

Review Transfer of Technology and Local Content & Offsets to Indonesia on the Procurement of Rafale Fighter Jets

Taufik Budi Cahyana^{a,1,*}, Achmad Wardana^{a,2}, Hudoro Tahdi^{a,3}, Y.H. Yogaswara^{a,4}

^a Faculty of Defense Technology, Republic of Indonesia Defense University, Jl. Salemba Raya No. 3, Jakarta Pusat, Jakarta, Indonesia 10440,

¹taufik.cahyana@tp.idu.ac.id*; ²achmad.wardana@tp.idu.ac.id; ³hudoro.tahdi@tp.idu.ac.id; ⁴yh.yogaswara@idu.ac.id

ARTICLE INFO

ABSTRACT

Article history:
Accepted

Keywords:
Procurement of Rafale Fighter Jets,
Transfer of Technology (ToT),
Local Content & Offset (LCO)

Indonesia's decision in the procurement of the 4.5th generation Rafale fighter jets was agreed to replace the obsolete aircraft Hawk 109/209 and grounded F-5. The choice of Rafale was made taking into account both Indonesia's foreign policy and the long-standing defense cooperation between France and Indonesia. The diverse and aggressive foreign policy of Indonesia is demonstrated by its possession of weapons from many other nations. The government's considerations in choosing the Rafale to strengthen the TNI and cooperation in the defense sector with France include: Advantages of the Rafale Fighter Jet, Long-Term Investment in Indonesian Alutsista, Development of Defense Industry Cooperation, Budget Efficiency, Aspects of Defense and Political Strategy, and Free Guarantee from CAATSA Sanctions. In this case, it is expected that Indonesia will not rely on the procurement of defense equipment from abroad and the implementation of the Transfer of Technology, Local Content and Offsets on Rafale fighter jets can run as expected, therefore a strategy is needed in accelerating defense acquisition.

Copyright © 2023 Politeknik Aceh Selatan.
All rights reserved.

I. Introduction

Defense industry development policies are directed at realizing a strong, independent, and competitive defense industry that can support national defense and security, as well as support the development of national economic growth. Development.[1] The defense industry has a strategic role in the implementation of defense so when talking about independence for Indonesian defense, it must also include the independence of the defense industry. Independence in the defense industry means that the domestic defense industry must be able to produce, maintain, operate and be free from embargoes and dictates from other countries. At the defense industry policy committee meeting in 2014, President Joko Widodo said four priority policies in the defense sector. One of the policies is to ensure the fulfillment of defense needs, both related to the welfare of soldiers and the provision of defense equipment.[2]

Seeing the Indonesian Air Force wants to replace its fighter jets, world fighter jet manufacturers are competing to offer their products, including the Saab JAS 39 Gripen made in Sweden, Dassault Rafale made in France, the Eurofighter Typhoon made by a consortium of four Western European countries (Spain, England, Germany, Italy), the US-made F-16 Viper and the Russian-made Su-35 Super Flanker.[3]

The main defense equipment needed by Indonesia at this time is fighter aircraft to protect the sovereignty of the Republic of Indonesia. Indonesia's first purchase of fighter jets from France comes amid efforts to overhaul its aging air defense system including Hawk 109/209 and F-5.

French Defense Minister, Florence Parly during her visit to Indonesia on February 10, 2022, argued that the strategic partnership would improve defense relations between the two countries.



France is proud to contribute to modernizing the armed forces of its partner (Indonesia), which plays a key role in ASEAN and the Indo-Pacific region. On the other hand, with the cancellation of the defense agreement, there will be consequences and risks in the form of possible stretching of defense relations. Parly also said Indonesia was the second country in the Pacific region after India to buy jets from Dassault Aviation.[4]

According to Marsdya TNI Donny Ermawan Taufanto in the Webinar of the Pusat Studi Air Power Indonesia, related to the source of procuring defense equipment for Indonesia's foreign policy which is free and active, requires Indonesia not to bind itself a priori to any world powers. This free and active policy is reflected in the current defense equipment procurement policy which does not come from one country or one block only. Geopolitical and geostrategic considerations are also factors to be considered in the procurement of defense equipment in addition to technical factors.[5]

II. Method

The Dassault Rafale Purchase problem is explored or explained in greater detail in this study using a descriptive qualitative methodology. The study focuses on local content, technology transfer initiatives, and Dassault Rafale alternatives for Indonesia. Literature reviews from credible national and international periodicals, eBooks, and internet media are used to obtain data.

III. Results and Discussion

Results should be clear and concise. Discussion should explore the significance of the results of the work, not repeat them. Avoid extensive citations and discussion of published literature.

A. Agreement Transfer of Technology (ToT) and Local Content & Offset (LCO)

Technology transfer is one method for removing constraints that prevent technological mastery and for enhancing technological expertise. The policy is a plan for increasing human resource capacity in order to boost productivity even further. Higher human productivity will result in more competitive and high-quality products.[6]

In reporting on the visit of the Thales team to the Infoglobal Representative Office in Jakarta on March 23, 2022. Infoglobal, an Indonesian defense industry company, is preparing to become a partner of Thales from France to receive Transfer of Technology (ToT) and Local Content & Offset (LCO) related to the procurement of fighter jets Rafale for TNI AU by the Ministry of Defense of the Republic of Indonesia. During the visit, the team from Thales France intends to review Infoglobal capabilities in the field of aerospace and defense. Implementation of ToT and LCO as a requirement and mandate of UU No. 16 of 2012 concerning the Defense Industry. Infoglobal stated that it is experienced in developing avionics instruments for combat aircraft and has implemented the AS9100 standard in its quality management system.[7]

A memorandum of understanding (MoU) was also reached between Dassault and PT Dirgantara Indonesia about the Offset and ToT Program Collaboration in the deal for the procurement of 42 Dassault Rafale aircraft in addition to infoglobal (PT DI). By sending personnel to study and complete internships in the development industry, the Dassault Rafale aircraft purchase contract agreement should place an emphasis on the transfer of technology (ToT). There is a need for an offset program for the production of airplane components in Indonesia by the domestic sector, specifically PT Dirgantara Indonesia, in addition to HR offsets (PT DI). Since PT DI is a key national asset, it needs facilities and people resources that are respected internationally. Aerostructure (parts and sub-assemblies, assembly tools and equipment), aircraft (plane and helicopter), aircraft services (maintenance, overhaul, repair and alteration), and engineering services make up PT DI's business portfolio (communication technology, simulator technology, information technology). The national aviation system should be optimized as a supplier and supporter of commuter planes and TNI defensive hardware (solution, design center). The nation's independence and Indonesians' ability to understand technology must be prioritized in the development strategy. As a result, the government must make provisions in the defense equipment expenditure agreement for science and technology-related human resource development.

B. Indonesian defense policy in the procurement defense equipment

A collection of guidelines for principles, attitudes, orientations, and goals used to protect, advance, and promote national interests abroad is known as foreign policy. Foreign policy is a strategy in dealing with other international political units made by decision makers in order to achieve specific national goals in terms of national interests.

The Ministry of Defense, which is the governmental authority on defensive policy, implements the strategy for purchasing defense equipment for the TNI. This policy requires the procurement of TNI defense equipment to follow the established mechanism, namely through the Ministry of Defense. The Ministry of Defense will appoint a consortium company or the authorized party to further procure armaments. The policy for the one-stop defense system for the defense equipment system is important so that the government clearly knows from whom and for whom the defense equipment system is being held. The Ministry of Defense will get a request from the TNI regarding what defense equipment needs to be modernized.

Komite Kebijakan Industri Pertahanan (KKIP) meeting at the Bogor Palace on April 13, 2021 discussed the follow-up to President Joko Widodo directive regarding the independence of the domestic defense industry. The paradigm of spending in the defense sector must be transformed into a defense investment so that it can help increase the national economy. Therefore, in every procurement of defense equipment from abroad, it must include trade balances, local content, offsets and transfer of technology. There must also be continuity in the procurement of defense equipment. The strategy carried out is that approximately 40 percent of procurement must be spent domestically, and all procurement/acquisition of defense equipment from abroad must be built in Indonesia to lead to independence in the defense industry. Long-term Strategic Plan is needed, so that can be used as a reference to build the independence of the defense industry.

C. Considerations of the Indonesian government in choosing the Rafale

The government's considerations in choosing the Rafale to strengthen the TNI and cooperation in the defense sector with France, among others.[8]

1. Advantages of Rafale fighter jets

Rafale is manufactured by the French company Dassault Aviation. The Rafale has twin engines designed as versatile aircraft that can carry out multiple missions or an omnirole. Rafale is equipped with a variety of weapon systems, including:

- MICA and METEOR air-to-air missiles
- HAMMER air-to-ground missiles
- AM39 EXOCET anti-ship missiles
- Laser-guided bombs
- Internal cannon 30 mm with a capability of 2500 revolutions/minute.

This fighter jet is also capable of accommodating up to nine tons of weapons. The maximum speed reaches 1,384 kilometers/hour. The ability to carry many types of weapons and sophisticated mission systems, the Rafale is said to be able to carry out air-to-ground attacks, as well as air-to-air attacks and interceptions of enemy aircraft in one mission.[9]

2. Long-term investment in Indonesia defense equipment

Because the systems on the Rafale aircraft are different from those on the TNI's prior Russian or American-made aircraft, the advent of the Rafale presents new problems to the TNI. Indonesia has to start from scratch in terms of its maintenance. Pilots and technicians must be educated from scratch, as well as a maintenance laboratory to calibrate super-sophisticated electronic equipment.[10] So it should be followed by infrastructure development which is a big consequence for Indonesia when it decides to buy a French-made fighter jet for the first time.

Defense observer and defense equipment observer, Marsekal TNI (Purn.) Chappy Hakim stated that fighter jets are only one part of the air defense system. Although sophisticated, its capabilities will still depend on the air defense system - radar, base, command and control, etc. The air defense design must be an ecosystem that correctly integrates the degree of air defense power, including air

base infrastructure, radar systems, etc. The inclusion of technology transfer in the purchase of the Rafale is under the mandate of UU No. 16 of 2012 concerning the Defense Industry. Transfer of technology is one way to realize the President vision of turning defense sector spending into a long-term investment.

3. Development of defense industry cooperation

Ministry of Defense of Republic of Indonesia and France have also devised a strategy that combines three core instruments at the level of strength: software, hardware, and human resources, as part of cooperation. The Ministry of Defense's strategic plan calls for a number of memorandums of understanding (MoU) to be signed between French partners and the defense industry's Badan Usaha Milik Negara (BUMN).[11]

The purchase of fighter aircraft from France as a producer will have an impact on the implementation and operational scheme of ground support equipment, calibration laboratories, as well as tactics, and strategies specific to each aircraft. The development of human resources in supporting ecosystems is the basic capital because it is needed to deal with control, maintenance, and basic support systems in general. This means that defense cooperation with France will have a major impact on the education and training scheme of TNI personnel who handle the maintenance of Rafale jets. This scheme can be said to be part of the offset mechanism agreed with France. The target of this offset mechanism is to produce a greater number of technicians and instructors who understand fighter jet platforms such as the Rafale. The Ministry of Defense hopes that strategic cooperation in the defense sector with France will open new opportunities for Indonesia in the development of anti-air missile and radar systems.

4. Budget efficiency

The aspect of budget efficiency can be judged that the purchase of defense equipment is considered appropriate due to rational price quotations. In addition, defense diplomacy has been carried out from the Ministry of Defense team led directly by Defense Minister Prabowo.

5. Aspects of defense strategy and politics

Indonesia's free and active foreign policy requires Indonesia not to bind itself a priori to any world powers.[12] However, amid the limited defense equipment and budget of the Indonesian state defense sector, the purchase of fighter aircraft is currently considered appropriate because it is carried out when Indonesia is trying to strengthen its defense posture to increase its bargaining position in the Asia Pacific region. The procurement of this fighter aircraft is an air defense subsystem, a subsystem of the state defense system.

France is a country that has independence in the production of defense equipment. France is willing to cooperate in the offset scheme (reciprocal trade in the manufacture of aircraft spare parts or other cooperation). Of course, this has a positive impact on the development of Indonesian defense equipment. Moreover, even though France is a member of NATO, France's foreign policy is neutral on sensitive issues such as rejecting the US invasion of Iraq.[13]

6. Guarantee free from CAATSA sanctions

There is speculation that the purchase of the Rafale from France is considered safe from the potential imposition of sanctions from the United States (US) which has also colored the discussion about the Rafale jet. However, even though the US has implemented the Countering America's Adversaries Through Sanctions (CAATSA) Act or a law that imposes sanctions on countries that act 'against' the US since 2018, Indonesia and two other Asian countries are guaranteed freedom from sanctions even if they buy military equipment from Russia. The US considers the three Asian countries, namely India, Vietnam, and Indonesia, to be strategic allies of the United States in Asia.

D. *The effect of selling companies on the procurement of defense equipment*

It can be seen in the literature study that Indonesia is looking for advanced technology in the procurement of fighter aircraft. On the basis of sociological studies, it is also clear that "the introduction of new technologies is never just a question of the best technology being the winner over inferior products, but is always complicated by economic, political and organizational interests.

[14] As also according to Theo Farrell and Terry Terriff, "the design of a particular weapon system is not all about which design is technologically advanced and militarily efficient where inferior designs are ruled out but design selection is a function of the social network that surrounds a particular design".[15] The result is a social process in which the choice is made on the dominant design, not the design efficiency that shapes technological development.

In this way, the trend of procuring armaments can be constructed in certain ways depending on the actors who promote them. Social networks that promote certain designs, new technologies, and even certain ways of procuring weapons include a wide range of actors; including defense companies (both national and foreign), military and political elites, scientists-entrepreneurs, and even foreign governments seeking political influence over the buying country and ways of increasing export sales.

Defense corporations attempt to market their goods by altering the Ministry of Defense's or the procurement agency's perception of what is required. Because of this, states may choose weapons systems that do not adhere to military doctrine or defense policy. In these situations, military doctrines are developed in accordance with recently acquired capabilities, or new weapon systems cannot be effectively used until the required military doctrines are developed, both internally and externally. Finally, foreign governments work to alter how the buying nation is seen, primarily through alliance organizations. The development of military doctrine is what causes the change in the purchasing state's understanding of what is required. The specific qualities of the weapon system to be purchased are determined by military doctrine, which has an impact on what will be done and what is anticipated of the weapon system. For nations firmly enmeshed in military alliances like NATO, the influence of military doctrine on choosing suppliers is greater than it is for nations outside of these agreements.[16]

Also, by putting the state on the system and limiting its alternatives, military and security alliances use co-procurement agencies and co-procurement programs to choose the providers of weapons systems. As a result, the alliance's military doctrine has undergone a substantial change. One example is Network Centric Warfare, which automatically determines the sort of weaponry required and which can only be delivered by specific nations and with specific technologies. In this instance, Indonesia, which is growing its arms industry, is able to independently create military doctrine and the necessary tools to carry it out. But big challenges have to be faced as Kjell Inga Bjerga and Torunn Laugen Haaland say:

"The first is that small states have limited freedom to develop separate ways of thinking about the use of their military force. Their dependence on international allies and institutions gets in the way. such efforts. Secondly, small states also have limited institutional capacity to develop their capabilities. Their thinking and research capacity of military doctrine is limited, and their military academies are relatively small with only basic competencies in many areas... Small countries will be highly influenced by the thought that occurs in large countries, and will only to a certain extent address particular national security challenges, according to doctrinal states."[17]

In this regard, some conclusions can be drawn about how Indonesia buys by developing its approach to arms procurement. The first conclusion is, that Indonesia as a developing country is trying to emulate other militaries; generally, militaries that are considered allies or have higher prestige. As Farrell and Terriff put it "military emulation has a broader and deeper impact on military practice in developing countries".[15] As a result, Indonesia is seeking to buy military-used weapons systems that they want to emulate. In this case, the Rafale fighter aircraft procurement program is intended to provide high-reliability fighter jets specifically designed to meet Indonesia's needs and expected technology transfer.

Second, through military assistance, France created a policy in Indonesia, which in turn created a kind of product loyalty, in this case, Indonesia's loyalty to synchronize the weapons systems of France and its allies. The above process can occur depending on the foreign policy adopted by Indonesia. At the most basic level, foreign policy determines which countries can become suppliers and which cannot, because the procurement of weapons is not only a way to buy defense equipment, but also a way to strengthen relations between the two countries.

If Indonesia is required to purchase goods from a particular set of suppliers, it must abide by their requests in order to avoid embargo consequences. This could become a vicious cycle, as Indonesian

users become increasingly dependent on supplying countries and their allies, in return for technology transfers, in addition to providing increased dependence and limiting options. On the other hand, if Indonesia does not limit it to a certain group of supplying countries, then the political influence on Indonesia will be low.

The decision of supplier country companies to develop and support a national defense industrial base also affects the number of available supply countries as well as procurement decisions for Indonesia. In addition, increasing the integration of the national defense industry into the supply chains of international companies could increase the likelihood that Indonesia will choose certain companies in procurement decisions. As an advantage to companies operating internationally, they can lower production costs, using their partnerships with the national defense industry to sell systems in other countries through the use of relationships between Indonesia and other buying countries. Furthermore, such a relationship between companies increases the possibility of future sales, but also increases the political influence of the supplying country over Indonesia, as long as the national defense industry continues to rely on foreign companies for technology transfer and trade relations. As a result, these arrangements can harm procurement decisions that unite interests with certain supplying countries, so the independence of the national defense industry cannot be achieved.

E. Will the expected reciprocity be achieved?

In recent years, acquisition of defense equipment in Indonesia through a Transfer of Technology (ToT)-based program has become the pinnacle of mastery and advancement of national defense capabilities. Technology transfer is the exchange of modern technological know-how and skills from developed to developing nations. In Indonesia, this is typically done through the Foreign Direct Investment (FDI) program, Technical Licensing Agreements (TLA), also known as Foreign Licensing (FL), and Capital Goods Import (CGI). [18] However, none of the plans in this technology transfer program have been successful in raising awareness, enhancing abilities, or expanding the capacity to efficiently organize and manage Indonesian human resources. The fundamental issue with this situation is that, despite the high standards for technological mastery, there is no explicit legislation on technology transfer programs. Indonesia's capacity to embrace technology transfers is hampered by policy conflicts, the distribution of norms among institutions, inadequate coordination, and institutional competition.[19]

based on the collaboration between South Korea and Indonesia in the KF-21 Boramae development process. Indonesia aspires to gain knowledge and technology transfer in the production of cutting-edge fighter aircraft by taking part in aircraft development from the beginning. The Administration of the South Korean defense acquisition program and the Indonesian military both signed the Memorandum of Understanding on July 15, 2010. The collaboration agreement for the development of fighter aircraft was signed in 2014. Indonesian Defense Minister Purnomo Yusgiantoro and South Korean Ambassador Cho Tai Young participated in the signing.

With the entry of Indonesia, in addition to the name KF-X, the development of this aircraft is also called IF-X. In the cooperation agreement, the South Korean government will bear 60% of the costs, while the remaining 40% will be divided between South Korean domestic companies, especially the Korean Aerospace Industry, and the Indonesian government, so the Indonesian government will bear 20% of the costs of this aircraft development program.

However, this cooperation with Indonesia did not run smoothly. Of the payment obligations of IDR 20.3 trillion, in 2018, Indonesia was still in arrears in payments of IDR 7.1 trillion. And in 2020 there are still IDR 5.9 trillion in arrears. This slow payment, apart from budget problems, also due to technology access problems, Indonesian experts who were sent to Korea complained that they did not have access to sensitive technology in the KF-X program. Indonesia's initial hope to participate in this program was to be able to absorb the technology for developing modern fighter aircraft. If access is restricted, then the large funds paid to co-finance this program will not produce the expected returns, namely in the form of mastery of knowledge and technology of modern combat aircraft.

South Korea argued that this restriction was because Indonesia did not have a high-tech access agreement with the United States. In the development of the KF-X, Korea cooperated and received assistance from Lockheed Martin from the United States. This technical assistance or guidance

obtained by Korea is part of the contract to purchase the F-35 fighter aircraft. Indonesia, because it did not buy the F-35 and has not been allowed to buy the F-35, does not have the right to access the technology from America. If Korea grants access to Indonesia, it could result in Korea being sanctioned by the United States. In addition, it is also about the desire of the United States government to ask Indonesia to immediately have a Defense Technology Security System, which is a technology security system that if Indonesia gets knowledge from South Korea, Indonesia can convince the United States and South Korea that it will not leak. to third parties.[20]

In addition to the KF-X instance mentioned above, Indonesia faces significant challenges in developing its defense industry and technology, one of which is the defense acquisition system's lax regulation, which facilitates the process of absorbing new technology. The delayed adoption of technology is further made worse by the lack of training and experience among scientists and engineers. Technology advancement and the defense sector won't considerably advance as long as these two fundamental issues are not fixed.

IV. Conclusion

To complete the strategic plan for the third phase of the TNI's Minimum Essential Force (MEF) program, Indonesia wants to buy a number of significant modern weapon systems (alutsista) in stages up until 2024. Among the defense equipment to be purchased are 42 Dassault Rafale fighter jets and 8 American F-15 EX multirole combat aircraft (France). The Ideal Essential Force (IEF) for the military equipment of the Indonesian Air Force is another goal of this MEF program's completion.

The transfer of technology is the benefit that Indonesia expects from the purchase of this Rafale fighter. Implementing ToT and LCO in accordance with UU No. 16 of 2012's mandate for the defense industry The Indonesian companies ToT and LCO have expressed interest in partnering with the Infoglobal national defense industry. Additionally, it has claimed to have experience creating fighter aircraft avionics and to have integrated the AS9100 standard into its quality management system. A memorandum of understanding (MoU) between Dassault and PT DI for the Offset and ToT Program partnership was also included in the contract for the procurement of 42 Dassault Rafale aircraft.

The government's considerations in choosing the Rafale to strengthen the TNI and cooperation in the defense sector with France include: Advantages of the Rafale Fighter Jet, Long-Term Investment in Indonesian Alutsista, Development of Defense Industry Cooperation, Budget Efficiency, Aspects of Defense and Political Strategy, and Free Guarantee from CAATSA Sanctions. In this case, it is expected that Indonesia will not rely on the procurement of defense equipment from abroad and the implementation of the Transfer of Technology and Local Content & Offsets on Rafale fighter jets can run as expected, therefore a strategy is needed in accelerating defense acquisition.

Acknowledgment

The author would like to thank the 2022 KKLN committee from the Defense Technology Faculty of The Republic of Indonesia Defense University for their facilitation in team formation, data search, and encouragement to publish this paper.

References

- [1] Kementerian Pertahanan RI, Buku putih pertahanan indonesia 2015, 2015.
- [2] R. Armenia, "Presiden Jokowi beberkan empat kebijakan pertahanan prioritas", CNN Indonesia, 2014
- [3] Y. Pratomo, "TNI AU puji hebatnya Sukhoi 35: 4 pesawat bisa hancurkan Jakarta!", Merdeka, Indonesia, 2016
- [4] BBC News, "Jet tempur Rafale buatan Prancis dan rencana Indonesia untuk perkuat alutsista, apa istimewanya?", BBC News Indonesia, 2022
- [5] G. Irawan, "Politik bebas aktif serta kandungan lokal jadi pertimbangan Kemhan beli Rafale dan alutsista Prancis", Tribunnews, Indonesia, 2022
- [6] M. Waluyo and A. Damaryanti, "Transfer teknologi dan keberlanjutan industri", LIPI, 2018
- [7] Jaden, "Infoglobal bersiap jadi mitra ToT dan LCO pesawat Rafale Indonesia", Airspace Review, 2022

- [8] S. Hariyanto, A. Salim, E. Palupi, "Kerjasama industri pertahanan melalui pengadaan Jet Rafale untuk memperkuat pertahanan Indonesia", *Journal of Industrial Engineering & Management Research*, vol. 3, no. 6, p. 1-6, 2022
- [9] M. Herindra, "Why France, Why Rafale", Kompas, Indonesia, 2022
- [10] H. Basri, "Kerja sama pertahanan, Prabowo: 300 militer Indonesia telah menyelesaikan pendidikan di Prancis", Kompas, Indonesia, 2022
- [11] A. Yuniar, "Ingin industri pertahanan RI mandiri, Prabowo ingatkan harus ada renstra", *Liputan6*, Indonesia, 2021
- [12] F. Sidebang, "Ini pertimbangan Kemenhan beli alutsista dari Prancis", *Republika*, Indonesia, 2022
- [13] B. Alam, "Mengulas pilihan Menhan Prabowo beli pesawat tempur Dassault Rafale asal Prancis", *Merdeka*, Indonesia, 2022
- [14] M. Rene, "Technology, Organization and Power. In G. Caforio (Ed.)", *Handbook of the Sociology of the Military*, New York: Kluwer Academic / Plenum Publishers, pp. 385-402, 2003
- [15] T. Farrell, and T. Terriff, "The Sources of Military Change. In T. Farrell, T. Terriff (Ed.)", *Sources of Military Change: Culture, Politics and Technology*, Boulder, Colorado: Lynne Rienner Publishers, pp. 3-20, 2002
- [16] C. Kurc, "The role of culture and politics in arms procurement", *Abdullah Gul University*, 2012
- [17] K. I. Bjerga, T. L. Haaland, "Development of military doctrine: The particular case of small state" *Journal of Strategic Studies*, vol. 33. No. 4, pp. 505-533, 2010.
- [18] K. W. Thee, "The major channels of international technology transfer to Indonesia: An Assessment", *Journal of the Asia Pacific Economy*, vol. 10, no. 2, pp. 214-236, 2005
- [19] A. Thalib, "Technology transfer in Indonesia: Legal Perspective", *UUM Journal of Legal Studies*, vol. 5, no. 14, pp.75-92, 2014.
- [20] B. F. Salsabiela, "Analisis akuisisi teknologi industri pertahanan Indonesia: Studi kasus pengembangan pesawat tempur Korean fighter xperiment/Indonesian fighter xperiment (Kfx/Ifx). *Jurnal pertahanan & bela negara*, vol. 6, no. 2, pp. 51-74, 2018.