Chapter III

Indonesia's Defence Industry Development

This chapter will give the description of Indonesia defence industrial development, the structure of defence industry, the national industry capability, the factors involve in defence industry, for instance the defence budget, defence market, national policy, and the role of government. Finally, it will discuss the Indonesia defence industry linkage. It will see what happens when all factors are put all together and how the performance of that linkage. The author argues that this chapter is important for the next section since it gives the macro overview and discusses potentials and problems which shape the current status of Indonesian defence industry.

III.1 Defence Industrial Development

III.1.1 Pre-Independence

The pre-independence (pre-1945) defence industrial infrastructure in Indonesia was limited. It was the Colonial Dutch facilities and private-owned workshop. The facilities ranging from land, marine, and air support. It generally catered from the lowest spectrum of defence production – repair and overhaul Dutch colonial defence system to the flight test center and aircraft production.

In 1808 the Dutch government established the workshop for military equipment in Surabaya which called Artillerie Constructie Winkel (ACW). In 1848 the facility to repair and overhaul shipyard established also in Surabaya and in 1939 Dutch government dedicated this facility as Maarine Establishment (ME).

To support the air defence, in 1914, the Flight Test Section (Bagian Uji Terbang) was founded in Surabaya with the task to study aircraft flight performance in tropical region.

The private initiative showed around the 1922, when the Indonesian had even been involved in the modification of an aircraft at a private house in Jl. Cikapundung, Bandung.

The Flight Test Section establishment was followed by the establishment of Aircraft Production Section (Bagian Pembuatan Pesawat Udara) in 1930. It produced the Canadian AVRO-AL aircraft, of which the modified fuselage made of local wood. This manufacturing facility was later moved to Lapangan Udara Andir or the Andir Airfield (now Husein Sastranegara Airport).

In 1937, eight years prior to the Indonesian Independence some Indonesian youths, led by Tossin built an aircraft at a workshop located in Jl. Pasirkaliki, Bandung due to the request of a local businessman. They named the aircraft PK. KKH. This aircraft had once surprised the then aviation world due to its ability to fly to the Netherlands and the mainland of China vice versa.

In 1938, with the request of LW. Walraven and MV. Patist - designers of PK. KKH - a smaller aircraft was built in at workshop in Jl. Kebon Kawung, Bandung. It successfully produced the aircraft on the same year, yet the further development either the product or the workshop had not heard since after.

III.1.2 Early Independence to End of 1970s : Off The Shelf Regime

Indonesia declared its independence in 1945. Under Soekarno's presidency (1945-1966) Indonesia faced both internal and external threats directly toward its sovereignty from Dutch military aggression (1945-1949), confrontation with the neo colonialism in West Irian (1961-1963) and Borneo (1963-1966), communist coup (1949, 1966), as well as several separatism efforts. Governments of Indonesia therefore concentrated on the effort to tackle these situations. Meanwhile, the building up of Indonesia's defence industry was still not in the government's main agenda. The government took over the legacy facilities of Dutch colonial, but less program to produce or up grade those facilities. Military capability was build up through buying off the shelf equipment. It can argue that this policy has shape the culture of Indonesia military over the defence equipment. That is "if we can buy it, why we have to make it". The phrase shows the culture

that commit to instant process. In the long run, this culture proved to become a major problem that constraint the defence industry development.

The first facility of Dutch legacy that transferred to Indonesian government was the workshop for military equipment The Artillerie Constructie Winkel (ACW). The workshop was then moved to Bandung in 1923 transferred to Indonesian government in 1950 and changed the name to Pabrik Senjata dan Mesiu (PSM) - the factory of equipment and ammunition, and finally under the Presidential Decree NO. 59/1983 PSM officially become PT. Pindad (PT. Perindustrian TNI-AD). Government also took over ME (the marine facilities) and changed the name to Penataran Angkatan Laut (PAL) in 1949. Under Government of Indonesia (GoI) some activities to build up the production capability took place.

Since 1950, PT. Pindad had begun its armament production in Bandung. The production facilities at that time were imported from Italy. It started with small arm caliber, P1. Through reverse engineering from the available model like Colt, PT. Pindad succeeded to make P1 prototype. After a series of testing, learning by trying and failing, finally PT. Pindad could deliver P1 as user required and it become TNI's organic equipment.

In 1960 PT. Pindad has begun to produce ammunition. It started with the acquisition of cassava factory at Turen, Malang from Dutch government. In 1968 PT. Pindad produced bullets with 12.7 mm caliber. It continued to produce 7.62 caliber and 7 mm in 1970 and 3.56 mm in 1973.

In the field of aerospace, the embryo of Indonesian aviation came from private initiative. It began when three young men –Nurtanio Pringgoadisujo, Wiweko Soepono, and R.J Salatun- in a junior aero club created locally made aircrafts in 1946. They were concerned that the condition of the Air Force fleet was too dependent on imported parts. Nurtanio and Wiweko constructed a glider called NWG01 entirely out of local materials. The glider flew successfully and caught the attention of their superior who authorized a small order for the glider to be used for training purposes. Two years later, Wiweko created a modest airplane

made out of metal and wood and using a Harley Davidson engine. Named RI-X, this was the first motor-powered plane produced by an Indonesian. [36]

Nurtanio's success attracted the attention of Soekarno. In 1960, the Soekarno government forms the Preparatory Agency for Aviation Industry (LAPIP), which was meant to be the start of an aircraft producer. In 1961, with the loan of US$ 2,5 million from the Polish government, LAPIP built a manufacturing facility at nearby Husein Sastranegara Airport in Bandung. With license from Polish Cekop, it started producing a modified version of PZL-104 Wilga named Gelatik (rice bird) used for agricultural purposes, light transport, and by the aero club.[37] It also produced training aircrafts LT-200 and established a factory for after sales, maintenance, repair and overhaul.[38]

However this success was not long. During the harsh times on early 1970s LAPIP which was later named LIPNUR struggled to survive. It could only afford to produce a small number of Gelatiks, mostly for Air Force use. This diminished vitality lingered through the mid-1970s until the arrival of B.J Habibie, which marked a watershed in the history of the Indonesian aviation industry.[39]

One industry that the government established during this period was PT. Dahana in 1966 at Tasikmalaya. It produces explosive materials for both military and commercial purposes.

III.1.3 The beginning of 1980s to End of 1990s: In Pursue of Self-Reliant…

This period is very important in Indonesia defence industry. For almost two decades government exercised the real build up defence industrial base. The build up based on the distinct concept and systematic strategy, rapid investment in production facilities, knowledge, human resources, and research. It witnesses the activities and resulted in the strategic industries, private industry, and technology research agencies like BPPT.

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[36] Amir, Sulfikar, *Natinalist rhetoric and technological development : The Indonesian aircraft industry in the New Order regime*, Elsevier Ltd, 2007, p. 285
[37] Ibid
[38] Irahali, Lili, *25th PT. Dirgantara Indonesia Opening the New Paradigm : Indonesian Aerospace in History's Perspective*, PT. DI, 2001, pp. 13
[39] Ibid

To anticipate the future modernization requirement, in the beginning of 1980s, Suharto – Indonesian second president- initiated plan to build a national defence industrial base. The idea was based on Suharto's concern that the upcoming defence modernization will inevitably produce soaring dependency to foreign supplier. The second concern was the budget waste: annually ABRI gets an average of US$ 250 Million of export credit and of which the major part went into foreign weapon' spare parts procurement. If only Indonesian have grown its indigenous defence industry, the problem of dependency and also self sufficiency will be conquered. The procurement budget will move into national industry and may contribute to the economy.[40]

The approach that government used to build the national defence industrial base was by the formation of a group of industries that was considered strategic industries. They are: PT. Dirgantara Indonesia (aerospace industry); PT. PAL Indonesia (shipbuilding industry); PT. PINDAD (weapon industry); PT. Dahana (explosive industry); PT. Krakatau Steel (steel industry); PT. INTI (telecommunication industry); PT. INKA (train and railways industry); PT. LEN Industri (electronics industry); PT. Barata Indonesia (machineries industry); and PT. Boma Bisma Indra (diesel machine industry). Five out of ten strategic industries regarding have a role as industries supporting defence production in Indonesia. They are PT. Dirgantara Indonesia, PT. PAL Indonesia, PT. PINDAD, PT. Dahana, and PT. LEN. The compositions of strategic industries are divided into two production lines: commercial and defence product. It was planned that within the peace time 80% of industry total sales are dedicated to commercial whereas the 20% is dedicated to defence; under war condition 80% industrial capacity is dedicated to defence and the rest is for commercial.

Suharto was very enthusiastic about high technology. He once said, "We have to make a long-term plan to anticipate the future, which will determined by our own mastery of modern science and high technology. This statement illustrates

[40] Maharani, Curie, *The Change Within Indonesia's Defence Acquisition*, ITB 2007, p. 6

Suharto's conviction that high technology was a strategic tool for the country, a belief that was imposed upon the national development agenda[41]. To make this real, in1974 Suharto asked Habibie- a young Indonesian who worked for over 10 years for Messerschmitt-Boelkow-Blohm (MBB) Germany where he reached the position of vice president and director for technology application - to return home and joint to Indonesia cabinet. Habibie then become his right hand to prepare the making of a management body of strategic industries

At the beginning, Soeharto has taken the steps of: [42]

- Appointing Prof. Dr. –Ing B.J. Habibie as technology advisor to the President of Republic of Indonesia
- Directed the Advanced Technology Division of Pertamina as the progenitor of the Agency for the Assessment and Application of Technology (BPPT)
- Developing the aircraft industry in Bandung

In 1978, Habibie was appointed as Minister of State for Research and Technology, a position he held for 20 years. In addition he also chairman of BPPT, Principle Director of PT. PAL, Principal Director of PT. Pindad, Chairman of the Board for the Advancement and Management of Strategic and Defence Industries, and Chairman of the National Research Council.

Soeharto argued that to safeguard and harmonious development of the industries to be combined within the Strategic Industries they need to be in one hand from the start prior to the establishment of an agency for their advancement and management at central government level.

Although Habibie was given the task of handling technology development in general, his agendas focused primarily on developing the aircraft industry. Habibie's famous phrase in developing technology development was known as

[41] Amir, Sulfikar, *Natinalist rhetoric and technological development : The Indonesian aircraft industry in the New Order regime*, Elsevier Ltd, 2007, p. 285
[42] _____, *Prof. Dr. Ing. B.J. Habibie Half a Century Impressions and Reminiscences*, Cipta Kreatif, Jakarta, 1987, p. 11

‘Begin at the end, and end at the start’. It meant when we know the more difficult, the less difficult would be a cinch. When start with the simpler things and then tried to proceed to the more difficult it would be hesitant to meet problem. The logical implication is, that when we know how to build an aircraft, people will believe that we can build motorcars, on the other hand, when we begin with building cars, people may doubt whether we would be able to build aircraft of tail-cars.[43] In operating level the mantra means to build the equipment is not necessary start with making the component first, but could jump to learn from the end of the process (the final product) and then step backward to the staging and phase to make the component. Habibie formulated the strategy in four phases : Technology acquisition through the transfer of existing technology, integration of acquired and existing technology into the design and production of completely new products to be introduced in the international market, development of existing and new technology into the design and production of completely new products to be introduced in the international market, and finally acquisition of large scale basic research capability and the implementation of basic research as key elements in the introduction of competitive generic technology.
With this strategy the defence state-owned company during this period were engage primarily in manufacturing a series of licensed production.

In 1976, Indonesia made its debut in the world of high-tech development. Harnessing the oil bonanza at that time, Indonesia’s New Order government sought to industrialize the country by establishing Industri Pesawat Terbang Nusantara (IPTN) with later was renamed Indonesian Aerospace (PT. DI). Headquartered in the city of Bandung, IPTN manufactures a variety of aircraft products ranging from helicopters and propeller airplanes to jet aircraft components. By 1995, the industry employed 16,000 skilled workers and hired hundreds of Indonesia’s best scientists and engineers, especially those with doctoral degrees from prominent universities in Europe and North America. Over the course of the next two decades, the New Order government invested more

[43] Ibid, p. 295

than US$2 billion in IPTN, an enormous amount for a developing country with a GNP per capita under US$ 1000. [44]

For government at that time, IPTN was not merely a manufacturing industry but a machine of social change that could transform Indonesia society from an agricultural to an industrial culture through a scheme of technology transfer. It refers to the process of mastering Western technology via four systematically steps: importing technology, modifying existing technology, designing new products, and conducting basic research.

IPTN experienced these steps with the CN235 project as a joint development between IPTN and CASA Spain. IPTN wanted to use CN235 in military operation in remote areas. It was intended to replace the C130 Hercules, which was used extensively by the Indonesian military. It was granted an airworthiness certificate by the Joint Certification Board of Indonesia and Spain on June 21, 1986. The valuable lesson from this experienced brought IPTN to embark on indigenous project N250 propeller aircraft in 1987. It was clearly a colossal project. IPTN sent its brightest employee abroad to study aircraft-related subjects at universities in Europe and North America. 7 years later, the rollout ceremony of N250 was held on November 10, 1994. The N250 project was the stage at which IPTN proved its ability to produce designs of its own. Moreover, it was the 3rd aircraft in the world with fly by wire system after Airbus A320 and Boeing 777. However, before N250 get the Certificate of Airworthiness either from FAA (USA) or JAA (Europe) the project stopped in 1998 due to the lack of fund. Government stopped the funding based on the Letter of Intent between GoI and IMF on point 4: The funding in budget or non budget for IPTN's program stopped. [45]

IPTN also take advantage of offset procurement to develop its capability in maintenance and part production. Among of those were the procurement of Eurocopter BO105 (FR Germany), Bell 412 (USA), and NES-323 Super Puma

[44] Amir, Sulfikar, *Natinalist rhetoric and technological development : The Indonesian aircraft industry in the New Order regime*, Elsevier Ltd, 2007, p. 283
[45] Koesman, H. Aboeng, *IPTN : Harapan dan Tantangan*, Mitra Prima, 2001

(France). IPTN's Universal Maintenance Centre is rapidly becoming a major competitor in the South East Asia engine overhaul and repair business and Indonesia is self-sufficient in the production of airframe parts for the BO105.[46]

In developing naval industrial capability government also took steps through establishment some new dockyards like PT. Kodja and Pelita Bahari and also invest to new production facilities of PT. PAL which called Ship Building Plant (SPB). In 1980, government poured big enough money to PT. PAL to build division of warship, merchant ship, maintain and repair, and general design. The warship facilities was designed to be able to build the warship from 400 ton like fast patrol boat to 2500 ton like Frigate. The merchant ship facilities was also built progressively until at the end it can built the merchant ship up to 50,000 ton. These facilities were built up to 1994 as a result of corporation between PT. PAL, BPPT, and foreign shipbuilding company like Luerssen, Ferrostall, Thyssen, Howalds Deutsche Werke (Germany) for warship and Mitsui (Japan) for merchant ship.

At that time PT. PAL see Germany as the world orientation for shipyard. Therefore PT. PAL made corporation with Germany's shipyard company, Friedrich Luerssen Werft (FLW). As the first step PT. PAL bought product licence for fast patrol boat (FPB 28 and 57). PT. PAL and FLW signed contract for 8 FPB 57 in 1980. In the beginning, PT. PAL had undertaken assembly and manufactures some parts of the boat only while the basic and manufacturing design was supplied by FLW. During the process of manufacturing some staffs of PT. PAL sent to FLW plant at Bremen to learn the warship production management as part of the contract. PT. PAL took advantage from this process to up grade the knowledge to build a shipyard. The result of the knowledge accumulation showed in the capability of PT. PAL in modified the design of PFB 57 as the user needed (TNI AL). The last FPB 57 transferred to government on March 9, 1992. Following the successful of FPB 57, PT. PAL was trusted by

[46] Maharani, Curie, *The Change Within Indonesia's Defence Acquisition*, ITB 2007, p. 46

Indonesia custom agency to build 12 FBP 28 which followed by the next order for 5 units.

The similar step PT. PAL took to build the merchant ship. This time was through cooperation with Mitsui, Japan. Under cooperation with Mitsui, PT. PAL took most advantage in merchant ship design and engineering skills. Therefore, for merchant ship it can be noted that PT. PAL achieve a great success. Up to 1995 PT. PAL was able to deliver 3000 ton cargo ship, 3650 ton semi container and cargo ships, and also 3500, 6500, and 17600 ton tanker. Furthermore, since 1995 PT. PAL accepted order from foreign country like British and Germany.

In the field of arm and vehicle production, a series of project were begun at PT. Pindad. In 1983, PT. Pindad started the program to produce a new riffle FNC under the licence from Fabrique Nationale Herstal (FNH), Belgium. This riffle is based on NATO standard. After that, PT. Pindad taken up the licence assembles of 10 Scorpion tanks from a British company. The project to modernize the production facilities started in 1984 until 1993 and it cost approximately US$ 350 million.

To fulfil the demands for R&D, Habibie is functioned BPPT as a single government technology R&D agency. To support technology research and development in strategic industry, government flow the budget to BPPT which then transfer to strategic industries. From 1978 to 1990, BPPT transferred its employee to work in strategic industries and support the technology development there. Until 1990, only 3 strategic defence industries had already established directorate technology. They are PT. IPTN, PT. Pindad, and PT. PAL. After 1990, Habibie decided the focus for technology development phase was finished and it’s time to change the focus in commercialization strategic industries’ products. Therefore, each of strategic industries asked to establish its technology directorate with task to decide how the technology in its strategic industry could develop.

BPPT recalled it's employee in strategic industries. The employee was given the choice to work back to BPPT or become the employee of its strategic industries.[47]

During this period it can be noted that each of the state-owned company in the process of built up their capabilities. Align with this process the government also took step in managing the strategic industries. By the year of 1980, President Soeharto issued a presidential decree to create a body called DPIS- Dewan Pembinaan Industri Strategis (Strategic Industries Managing Council). Later on, DPIS create BPIS (Strategic Industries Establishment Board). Soeharto through a Presidential Decree No.50/1986 stated that BPIS was under the authority of Ministry of Research and Technology. BPIS task was to manage, plan, and oversee production programmed of the strategic industries, the transfer of technology, and industry transformation as well as strategic industrial development in harmony as well as wealth generating effort and marketing of strategic industry. Furthermore, BPIS functioned not only to enhance the development of but also to connect the defence capability requirement (acquisition program) with defence strategic industry production.[48]
Under management of BPIS, during 1984-1998 strategic defence industries like PT. IPTN, PT. PAL, and PT. Pindad was able to contribute weapon system fulfilment worth 1,1 Trillion Rupiahs, including aircraft and helicopter, fast patrol boat, attack rifles, and munitions.[49]

In 1998 BPIS change its form into holding company called PT. Bahana Pakarya Industri Strategis (also BPIS in short, Bahana Pakarya Strategic Industry Ltd.–). Instead of being an establishment board, BPIS become a shareholder of strategic defence industry where BPIS as the parent firm and the strategic defence industries are the affiliated firms. Because the status was Ltd. (PT), government then stop the funding to BPIS, and it lived from the strategic defence industries'

[47] Interview with Chairman of BPPT, Prof. Said D Jenie on Jakarta, January 22nd, 2008
[48] Maharani, Curie, *The Change Within Indonesia's Defence Acquisition*, ITB 2007, p. 38
[49] Ibid, p. 40

dividend. This mis-management created the tension between BPIS and strategic defence industries.[50]

While this situation continued, the economic crisis stroke in 1998. Strategic industries suffered from financial constraint. For example, PT. IPTN cannot continue its N250 production and impede at certification process. In order to survive in this difficult condition, Government asked for help from the International Monetary Fund (IMF). IMF required that government should stop direct subsidies to its strategic industries because these subsidies were a large amount of money and was thus a burden for the national budget. In 2002 government decided to dismissal PT. BPIS. As consequences 10 industries strategies under PT. BPIS placed under ministry of state-owned corporation (BUMN) with the mission to maximise profit, whereas the early defence industry's mission is to achieve self sufficiency in weapon provision. It was mark a new era for defence industry.

As indicated above, in this period the development of defence industry centred to state-owned company. All money and effort of government goes directly to state-owned company. While most of the private company played role as subcontractor or part supplier to the state-owned company. Yet, there are some private companies contributed significantly to develop Indonesia defence industry.

PT. Texmaco Perkasa Engineering (TPE) is one of the private companies noted as a vehicle manufacturer. It is as a subsidiary of a PT. Texmaco Group, the most leading textile company in Indonesia. PT. Texmaco founded in 1961 and enjoyed the government import substitution strategy such as free of import tariff for capital goods and machinery, even acquittal.

At the beginning, TPE was only a unit for maintain, operate, and repair PT. Texmaco textile machine. Along with the excellent progressive of PT. Texmaco,

[50] Interview with Chairman of BPPT, Prof. Said D Jenie on Jakarta, January 22nd, 2008

PTE become stronger and finally in 1982 it transferred to subsidiary company of PT. Texmaco Group.

PT. TPE capabilities in producing equipment progress step by step. It started with maintain and repair only textile machine, then it progress to making the textile machine spare part. In 1990 PT. TPE could produce textile machine. This indigenous product named as 'Perkasa'. The accumulation of knowledge and know-how brought PT. TPE further in manufacturing skills. Under license of Aciera (Swiss) in 1995 PT. TPE produced machine tool, the very important machine to support the industrial development in a nation.

The successful of produced machine tools has brought PT. TPE as Indonesia's leading industrial equipment and machinery manufacture which has wide range of products. It implies to the wider of its customer. It includes the leading automotive companies and TNI. Since that time PT. TPE supported TNI significantly specially for automotive component. Furthermore, PT. TPE established military vehicle unit. In 1999 PT. TPE successfully launched its indigenous truck for military with brand "Perkasa".

Unfortunately, in the early of 2000 PT. Texmaco Group's debts problems emerge. It ends up to the freezing of all of its assets and drawing of its production licence by government, including PT. TPE.

Private company initiatives also showed in the developing of Unmanned Areole Vehicle (UAV). In the last 1990s, there was the emergence of companies that specializes in UAVs; PT. Uavindo is one of them. It was encouraged by situation when the Department of Defence and Indonesia Strategic Intelligence Board (BAIS) interest to operate UAV. It was started in 1999 when the BAIS bought FOX AT from CAC France and Indonesia Department of Defence offered a contract to buy UAVs from a national company.[51] Another private initiative as an

[51] Jupriyanto, *A Roadmap of Indonesia's UAVs Development*, ITB 2007, p. 2

effort to manufacturing defence equipment such as hovercraft was still on the early stage in this period. [16]

To sum up: While the Indonesian defence industry was expected to raise its production level to pursue self-reliance through mostly license production, in fact the results were very limited. At the end of 1999 the import was still high with an amount up to US$ 185 Million. While at the beginning of this period, 1976 the import worth US$135 Million.[52]

III.1.4 Into the third Millennium…

The economic crisis that hit in 1998 followed by the big changes in the political situation has brought Indonesia entering the year 2000s with a weak defence industry. It is in a state of flux. Defence state owned company had to adapted to the new situation under new mission of profit hunting within financial constraint situation. It demanded internal reforms. Downsizing the employee was one of the big steps state-owned companies have taken. For instance, PT. DI lay off its 6,289 employees.

The decision of the government to ask for IMF help for the economic crisis brought government to the privatisation agenda. Amongst the state-owned companies in the privatisation lists were PT. DI, PT. Pindad, PT. PAL, and PT. Dahana. In 2002 Ministry of Defence submitted a proposal to assume control of the four companies directly involved in defence together with a fifth enterprise, PT. Texmaco. It plan would cancel any eventual privatisation of these four state owned companies, instead placing them under the directorate general of technology and industry in the defence ministry's directorate general for defence services. The government has yet to reply to the proposal, although indications would appear it is reluctant to grand the institution which tight related to military such power over key economic operations following a hard-won divestiture of its political involvement.[53]

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[52] www.Sipri.com, related year.
[53] *Indonesia Defence & Security Report Q3 2007*, Business Monitor International, London UK, August 2007, p. 30

After the habibie era, in term of technology the interest of government shifts from complex technology like aircraft to technology which is more related to daily life like food technology. Moreover, after the government's dismissal of BPIS in 2002, it was followed by the dismissal of technology directorates in strategic industries. Only PT. DI's technology directorate is remaining. Meanwhile, because the strategic industries demanded to generate the profit they have no budget for development. For example in PT Pindad, in average it needs Rp. 10 – 15 Billion a year for research and development, yet the profit generate only Rp. 20 – 30 Billion a year.[54] Therefore, they suggested to the government that BPPT could play role in technology development for strategic industries as before. Since 2003 BPPT position is as strategic industries' partner for new development product such as tank, UAV, and technology beneath the surface.

It was obvious that the defence industry development was not the priority anymore for two former presidents, Abdurrahman Wahid and Megawati. The concept of Habibie's defence industry development was not exercised by the government anymore, yet the new concept was not formally launched. However, because the experience of the US military embargoes in 1991-2005, the urgency to pursue self-reliance defence industry increases. In the other hand, it is less possibility to buy a licence of foreign technology or to conduct major research because of financial severe. This external factor coupled with internal factor was spring up the spirit to develop indigenous defence product by maximising all available resources.

The government under President Susilo Bambang Yudhoyono shows the willingness to develop defence industry again. The mission is still the same that is to pursue the self-reliant. In term of technology government decided to focus on low and medium technology development due to the lack of budget. Currently reverse engineering is one option to acquiring technology that was exercised by most of the defence industry. Government also emphasized the implementation of

[54] www.dephan.go.id, *Industri Pertahanan Optimis Penuhi Kebutuhan TNI*, January 13, 2006

domestic preference in defence procurement policy. It stated that for all defence equipment that already produced by national defence industry then government could not import it from foreign country.

In 2003 PT. Pindad initiated the development of Panzer Armoured Personnel Carrier 6X6 together with BPPT. In 2004, the prototype of this indigenous product, APS-1, delivered. It claimed the performance of APS-1 equal to AVB made in French. After some modification to meet the user requirement and a series of testing, September 2007 government placed order for 150 APS-1 to PT. Pindad. It has to be delivered within a year. Although it leaves the question of production capacity and financial capability of PT. Pindad for the delivery order to be on time, nevertheless it marks the goodwill and trust of government to indigenous product. This order has also encouraged the government to provide new policy to support the domestic financing for defence procurement. Until now the government only has the policy for financing defence procurement through credit export.

The trust of user to domestic private company also shows when TNI AL placed order for 5 hovercrafts to a private company, PT. Hoverindo in 2006. The result of another indigenous development products by private company that could be noted as a success are the P2 APC (Armored Personnel Carrrier), a light tactical and high mobility vehicle P3 Ransus, and the light reconnaissance vehicle P2 Komando by PT. Sentra Surya Ekajaya (PT. SSE). Furthermore, PT. SSE has exported 5 P2 APCs to Srilanka in 2007 and also supply tactical vehicle to TNI.

The most recent big plan of government in defence industry is national corvette project. PT. PAL has point out by government to conduct the project which valued approximately Rp.5.4 Trillion.

III.2 The Structure of the Defence Industry

III.2.1 Defence Equipment Production and R&D Structure

At the centre of Indonesian defence industries are the 5 state owned companies. Only a small number of privately owned firms have strongly participated in the final production of defense equipment. Most private industries function as the supplier of raw materials, spare parts, components, and machinery.

State owned company focus to produce light, heavy, and advanced equipment such as light weapons and ammunitions, patrol boat, light armored vehicles, shipyard, amphibious tank, radar, communication system, helicopter etc. The private industry can be divided into two groups based on the product result. The first groups produce the similar product like the state owned company have, for instance panzer, hovercraft, UAV, and surveillance system. The second groups includes the private industry that produce basic and light manufacturing product such as clothing, leather, shoes, spare parts, and machinery.

Defence R&D is conducted by various agencies, it is not conduced by a single defence research and development agency under MoD, as at India for example. It gives benefits, yet constraints. Some of agencies are specialized in one sector, like LAPAN, BATAN, single services R&D agency, and company's R&D, but some have wide area of research, such as BPPT, university, and MoD R&D agencies. This kind of structure, in one side is open the door for massive creativity, but at the other side demanding so much coordination to avoid the overlapping area of research. Another concern is about the distribution of government R&D budget. The lack of R&D budget makes each of agency will only take a small R&D budget, hence it will constraint to the pace of development product.

In general, the set up of Indonesian defence industry as demonstrate on the figure III.1. It shows that there are three ways to look at how defence industry is conducted in Indonesia. They are Command, Coordination, and Cultivation relation between each party involved.

Command relation indicates the officially administrative relation. Therefore, it shows how the related part formally responsible to. This relation includes the objective, goal, working plan, achievement, and budget. Coordination shows the relation among party involved in order to conduct the defence production. It is voluntary relation, therefore it really depend on the willingness and how well the capability to coordinate each other. Cultivation here means activities government do to exercise the industry to built defence equipment as prototype. Cultivation relation is also voluntary but there is an available budget from the national budget to conduct the activities. Every budget has to be accountable at the end of the year. While command and cultivation right to the same party are different that creates the problems in the field. For instance, when the directorate technology and industry (Dirtekind) find that the development project they given to one state-owned company is slow because it has another urgent agenda, the dirtekind can not force the defence industry to work harder or re-arrange the work the industry have. It is because the right to do that is the ministry of state-owned company. Meanwhile the project have to be responsible at the end of the year to government because it funded by national budget.

Figure III.1 informs that in the government level the responsibility of the production and development in defence industry is under the different department. The production is under the ministry of state-owned company while the development is under the ministry of defence and ministry of industry. Whilst, in reality development is integrated part of production process. Meanwhile, each department might have different priorities and agenda. It will create a complex situation in the defence industry. As consequences it slower the defence industry development

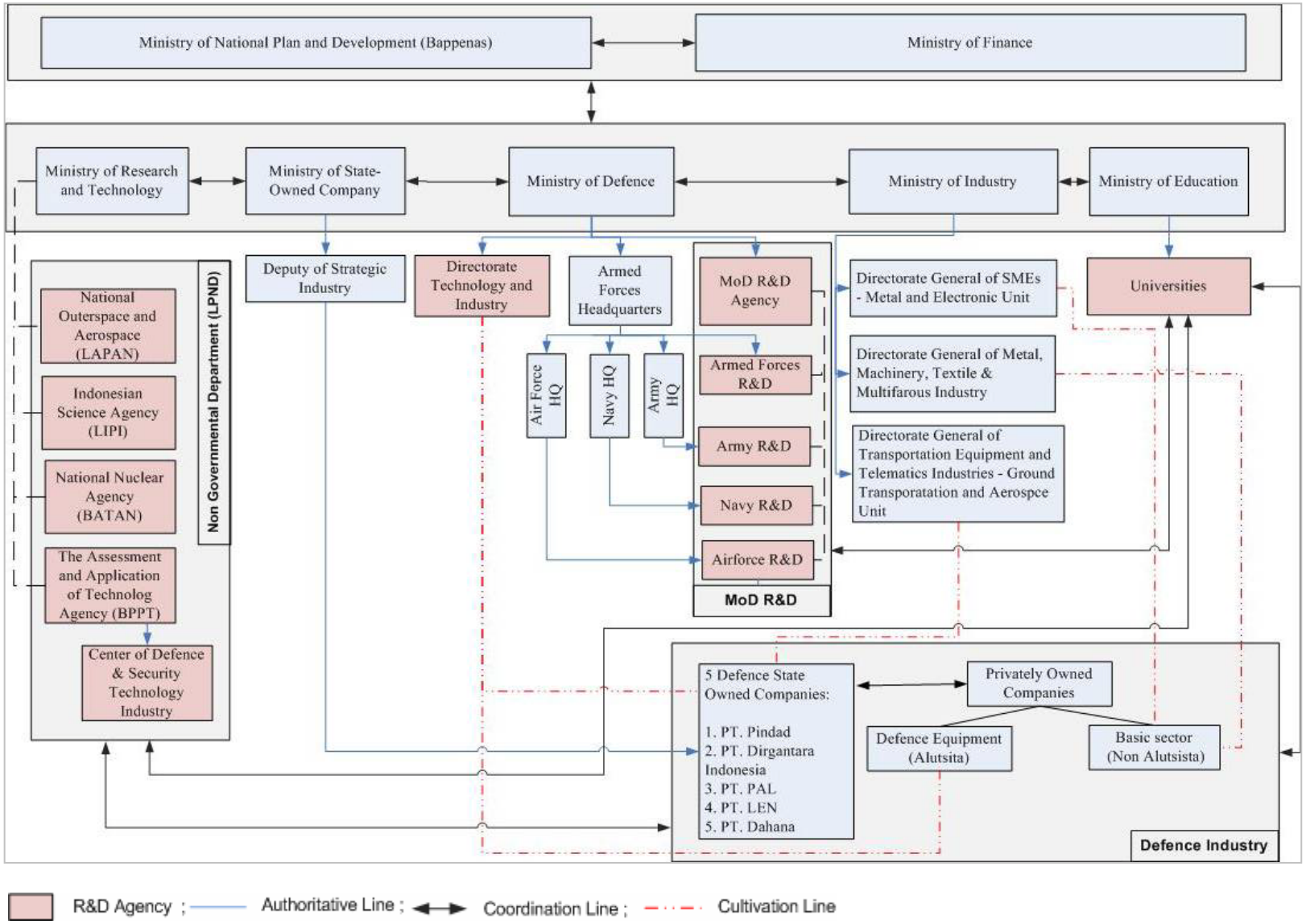

Figure III.1 The Structure of Indonesian Defence Industry (source: author, 2008)

III.2.2 Prime Contractor, Subcontractor, and Part Supplier

It's almost impossible recently for a single company to take all the work to develop or produce a single defence system, because it's too costly and inefficient. Therefore, it needs vertical integration between prime contractor, subcontractor, and part supplier.

The relation of defence contractors in each level illustrated as follow:

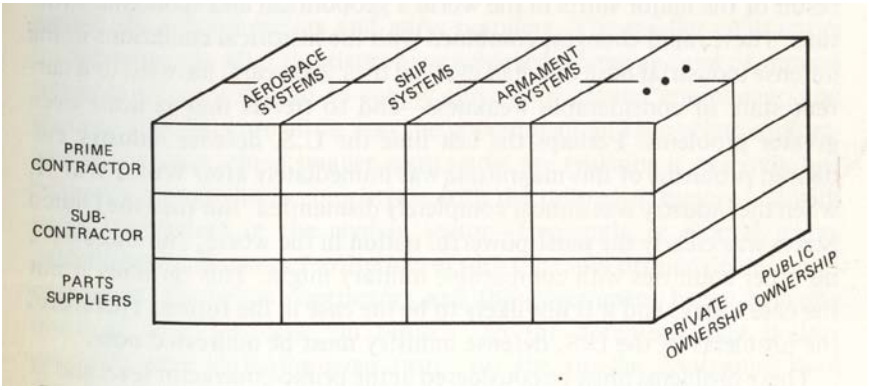

Figure III.2 the relation of defence contractors[55]

In reality, there are no clear lines separating any of these blocks. For example, a prime contractor in the aerospace sector may well be concurrently a subcontractor in some ship programs and a parts supplier in the armament system. Prime contractors tend to be large companies while subcontractors and part suppliers mostly are Small and Medium Enterprises (SME).

It is indeed the case in Indonesia. Furthermore, for Indonesian government, the prime contractors are defence state-owned company. It was proved by almost all defence equipment contracts either for development or production goes to state-owned company. It is not regulated, rather an agreement in the government to prioritize the state-owned company over the private company as a prime contractor. For example, on May 6, 2006 Secretary General of Defence Instrument (Ranahan) MoD signed MoU with state-owned companies to prioritize state owned company in term of new development product. It said it is because of

[55] Gansler, Jacques S., *The Defense Industry*, The MIT Press Cambridge, Massachusetts, London, England, 1982, pp. 3

limited development budget.[56] The other reasons that stated are because in military equipment production, especially weapons, there must be a strict supervision through the entire process particularly on distribution. If weapon production is given to private company, it would be very hard to control the distribution and it would be extremly dangerous for the state which is sensitive to conflict. [57]

The MoU reflects the way the government in general manages the three levels of contractors in defence production which positions state-owned company as prime contractor and private company as subcontractor and supplier. Through this MoU, actually government has assumed that state-owned companies are covered the entire defence leading sector (land, naval, air, electronics etc). It seems the government ignore the fact that each sector has wide spectrum. For example in electronic sector, there are radio system, radar system, rocket system, surveillance system, etc. No single company master in entirely spectrums. Therefore, the way the government manages to choose the state-owned company as prime contractor simply because it is a state-owned company could lead the state owned companies to exploit subcontractors. In recent practice, between 40-70 percent of total work is subcontracted with the nominal value 50-60% of total contract.[58] However, it will not be the case if the prime contractor in fact doesn't have enough capability and readiness to conduct the contract. In this regard the state owned company could only do an administrative job related to the contract while almost the entire technical job conducted by subcontractor.

The example for this could be seen in the case of surveillance development project in 2005. For government PT. LEN is seen as a leading company in electronics, partly because their plant facilities and long history. In fact, they have limited qualified human resources in this field. Meanwhile, there is electronic private

[56] Interview with Director of Dirtekind, First Admiral TNI, Ir. Josef Marsidi, MM, February 19, 2008
[57] Wardoyo, Yudi Eko, *Management of Domestic Industrial Industry based on Integration Supply Chain and Strategic Partnering, Case study Panzer APS production of PT. Pindad*, ITB, Bandung, p. 51
[58] Gansler, Jacques S., *The Defense Industry*, The MIT Press Cambridge, Massachusetts, London, England, 1982, p. 43

company that have even more capability and more ready to conduct the development project. However, because of the MoU, the contract for surveillance system development in 2005 then was given to PT. LEN and placed the private companies under PT. LEN as subcontractor. In fact, the process of designing, production, and testing the surveillance system prototype was conducted by the subcontractor. [59] This raises the question of the value added to the contract for the prime contractor.

This arrangement is neither healthy nor fair. While prime contractor are using big amounts of government-supplied funds, plant space, and equipment, the subcontractors and part supplier are required to supply their own plants, equipment, and money. Because of this, the subcontractors and part suppliers are mostly in the position of relatively low return on investment in comparison to the prime contractors. To make it worse, with this imbalance return of investment, most of the jobs are conducted by the subcontractors. As a result of this situation, a large number of defence suppliers can be bankrupted or purposely leave the defence business.

The combination of these factors could significantly reduce the number of defence supplier or attributes with the hesitation of suppliers to become defence subcontractors. In short time, it will affect the production efficiency of defence procurement, but in the long run it creates industrial bottlenecking that threatens production surge capability in times of national crisis. For instance, the inability of defence industry to respond to the increase of production which is not because of a shortage of the capacity of the prime contractor, but because of the inability to get special parts from suppliers that prefers to do civilian businesses. Therefore, the government should commit to creating an environment in which subcontractor and supplier can prosper as defence subcontractor and supplier.

The government has the responsibility for assuring the involvement of subcontractors and suppliers in contracts. And also for maintaining the percentage

[59] See the interview script result with PT. Global Asia Teknologi, January 2008

of subcontracts to make sure the added value of the contract both to prime contractor or subcontracting. There are various techniques that the government could employ for this regard. For example, to consider the two values in evaluate the proposal before place the contract.

The defence subcontracting and parts supplying business is now going international. The opportunities to be a part of global defence supply chains are wide open. One of Indonesia state owned company that experienced this is PT. DI. Until 2001, PT. DI has successfully delivered 1000 unit aircraft components, ranging from civilian aircraft like Boeing and Airbus to fighter aircraft like F-16.[60] Furthermore, PT Dirgantara Indonesia (DI) received the Best Performance Supplier 2007 award from major Airbus aerostructure supplier Spirit AeroSystems Europe Ltd.[61]

III.2.3 Triple Helix : Research institute – Industry – MoD/TNI

To fulfil the demand of defence equipments, it can not be carried out by defence industries only. It should be a result of a well collaboration between stakeholders. In Indonesia they are user (MoD/TNI), industry, and research institute. Some authors use the term 'Triple Helix' to address such heterogeneous relationships, such as show in the figure III.3 (a). In develop one defence equipment, the interaction of the three actors are illustrated in the figure III.3 (b).

Research institute here refers to the party which their nature of business is research. Research institute includes universities and government research agency like BPPT, LIPI, and Balitbang Dephan. Their activities sometimes involve manufacturing process but they do not conduct it in house. Their activities consist of basic research and applied research. So, they are not a product producer, rather the knowledge producer.

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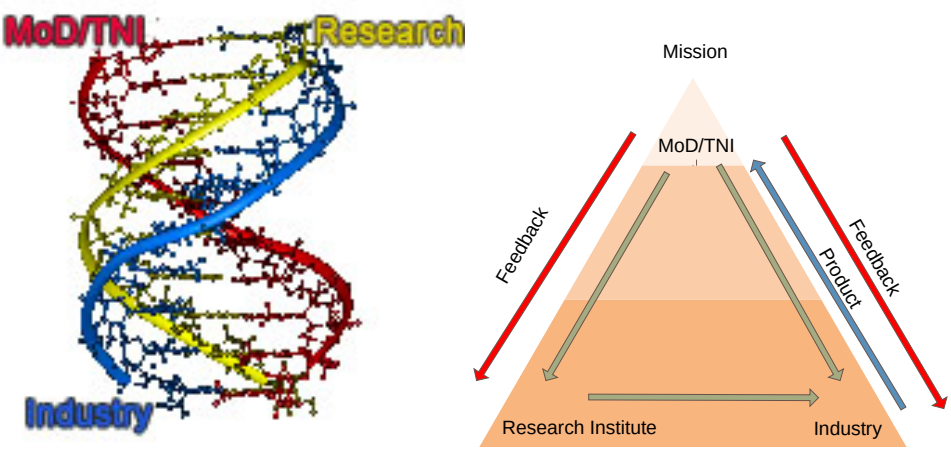
[60] See *25 Years PT. Dirgantara Indonesia: Opening The New Paradigm, Profile and Future Strategic Plan*, Mitra Prima, Bandung, 2001, p. 34

[61] *State airplane producer DIwins European award for best supplier*, The Jakarta Post, April 15, 2008



(a) (b)

Figure III.3 The Triple Helix in Indonesia Defence Industry

Industry is the party which their nature of business is manufacturing. However, their activities also include R&D which more to applied research. Therefore, in one hand they are product producer, another hand they are knowledge producer. The third actor here is MoD/TNI. MoD plays two roles, as source of funding to research and also as a customer that buy the industry's product to TNI. In other words TNI is the user of the product.

It is the interdependent relations. In reality, the relation form as a network. It can be noted here that the ultimate outcome of the relations is the final product use by the user. Therefore, it can be argue that the relation is starting and end in the MoD/TNI. The MoD/TNI is the party that set the mission/requirement, while the others work to deliver the mission/requirement. The mission that set is emphasizing on function rather than configuration of the product. MoD/TNI is also the evaluator of the product which has to deliver back to researcher and industry for improvement. Furthermore, this process could create new innovation in both parties.

That's how the innovation system works in defence industry. According to Ibo van de Poel, the innovation here drives from the user and the mission at the same time or it called user-driven innovation pattern and mission-oriented innovation

pattern. It is the uniqueness of defence industry, the user and the principal of the equipment who set the mission is in one hand that is the Government (MoD/TNI).

However, in reality the relation does not work as that simple. As describes above, the three actors have different nature of business, hence they have different culture, different knowledge and capability, etc. When they have to work together, it creates problems. For example, industry and researcher have less knowledge about the military aspect. At the other hand military has less knowledge in technology, production, and how systematic research is conducted. The researchers often have lack knowledge how the production is conducted. Maybe each party will brief the other party about their situations, for instance military as a mission establisher will brief what performance they want for particular product. However, usually one equipment doesn't operate in isolated circumstances. Therefore the researcher and designer from industry must have the feeling or imagination to adopt such situation in their work. It needs intensive communication among each party.

The gaps have to solve systematically. First alternative is the actors have to work in an integrated project team (IPT). It is a formal team that is formed by government through decree. But, for small project it wastes the money. The second alternative is every member of research institute and industries that involve in defence oblige to have special training from military once at minimum. It's like the journalist who want to report in conflict area have to follow the special training from military. Israel defence industry took benefit from military conscript program to solve the gap[62]. Most of their engineers and researchers are familiar with the military situation. Moreover they took benefit from close relationship among military, engineer, and researcher when they were at conscript program, so they can work together easier. At the other hand, from military side, they obligate to work for sometimes at industry or research centre once at minimum. As the result, at some degree each actor has the minimum knowledge over the other party as the catalyst in working together better.

[62] Kagan, K et all, *Defence Structure, Procurement and Industry: The Case of Israel*, 2005

III.3 National Defence Industry Capability

After three decades Indonesia effort to develop its defence industry and support industry, it is necessary to reflect the current status of national defence industry capability.

III.3.1 Shipbuilding Industry

For Shipyard industry, at least there are 240 shipyard and dockyard industry with investment worth US$ 1,426. It includes 95 cargo shipyard industry such as PT. PAL, Koja Bahari and PT. Dok, one fast boat industry (PT. PAL) , two hovercraft industry (PT. Hoverindo Nusa Bahari and PT. ATI Hovercraft), and 95 shipyard service and repair industry.[63] The biggest shipyard company is PT. PAL. As the shipyard with more than 25 years of experience, PAL INDONESIA has a number of quality products on merchant ships and naval ships.

The development of merchant ships is geared towards the international market, and development of models for national shipping industry and pioneering shipping for passengers and cargo. The production capacity now reaches an annual product rate of 3 units of 50,000 DWT and two units of 20,000 DWT ships

It mastered the production technology for We for vessels such as Bulk Carrier Ships of up to 50,000 DWT, Container Vessels of up to 1,600 TEUS, Tankers of up to 30,000 DWT, Passenger Vessels of up to 500 PAX. Furthermore it has also delivered Container Ships of up to 2,600 TEUS, Chemical Tankers up to 30,000 DWT, and LPG Carriers up to 5,500 DWT.

[63] *Analysis of Defence Strategic Industry*, Bapenas, 2005. The document was given to author on January, 2008

PT. PAL is currently developing products to fulfill local markets, especially to cater for the needs of various government institutions such as the National Defence Department, the National Police Force, the Marine Department, Finance Department/ Customs and Excise Directorate General and various Regional Autonomy Authorities and private enterprise. Some of the products that have been delivered to the market include Fast Patrol Boats steel structure 57 m, Fast Patrol Boats / Special Ships aluminum structure up to 28 m, Tugboats and Anchor Handling Tugs/Supply up to 6,000 BHP, Fishing vessels up to 600 GRT, Ferries and passenger ships up to 500 PAX. Each naval craft is equipped with an advanced computer navigation system, high-end communication and surveillance devices, and standard armaments with other specifications installed upon request. This year, 2008 PT. PAL starts to develop corvette 80 m. [64]

While for service, PT. PAL conducts one-stop service covers annual and periodical maintenance for special merchant ships, naval ships and submarines. PT. PAL all-inclusive repair and maintenance equipment consists of a floating dock of 5,000 tons, Dry Dock of 20,000 and 50.000 tons, Submarine dock and totally annual docking capacity of 600,000 DWT per year.[65]

III.3.2 The Aircraft Industry

Currently there's only one company that produce manned aircraft that is PT. Dirgantara Indonesia. They produce light transport aircraft such as C-212, CN 235, Helicopter Super Puma Nas 332, NBell 412, NBO 105. Beside that, they also produce medium range surveillance aircraft such as CN 235 MPA (Maritime Patrol Aircraft) and Coast Guard.

Until now PT. Dirgantara Indonesia still have no capability to produce fighter aircraft. What so far they do is add on the weapon to existing aircraft/helicopter. For example, Helicopter NBO 105 that added by gun-pod to attach the weapon and rocket launcher.

[64] www.pal.go.id , access on April 18, 2008
[65] www.pal.go.id, access on April 18, 2008

After 25years, PT. Dirgantara Indonesia has delivered 298 units aircraft and helicopters (97 units NC-212, 38 units CN235, 114 units NBO-105, 27 units NBELL-412, and 22 NAS-332). It also has delivered 50,000 units rocket and 150 unit torpedo.[66]

III.3.3 Armoured Vehicle Industry

Among the vehicle industry that exist in Indonesia now, there is no industry that could be noted as armoured vehicle one. PT. Pindad as the state-owned company that designed to be the one, until now it can only product tactical vehicle. Beside PT. Pindad there are two other tactical vehicle industries which are PT. Sentra Surya Ekajaya (SSE), and PT. Wahana Perkasa (Texmaco). Some of these industries' products are APC 6x6 (PT. Pindad), P2 APC 4x4 and P2 Commando (PT. SSE). One industry that include in this industry category is PT. Maesa which produce truck to carry personnel and artillery.

III.3.4 Weapon and Ammunition Industry

Three state-owned companies contributed to build the weapon and ammunition capability. They are PT. Pindad, PT. Dirgantara Indonesia, and PT. Dahana.

Through PT. Pindad Indonesia has the capability to produce riffle such as attack riffle (SSI-V1, SS2-V2, SS1-V3, SS1-V5), sniper riffle (SPR-1), gun (P-1, P-2), revolver (R1-V1, R1-V2, RG-1 (type A), RG-1 (type C)), ammunition, and water cannon. The riffle products are become the organic weapon for TNI since a few years back.

Meanwhile, PT. Dirgantara Indonesia has license to produce FFAR rocket from For Zebruge (FZ), Belgia and torpedo from STN Atlas. Beside rocket, PT. Dirgantara Inddonesia has also developed its launcher.

[66] *Opening The New Paradigm, 25 Years PT. Dirgantara Indonesia*, Mitra Prima, p. 34

PT. Dahana is the state-owned company that responsible to develop explosive and propellant to support rocket. However, until now PT. Dahana mostly develop explosive to support the mining sectors. They produce Cartridge Emulsion, DANFO, Bulk Emulsion, and Shaped Charges.

None of these industries has capability to produce land to air and land to land missiles or anti-tank missiles.

III.3.5 Communication and Electronics

According to the data from Industrial Departement, currently Indonesia has 12 communication industry, 50 electronics industry, and 75 electronic component industry. Not all these industries produce electronic and communication equipment for defence. PT. LEN as a state-owned company on communication and electronics has the dedicated division for defence. They produce Tactical Radio Communication HF and HVH Transceivers. That is a manpack which is a portable radio set that enables highly mobile military units. They also produce Combat Management System (CMS) that used in navy ships to locate target positions accurately. They also develop Sensor Weapon & Commad (SEWACO) and Data Acquisition System (DAS).

III.4 National Policy

Among the national policy that Indonesia has, it will discuss here six policies that is consider related to defence industry. It is to see weather that policies support and/or constraint to defence industry development and involvement of the actors on the process. The six policies are defence policy, industrial policy, investment policy, budgeting and financing policy, procurement policy, and R&D and technology policy.

III.4.1 Defence Policy

In 2002 President of Indonesia signed the new law No. 3/2002: National Defence. In Article 16(6) it is mentioned that Ministry of Defence conduct the cultivation activities due to technology and defence industry development in order

to supply the necessary equipment for national arm forces and the other security component. In Article 23, it is mentioned that in order to increase the state defence capability, the government conduct research, industry, and technology development in defence sector. In conducting those tasks Minister of Defence encourage and improve the growth of defence industry.

From this law, the government shows its commitment to develop defence industry. At least three component related to defence industry are mentioned there. They are research, technology, and industry itself. The purpose of development of the defence industry is clearly to serve security components in Indonesia, and not to maximising the profit.

As mandated by Law No. 3/2002, the president has to construct the general policy for national defence. After six years since the national defence policy issued, on January 26, 2008 President of Republic of Indonesia launched Presidential Decree No. 7/2008 : General Policy for National Defence. It is mentioned in its supplement that the actual problems related to build up the defence capability are includes the lack of the civil society participation, infrastructures TNI, and the condition of the main military equipment (Alutsista) are below the standards. The latter problem is due to the low of utilizing the domestic defence industry and also the arm embargo by the main foreign producers. It is not forget to mention the problem of insufficient of the defence budget. And it stated that those problems will be solved periodically within 5 years through Mid-Term Development Plan.

It is again emphasized the significant role of domestic defence industry to support the national defence's agenda. It is also given emphasized on urgency for public participation which somehow indicates the willingness of government to encourage the private industry participation.

The capability-based defence lead Indonesia to achieve minimum essential force. It required the defence need plan. It will give the clue to the defence industry of the defence need. Furthermore, it will give the direction for the defence company

to set up the research, the investment, and the working capital. However, it required two things. First is the plan itself, the second is the openness.

To summarize, these two defence policies are required the role of government related to defence industry. They are investor, regulator, supporter, planner, and customer. It will more elaborate in the section 3.7.

III.4.2 Industrial Policy

Within industrial policy and strategy of Indonesia, it doesn't mentioned defence industry specifically. It neither stated the defence industry is one of industrial priority development.

The vision of national industrial development now is to bring Indonesia as a strong industrial country in the world. The direction of national industry development itself refers to agenda and priority of national development within Mid-Term Development Plan (RPJMN) 2004-2009. It mentioned on Chapter 18: Improvement of Manufacture Industry Competitiveness. Ministry of Industry then sets certain goals which two of those are improvement of technology capability and deepening industry structure and product diversification. In the long run, industry development has to contribute as medium to increasing technology innovation and become one of important pillar for national defence. To achieve this mission within the Long-Term Development Plan (2010-2025) ministry of industry directed to promote world class manufacture industry and improve the role of SME to strengthen the structure of industry.[67]

As a strategy for manufacturing industry development, the government adopted a new strategy which is the cluster format. It is in order to develop industrial competitiveness. International competition serves as a new perspective for every country so that the focus of industry development strategies in the future is to develop sustainable industrial competitiveness both in the domestic and international markets. National industrial growth is directed toward utilizing the

[67] Ministry of Industry Republic of Indonesia, *Chapter VI : Industrial Development Policy*, Jakarta, 2004

development of national economic competitiveness based on 32 clusters of industrial priorities, divided into five (5) industry groups. They are agro-industries, heavy equipment manufacturing, computerization and computer networking, manufacturing-based industries, and certain small-scale and medium-size industries. The selected of industry priorities are based on the international competitiveness analysis and also the consideration of Indonesia's resources that can be use to growth the industry. With these selected industries, government designs what so called "Structure of Industry Sector 2025" as follow:

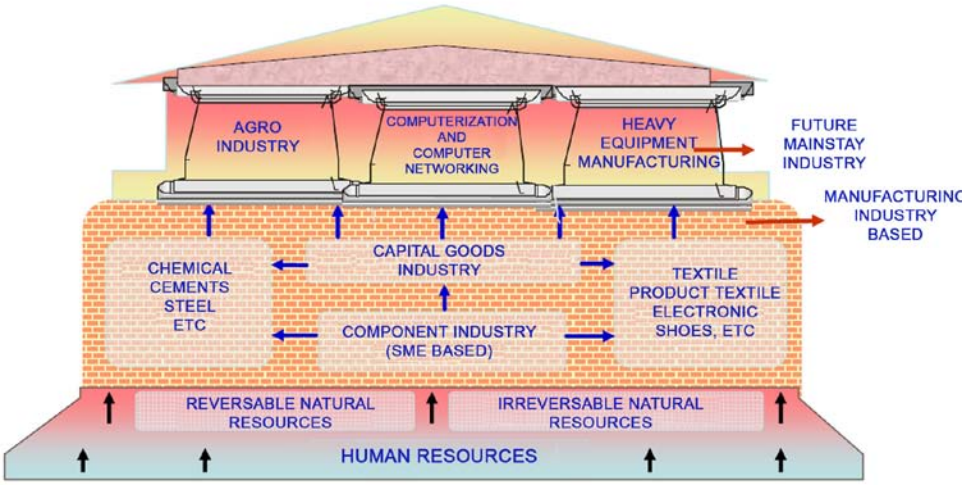


Figure III.4 Structure of Industry Sector 2025 [68]

Manufacturing Industry Based is a backbone of industry sector. Realizing how important this industry to support future main stray industry, government targeted to achieve world class level in 2025.

Since defence industry is not mentioned specifically on the mid term and long term industrial development plan, it can be assume that defence industry includes in manufacturing industry. As can be seen on the figure 3.4 heavy equipment manufacturing is one on the top of the structure of Industry Sector for 20025 with one of the goal is to be a world class manufacturing industry. Therefore, defence industry could take benefit through the manufacturing industry programs.

[68] Ministry of Industry Republic of Indonesia, *Industrial Policy - Chapter V : Structure of Industry Sector 2025*, Jakarta, 2004

III.4.3 Investment Policy

The investment Law was ratified by the Parliament on 29th of March, 2007. In July 2007, Indonesia's House of Representatives passed the 2007 No. 25 Investment Law. Importantly, the Investment Law sets out the fundamental principles of legal certainty, transparency, accountability, and equal treatment for domestic and foreign investments. The Law also prescribes equal treatment for investors, regardless of country of origin. Investment will pay an increasing role in driving economic growth. The stronger investment is expected to boost private incomes and in so doing encourage further growth in private consumption.

The 2007 Investment Law is superseded the 1967 Foreign Investment Law and the 1968 Domestic Investment Law covering investments in all business sectors. The law contains some changes. One of that related to defence industry.

On the previous investment law, it stated that defence is totally close for investment, while on the new law it only stated that is activities as the production weapons, ammunition, explosive devices, and armaments are close for Foreign Direct Investment.

Following this law, the president launched the president decree no. 77/2007 concerning the lists of business fields that are closed to investments and business fields that are conditionally open for investment. According to this decree industries of raw material for explosive (ammonium nitrate) and industry of explosive and components thereof for industrial needs (commercial) are conditionally open for domestic (up to 100%) and FDI (up to 49%). It also mentioned that production of weapons, ammunition, explosive devices and armaments are conditionally open for 100% domestic capital investment. Additional remarks mentioned that other than the requirements as referred to in the document, the business field remains connected with other requirements.

The law is can be seen to encourage the private industry to participate in defence production. However, it needs the additional regulation from the related ministry,

MoD in this case, to implement what stated in the law properly. Until now, MoD doesn't launch any regulation regarding on this issue.

III.4.4 Budgeting & Financing Policy

All national expenses are financing through national budget, APBN (National Income and Expenses Budget). Every year president proposes Plan of National Income and Expenses (RAPBN) to parliament. Based on RAPBN parliament will determined the national budget for that particular year and declare it in the form of Decree. So, the budget system in Indonesia is yearly based. Period of project have to follow fiscal year state budget, while production line process is difficult to follow a fiscal year (January to December). Defence product is not an inventory product. It starts the production once the contract active. It's not always possible to deliver the whole contract within a fiscal year. Multiyear contract is permitted, however, the contract must be tendered each year and there is no guarantee the similar supplier will be re-elected.

Instead of support, this budget system hampered defence industry. Because, most of the defence's R&D is multiyear based. The same case is for defence productions, especially for complex platform like aircraft. This situation doesn't give the guarantee for defence industry and R&D institution to invest great amount of money in new weapon system that requires years to development. Interviews that conducted by author inform that a lot of project unable to fulfil the military requirement as mentioned in contract because of this.

Other problem is in getting fund sources if defence industries want to work on government's order. Actually state-owned bank could support defence industry on this problem. But, the regulation to conduct this is absence. Meanwhile, there are a lot of cases that one defence industry could not compete to get the defence contract or it couldn't deliver the contract on time because the lack of working capital. The government could use this fact as adjustment that domestic defence industry is not able to fulfil their need so that they choose foreign company.

However, since the pressure to decrease the using of export credit for defence acquisition and the spirit to develop domestic defence industry increasing lately, the government plan to use the domestic source capital. That is through state-owned bank. For this purpose, the government needs to prepare the regulation and procedures. And BI should change the existing regulation which related to give the loan for defence acquisition. Some related departments like Ministry of Defence, Ministry of State-Owned Company, Ministry of Industrial, Ministry of Finance, and BI are working on it now. It is obviously the regulation that will supports domestic defence industry development. PT. Pindad and PT. PAL are now waiting for the regulation in order to deliver 150 panzer and national corvette development contracts.[69]

In order to manage defence budget, ministry of defence launched a series of finance policy for Ministry of Defence environment only, for instance Bill 1590/XII/2003: The Guidance for Finance Management in Ministry of Defence and Armed Forces. In general it adopted the policy that launched by Ministry of Finance. Yet, the mechanism of budget distribution is different. They use command hierarchy as the mechanism of budget distribution which includes seven stages from propose the payment until the treasury ready to distribute the money. This long bureaucratic chain creates the problem to distribute the money on time. It caused the delay of distribution for average 3 – 6 months.[70] It is also created huge problem for defence industry when they are doing government's order. The late to deliver the order is one of the consequences of this situation.

Since 2005, the government use performance based in budget planning. This system is required well-planning skills. Each program or activity has to have performance indicator and distinct output. The readiness of the planners to adapt to the new system will influence the approval of the program or project that they proposed. In the directorate technology and industry (Dirtekind) of the MoD this skills should be the concern in order to support its function in cultivation defence industry. In fact, the dirtekind's budget for defence industry's cultivation in 2006

[69] *Bantuan Setengah Hati*, TRUST, No. 16, 11-17 February 2008, p. 28-29
[70] Report of BPK over the MoD's Finance Report for 2005 fiscal year, Jakarta 2006, p. 40

and 2007 were never over seven billion rupiahs[71] while Bappenas allocated the budget five trillion rupiahs for this sector.[72] Some defence industry's practitioners assumed this gap galore is happened because unsuccessful of Dirtekind's staff in making the good plan proposals. With this budget Dirtekind only can develop one or two prototype in a year, un-significant number to support defence industry development.

III.4.5 Procurement Policy

Procurement for goods and services which funded by national budget (APBN/APBD) are regulated by Presidential Decree No. 80/2003. Its aim is to conduct the procurement activity with efficient, effective, open and competitive, transparent, fair/un-discriminative, and accountable principles.

In general, through the procurement activities, the governments want to increase the using of domestic production, national design and manufacturing, and develop national industry in order to improve competitiveness goods and service production in the international trade.

Basically, procurement is conducted through an open bidding method. However, because of some concerned like complexity of the work and efficiency of budget, procurement is conducted through limited bidding or selected choice, and for special conditions it is conducted through direct pointing to particular party.

The procurement steps from announcement to signing contract take up to 18 steps unless for straight pointing it is half of that, nine steps. Based on the working time, there are two kinds of contract. They are single and multiple year contracts. Single year contract is the contract that binding in one year budgeting period. Multiple year contracts are contracts that are binding for more than a one year budgeting period which is conducted based on the approval of finance minister. The government as a contract provider is forbidden to make a contract with a contractor or supplier if the budget is not available yet or insufficient.

[71] Interview with First Admiral TNI, Ir. Josef Marsidi, MM, February 19, 2008
[72] Priority Matrix, *Government's Working Plan 2006 and 2007*, Bappenas

It is mentioned also the requirements to be a supplier in government procurement. It includes within the last four years, the contractor or supplier had a contract from government or private company including the experience as subcontractor; accept for contractor or supplier that established less then three years. Once the contract is signed, the contractor or supplier is forbidden to transfer the entire main work to subcontractor. While the payment of work performance is conducted through monthly certificate system or terming system.

When placing a contract proposal, a contractor or supplier obliges to mention the offering price (HPS) which includes the structure of that price. It will be used as a means to evaluate the properness of the price. However, it is not mentioned what is allow and not allow to include in the structure of price. In fact, in some cases it triggers the debate weather R&D could include in the structure of price or not. It is become a big issue in defence equipment procurement since R&D consumed a big portion of entire cost.

Throughout this policy it will find the emphasized to support domestic industry. It is even the obligation for government institution to maximize the use of domestic goods and service through procurement activities. This obligation should conduct in every steps of procurement process from preparation to signing the contract. If the goods or services should be imported, it will use the credit export mechanism.

There are a lot of cases in defence acquisition to use the export credit. As guidance to conduct this mechanism, MoD launched Bill No. 7/2006: Guidance for goods/services procurement through export credit in ministry of defence and Indonesian national army. It adopted general principle of procurement in Presidential Decree No. 80/2003, but it is emphasized the independent principle which mentioned in article 37 (23) and (24). It is mentioned the requirement for foreign vendors that they should give the letter which stated if their government will not impose embargo over the contract and forbid or limited utilizing of the content of contract to Indonesia’s defence purpose. This requirement will give

benefit to military capability, but not to defence industry. The procurement through import will give benefit to domestic defence industry if there is obligation to foreign producer to conduct some percentage of the production in Indonesia or required the transfer of technology. It is mentioned in Article 18(C) that if the export credit is used in the form of Non-Guaranteed Export Credit, the government will use it as much as possible to increase the role of state-owned company (BUMNIS). First, it is not in the level of obligation, second it is only for state-owned company, not for private industry. The same case for transfer of technology, it is rather a request than an obligation. And since, the foreign country hesitate to transfer the technology, this policy does not give significant contribution to defence industry development.

III.4.6 R&D and Technology Policy

There are nine references that are related to conduct science and technology (S&T) development in Indonesia. They are UUD 1945, UU No. 18/2002, President Instruction No. 4/2003, Government's Decree No. 20/2005, S&T Vision and Mission 2025, Middle Development Plan 2005-2009, Research institute's Vision and Mission, and lastly Academic Document in the form of White Paper.

August 2006, Ministry of Research and Technology launched Indonesia 2005-2005 White Paper for Research, Development, and applied Science and Technology for Defence and Security Sector as guidance for research and defence technology development in the Middle and Long government development plan. As a final result of all reference is the Strategic Policy for National Science and Technology Development (JAKSTRANAS IPTEK) 2005-2009. It is guidance for direction, priority, and framework of S&T development policy for 2005-2009.[73]

In the research & technology department white paper defence technology includes one of 6 focuses. The mission is to pursue defence technology 'independency'. It

[73] Ministry of Research and Technology, *Indonesia 2005-2025 White Paper, Research, Development, and Applied Science and Technology for Defence and Security Sector,* Jakarta, 2006.

includes the mission to increase of local content in develop one particular technology. Moreover, the technology that developed should contribute to the national economy. It is articulated by the implementation of a series of research and industry development programs. Research and development is conducted by a triangle whose vertices are technology user, research institutes, and industry. At the other hand technology acquisition is conducted through 3 methods: technology transfer, forward engineering, and reverse engineering. It elaborates as follow:

- Technology transfer

  It is conducted through licence or training that related with defence procurement from foreign country
- Forward Engineering

  It is conducted through improvement and availability of human resources that master in a wide range of basic and applied science due to technology acquiring with steps: Idea – Design – Manufacturing – Testing".
- Reverse Engineering

  Reverse engineering is a learning process through deconstruction of existing defence product. Once its technology is acquired, the indigenous product development as needed take place.

In term of which technology will be developed, the government at least consider two things. First, the level of technology capability we have. For advance technology like fighting aircraft or manned submarine is no question that Indonesia's technology capability still left behind. Second, the economic scale factor. For instance, for some engine we have the capability to develop it, but in term of economic scale it is too expensive to develop because of limited demand. For these two reasons, instead of develop it, the government let to import it. [74] The rest of it, the government will the develop it.

There are 3 ways that the government choose to contribute technology in defence sector. First is through indigenous platform development like tank and fast patrol

[74] Interview with Ministry of Science and Technology, Dr. Kusmayanto Kadiman, February 15, 2008

boat. Second is through retrofit or add on. In short, we improve what we already have. For example is to add weapons to NBell-412 helicopter in order to self-defence. Third, how to decrease the dependency of some parts of defence equipment that Indonesia already have. For example, the drag-chute of Sukoi.

The goal of defence technology development for 2025 includes the independency of strategic transport production for land, sea, and air, the capability to produce weapon system with recent technology, and independent of command, control, communication, computer, and information system (K4I). Aligning with the defence technology goals, the research and development activities are directed to give results that can be used directly for defence technology production.

This policy indicates that research and technology development activities have to be within one framework. Research and technology development works in a tight relation with the same target which is the new product. So for instance, this policy should lead to product oriented activities. It's not the case in the past where research and technology development activities work in a loose relationship, if not separate. It causes the real product result that is supported by research work to be very limited. Public demands for the increase number of this. Through this policy, the government seems to try to answer this demand. It shows in the Research and Defence Technology Development Plan up to 2025 below:

Table III.1 Research and Defence Technology Development Plan up to 2025

No.	Product	Development Plan	Technology Needed to be acquired
A	**Moving Power**		
1	Land Transportation Vehicle	Design and Engineering tactical and armored vehicle	Automotive and material technology
2	Surface/Sub-surface transportation vehicle	Design and Engineering corvette, LCU, amphibious tank, and mini submarine	Propulsion, Navigation, Instrument, and Control technology
3	Air transportation	Design and Engineering UAV (PUNA), training, transport, and light fighting aircrafts	Far control and telemetric technology

B	**Fighting Power**		
1	Weapon	Design and Engineering cannon, ship cannon stabilizer, and PSU system	Metal material and precision manufacturing technology
2	Large ammunition and explosive	Design and Engineering large ammunition, propellant, sea smart mines, and smart bomb	Raw material for ammunition and launcher technology.
3	Rocket and Missile	Design and Engineering rocket control system	Rocket motor, control and material technology
C	**K4I**		
1	Communication means	Design and Engineering general and specific communication system	Electronics and Information technology
2	Surveillance and Navigation	Design and Engineering optic and electronic, streaming data, satellite, and radar system	Satellite and censor technology
D	**Personnel equipment**		
1	Personnel operation equipment	Design and Engineering material for body armored and meal in the field.	Textile, Food, Pharmacies, technology and Medicine, and Nutrition Science

Source: Indonesia 2005-2005 White Paper, Ministry of Research and Technology, 2006

From the table III.1 we can see that the research and technology development are product oriented with the state of the art technology are mediocre. It also shows specifically what technology will pursue.

In order to give the contribution to national economic, with the current research and technology policy the government choose the technology that has higher economic value. It drives the indigenous development of products.

BPPT as agency that conduct R&D and application of technology adopted the policy, values and the long term plan to its defence technology road map. For example, one of roadmap for land vehicle below:

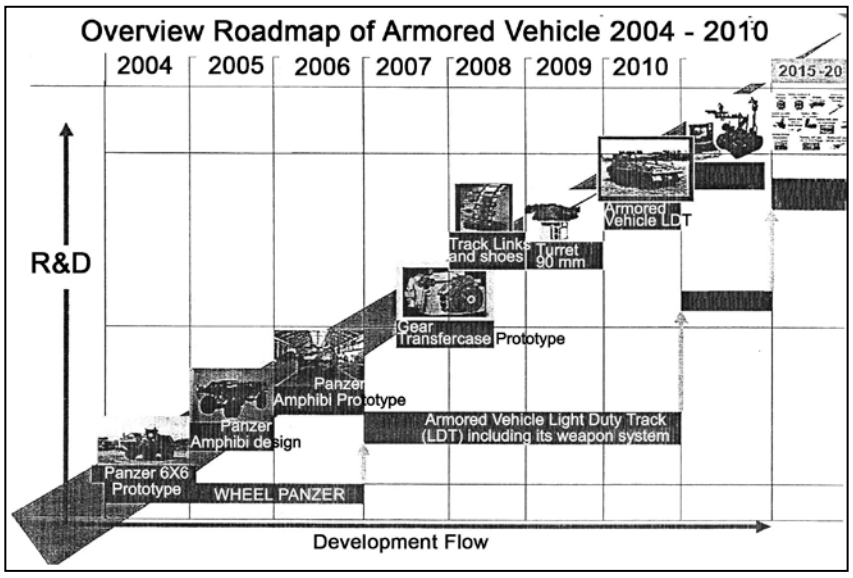


Figure III.5 Overview Roadmap of Armoured Vehicle 2004-2010[75]

If we look at the detail description of this roadmap, it will clearly show how the research and defence technology long term plan come to the land. This is the example in selected year of it:

Table III.2 Roadmap Armoured Vehicle

Year	2007	2008
Market		Wheel track vehicle industry
Product Output	1. Basic design 2. Gear Component 3. Casing Transfercase (GTC)	1. Gear Transfercase 2. Track Link & Shoe 3. Detail Design LTD
Design & Engineering	Manufacturing componen GTC Re- engineering GTC Basic Design Ranpur LDT RD & O Ranpur LDT	GTC Manufacture Track L & S Manufacture GTC Design Track link & shoes Detail Design LTD Engine Procurement
R&D	* Gear Transfercase selection * Research on Material selection * Research on Casting technology * Research on design and engineering armored vehicle	* Track Shoe and Link selection * Research on Material selection * Research on Casting technology * Research on Indonesian defence industry
Resource	Fund : Rp. 581 Million Infrastructure : B2TKS lab Partner : PT. Pindad and SME	Fund : Rp. 2,750 Million Infrastructure : B2TKS lab, Latice Lab Manufacturing facilities : PT. Pindad, SME Partner : PT. Pindad, PT. Inkaba, SME
	Human Resource = 20 9 engineers, 3 Masters, 8 Dipl.	Human Resource = 27 11 engineers, 4 Masters, 10 Dipl.

Source: Technology Roadmap, BPPT, 2007

[75] BPPT, Technology Roadmap, *Chapter 7 : Defence and Security Technology*, Jakarta, 2007

The table III.2 shows that R&D activities that are conducted align with the output product. It's not necessary for the final product; it could be the design or components. The table also informs about the partnership in the development of the product. Despite its involvement the state-owned company, it also involves SME. In development through partnership it will raise an intellectual property sharing issues.

As mentioned before, the defence industry was planned to have two line productions, defence and civilian products. It relates to the technology choice that is emphasized, whether it is military, civilian, or dual-use. It requires the conversion of technology from military technology to civilian technology. It is not a given process, rather a constructed process. Therefore, the government has to encourage the process as well as build the environment to do so. However, the R&D and technology policies does not mention about these.

In reality, the development of dual-use technology is limited. And also each of the defence industries has different compositions of the two line productions. PT. DI and PT. PAL have larger production in civilian product, while PT. Pindad has a larger production in military product. However, the civilian product is not explicitly the result of technology conversion. So, the two lines production seems to run completely separate. It is not efficient. Military product development is naturally more costly than civilian product development, because of the higher requirement. If the company could take benefits from the conversion of technology, the company will be more efficient.

III.5 Defence Budget

As mentioned before defence market tends to be the monopsony market. It means it depends on the single buyer which is the government, the MoD in this regard. Therefore, it is necessary to look close the defence budget. It will see the trend of total of the defence budget, and then breakdown to the development budget and its realization, and finally the defence industry development budget. From those facts it will discuss how budget impacts the defence industry.

III.5.1 The Trend of Defence Budget

Table III.3 Defence Budget 2000-2008

(in Trillion Rupiahs)

Year	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*
Budget	9.471	9.43	12.754	18.31	22.81	24.72	28.23	32.72	36.39

Sources : Pacivis 2006 and Indonesian Department of Defence 2008

From the table above it informs the increasing trend of defence budget since 2001. It increases triple times compare to budget on 2000. However, the trend in last five years shows the other way if it compare to the trend of GDP as shows in the table III.4

Table III.4 Share of Defence Budget over GDP in 2003-2007

(in Trillions Rupiahs)

Year	*2003*	*2004*	*2005*	*2006*	*2007*
Budget	18.31	22.81	24.72	28.23	32.72
GDP	1940	2004	2190	3035	3531
% of GDP	0.94%	1.14%	1.13%	0.93%	0.93%

Source: Dephan 2007

From table III.4 it informs that in the last five years the share of defence budget over the GDP is about 1%. Meanwhile, the defence needs increasing every year as confirmed by the number of defence budget that proposed by the Ministry of Defence.

Table III.5 Comparation between proposed and approved defence budget 2004-2008

(in Trillion Rupiahs)

Year	*Proposed*	*Approved*	*Percentage*
2004	36.4	22.81	63%
2005	45.1	24.72	55%
2006	56.9	28.2	50%
2007	74.4	32.72	44%
2008	100.53	36.39	36%

Source: Indonesian Department of Defence 2008

From the two tables III.5 above, it informs that the rate of defence need is higher compare to the rate of defence budget available. Moreover, they move at the opposite way during the year 2004-2008 as shown in the figure III.6 below:

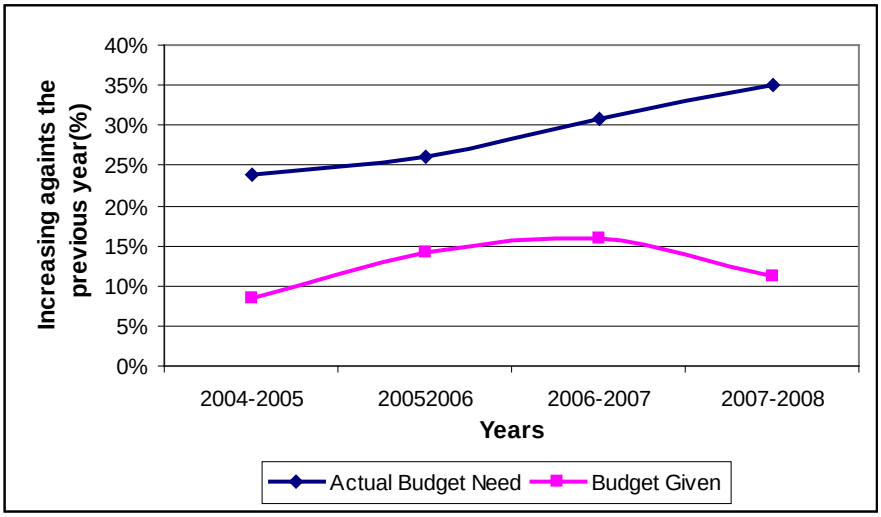


Figure III.6 The trend of actual budget need and budget given in 2004-2008

If this trend continues, Indonesia will never have strong defence as planned. Government need breakthrough to decrease this gap. The reality now is that defence and security have not been a top budget priority. In 2007 it is the second largest share after education. Under the Constitution of 1945 (Article 31), at least 20 percent of the central and regional government budget is to be allocated to education. Consequently, the scope for increasing the defence budget will be quite limited between now and 2009 – and probably will remain so for at least the next ten years.[76]

III.5.2 Opportunity Budget for Defence Industry

Defence budget is distinguished of two element, that is routine and development budget. Routine includes expenses for employee and goods/service. Development includes the expenses which related to improve the defence capability, for instance to buy the military equipment and its maintenance or to conduct the research. For period 2004-2008 the routine and development budget as shows in the table III.7:

[76] Rieffel, Lex and Pramodharwardani, Jaleswari, *The Challenge of Military Financing in Indonesia : Out of Business and on Budget*, The Booking Institution, Washington DC, 2007, p. 25

Table III.7 Allocation of defence budget

(in Trillion Rupiahs)

Year	*2004*	*2005*	*2006*	*2007*	*2008*
Routine	13.14	13.63	13.48	21.13	18.195
Development	6.39	7.32	7.34	10.17	18.195

Sources: BPK Report 2004-2006, Indonesian Department of Defence 2007-2008

The table III.7 informs that until 2007 the development budget is far less than routine budget. In amount, it is increasing every year. Yet, in term of percentage the share of development budget over the total is almost constant every year. That is only about 30% in average. Yet, in 2008 it increase to 50%. It might be drives by some accidents of military platform in the operation lately, for instance the crash of military aircraft and the sunk of amphibious tank. It shows clearly the critical condition of military equipment due to obsolescence.

The development budget sources come from national budget and export credit. It means only the source from national budget that will give benefit to defence industry. According to research report on Indonesia's defence economy reform by Infid 2006, on average national budget share from total development budget is 50% or 5.08 Trillion rupiahs in 2007 and 9.25 Trillion ruipahs in 2008.

The development budget shows how big the market opportunity for domestic defence industry. 30 % of the development budget in 2008 is worth 2.7 Trillion rupiahs. If this amount goes to domestic defence industry the government could buy the mix of 15 hovercrafts (3 Billion rupiahs each), seven CN-235 (350 Billion rupiahs each), 20 surveillance system (1 Billion rupiahs each), 55 APC 6x6 (5 Billion rupiahs each), and 5 units UAV (30 Billion rupiahs each). Moreover, align with the defence technology policy that Indonesia will focus to develop mediocre technology, the available development budget is significant to support domestic defence industry development.

Therefore, arguably for defence industry, the issue is not about the amount, it is rather about how wise the government to distribute the development budget. It does not only need the willingness but also the ability to make the well plan and the program. Because it determinate the successful of realisation of the available budget. In fact, it's not always the case that all development budgets are spent as show in the table III.8:

Table III.8 Defence Budget Realization

(in Trillion Rupiahs)

	2004			*2005*			*2006*		
	Budget	*Realisation*	*%*	*Budget*	*Realisation*	*%*	*Budget*	*Realisation*	*%*
Total Expenses	19.5	18.19	93%	20.95	20.85	99%	28.02	23.9	85%
Routine	13.14	13.13	100%	13.63	13.48	99%	18.60	18.55	100%
Development	6.39	5.06	79%	7.32	7.34	100%	9.57	5.40	56%

Source: BPK Report : 2005, 2006, 2007

In 2004 and 2006, the realization of development budget only 79% and 56% or it worth 1.3 trillion rupiahs and 4.17 Trillion rupiahs. It could be happened because of the program that already set are not possible to implement. Nevertheless, it caused the big lost for domestic defence industry. If this condition continued, it would obviously slower the defence industry development.

To look closely the budget dedicated to defence industry development and defence R&D development, it is necessary to see the defence budget that breakdown in programs. 6 of 11 programs in a year are indicating to contribute to defence industry as shows in table III.9

The six programs could be divided into two groups. From 1 to 4 the groups that are contributing to the defence industry through procurement, the rest is through development. According to description of each program which given in Bappenas report, the first group program includes the personnel and staff training, preparation and sending the troops for Peace Keeping Operation, building the support infrastructure like the dormitory and the house. The programs that directly give benefit to defence industry are the military equipment procurement and

maintenance programs like to buy Night Vision Goggles (NVG), Boat KAL-12M, CN-235 and also to conduct the maintenance of Puma SA-330 and F-16.

Table III.9 Defence Budget in Programs
(in Trillion Rupiahs)

Programs	*Budget*			
	2005	*2006*	*2007*	*2008*
Integrative Defence Development Program	2.19	2.66	16.34	1.43
Land Development Program	8.68	1.08	2.93	2.00
Sea Development Program	3.12	4.20	2.53	1.77
Air Development Program	2.42	3.30	2.53	1.70
Total Group 1	*16.41*	*11.24*	*24.33*	*6.90*
Defence Industry Development Program	0.02	5.05	5.23	5.24
Defence Research and Development Program	0.03	0.04	0.04	0.04
Total Group 2	*0.05*	*5.09*	*5.27*	*5.28*
Grand Total	*16.5*	*16.3*	*29.6*	*12.2*

Sources: BPK Report 2005 and 2006, Bappenas 2007 and 2008

From group 2, it describes that the programs are to repair, maintain, changing the military equipment, procure defence devices, and including procure new military equipment. It also mentioned the cooperation in aerospace, ship, heavy equipment, automotive, etc within defence industry and beyond. The programs also include the improvement of human resources capability in design, engineering, etc.

From those data and explanations, it can be estimating the budget opportunity for defence industry through 3 scenarios: Optimist, Most Likely, and Pessimist. Based on the trend of procurement up to now which more export oriented, the optimist scenario set for 50% of total, while for most likely and pessimist scenario are 40% and 30%. The results are show in the table III.10 below:

Table III.10 Defence Industry's Opportunity Budget in Scenario

(in Trillion Rupiahs)

Programs	*Budget*			
	2005	*2006*	*2007*	*2008*
Total Group 1	*16.41*	*11.24*	*24.33*	*6.90*
Optimist (50%)	*8.21*	*5.62*	*12.17*	*3.45*
Most likely (40%)	*6.56*	*4.50*	*9.73*	*2.76*
Pessimist (30%)	*4.92*	*3.37*	*7.30*	*2.07*
Total Group 2	*0.05*	*5.09*	*5.27*	*5.28*
Optimist (50%)	*0.02*	*2.55*	*2.63*	*2.64*
Most likely (40%)	*0.02*	*2.04*	*2.11*	*2.11*
Pessimist (30%)	*0.01*	*1.53*	*1.58*	*1.58*
Grand Total	***16.5***	***16.3***	***29.6***	***12.2***
Optimist (50%)	***8.2***	***8.2***	***14.8***	***6.1***
Most likely (40%)	***6.6***	***6.5***	***11.8***	***4.9***
Pessimist (30%)	***4.9***	***4.9***	***8.9***	***3.7***

Source: author 2008

From the table III.10 above it shows that in such scenario the opportunity budget for defence industry ranging from 3.7-14.8 Trillion rupiahs/year. In reality, up to now most of procurement goes to foreign country. Using the same way of calculation, if the worst scenario is the budget from groups 1 goes to import 90% while the groups 2 are constant, the opportunity budget for domestic defence industry become 1.8-3.8 Trillion rupiahs/year. According to the agreement between MoD, Bappenas, State owned companies, and ministry of finance, it is planned to spend 4 Trillion rupiahs for 2008-2009 for domestic defence industry.[77] It means that until now the import rate is around 80%-90% of total military expenditure on equipment.

III.5.3 R&D and Defence Industry Development Budget

If we back to the table III.9 above and look for the budget for R&D and Defence Industry Development compare to total defence budget, the results are like this:

[77] *Strategic Plan for National Security and Defence Industry Development*, Bappenas. The document is given to the author on January 2008.

Table III. 11 Research Budget 2005-2008

(in Trillions rupiahs)

Budget	*2005*		*2006*		*2007*		*2008*	
	Value	*%*	Value	*%*	Value	*%*	Value	*%*
R&D	0.03	0.12%	0.04	0.16%	0.04	0.14%	0.04	0.15%
Defence Industry Dev	0.02	0.08%	5.05	20.43%	5.23	21.16%	5.24	21.20%
Total Defence Budget	24.72		28.23		32.72		36.39	

Sources: BPK Report 2005 and 2006, Bappenas 2007 and 2008

The R&D budget is almost constant within 4 years. It is around 40 Billion rupiahs or only 0.15% from total defence budget. The budget distribute to 5 R&D agency, they are MoD R&D agency (Balitbang Dephan), Armed Forces R&D agency (litbang TNI), Army R&D (litbang AD), Navy R&D agency (litbang AL), and Airforce R&D agency (litbang AU). If the MoD have the biggest postion (40%), the TNI are the second (30%), and the rest are in the similar portion(10% each), so the MoD will have 14 Billion, TNI 11 Billion, and each single services have 3 Billion rupiahs/year. This amount is still deducted with some expenses beyond the R&D development activities, such as for staff training. It is a small number for defence R&D to develop a prototype. If one prototype needs 3 Billion rupiahs, MoD only can produce maximum 3 prototypes a year. With this amount of money, MoD has to focus to develop only a few products. However, in reality, the result of R&D activities within MoD is mostly in the form of research documents.

As shown in the structure of defence industry in figure III.1 above, the defence R&D is not only conduct in MoD. At least four non governmental research agencies conduct the defence R&D. They are BPPT, BATAN, LAPAN and LIPI. According to survey of government R&D agency in 2006 which launched by ministry of research and technology, in 2005 agencies that participate in defence technology development shows in the figure IIII.7 below:

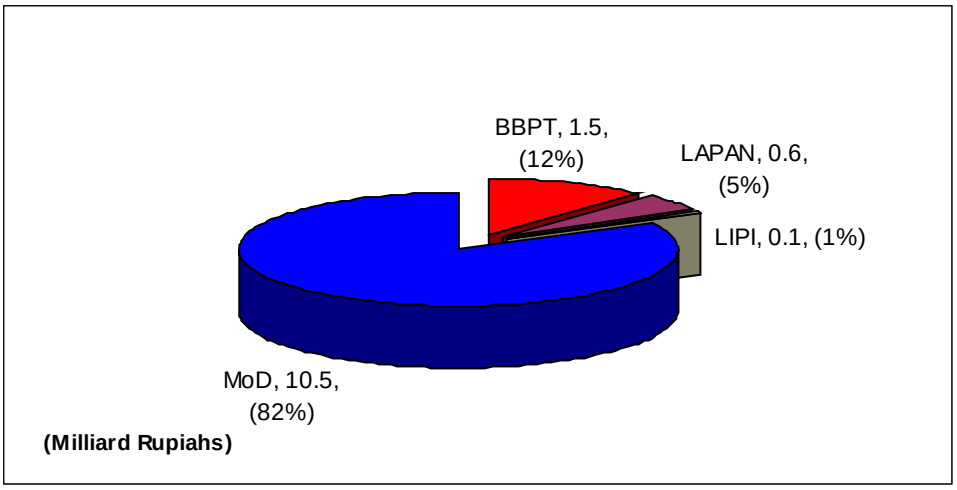


Figure III.7 Defence Technology Development Expenses in 2005

(source : survey of government R&D agency in 2006 by ministry of research and technology)

The biggest share is from MoD. It means for defence technology development in Indonesia is relied on MoD. If this condition continues, the defence industry could not rely on government R&D agencies to catch up to defence technology demand. Nevertheless, the R&D budget is open the opportunity to industry to bring in house some share of the R&D budget through research partnership. It will give two benefits, first to bring the work to run the company, second to improve the knowledge and capability of that industry.

Meanwhile, the defence industry development budget had a big jump from 2005 to 2006. That is from 0.02 to 5.05 trillion rupiahs. And since after this budget constant in 5 trillion rupiahs or 21% of total defence budget. It is a good signal for defence industry, that government shows the commitment to domestic defence industry development. However, as mentioned above the budget is divided into 4 groups, procurement, maintenance, training, and cultivation. For cultivation, the philosophy is to exercise the industry in development one particular defence product. As a final result of this activity is the prototype of the product. The rule is the money has to deliver to industry, not to R&D agency.[78] In MoD, directorate technology and industry (Dirtekind) which established in 2003 is in charge to

[78] Interview with Director of Dirtekind (when interview is conducted)-First Admiral TNI Ir. Josef Mursidi, MM, February 2008

manage this task. In 2005, Dirtekind proposed 20 Billion rupiahs for development program, and it approved by the decision maker in the next level because the team could convinced them about the program that proposed.[79] It is due to budgeting principle which is performance based planning. Yet, in the following year up to now Dirtekind only gain 5-7 Billion rupiahs/year. In the absence of the military need planning and defence industry road map, the development program conducted by Dirtekind tends to ad-hoc based. Sometimes it depends on the proposal from industry. This is somehow contributes to the limited budget dirtekind gain from the available allocation. As estimate above, in the pessimist scenario the available allocation for defence industry development program up to 1.5 Trillion rupiahs. If Dirtekind could maximize this allocation on worst case 10% of 1.5 Trillion ruipahs, it will worth 151 Billion rupiahs or increase 3030%. With this, the government will serve the defence industry more through more development programmes.

III.6 Defence Market

III.6.1 International Market

Defence market is estimated to be worth US$ 400 Billion worldwide. The USA is by far the largest market at around US$ 180 Billion in 2004. The next level is Russia, China, Japan, UK, and French. At the other side, US companies continue to dominate the global defence industry. 7 out of the top 10 defence companies are now US-based. The characteristic of product that these spender and supplier want and produce are the integrated platform and system level with advance technology.

For such product, they are heavily dependent on a wide range of lower level suppliers. While Indonesia has no opportunity to compete with the giant defence company in the product, yet the big opportunity to gain the market as part supplier is widely open. It is experienced by PT. Dirgantara. In line with the growing global demand for airplanes and the company's improving performance, orders for components come from foreign manufacturers including Airbus, Boeing,

[79] Interview with former Director of Dirtekind – Brigadier General TNI Suendro, January 2008

Bombardier, EADS, CASA and Eurocopter. In 2008 the company would finish 15 sets of Airbus A380 wing components and parts this year and 25 more sets over the next three years. It was also producing 30 sets of Airbus A320 wing components and parts each month. According to Budi, the company's director, within two years the airline company hopes to double its 1 percent share in the global airplane components assembly market, an industry whose size could reach US$5 billion in 2008. Furthermore, PT Dirgantara Indonesia (DI) received the Best Performance Supplier 2007 award from major Airbus aerostructure supplier Spirit AeroSystems Europe Ltd. It is a proof that Indonesia's defence industry could compete in the global market.

However, in order to secure their share in the global market, the big supplier country will boost their export. For example, as mentioned in UK 2005 Defence Industrial Strategy (DIS), UK companies continue to consolidate Britain's position as the second largest defence exporter, with a 20% share of the global market. Asia is one of their export targets. It means Indonesia's defence industry will continue to compete with giant world defence company like BAE system. To secure the domestic market, the government's protection will not be the answer, since Indonesia is one of the WTO members. One alternative solution for this is to add the fortification requirement on the product. For example, by exploit the daylight that Indonesia has as fortification requirement on the military product. In other words the industry has to be creative to exploit the uniqueness of Indonesia in designing the product, so that they can win the competition with global player in domestic market.

III.6.2 Domestic Market

As the biggest defence procurement in Indonesia comes from the ministry of defence, it can be noted that the defence domestic market is reflected by the government defence budget in development. As discussed in the section 3.5 above, the domestic market worth around 4 trillion rupiahs a year.

However, the market could be enhanced if the defence industry could expand the market to another government agencies and civilian market. It can be achieved through selling the dual-goods such as hovercraft, UAV, surveillance system, radar, etc.

III.7 Government Role in Defence Industry

Defence industry possessing a number of characteristic which, taken together, differentiate it from other industry. Nevertheless, it needs certain features that shape the defence industry, namely:

- The market that is sufficiently attractive to retain companies' participation
- Industrial delivery: effective and efficient
- Innovation and technology/capability development in industry
- Sufficient control for government to ensure appropriate sovereignty

To achieve these features it demanding the government intervenes. These take many forms. Some are available through day to day activities, for example as a customer of defence products and services. Others come from governments' wider investments in the well-being of industry and some through government's authority as a controller or regulator of industry.

As mentioned in section 3.4.1, implicitly the national defence policies mandate five roles of the government in defence industry. They are investor, planner, customer, supporter, and regulator. The next part will discuss each of that role.

III.7.1 Investor

In the Soeharto era, the government play significant role as investor, mainly in facilities, research and technology, and human resources. However, the investment was only for state-owned company. After the crisis hit in 1998 and the agreement with IMF, this role was weakening.

In recent government, the investment is simply only in the research and technology. And it is with small distribution budget whereas the governments' approaches to R&D are an important factor in determining the overall

attractiveness of the defence market. However, the defence industry condition now in generally has no money to conduct the research and technology development. In other words, the industry depends so much to government in this regards. Besides that, the nature of major defence programme which is high cost and high risk strengthen the argument that government could play role more as investor.

In reality, it is the state-owned company that enjoy most of the investment so far. Nevertheless, the government through the ministry of research and technology already took a positive step to share the investment in research and technology wider. They provide research grant and incentive via grand research programme and incentive programme. The latter is open to individual, groups, or industry.

III.7.2 Planner

Governments' forward planning activity, at the strategic level and addressing military capability can provide industry with a level of future market understanding that underpins business strategy and corporate investment. This role is very important, because for industry the government forward planning is the starting point for the next step. Moreover, it helps the industry to remain effective and efficient. However, it can argue that it is the weakest role of Indonesia's government in serving the defence industry now.

National defence strategy is the ultimate source to make defence need plan. In the absence of national defence strategy the government could make the credible and sustain plan for defence need, both for short time or long time. It is the case in Indonesia. For almost ten years Indonesia was in the absence of national strategy. TNI's claimed that Indonesia has strategic plan 2004-2009 and defence posture 2004-2024.[80] However, it is obviously that the plan is not based on national strategy, therefore there is no guarantee that it is a sustain plan. Moreover, this plan is not share to the industry or other related department.[81]

[80] Interview with staff of TNI's general plan assistant (Asrenum), February 2008
[81] Interview with Ministry of Science and Technology, Dr. Kusmayanto Kadiman, February 15, 2008

In fact, the defence need is ad-hoc base or sometime it's a 'magic'. In this condition, Indonesian defence industry suffered. They have no clue what technology to be developed, how much it needed, when it needed, etc. It leads to mis-investment, furthermore bankruptcy. As the consequences the defence industry tends to be very carefully in investing and it made the technology development or industry development itself very slowly.

The president just launched the general policy for national defence no. 7/2008 on January 26, 2008. It mentioned the Over-all People's Defence and Security or SISHANKAMRATA as defence strategy. This is a forward step. It will be base to develop sustain and credible defence need plan. However, to produce sustain and credible plan it need analytical capacity and certainly a time. Since it is just launched in January 2008, the defence industry is still in the same condition as before.

III.7.3 Customer

How the government behaves as customer is most probably the critical factor in making defence industry develop and sustain. Moreover, it is making the defence industry attractive to investor and workers.

In the current status of Indonesian defence industry, the centred customer is the government. The loyal customer is what defence industry needed now. It means the government have to look and understand the technology and manufacturing level that defence industry has achieved. It is unconstructive attitude if the government treat the domestic defence industry exactly the same as the foreign supplier.

It is true that in the procurement policy it is mentioned to prioritize domestic industry in every procurement contract. However, it also required that the product have to meet the required standard. Meanwhile, it is often the government adopt blindly the international standard such as NATO. It is a very high standard, yet no

guarantee that it is compatible with Indonesian circumstances. It can argue it is necessary to set up our own standards, which probably lower than international's standard but still acceptable. And more importantly, it is compatible for our mission and circumstances. It is as first step to give the chance to domestic defence company. And parallel with that the government also demanding the gradual improvement. This will be enhancing the role of the government as customer to Indonesia defence industry.

The government also point out that it is compulsory for Indonesian Military (TNI) to buy their equipments from domestic industry, except for products that are not available domestically. However, in the absence of agency and policy which decided weather one product will be deliver through domestic or foreign supplier, that obligation will not successfully come on the ground. Thus the role of government as a customer currently is limited.

III.7.4 Supporter

The government has a broad range of support in this area which can significantly contribute to development of defence industry. The support could be direct or indirect. In the area of publicity and marketing the government can support through conducting defence exhibitions in Indonesia or sending selected the industry to participate the similar events in foreign country. It is still limited the support of government in both activities. The government through the president, minister, and ambassador also can actively promote Indonesian defence product in foreign country.

The support that also has significant benefit for industry is the loan from government bank. With the loan the industry can expand the production. The government of Indonesia is still working to prepare the regulation and procedure in this regard. One other thing that gives benefit to the industry is the support in the fiscal incentive. For example tax deduction and import tax relief for raw material. It also important the assistant support from the government, like technical assistant from TNI and MoD procurement department or assistant help

for export. Ownership of this support is vested across government, notably in the MoD, Ministry of Finance and Treasury, Ministry of Industry, and Ministry of Research and Technology.

Above all, the political support is the most important one for defence industry. For example by categorize particular product as a strategic product, or convinced the decision maker that one particular technology is important for the country. It is massively took place on the Habibie's period. Recently, this role only can see through the development programme that funding by government, such as panzer and UAV.

III.7.5 Regulator

On occasion, governments may need to exploit this role more concerned with controlling or restraining parts of industry to ensure access to, or control over, capability and capacity. Equally, governments can consider where regulations can be relaxed or removed, to increase industry's profitability and agility.

The regulation that should be considered to be relaxed for example is the financing of multiyear contract. At the other side the regulation that should be restrain is the policy towards Intellectual Property.

III.8 Defence Industry Linkage

Defence industry is not an isolated industry. It is a part of larger national economy. It involves various actors, policies, and industrial setting as already describe one by one above. However, each element is not working alone but it links each other. Moreover, it is influenced one another. Therefore, it is necessary to see what happen if all elements are put all together.

To see this, the author will use a model that developed by Jose O. Maldifassi and Pier A. Abetti (1994) which called The Defence Industry in Semi-Industrialized Countries which was described on section 2.4. If we take the defence industry as

the centre of the model, it can say that defence industry has responsibility to transform technological capability (the left side) to fulfil the technology push by the armed forces (right side), and present it by the product supply to armed forces as an output of defence industry. In other words, it could be say that left side as a supply and right side as a demand. It is the responsibility of defence industry to utilize the supply in order to fulfil the demand. The final result of this process is the product output that supply to the armed forces. Figure III.8 shows the schematic of this process.

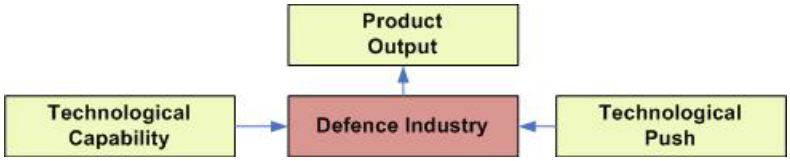


Figure III.8 Defence industry supply-demand-output relations (source: author, 2008)

Regarding to conduct this process, there are four issues influence noted, as shown in figure III.9

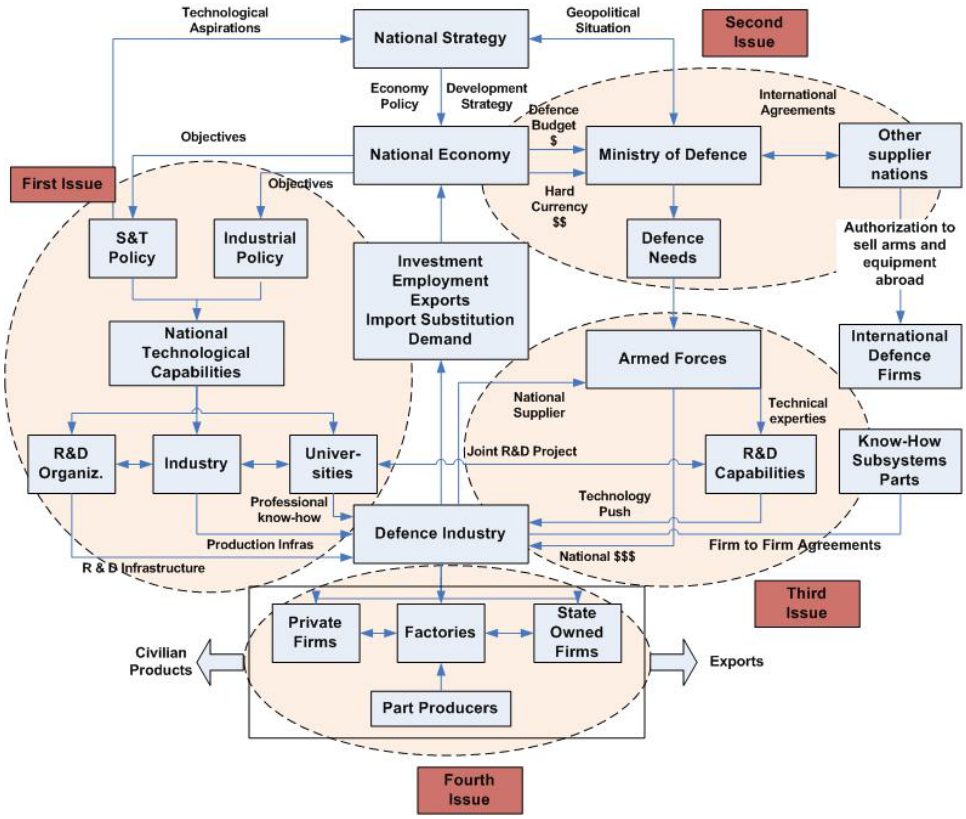


Figure III.9 Analysis within Indonesia defence industry (source:authour 2008)

First issue relies in the technological capability. In here, Science & Technology (S&T) and industrial policy as the umbrella or guiding while research institute and industry as the pillars of technological capability. The pillars are the place to exercise what is stated on policies.

As mentioned before Indonesian S&T policy stated to develop mediocre defence technology for all defence equipment spectrums (land, air, sea, communication). Meanwhile, industrial policy instead of mention specifically the strategy to develop defence industry, it is stated the strategy to develop manufacturing industry in general. It can assume here that the government use the 'one fits all' strategy. As a result, the technological capability to support defence industry will be the capability to produce mediocre technology with manufacturing technology not specifically for defence.

Second issue is about defence budget, the amount and the way it spend. National economic condition only can serve about 36% of total defence sector needs, and the hard currency within it is a loan from foreign supplier countries. The budget gives small portion to R&D and defence equipment procurement. Small portion of R&D impact to the technology pillars. While the small portion of national currency for equipment procurement leads to high defence equipment import. The hard currency using the scheme export credit to procure foreign product. The evident shows that the spending to procure foreign product has achieved 70% of total procurement. This condition leads to the third issue.

Third issue relies on 'the culture' of armed forces regarding to technological push. The highly dependent to foreign procurement for long time makes the armed forces is used to have foreign technology which is higher than what available in Indonesian defence industry now. It leads to technology push to defence industry with bases of foreign technology. In other words, armed forces demand the domestic defence industry to produce the same technology as they existing have or want to have in the future.

If we put again this three issues to the figure III.8 it will show the gap between the supply and demand.

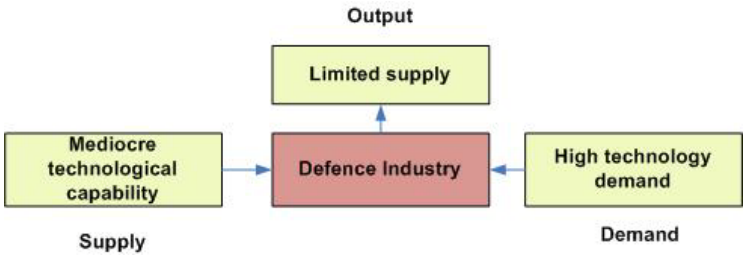


Figure III.10 The gap between supply and demand in Indonesia defence industry (Source: author 2008)

As noted here, it's not all the armed forces need is high technology. The limited supply at the output is also indicates the mediocre defence technology that can fulfil by the domestic defence industry. The defence need on mediocre technology actually is also big. For example by the year of 2010 Indonesian Armed Forces need 400 units of panzer.[82] This fact leads to the fourth issue.

Fourth issue is about the actor within the defence industry itself which mainly is the state-owned company and the private company. The technological capability and capacity of the defence industry determine the output that supply to users. Until now, the defence industry is centred to the state-owned company. Furthermore, some areas like weapon and explosive device production are closed to private industry participation. Meanwhile, capacity of state-owned company now could not fulfil the demand. For example, the capacity of PT. Pindad to produce light arm 200 thousand a year while the needs of TNI more than that.[83] Another example is PT. Pindad panzer production capacity is only 20 units per year whereas it is needed 400 units by 2010. This fact indicates that the more participate the more demand can be fulfil. Furthermore, the more participation the more technology will be acquired. In the long run, the gap of supply and demand of technology which shown in the figure III.10 will possibly reduce. This fact leads to the urgency need of private participation.

[82] Yudi Eko Wardoyo, *Management of Domestic Industrial Industry based on Integration Supply Chain and Strategic Partnering, Case study Panzer APS production of PT. Pindad*, ITB, Bandung, p. 7
[83] Interview with Colonel Wargiono –Paban 3 Assistant of TNI General Planning (Asrenum TNI), February 2008