Indonesian Defense Industry Model Concept: A Study Framework for Defense Industry Building

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***Abstract*—Defense industry plays a role in supporting and strengthening the national defense, especially in the infrastructure and technologies that include defense equipment. In addition to technology, the components that make up the national defense force is human resources (number of personnel, capabilities and combat strategies , moral struggle) and natural resources (land area , natural fortress, mineral wealth , raw materials and ingredients for food , energy materials) Overall national defense force was used to protect our national interests against potential threats from outside the country. Operationally, the use of the national defense force is regulated in national defense doctrine, which is further elaborated in the various government regulations. This study aims to determine the existing condition of the Indonesian defense industry system and analyze the model of Indonesia's defense that needs to be applied. This type of research methods research is a descriptive research (descriptive research). verification study (verificative research) and applied research (Applied Research). The unit of analysis in this study is the defense industry, businesses. The results showed that there are three main models of the defense industry autarky system models, niche production models as well as global supply chain models. Indonesian models wearing the realization of self-sufficiency efforts chain. In an attempt supply defense industry, defense industry system and the model of the technology supplied from existing civilian production.**

***Index Terms*—defense system, defense industry, revitalization, model defense industry**

I. Introduction

The ability of keeping the country safe atmosphere conducive to the development of economic sectors is essential. The task of maintaining national security will be easier if there are collateral support national strategic industry technology capabilities. Strong nation is a nation that has a defense to the main weapon system is capable, accompanied by maximizing the energy of natural resources and human resources capability reliably, to have an impact on economic progress. Thus national technological capability able to perform two functions simultaneously, namely: first, produce defense equipment products, and second, is able to produce a commercial product products that are highly competitive. Indonesia's defense industry development until 2025 as stated in the MP3EI emphasis on improving the defense equipment needs / Defense Facilities Almatsus military and police. This is done through the following strategies: synchronization with the ability to meet the needs of defense equipment industry in the country, the acceleration of the process of technology transfer (transfer of technology) for infrastructure development and increase local content as well as cooperation

In connection with this, the Indonesian defense industry need to revitalize and business development, where the business needs to be directed to develop comparable with commercial products. So that the economic development of the defense industry development that maximizes energy sources and local resources in addition will be able to grow the industry in the country, but also strengthen the country's competitiveness in the international arena. In addition, having the domestic defense industry will have an impact on the fulfillment of the defense system more efficient and effective. Indonesia also will no longer depend on the supply of defense equipment spare parts from other countries and do not need to spend a lot of foreign exchange to import defense equipment and spare parts. In addition, Indonesia will get the recognition of the defense forces in the context of international relations.

II. Literature Study

Defense industry is a national industry (government or private) whose products either individually or in groups, including maintainability and repair services, the government's assessment could be utilized for the benefit of the state defense order or part of the national industry in particular has the ability or potential to be well developed to produce products such as weapon systems, equipment and supplies, administrative support / logistics

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or services for the purpose of the national defense [1]. Defense industry, also called the military industry, consisting of government and commercial industry involved in research, development, production, and service of equipment and military facilities [2].

Alexandra Retno Wulan states that (2009) some of which must be considered in order to form a strong Indonesian defense industry. Her historical and empirical study reveals that several countries have developed defense industry and these experiences can certainly be taken as a reference for Indonesia to develop its own defense industry development model. The main aspects that must be considered to establish the defense industry [3]:

- Institutional aspects. Almost all developing countries decided to establish its defense industry on the basis of political and strategic motivations.
- Therefore, the institutional aspect requires government commitment, especially in strategic industries to protect against this. Commitment and protection is implemented in the manufacture of defense industry development blueprint.
- Aspects of the industrial framework. In theory, Joseph Schumpeter provides two mechanisms as agents of change in the context of innovation.

  First, small industries with large industrial innovation and entrepreneur with managerial innovation. Empirically, many countries do the audit and consolidation of the defense industry to ensure the effective and efficient performance. Aspects of the industrial framework also requires Indonesia choose from three possible models of choice that often arise in the development of the defense industry, namely [4]:

(1) Model autarky. This model for example, adapted by Turkey and South Korea. Turkish defense industry is supported by a very large role for the state, while South Korea supported a large conglomerate such as Samsung and Daewoo to support the independence of its defense industry. (Mohammed Jaki Nurhasya, 2011) [5]

(2) Industrial models niche (niche) developed by Israel. This industry specializing in technology development and defense instruments that have not been offered in the industry that has developed. Defense industry in the context of a very niche relied on comparative advantages of a country such as comparative advantage in technology such as reverse technology capabilities like those of Israel and China.

(3) The third option is to become part of the model advocates in the global defense industry chain. Singapore has become part of the global defense industry, although Singapore is not known as one of the weapons manufacturers or specific platforms.

(4) The third aspect to consider is the legal aspect. The legal aspect requires Indonesia to consider the rules that exist at regional and international levels because Indonesia is part of the global community and regional.

Development and the rise of the defense industry in Indonesia began the development of a military-run industrial equipment under the State Owned Enterprises (SOEs), which is now known as PT. Pindad (Persero) as well as the issuance of Presidential Decree (Decree) No. 59 year 1983 on the establishment of the Board of Trustees and Strategic Industries business and Defense Industry. The next step the government set 4 defense industry, PT. PINDAD engaged in arms and ammunition, PT. IPTN (now PT. Aerospace Indonesia) in the field of aerospace, PT. PAL maritime field, and PT. Dahana field of explosives into 10 strategic industries shade into State Owned Strategic Industries (BUMNIS) [6]. Six other strategic industries, among others; PT. INKA (rail), PT. CORE (telecommunications), PT. Krakatau Steel (steel), PT. Boma Bisma Indra (container and equipment), PT. Barata (diesel engine) and PT. LEN (electronics). Current and future defense industry that Indonesia needs a strong and independent. Historically, the United States develop its defense industry to win the war. Brazilian experience provides another illustration that Brazil chose to develop its defense industry with the hope of stimulating economic growth. Several investigations have been done regarding defense industry ties with the economy, namely [7]:

- Benoit (1973), in 44 developing countries from 1950 to 1965 data is the result that the relationship between economic growth and defense expenses is positive [8].
- Lim (1983), Biswas and Ram (1986), Deger (1986), Atesoglu and Mueller (1990), Chowdhurry (1991) in 44 developing countries from 1950 to 1965 as a critique of data to the study of Benoit (1973) [9]. The relation between the results and the defense expenses economic growth, to Asia, Middle East and South Europe, while positive for West Africa and Europe ugly.
- Kollias and others (2004) in 15 European countries from 1961 to 2000 concluded that the data in relation between economic growth and defense expenses for Austria, Denmark and Luxembourg bidirectional, France, Finland and Portugal there are no random situations (random), Germany, Italy, Holland, Spain, Sweden and the United Kingdom there is a causal relationship, no Begium and Iceland and Greece unidirectional causality [10].
- Dritsakis (2004) in Turkey and Greece concluded that There is no integration between economic growth and defense expenses, but found unidirectional from economic growth to defense expenses [11].
- Ozsoy (2008) Turkey VAR Model and Granger Causality Test Unidirectional causality from GNP to defense expenses in the Annual Growth Rate GNP, but no causality for other economic variables [12].

III. Research Methode and Questions

A. Method of Research

Position figures and tables at the tops and bottoms of this type of research is a descriptive research (descriptive research) verification study (Verificative research) and applied research (Applied Research). The unit of analysis in this study is the defense industry, businesses. Determining the location of the samples was done by purposive - Vendor defense industry. Data were analyzed by cross- sectional and time series. Types of data collected for analysis consists of data Primary and Secondary Data. Sources of primary data obtained from interviews with respondents using questionnaires and field observation.

Secondary sources of data obtained from the literature, documents review, and data from agencies, institutions, agencies, and the Bureau associated with this study. Primary data were collected with 4 ways: Through PRA approach (Participatory Rural Appraisal), Focus Group Discussion (FGD) and the survey through interviews using questionnaire, and direct observations (observation). Secondary data will be collected through the study of literature, Review Documentary and the results of previous studies.

In this research also used method of Systems Thinking. The Systems thinking is a scientific approach which enables the revelation of causal structure of a phenomenon (Kim, 1999), whose known structure is called a system. Systems thinking approach has been widely used in researches made on policy and strategy, because it relies on modeling of the logical deduction.

B. Research Questions

- What is System Thinking Structure of current Indonesian Model?
- What is the alternative model in defense industries?
- What would be the future new Indonesian Defense Industries model?

IV. Results and Discussion

A. Existing Condition Indonesian Defense Industry

Development in all areas is a must. Defense Industry Development is a fairly important part in the General National Development Strategy of the Republic of Indonesia. Always lurking threat both from within and outside the country and in a variety of formats. Defense preparedness is an absolute constant that must be upheld at any cost. For the software and hardware should always be available for use in warding off threats that disrupt or destroy. To support the capabilities and functions of the State defense, needed a new paradigm that makes the atmosphere to raise defense industry as the main supplier of weapons and defense equipment to the armed forces. Several companies and the defense industry production capacity in Indonesia are presented in Table I.

TABLE I. Defense Industry Company and the Ability of Production in Indonesia

NO	DEFENSE INDUSTRY	PRODUCTION
1	PT DI	CN 235 N 212HELLI (SUPER PUMA, BELL, BO)
2	PT PINDAD	Small weapon, Munition, Panzer, Heavy Transportation
3	PT PAL	FPB 28, FPB 57, LPD, Commercial ship up to 50.000 DWT
4	PT DAHANA	Civil and Military Explosives
5	PT LEN	Combat Communication and Surveillance, Combat Management system, Solar panel.
6	PT INTI	Video Surveillance System, Nex Generation, Video Messaging System, Digital TV System
7	PT KRAKATAU STEELL	KSW 500 Steel (Armoured), Hot/Cold Rolled Coil, Wire Road
8	PT INKA	Train car
9	PT BHARATA INDONESIA	Bomb Basket, Sharp Bomb F-16, & Heavy Equipment
10	PT BOMA BISMA INDRA	Electric generator equipment (for Paiton), Industrial equipment for Cement, Sugar, Amonia
11	PT DOK PERKAPALAN KOJA BAHARI	LCT, LCU Ship, Repowering naval ship
12	PT DOK PERKAPALAN SURABAYA	LCT, LCU Ship, Repowering naval ship
13	INDUSTRI KAPAL INDONESIA	Fast Patrol Boat, Cargo Vessel, Fishing Vessel, Tunda Vessel

V. Concept Model Defense Industry in Indonesia

A. Present System Analysis: Israelis Model

Indonesian Defense Industries set up has been following Israelis model that shown below (see Fig. 1). By using Systems Thinking schematic, Israel system would be described as next schematic. Defense Industrial Production will fulfill **Foreign Demand** and from it the sales result has adding the capital for Defense Industrial Needs State Vision that create Strategy also creating **National Allocation** and from it resulting **Resources Needs** and from it would be create a **Resources Allocation** Industrial Profit from Defense Industrial Production also adding to **State Income** that contribute to National Allocation.

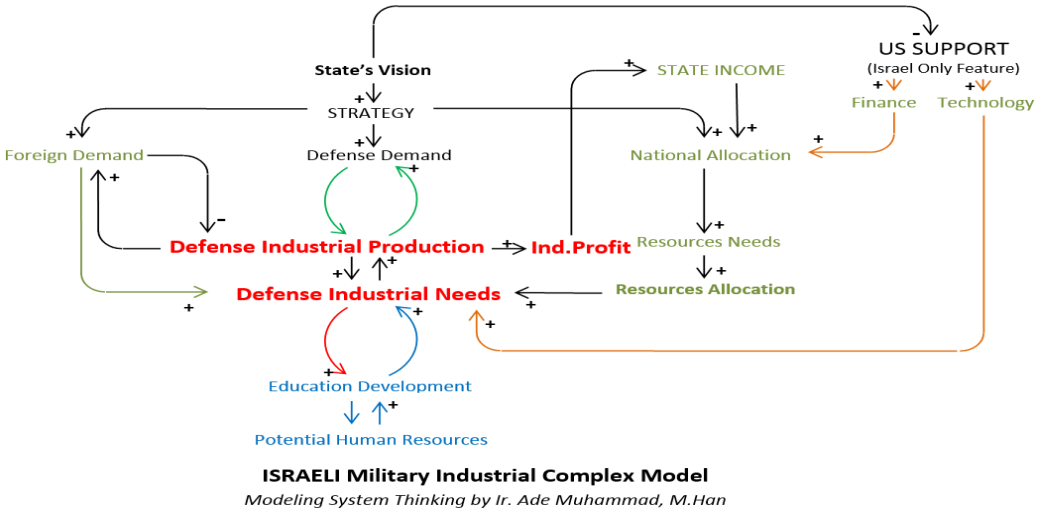

Figure 1. Israeli defense industries model. (Ade Muhammad, 2012) [13]

State Vision also needs **US Support** in terms of **Finance** and **Technology**. Finance support to National Allocation and technology support to Defense Industrial Needs.

The understanding points of Israeli Model (see Table III) are this model mainly SOE as spearhead of Defense Industries that resulted on private defense Enterprise was not developed. This system featuring of US Support and its also highly dependable to US Policy. State has two concentration of financial which are capital of SOE and defense project funding. This system also required no need to rely on natural resources and supplier because very high dependent to raw material risks as well supplier. The followers are Singapore CIS (now ST-Kinetics), Indonesia BPIS (now KKIP), South Africa.

From the Fig. 1 we could explain; basically from the State vision to Defense Application Needs is the same as Israelis Model, also minus US Support in Financial and Technology.

B. Present System Analysis : Japan Model

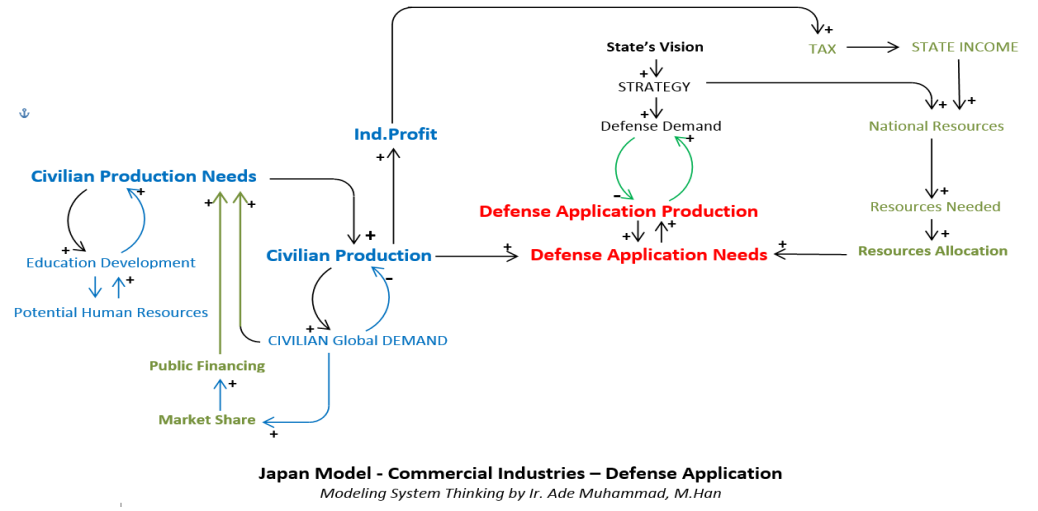

Figure 2. Japan defense industries model (Ade Muhammad, 2012)[13]

The main distinction of this model is it reliance on the civilian engineering / manufacturing system that supplies Defense Application Needs with **Civilian Production**. This means in Japan philosophy Civilian Products has to be number one, then after that the military application could be derived from it. For example, if Japanese civilian automotive industries could build a civilian jeep, then it's easy to build military version of it.

From Fig. 2 we could be explain; **Civilian Production** is a response to **Civilian Global Demand**. This will create **Civilian Production Needs** that has to be fulfilled by creating Civilian Production.

For Financing the Private Civilian Enterprise supplied from **Public Financing** that influenced by **Market Share** in Capital Market. The bigger the Civilian Global Demand, the bigger the Market Share of that private company. Meanwhile for Technology the private company will cooperate with **Education Development** and create the engine of growth.

The civilian production will create **Industrial Profit** then contribute to **Tax income** and influence to **State**

Income. The higher State Income, then the higher **National Resources** that can be mobilized into **Resources Needed** and contribute to **Resources Allocation**.

TABLE II. UNDERSTANDING POINTS OF JAPAN MODEL (ADE MUHAMMAD, 2012)

NO	Points of Understanding	Consequences
1	Private Enterprise as a spearhead of Defense Industries	Effectively to maximizing national potential to support Defense efforts.
2	State Financial focus on Defense Project	Efficiency of State Budget
3	Technology using Defense Application from Civilian Product	Cheaper and easier to do so, because already have the basic technology, just need to increase it to military requirements.
4	Heavy Reliance to National Supplier and Supply Chain Management	Less dependent to foreign supplier or supply chain management
5	Followers by several Asian countries	South Korea, Taiwan,

Table II is explaining the difference of new model from previous Israeli model that emphasis on the private sector and the military industries application are based on civilian products that already exist.

C. Future System Analysis : New Indonesian Model

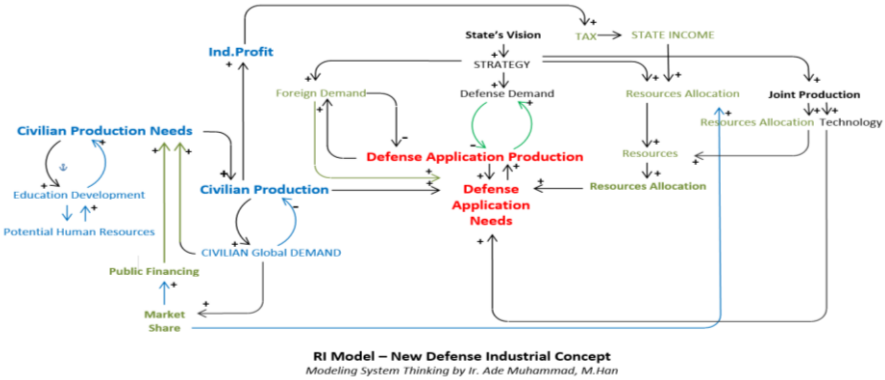

Figure 3. Future Indonesia defense industries model (Ade Muhammad, 2012) [13].

Fig. 3 is explaining about the difference between of New Indonesian Model with Japan Model are two things, firstly is the obligation of International Cooperation (Japan model only cooperate with US defense industries or National consortium) and secondly is still maintaining several State Owned Enterprise.

This two distinct feature are designed for share the risk of defense project, in the same time increasing capacity of technology and also widening market of defense production. The other benefit is maintain SOE with solely purpose to produce specific product or component that civil industries doesn't have capacity nor interest nor having civilian basic technology to produce it.

TABLE III. UNDERSTANDING POINTS OF NEW RI MODEL (ADE MUHAMMAD, 2012).

NO	Points of Understanding	Consequences
1	Private Enterprise as a spearhead of Defense Industries, however few of SOE still exist.	Private Enterprise role is to build military application based from their civilian product. SOE only role is to build military product when no private enterprise has civilian based product nor intention/capacity to produce it.
2	State Financial more focus on Defense Project	Efficiency of State Budget
3	Technology using Defense Application from Civilian Product	Cheaper and easier.
4	Supply Chain Management : Heavy Reliance to National Supplier	Less dependent to foreign supplier – in time will grow capability to self-sustaining.
5	Feature of Obligation to International Cooperation	Sharing risk, increasing capacity and widened market.

Table III is explaining basically about the distinction of Indonesian model that combined between SOE and Private sector efforts to contribute to defense needs.

VI. CONCLUSION

The conclusion would be the answer of Research Questions:

- What is System Thinking Structure of current Indonesian Model?

Indonesia now is using Israeli model of Defense Industries. Refer to Fig. 1 Israeli Defense Industries Model.

It means with lack of US support and SOE only spearhead of defense industries, doesn't provide a sustainable factor to Indonesian defense industries.

- What is the alternative model in defense industries?

The alternative model that suitable for Indonesia new defense industries model is Japan Model. Refer to Fig. 2 Japan Defense Industries Model.

This Japan model is very attractive because using the advantages of private sector that already existing. It means powerful private industries ensure powerful defense industries.

- What would be the future new Indonesian Defense Industries model?

The New defense Industries of Indonesia would be using enhanced Japanese model, that features International cooperation and maintain several (but lesser than previous model) SOE's. Refer to Fig. 3 Future Indonesia Defense Industries Model.

This new model based on successful Japan model with additional several few but necessary of SOE contributes to defense industries.

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From the author Ade Muhammad, this is dedicated as a birthday present for Dr. Anggi Aulia Harahap, M.Soz.

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