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PT. Pindad Cooperation Synergy with Private Owned Enterprises in Defense Sector

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A B S T R A C T

The ability to produce domestic defense equipment (Alutsista) is crucial for national sovereignty, ensuring availability during conflicts, creating jobs, and driving technological and industrial growth. Indonesia relies on State-Owned Enterprises (BUMN) like PT. Pindad for Alutsista production. However, PT. Pindad still requires support from other parties due to limited technology and expertise, especially in developing and modernizing defense systems for the Indonesian National Army. This study, using a descriptive qualitative method through a literature review, explores PT. Pindad's collaboration with private enterprises. The findings show that PT. Pindad has stronger synergy with foreign private-owned companies than domestic ones, mainly due to reliance on imported components such as engines, transmissions, fire control systems, and electro-optics targeting systems (EOTS).

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INTRODUCTION

Defense industrial independence is the ability of a country to meet its defense needs by producing the defense equipment domestically. Capacity in self-producing defense equipment or Alutsista in the modern era is crucial to reducing the potential threats that may arise in modern conflict. The threats in question are an arms sales embargo on the defense equipment and sub-components, as well as potential blockade of trade routes which could disrupt national policy making and the combat readiness of the armed forces. The ability to produce defense equipment domestically also has a multiplying effect, such as absorbing labor, increasing local economic growth, and contributing income to the country from the defense industrial sector.

Indonesia historically has experienced an arms sales embargo in 1991 as a result of military operations in East Timor. The arms sales embargo imposed by the United States and European countries in 1991 lasted until 2005, had a significant impact on the condition of defense equipment already operated by Indonesian Armed Forces and influenced Indonesian weapons procurements programs at that time (Jean A. Berlie, 2015). Reflecting on arms sales embargo on defense equipment from 1991 - 2005 shows the importance to build domestic capability to produce defense equipment used by the Indonesian National Army in order to diminish the possibility of future arms embargo.

There are three main models in the development of the Defense Industry, namely:

1) Self Sufficient Model, in which the country focuses on building Defense Industry capabilities, especially mastering military technology with the ultimate goal of domestically produce 70 percent of arms sales required by Armed Forces.
2) Niche Production Model, in which the country focused on reducing the use and purchase of defense equipment from abroad through developing national capacity in major military technology, consisting of eight conventional weapons systems: Fire Arms, Main Battle Tank, Surface Combatant Ship, Submarine, Fighter Jet, Attack Helicopter, Missile, Communication System and Sensor.
3) Global Supply Chain Model, in which the country already have adequate weapons technology collaborate with another country or company in order to access international arms market through consortiums. (Supandi, 2020).

One of Indonesian government efforts to increase the capabilities of domestic Defense Industry are through its regulations related to defense and military. Indonesian Law Number 16 of 2012 on Defense Industry, emphasizing procurement, maintenance and repair of defense equipment to prioritize domestic products or domestically source/based contractors. Defense Sector production processes in Indonesia heavily rely on State-Owned Enterprises (BUMN) such as PT. Pindad, PT. Len, PT Dirgantara Indonesia and PT. PAL. In practice, Indonesian State Owned Defense Industry such as PT. Pindad collaborates with Private Owned Enterprises both from abroad and within the country to produce its products. To maximize the capacity and capability of

PT.Pindad in producing light to medium arms and also ground vehicle, synergy process are needed in the collaboration carried out by PT. Pindad and private owned enterprises either from domestic or abroad.

According to A.F Jones in Ansori, synergy is a level of cooperation that produces output that is greater than the expenditure incurred (Ansori et al., 2017). A.F Jones's Synergy Theory explains that synergy is the last level of three levels of cooperative communication. The second latest is respectful level where the cooperation carried out has reached the stage of mutual trust and respect, and the first level is defensive level where cooperation is still at early stage and trust between parties hasn't been established yet. Based on the definition of Synergy, the author will discuss cooperation between PT. Pindad with foreign and domestic private owned defense industry to produce defense equipment (Alutsista).

THEORETICAL REVIEW

Several studies have examined the synergy between state-owned enterprises and private-owned companies in the defense sector, highlighting the importance of collaboration to enhance technological capabilities, innovation, and production efficiency.

Synergy in Defense Industry Cooperation

Synergy in partnerships can create greater value than individual efforts, especially in industries requiring high technology and expertise, such as the defense sector. Similarly, Kanter (1994) emphasizes that collaborative advantage arises when organizations leverage each other's strengths to achieve mutual goals. Studies by Prasetyo and Nugroho (2021) on Indonesia's defense industry found that partnerships between PT. Pindad and private-owned enterprises contribute significantly to technology transfer and accelerate the production of modern defense equipment.

Resource and Capability Sharing

In the Resource-Based View (RBV) theory highlights that collaboration allows organizations to access valuable resources, including technology, knowledge, and human capital. Setiawan et al. (2022) found that PT. Pindad's cooperation with private enterprises provides access to advanced technologies, such as fire control systems and electro-optics, which are essential for improving defense products. Additionally, a study by Santoso and Rahardjo (2020) highlighted that joint ventures with foreign private companies enhance PT. Pindad's research and development capabilities.

Public-Private Partnerships (PPP) in the Defense Industry

Notes that public-private partnerships (PPP) can bridge resource gaps and increase efficiency in project execution. According to Wicaksono et al. (2021), PT. Pindad's partnerships with private-owned enterprises have improved production efficiency and reduced costs through shared investments and technological collaboration. However, Wicaksono also noted that domestic

private companies often lack the technological capabilities provided by foreign partners, resulting in a technological gap.

Open Innovation and Technology Transfer

In the Open Innovation Theory suggests that collaboration accelerates innovation by integrating external knowledge with internal capabilities. Research by Lestari and Prabowo (2022) on PT. Pindad's cooperation with foreign private enterprises found that technology transfer from international partners has been critical for producing advanced defense systems. However, the study also emphasized the need for stronger collaboration with domestic private companies to build local capabilities.

Challenges in Domestic Cooperation

Despite the benefits of international partnerships, several studies highlight challenges in domestic cooperation. According to Susanto (2020), domestic private enterprises face barriers such as limited technological capabilities, insufficient capital, and a lack of experience in large-scale defense projects. This has resulted in PT. Pindad relying more on foreign partners for key components like engines and targeting systems.

METHODOLOGY

The research uses a qualitative literature study method by providing research results regarding the synergy of cooperation between PT. Pindad and domestic and foreign private-owned enterprises in defense products produced by PT.Pindad. The data collected in this journal article comes from open sources literary such as books, magazines, publications, articles, images and graphs. The data obtained then summarized and reviewed in the form of a journal article.

RESULTS AND DISCUSSION

PT. Pindad

The establishment of PT. Pindad started from the Dutch colonial period. In 1808 the Government of Governor General William Herman Daendels built facilities for the procurement, maintenance and repair of Dutch government weapons in Indonesia, namely Contructie Winkel (CW) which was located in Surabaya. At that time, the Dutch also built facilities to produce large-caliber ammunition, Projectiel Fabriek, which was located in Semarang. In 1850, the Dutch colonial government also established a factory, namely Pyrotechnische Werkplaats (PW) in Surabaya to produce and repair ammunition and explosive ordinance for the Dutch navy. These companies then in their development were merged into one by the Dutch Government called Leger Produktie Bedrijven (PT. Pindad, 2023).

After the withdrawal of the Dutch Government's occupation, Leger Produktie Bedrijven was then transformed into the Indonesian Army's Arms and Munitions Factory. Eight years later, on 1 December 1958, the Weapons and Munitions Factory changed its name again to the Army Equipment Factory (Pabal AD). Not only does Pabal AD produce small arms and ammunition, it also

produces other defense equipment to reduce Indonesia's dependence on defense equipment from other countries. Pabal AD was changed again in 1962 to the Indonesian Army Industrial Command (Pindad) and then changed again in 1972 to Kopindad (TNI Army Industrial Command). Pindad then became a company in 1983 and changed its status to a limited liability company. PT. Pindad is currently part of the DefendID holding which consists of a combination of State-Owned Companies in the Defense Industry sector. PT. Pindad officially entered DefendID on 12 January 2022 with the handover of the majority of shares to PT. Len Industri as DefendID Holding Parent. PT. Len Industri selected as DefendID Holding Parent due to PT.Len network and products does not lineate towards one branch of the military like other State Owned Defense Company, for example PT. PAL which is leaning towards the Naval System as a shipyard, PT. Dirgantara Indonesia which is leaning towards the Aviation System as a company producing fixed wing aircraft and rotary craft, or PT. Pindad focuses on light and heavy land weapons. PT. Len Industri focuses on producing command, communication, control, computer, intelligence, surveillance and reconnaissance (C4ISR) tools that can be used by all branches in the armed forces, which makes PT. Len Industri business processes and company networks more universal in comparison to other state owned defense company.

Senapan Petembak Runduk 2 (SPR-2)	-	89.36%	Senapan Serbu 2 Varian 4 (SS2-V4)	-	71.63%
Senapan Mesin 3 (SM-3)	-	91.12%	Senapan Serbu 2 Varian 4 HB (SS2-V4 HB)	-	66.85%
Senapan Mesin 2 Varian 2 (SM2-V2)	-	89.21%	Senapan Serbu 2 Varian 5 (SS2-V5)	-	78.04%
Senapan Serbu 2 Varian 1 (SS2-V1)	-	73.33%	Senapan Serbu 2 Varian 5 A1 (SS2-V5 A1)	-	51.31%
Senapan Serbu 2 Varian 2 (SS2-V2)	-	72.96%	Senapan Mesin 2 Varian 1 (SM2-V1)	-	87.71%
Senapan Serbu 2 Varian 2 HB (SS2-V2 HB)	-	67.91%	Senapan Petembak Runduk 3 (SPR-3)	-	81.69%

Figure 1. TKDN PT. Pindad, 2022
(Source: P3DN Kementerian Perindustrian, 2022)

As lead integrator on land system defense equipment, PT. Pindad produces various defense products ranging from small caliber ammunition, light weapons, armored fighting vehicles and light tanks. In the production process PT. Pindad still needs collaboration with domestic and foreign private partners, for example the SS1 assault rifle product which started from a license built FN FNC assault rifle from Belgian weapons manufacturer FN Herstal, which was then adapted and developed according to the needs of the Indonesian Armed Forces. Recently, the level of domestic components for light weapons produced by PT. Pindad is quite high, ranging from 41.27 percent to 95.14 percent but has not yet reached one hundred percent.

Synergy with Foreign Private-Owned Company in Defense Sector

Domestically sources components ratio (TKDN) in products produced by PT. Pindad is already relatively high, especially in munitions and light weapons products, but in products such as combat vehicles and light tanks it still needs foreign Defense Industry partners to carry out initial development and several crucial components in the defense equipment. For example is the collaboration with Arquus Defense, which was previously called Renault Truck Defense, in making the Anoa Armored Personnel Carrier (APC), the Komodo Light Armored Vehicle and the Badak Fire Support Vehicle (FSV). Anoa and Komodo resemble Arquus products, namely the VAB and Sherpa, which were then developed according to the needs of the Indonesian Armed Forces, with several components such as the engine and rolling chassis still produced and suplied by Arquus. Another collaboration is with Thales Australia in making the Mine Resistance Ambush Protected (MRAP) Sanca which was developed from Thales Australia's Bushmaster MRAP. PT. Pindad is also collaborating with General Dynamic Land Systems (GDLS) to manufacture the Cobra Infantry Fighting Vehicle (IFV), which was developed from the Pandur II IFV made by GDLS, using an Ares turret made by Elbit Systems with a Mk 44 30 Millimeter Cannon made by Northrop Grumman.

Collaboration carried out by PT. Pindad is not only carried out with defense companies from European countries and Australia but also Asian countries such as Korea and Turkiye. PT. Pindad and Hanwha collaborated in making the FSV Tarantula and APC Arwana which were developed from the APC Black Fox and APC Barracuda produced by Hanwha with several components, especially the engine, still using a Doosan diesel engine. In making the Harimau Medium Tank, PT. Pindad also collaborated with FNSS, namely the Turkiye private defense company. The collaboration mentioned above shows that the synergy carried out by PT. Pindad with Foreign Private Owned Enterprises in Defense Sector is generally due to the defense equipment and platform produced by PT. Pindad are developed or following the design of these partners (Mirdanies & Hartanto, 2013). This is done because of limited funds to carry out research and development (R&D) from scratch and it is more efficient to choose an existing design and modify it according to needs. Another collaboration pattern that researchers found was in the manufacture of large caliber turrets which almost always collaborated with CMI Cockerill Belgium, both for the 90 millimeter turret on the FSV Badak, FSV Tarantula, and the 105 millimeter turret retrofit/modernization of the AMX-13 Light Tank and the Harimau Medium Tank.

Figure 2. Foreign Components in PT. Pindad Products, 2023
(Source: Data processing results from author's literature study)

The development of foreign partners design and the use of foreign components is not only to minimize R&D funds, but also because several advanced and cutting edge components such as propulsion system, Electro Optical Targeting System (EOTS) in the Fire Control System (FCS) still cannot be produced one hundred percent domestically. The combat vehicle products produced by PT. Pindad still have the same propulsion engine as the model used as a reference, for example the APC Anoa and Komodo still use engines from Renault/Arquus, Medium Tank Harimau and MRAP Sanca still use engines from Caterpillar, APC Arwana and FSV Tarantula also still use engines from Doosan/Hanwha. Development of the Maung Tactical Vehicle (Rantis) which was developed by PT. Pindad is also inseparable from foreign components, especially the engine, which still uses engines from Toyota or Isuzu (diesel version). The decision to use the same drivetrain and propulsion engine as the reference model also minimizes reliability problems that would inevitably arise if we opted to develop a new indigenous engine or an off the shelf engine modified to replace the engine already used in that model.

Collaboration with foreign private companies in defense industry sector and PT. Pindad, especially in the manufacture of products that have similarities or commonality with defense equipment used by other countries, can be used as an opportunity to increase PT. Pindad's income. For example, FNSS and PT. Pindad can collaborate in tenders for the procurement of Medium Tanks in a country that wants to renew/replace the AMX-13 and Alvis Scorpion fleet. The collaboration that has been carried out by PT. Pindad with foreign private owned defense industry company can be utilized to penetrate new potential of the international defense market which previously could not be accessed by PT. Pindad alone.

Synergy with Domestic Private-Owned Company in Defense Sector

The The collaboration carried out by PT. Pindad also includes domestic private-owned enterprises. One example of collaboration between PT. Pindad and Domestic private-owned company in defense sector is with PT. Lundin in making the Antasena type Tank Boat. The Antasena Type Tank Boat is a catamaran boat equipped with a LEMUR Remote Weapon Station (RWS) made by BAE Systems Bofors Sweden, a 30 millimeter or 105 millimeter turret made by

CMI Cockerill Belgium and powered by an MTU V12 2000M86 diesel engine made by the German company MTU Friedrichshafen GmbH. PT Pindad acts as Lead Integrator while PT Lundin plays a role in making the body/Hull of the Boat and PT. Hariff DTE played a role in developing the Battle Management System. Foreign components still encountered in the Antasena Tank Boat although PT. Lundin and PT. Hariff DTE also played as major partner in making the hull and Battle Management System (BMS).

BMS produced by PT. Hariff DTE is also used in land defense equipment produced by PT. Pindad, one of which is the use of the CY-16H BMS on the APC Anoa and Medium Tank Harimau. The use of BMS in land defense equipment produced by PT.Pindad functions as an Integrated Command and Control System which increases crew situational awareness, makes it easier to coordinate assets in the field, and minimizes the potential for blue on blue incidents. PT. Pindad also collaborates with PT. Indonesian Defense and Security Technologies (IDST) in manufacturing ammunition by building an ammunition factory located in Malang, East Java. With synergy between PT. It is hoped that Pindad and PT IDST will produce domestic ammunition to meet the needs of the Ministry of Defense, which in the Letter of Intent requires 1 billion ammunition per year from 2020 to 2023.

Figure 3. PT. Pindad Antasena Class Tank Boat Design
(Source: MiliterMeter.com, 2020)

The cooperation synergy between PT. Pindad and Private Owned Enterprises is more dominated with foreign private-owned defense industry compared to private-owned defense industry within the country, this is caused by various factors, namely :

1) The capabilities of the Domestic Private-Owned Enterprise in Defense Industry are not yet mature, especially in manufacturing engines, transmissions, fire control systems (FCS) required by PT Pindad.
2) The experience of Domestic Private-Owned Enterprises in Defense Industry is not yet mature considering the regulatory limitations that require Lead Integrators from State Owned Defense Company. To counter this issue, the government then implemented Government Regulation Number 2 of 2022 on Omnibus Law. Especially on chapter 74, which is a

change to the previous regulation Indonesian Law number 16 of 2012 chapter 11 on Defense Industry by adding more role to private- owned defense company without limitation of state owned company as lead integrator restriction before (Perppu Nomor 2 Tahun 2022 Tentang Cipta Kerja, 2022).

3) Limited operational, Research & Development (R&D) and production fund. In contrast to state owned company, private owned company don't receive large funding injections from the government, meanwhile they have to compete with state owned company in defense sector.
4) The complexity of the arms sales process for the products produced is considering that sales of defense equipment are strictly regulated by the government.

This disadvantages condition cannot be changed in a short period of time and requires government attention to solve this issue. One of the corrective steps that have been taken is the implementation of Government Regulation Number 2 of 2022 which paves the way for domestic private owned defense industry to become defense equipment integrators. Problem with dependency on several high-tech components from foreign origins on land defense equipment, which as explained above not only experienced by Indonesia as a country with growing defense sector but also experienced by major defense manufacturer country such as Russia.

Figure 4. Captured Russian T-90 Tank equipped with Thales FCS
(Source: Cole, 2022)

The recent war in Ukraine shows that Russian Main Battle Tank of Ts series are using western subcomponent, one of the example is the captured T-90 equipped with thermal imagers from France manufacturer Thales. The Thales subcomponents used are Catherine FC (Fire Computer) and Catherine XP optronics (Imagery/Camera) used in modernized T-72, T-80 and T-90s of Russian Army. The presence of Western subcomponents in Russian equipment highlights either the economic and performance advantages of these components or the lack of suitable domestic alternatives during modernization programs.

CONCLUSIONS AND RECOMMENDATIONS

PT. Pindad synergy with foreign and domestic private-owned defense industry are very crucial in order to increase cooperation, considering that the domestic private-owned defense industry requires the technical know-how that PT. Pindad already has proven history as Lead Integrator mainly in small – medium arms and land system defense equipment in Defend ID Holding. By building good synergy between PT. Pindad with Foreign and Domestic Private

Owned Defense Industry in Indonesia can reduce PT Pindad's workload by dividing the focus of components development program such as propulsion/engines, Fire Control Systems (FCS) and other sub-components to domestic private owned defense industry to achieve better defense industry independence.

PT. Pindad must maintain good synergy with Foreign Private Owned Defense Industry considering that the latest technological capabilities and Research & Development of international partners have already advanced from previous era and become a reference in developing domestic capabilities. Synergy with international partners also has the potential to increase the Company's income through penetration of the International Foreign Military Sales market, which without a synergistic cooperative relationship cannot be achieved.

FURTHER STUDY

Future research can explore strategies to strengthen synergy between PT. Pindad and domestic private-owned defense industries, focusing on technology transfer, joint research and development (R&D) programs, and capacity-building initiatives to reduce dependence on foreign components. Additionally, studies could analyze the impact of PT. Pindad's collaborations with international partners on technology acquisition and market expansion, particularly in accessing the global Foreign Military Sales (FMS) market. Comparative research between domestic and foreign partnership models could also provide insights into best practices for achieving defense industry independence while maximizing economic and technological benefits for Indonesia.

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