass that creates the right strategy to achieve national will by means of heightening the E and M (Cline, 1975).

Indonesia is an archipelago consisting of lands and waters. Indonesia's land area is about 1.9 million km², and the water area is about 3.5 million km² (Ministry of Maritime Affairs and Fisheries, 2012). This means that the 2/3 area of Indonesia is water. Therefore it requires a formidable military force, both in terms of the personnel and weaponry numbers. The formula of state defense as made by Cline identifies that each variable is interdependent.

This paper will discuss one of the country's defense factors, i.e. a 'M' factor (military), i.e. 'the readiness of defense equipment and supporting personnel'. Indonesia's vast territory and its abundant natural resources should be protected and preserved as well as possible. Thus it requires a formidable military force. Some things to consider in establishing a formidable military force (factor 'M' / military) are among others the number of military personnel, the number of defense equipment, and supportive defense and security policies. For more details it will be described as follows:

The Number of Military (TNI) Personnel

The power of the military personnel as one of the main components is currently numbered around 376,000 soldiers. When we compare to the number of Indonesian population, the number of military personnel we have is still unbalanced or deficient. Ideally the ratio of the number of military personnel to population is 1: 629 (Bakrie, 2007). So if the number of Indonesian population is currently around 241 million people, then the ideal number of military personnel is 383,148.

Apart from the number of personnel, the composition ratio of each military force is still not ideal. To keep the Indonesian archipelagic territory, whose main area is water, we require more Navy personnel. Ideal number of Navy and Air Force personnel is 2/3 of the total number of military personnel, with the ratio of 60% of Navy personnel and 40% of Air Force personnel. Hence the ideal composition of military personnel is as listed in Table 1 below:

Table 1. Military (TNI) Composition

TNI	Current condition		Ideal condition	
	personnel number	military force percentage	personnel number	military force percentage
AD (Ground force)	288.000	75%	127.716	33%
AL (Navy)	59.000	17%	153.259	40%
AU (Air force)	28.000	8%	102.173	27%

The Number and Capability of Defense Equipment (ALUTSISTA) Industry

Another important factor to support military force is the number of defense equipment owned. The white papers of the Ministry of Research and Technology concerning the science and technology for defense and security to support the principal strength of TNI/MEF in 2025 has mapped what is required by the military, capabilities of defense and security industry, and the ability of R & D institutions to participate in supporting the development of defense equipment

The current condition of military defense equipment is as follows: the ready Army 60%; Navy (ready KRI hitter 83%, ready KAL patrol 68%, ready KAL supporters 43%); Air Force (ready fighter 45%, ready transport plane 45%, ready training aircraft 45%, ready helicopters 45%) (Bakrie, 2007).

At the present, the number of tanks Indonesia has is as much as 231 units of the type PT 76, AMX 13 and Scorpion 90. The equipments are derived from the '50s and' 70s generation, no longer compatible with the present development. The ideal number of tanks owned by the Army should be 1,161 units, where the ideal number 1 unit of tank is intended for 110 personnel. For comparison in Vietnam, they have 2,200 unit of tanks, whereas the population of Vietnam is less than Indonesia (Bakrie, 2007).

The ideal amount of ACV (Armored Combat Vehicle) is 3,991 units where 1 unit of ACV is ideal for 32 number of personnel, while for the artillery we should have 1,703 units in which one artillery unit is for 75 personnel (Bakrie, 2007). To strengthen Indonesia's defense, the number of defense equipment owned must also be balanced by the number of military personnel. While the current number of military personnel is as many as 376,000 personnel consisting of the Army, Air Force, and Navy.

The current condition of TNI's defense equipment is inadequate and far from the standard because most of them are already more than 40 years. Qualitatively they are below standard, while quantitatively they are insufficient, less than required. The main obstacle is the issue of funding for defense equipment. Over the past 10 years, the Indonesian defense budget on average is under 1% of GDP (gross domestic product), while the defense budget for the Southeast Asian countries is above

2% of GDP; some countries even allocate defense budget of 3% -5% of its GDP (Harsono, 2009; Purwanto, 2011).

Closely related to defense equipment is the presence and capabilities of domestic defense and security industry. Currently defense and security industry in Indonesia actually has the ability to produce a quality defense equipment. It is proven by the ability to produce several types of armaments such as (Ministry of Research and Technology, 2010):

- a. Combat Power: Rocket (FFAR, Ø 122 including R-HAN1-D230), SS2 V3, Firearms, MKK;
- b. Motion Power: pioneer vehicle, Anoa panzer 6x6, KPC 40, LPD Ship, CN235 MPA, UAVs, MSR, AWC;
- c. K4IPP: HF/VHF communication tools, radio jammer, radar, Combat Management System (CMS), encryption technology, binoculars viewfinder day/night, target simulators;
- d. Soldiers set: bulletproof vest and helmet, DNA forensics, bomb/drug scanners, tears grenades, rubber guns/bullets, drug test kits, drugs mobile incinerator, fingerprint recording equipment;
- e. Supporting products: police/military post on the border (Mobile Water Treatment Unit, Solar Electric Power, electronic and communication tools), bomb/explosive scanner, electric vehicle (bike/car) for Polmas patrol.

Some domestic industries that can participate in the manufacture of armaments include PT Krakatau Steel, PT PAL, PT Dirgantara Indonesia, PT Pindad, PT LEN, PT Dahana, PT INTI, PT BBI, PT Barata, and PT INKA. Meanwhile, research institutes/universities that can participate to support the development of armaments are among others LIPI, BPPT, LAPAN, R&D Agency of the Ministry of Defense, R&D Division of Army, Navy, and Air Force, University of Indonesia, Bandung Institute of Technology, Gadjah Mada University, 10 November Institute of Technology, and Sebelas Maret University.

Indonesia's progress in the field of defense and security cannot be separated from the role of R&D institutions both of government, universities, and of the industry. However, there are some problems encountered by the research institutes, i.e. insufficient funds, human resources, inadequate facilities and infrastructure for research on defense equipment, and the lack of cooperation between research institutes/universities with military R&D, so that the research conducted is less synergistic.

Defense and Security Policy

Factors that play an important role in the independence of armaments industry of a country is the defense and security policy issued and executed

by the government to support its domestic defense and security industry and defense procurement. Such policies include:

A. Research Policy

The strength of a nation in the field of defense and security cannot be separated from the policy that supports it. The policy can be started from a mature plan contained in the National Medium Term Development Plan (RPJMN) 2010 - 2014 that is prepared as a reference for Indonesian national development.

In RPJMN 2010 - 2014, there is a matrix of prioritized activities including their responsible agency and annual target, as well as the funds allocated to each of these activities (Bappenas, 2010). Later the RPJMN made by the government is described in more detail in the National Research Agenda (ARN) as a planning agenda of science and technology in Indonesia. ARN is formulated by researchers from ministerial and non-ministerial R & D divisions, universities, and businesses (ARN, 2010). In the ARN there are seven focus areas, all of which are supported by basic science as illustrated in Figure 1. All activities are focused on the development of science and technology with the support from social and humanitarian fields. One of the focus areas of the ARN is the defense and security technology whose main priorities (ARN 2010) are: mobility power support, combat power, supporting technology for Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR or K4IPP), soldier set support technology, special equipment support technology, and independence support technology.

For each area of focus there has been research topics, the 4 years target, indicators of success, and achievement in 2025. For defense and security there are some main topics, i.e. the design and engineering of transportation means/vehicle for land, sea and air; design and engineering of smart naval mines and smart bomb; design and engineering of rockets and missiles; design and engineering of specialized communication tools; design and engineering of streaming data ; design and engineering of special equipment; design and engineering of anti-terror robot; Defense and Security Strategic Studies; Police special equipment; design and engineering of tactical vehicles, hovercraft and amphibious tanks; design and engineering of cannon; design and engineering of major ammunition and propellant products; design and engineering of optronic devices, radar and satellite; design and engineering of unmanned aircraft; design and engineering of explosive-tamer tools, bomb and metal detection; design and engineering of electronic warfare equipment; and design and engineering of war strategy simulation (ARN, 2010).

Ministry of Research and Technology classifies 12 priority defense industry products that are divided

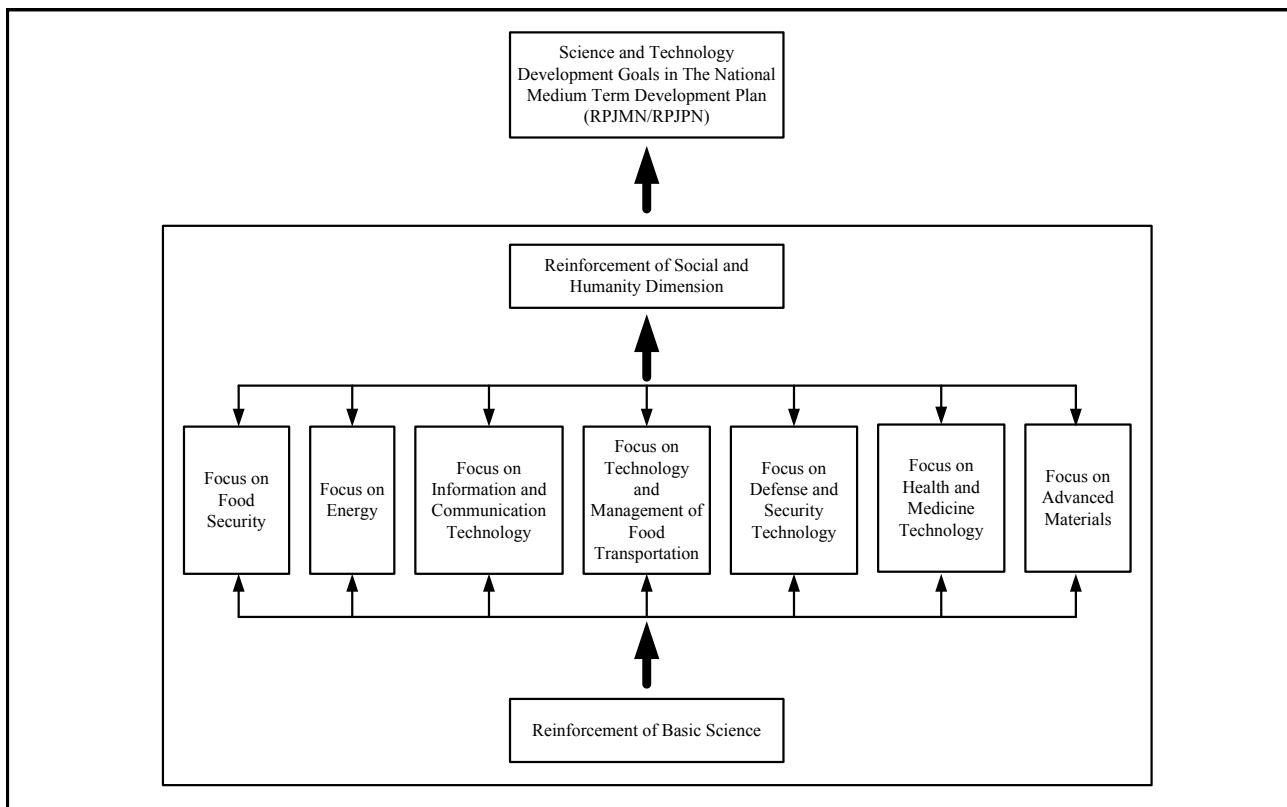


Figure 1. Linkages in focus areas and supporting factor for the successful development of science and technology (ARN, 2010)

into four defense and security industries, i.e. Defense and Security Industry A (C4I system, consisting of satellites, radar, UAV and UCAV); Defense and Security Industry B (fighter aircraft, transport aircraft, and missiles); Defense and Security Industry C (light tanks, mechanics infantry combat vehicle, armored personnel carriers, multipurpose tactical vehicles, and cannons); and Defense and Security Industry D (missile patrol boats, submarines, helicopter landing platform).

To accelerate research in the field of defense and security, Defense Industry Policy Committee (KKIP) was established through Government Regulation No. 42 Year 2010. This committee is working to formulate strategic national policies in terms of defense industry, coordinate the implementation of the defense industry, coordinate international cooperation in the defense industry, as well as monitor and evaluate the defense industry policies.

Ministry of Research and Technology and KKIP initiated the consortium of fighter aircraft, missiles, submarines, combat vehicles, and others. However, the consortium has not run optimally and is lack of coordination. The formation of research consortium is actually good to synergize research and include several research institutions. Each research institutions participating in the consortium plays its own role the goal of which is defense equipment such as rockets, warships or aircraft, etc.

LIPI as one of the research institutions participates in the consortium established by the Ministry of Research and Technology and KKIP due to LIPI track record that has long been doing research for defense and security equipment. One of Defense and Security Equipments made by LIPI is the day and night sight binoculars rifle that have been used by the army in East Timor. In addition, there are many more research in the field of defense and security that has been done by LIPI.

The results of research conducted by LIPI cannot be directly used by the user, in this case by the military, since they have not been certified by the TNI. To obtain the necessary military certification requires huge costs. One of the requirements is the prototype must meet the specifications of military equipment. The price of components in accordance with military specifications is expensive while research funding is limited. Therefore the cooperation between research institutions and the military is required so that LIPI's research results can be tested by members of the military. The prototype produced by LIPI has not certainly been proven; hence to get to the level of proven, trials by military members is required. From the test results will provide feedback for researchers to learn the shortcomings of the resulting prototype, and fix it according to the appropriate input from the user, so that the prototype becomes a proven products and is ready for production. It is clear that R & D institutions need the support from the relevant agencies such as

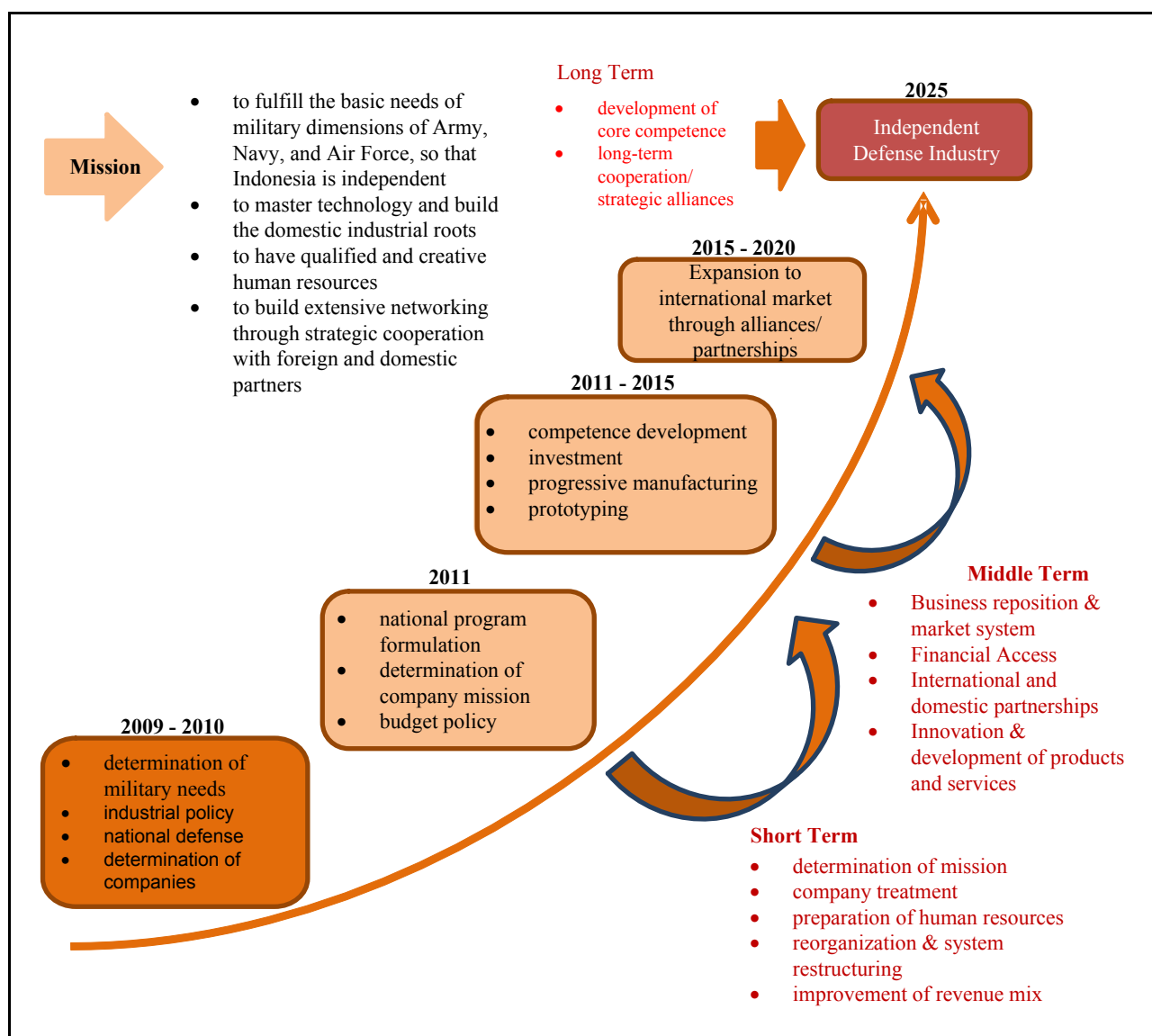


Figure 2. Strategic Defense Industry up to 2025 (Coordinating Ministry for Economy)

the military to make the research results of R & D institutions into proven products, thus Indonesia no longer need to buy defense equipments from abroad.

B. Domestic Defense Equipment Industry Policies

In the Master Plan for the Acceleration and Expansion of Indonesian Economic Development (MP3EI), eight main programs become the focus for accelerated development. The eight main program is divided into 22 main economic activities, one of which is defense equipment. The national programs to support the existence of these defense equipments include: manufacturing of aircraft, rockets/missiles, torpedoes, ships/submarines, combat vehicles, weapons, and ammunition (Coordinating Ministry for Economy, 2011).

The programs are selected due to geographical conditions of Indonesia, that consists of islands and surrounded by the ocean, hence it is prone to threats coming from the border of land, sea and air. The

encountered threats cause disharmony with neighboring countries, such as illegal logging, illegal fishing, illegal mining, illegal trading, and others. As a sovereign nation, we must maintain the wealth we own; one way to keep it is by procuring adequate armament so as not to be defeated by the armament of the perpetrators of these crimes.

The problem encountered is the lack of defense equipment industry in Indonesia. So far the defense equipment was purchased from the overseas industry, so that the domestic industry is not growing. The lack of development of the domestic industry is also due to the absence of Law on the development and utilization of national strategic industry to support the defense system in Indonesia.

The target of MP3EI for defense equipment program is to improve the fulfillment of defense equipment for the military and police. The strategy made is by synchronizing the fulfillment of the defense equipment needs with the ability of domestic

industry to accelerate the transfer of technology, increase the use of local content, as well as conduct productive cooperation to improve the production of the domestic economy. The strategic defense and security industry roadmap contained in the document of MP3EI is as found in Figure 2.

Figure 2 shows the steps to be done in 2009-2025 to reach defense industry independence in Indonesia. Since its inception there has been a mapping of defense equipment needs, and domestic human resources and industrial capabilities we have. What is not less important is the issue of funding to support this program. However, in the MP3EI there is no clear roadmap on the development, engineering, or the purchase of defense equipment. The annual target for the defense equipment is also not included. It seems that the economic activity of defense equipment is not a top priority like other economic activities. Therefore a more detailed elaboration of the roadmap is required.

4. Conclusions

The number of military personnel in Indonesia is not proportional to the number of inhabitants. Army personnel is more than the Navy personnel, whereas Indonesian territory consists of islands, 2/3 of which is water. Thus the Navy personnel is supposed to be more than other military personnel to guard the territorial waters of Indonesia. The number of ideal composition of military personnel is 33% for Army personnel, 40% for Navy personnel, and 27% for Air Force personnel. the ratio of the number of population to military personnel are currently 641:1, still below the ideal ratio of 629:1. The ideal number of military personnel is 0.15% of the population number. If the population number is 241 million people, the number of military personnel should be 383,148 personnel.

In addition, the number of defense equipment owned by Indonesia is still far from standard and not comparable in number to the number of military personnel. The ideal number of tanks owned by the Army should be 1,161 units, where 1 unit of tank is intended for 110 personnel. As for ACV (Armored Combat Vehicle) the ideal number is 3,991 units, where 1 unit of ACV is for 32 personnel.

In MP3EI document, the annual target for defense equipment is not included; hence it seems the economic activity of defense equipment is not a top priority. Defense and Security research cannot only be done by an agency or group alone. Therefore the cooperation between research and development section of military, universities, and other research institutions is recommended under the umbrella of defense and security research consortium, thus there is a harmonious synergy of research by releasing sector-ego for the benefit of the country.

LIPI has conducted research and produced several prototypes in the field of defense and security. Existing R & D results should be used and tested to determine its performance in order to be more proven.

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