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Indonesia Military Research and Development in Dealing with the Sixth Generation Warfare: The Use of Artificial Intelligence in War Operations

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ABSTRACT

Technological advancement has forced the international community to deal with the sixth generation of war, which is a conflict involving the most advanced robotics, artificial intelligence (AI), and satellite technology. This shows that warfare has evolved beyond traditional tactics because parties are no longer required to engage in face-to-face combat as they did during the first generation of conflicts. Although the "classic" war still takes place in some regions of the world, it is more sectoral in nature and only in small-scale wars. The researcher needed a description of Indonesian military research and development in dealing with sixth generation warfare: the application of artificial intelligence in military operations, hence the qualitative descriptive research approach was used. The Indonesian National Armed Forces (TNI) must be flexible in light of the dynamics of the world's swift technology advancements, which includes updating defense equipment with artificial intelligence (AI) functionality. Due to increasingly sophisticated danger patterns, the TNI must deploy artificial intelligence, making technological advancements crucial to safeguarding the security of border areas. Keeping the Republic of Indonesia's unitary state intact comes with a "fixed price," one of which is preserving the security of the border region

INTRODUCTION

Si Vis Pacem Parabellum is a saying among realists, according to which the current state of the world is in fact rife with uncertainty and dynamic security challenges. The phrase "if you want peace then prepare for war" seems suitable when describing the peace that the realists long for. Conflict can be settled by war in reality itself because when compared to diplomacy, war is the easiest option (Wardhani, 2016). Realists have a pessimistic outlook on peace and believe that true peace will never be attained by humanity. However, this does not imply that realists do not yearn for peace; despite being aware of the impossibility of achieving peace, realists still yearn for an alternative viewpoint. The perspectives of these realists make sense when we consider Thomas Hobbes' viewpoint in his book "De Cive" from 1651, in which he explains that there is a phrase for romantic conflict that is still widely used today, namely "Homo Homini Lupus." This translates as "to another man, a man is a wolf." Humans are viewed in the context of war as avaricious beings that put their own interests before those of other humans. This sets off an easy conflict of interests that might result in war. Whether or not it is due to human nature, war is the result of a series of disputes between parties with an interest. However, it turns out that there are benefits to the fight, and when it is ended, there will be a time where the disputing parties resolve their differences Problem-solving will follow the resolution of the conflict if (Diplomacy, a stalemate scenario, or a losing party) exists. The proverb "Si Vis Pacem Parabellum" and the phrase "Homo Homini Lupus" share a connection with this issue in that human life will not be free from what is known as "war" as long as there is a conflict of interest between each player, war will persist. develop in accordance with the era.

As is commonly known, a war, invasion, or other act of power being used against another country is always tied to the history of how conflict has evolved across the world. Powerful nations will consent to annexing territory from weaker nations for reasons related to politics, commerce, and society. Fears of geopolitical unrest were sparked by the conflict between Russia and Ukraine, which has since escalated into worries that a big invasion of a major power may start a nuclear conflict. Traditional battles like those that took place in the Middle East and Asia have actually started to fade away in this postmodern period. technical advancements the world community to the most recent generation of conflict, or the sixth generation war, in the form of technological sophistication. According to a declaration made by Defense Minister Prabowo Subianto, a sixth generation of conflict will soon or already exists in the world. The utilization of robotics, satellites, artificial intelligence (AI), and other modern technologies is necessary in this conflict. However, this technical prowess does not automatically render direct physical conflict or face-to-face conflict obsolete. That conflict is referred to as the first generation war in theory. Therefore, even after discussion and analysis, war remains a significant and important topic in international relations. Additionally, Defense Minister Prabowo Subianto highlighted that there is no need for physical contact on the battlefield because of how far-reaching Alutsista technology has advanced. Even intercontinental distances can be crossed by a missile while cruise. Additionally, former KSAL Admiral TNI (Ret) Prof. Marsetio concurs that a world war is indeed raging right now despite the fact that few people are aware of it. Non-contact warfare is the type of conflict. Then, consider how combat technology has advanced in wealthy nations that have combined artificial intelligence (AI) technology with military operations.

Additionally, consider the advancement of Russian defense technology, which is now prepared to handle 6th generation combat. Russia's military and government do extensive research and development, which is essential to its readiness. By using asymmetric non-military tactics and means, Russia has been gradually integrating new force multiplier technologies into its advanced weapons systems, including nuclear and non-nuclear strategic weapons and conventional troops. Indonesia must implement this new system, particularly the TNI as

the primary instrument of national defense and the Ministry of Defense as the key executive / governing body. This novel system might offer a spatial and temporal benefit. Regarding Indonesia's ability to compete in the cutthroat military technology competition, there will still be some ambiguity. For this reason, the TNI must continue to conduct research and development (R&D) activities, and these efforts must continually aim to adapt to the evolution of the war generation. TNI must seek out scientific and technological advances that can increase the treasury of knowledge, seek the advantages of advancement, and develop and prepare diverse areas of its use in military operations.

All facets of national life, particularly one pertaining to national security, are affected by the extremely rapid growth of technology and information. The world's increasingly advanced technology must be viewed as a danger to the sovereignty of the Indonesian nation. The TNI must become more adept at recognizing and adapting to technical advancements in its role as the main tool of national security. This serves to support the Republic of Indonesia's primary responsibility of protecting the Unitary State. Given that Indonesia's border regions are places where it is very difficult to rely just on the capabilities of soldiers, the TNI's ability to protect Indonesia's remotest locations can operate more effectively and efficiently thanks to technology. The fundamental concern of nations nowadays is the growth of technology and artificial intelligence. This needs to be done as a preventative measure, as an illustration of protecting sovereignty, and as a source of information for assessing the current state of the TNI weapons system.

METHODS

This study used a qualitative research design that takes an ontological view, or the recognition that reality is not objective. If it is in line with Devine's theory, researchers must interact with the research topic's social environment. We can begin to comprehend that context is the primary driving force behind qualitative research and that "what we are really looking for answers to are not only what happened, but also, why and how" (Harrison, 2007) are equally important. A qualitative approach is used in this kind of study. One can utilize qualitative techniques to discover and comprehend a phenomenon's underlying cause, which is currently unknown. This approach can be used to learn more about a topic that is poorly understood and to help academics explain complicated details about phenomena that are challenging to quantify. The qualitative descriptive format seeks to draw that reality to the surface as a character trait, trait, model, sign or description of the condition, situation, or specific phenomenon. It aims to describe, summarize various conditions, situations, or various social reality phenomena that exist in society and are the subject of research.

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RESULTS

The Sixth Generation Warfare and AI Technology

Using high-accuracy weapons, sixth generation warfare focuses on non-contact conflict while also requiring the enemy to perform desired actions covertly (Edit Zgut & Janis Berzins, 2017). Operation Desert Storm is one example of this type of warfare. The Soviet Union's theoretical military thinking initially devised sixth generation warfare in 1920 with the intention of conducting its operations on air, land, sea, and space platforms employing

long-range and high-accuracy weaponry. Using coordinated strikes and attacks on the enemy's territory at opportune moments, the sixth generation of war attack engages in psychological and information warfare (Mattson, 2015). We have reached the sixth generation of warfare due to technological development, which includes conflicts utilizing the most advanced robotics, artificial intelligence, and satellite technology. absolute enhancement of HR standards.

Readiness to Modernize the Defense Equipment and Human Resources of the Indonesian Armed Forces by Implementing AI Into War Operations

A quick, efficient, yet quantifiable plan is immediately implemented to upgrade the Alutsista. In order to use what is offered, a strategic plan that is mature and fit for the situation is required. Defense requirements and a study of prospective threats and interferences with national sovereignty must be the basis for the acquisition of defense equipment. Indonesia's defense capabilities for land area monitoring are still quite weak in terms of the security of land border areas. The state may then use this as a chance to violate international law and take our land's resources. Territoriality, or the practice of deploying the defense force in a certain area, is one of the features of the national defense and security system that is universal in nature scattered evenly across the Unitary Republic of Indonesia's territory in accordance with the country's geographic circumstances as an archipelago. Only if the Alutsista held is qualified, at least enough to defend the nation, can this title of strength be accomplished. The plan to improve Indonesia's defense posture includes a proposal to update the military hardware. This is mentioned in the defense vision of Indonesia, which is realized through the purchase of Alutsista, to improve Indonesia's defense capabilities. Weapons of sufficient quality, rather than just purchase in terms of quantity, are prioritized when purchasing new defense equipment.

Defense equipment has a significant impact on a nation's standing in the international political sphere, and its urgent modernization is seen as necessary given the threats' increasing intensity and escalation as a result of environmental strategy advancements. This professionalism of the TNI AD is demonstrated through the modernization of the main weaponry system. It is possible to execute this through improving artificial intelligence technologies (such as drones, radar, signals, etc.) to secure Indonesia's border territoriesArtificial intelligence must be used at the border in order to preserve state sovereignty. It is crucial to integrate AI technology into a container so that border security can be effectively managed. The state security system at the border is currently only minimally technologically advanced, and it is not yet using artificial intelligence as a TNI Defense System to its full potential. When it comes to the advancement of the military, a number of developed nations have chosen to focus on the creation and application of technology and artificial intelligence (AI) integration of nations into armed systems. This ought to serve as both a warning and a lesson to Indonesia on how to preserve its sovereignty. In a statement, the President of the Republic of Indonesia27 claimed that technical advancements had affected the defense system, with unmanned aircraft or drones carrying weaponry capable of pursuing and neutralizing tanks and other military vehicles on target. Therefore, rather than just observing, we must participate in the technological advancements that have improved not only machine tools but also along with the application of artificial intelligence28. This is consistent with what the Commander of the Indonesian Armed Forces29 stated, according to which the TNI's Main Armament System (Alutsista) will soon be updated to be based on digital technology. This step of updating the Alutsista is necessary given that the fourth industrial revolution is currently taking place.

The components they possess provide insight into the TNI and Ministry of Defense's readiness for deploying artificial intelligence. To begin programming the mastery of artificial intelligence technology to assist the TNI's increasingly complicated tasks, the TNI and the Ministry of Defense, particularly the research and development agency, have some of the infrastructure and personnel resources required. Additionally, the TNI

can develop a partnership with the Agency for the Assessment and Application of Technology (BPPT), the Ministry of Research and Technology, and the National Research and Innovation Agency (Kemenristek/BRIN) in order to respond to advancements in artificial intelligence technology around the globe and use this technology to carry out the task of securing border areas. Robots today make up the majority of defense technology in developed nations. In order to integrate artificial intelligence with robots created for military uses, the national defense industry must change its focus. With this growth, the state defense and security system's independence may be effectively formed, leading to the creation of a strong defense and security system for the Indonesian country.

It will become a significant capital for the Indonesian Army in raising the readiness of the modernization of defense equipment that is integrated with artificial intelligence (AI), with the full support of the government and carrying out the mandate of the 1945 Constitution. One of them is by beginning to develop and implement artificial intelligence in the defense apparatus of the Indonesian Armed Forces. The employment of artificial intelligence in Indonesia's defense system can enhance territorial security, particularly along its borders. The national defense system can quickly identify trends in cyberattacks using AI, and then create retaliation capabilities. The incorporation of artificial intelligence into military transportation can save operational expenses and reduce the need for human labor. Additionally, the use of AI in target recognition systems can help soldiers better identify enemy targets, extract medical data from the army, and aid in the treatment of complex diagnoses. It can also help defense personnel monitor threats, which will improve situational awareness in the field.

DISCUSSION

The Projection in AI Research and Development for War Operations

Development and research are crucial to national defense, as was previously said. The TNI should have conducted research and development on AI that can be used in carrying out every major duty, notably war operations, in light of the growth of war toward the sixth generation. As previously stated, AI must be used in military operations in a number of nations. One of the numerous technologies that has the potential to alter how war is fought is artificial intelligence (AI). Numerous studies explain the possibilities and caution many nations that, if they do not take this seriously, they risk falling behind in the race to create AI technology. To be able to triumph in every military operation, especially AI conflicts, the ministry of defense and the TNI ought to have established an artificial intelligence command center, in which there is also research and development. Some jobs, such picture identification, recommendation engines, language translation, and battle analysis, are amenable to the use of artificial intelligence. For the military tasks of today, many systems are created. Military artificial intelligence models will be very helpful for specific tasks like identifying battle tanks, drones, enemy locations, identifying enemy identities in crowds of civilians, translating texts, and creating and analyzing data that can be used in information warfare operations.

Future military uses of artificial intelligence will undoubtedly be important, particularly those related to 6th generation combat. Numerous applications for this AI technology are being developed that will boost output, lighten soldiers' loads, and enable faster operations than humans even when they are fatigued. In an endeavor to safeguard state sovereignty from any risks posed by 6th generation war, the TNI will continue its ongoing research and development work. There is no way the TNI or the Ministry of Defense can overlook this technology.

Indonesia must be ready for the sixth generation of warfare, which includes the employment of AI technology, according to the President of the Republic of Indonesia, the Minister of Defense, and numerous academics. The C4ISR (Command, control, communication, computer, intelligence, surveillance, and reconnaissance) sensor control, a defense system using information and sensing technology (Radar and satellite), including mastery of mindset and public opinion, will be faced by Indonesia as one of the characteristics of the 6th generation of war. As a result, the 6th generation of warfare also refers to the 5th generation of warfare, which is the conflict fought in the mental space. This includes electronic intelligence, cyber, satellite/ELINT, electronic control and measurement (ECM), network EW/electronic warfare, and remotely operated systems. That is to say, swaying people's attitudes and beliefs through informational distortion, black propaganda, and misdirection is equally essential to a winning military strategy.

Fortifying human resources (HR) by improving awareness of Pancasila as the state ideology and the 1945 Constitution as the constitution and the highest source of law in the country and state is crucial since humans (Indonesia) are the focus of the war for space of mind. The Global Competitiveness Report: World Economic Forum, 2019 places Indonesia in 50th place out of 141 countries, below Malaysia, Thailand, and Singapore. Unfortunately, the low level of literacy not only puts the Indonesian people behind in global competition and competitiveness (Program for International Student Assessment/PISA: Organization for Economic Co-operation and Development/OECD, 2019, places Indonesia in 62nd place out of 70 countries), but also makes it difficult for them to adapt The nation of Indonesia still needs a lengthy process.

In contrast, as military weapons develops and requires uniformity and specialization in operation, mastery of technology and information will become increasingly important in the future. Quality human resources or professional human resources, backed by a sufficient military sector, cutting-edge weaponry, socio-political stability, and economic power are thus crucial factors that indicate a nation's (Indonesia's) capability to face sixth-generation conflict.

Supporting Factors and Inhibitting

In terms of what military applications of AI might entail over the following 10 years, certain of its approaches will define or redefine significant cutting-edge military technologies. AI systems will incorporate intelligent, knowledge-focused, analytical AI capabilities first and foremost. Then, employing blockchain technology's benefits for data integrity, the AI solutions will be linked to a network of both physical and virtual domains, including sensors, businesses, people, and autonomous agents. They will be disseminated to make use of widely dispersed large-scale sensor networks, storage, and processing. They will digitally combine the physical, informational, and human worlds to enable new disruptive repercussions. There is a challenge, though, because we are aware that in order to conduct R&D operations and generate high-quality products, a sizable budget is required. If the research budget is not reached, R&D aims will be hampered or possibly failed. Since we are aware that the costs associated with research and development are higher than those associated with purchasing finished goods directly, it has been determined that the absorption of the current Due to the fact that the R&D proposal was not in line with the requirements of the Indonesian Military at the time it was submitted, the R&D budget is still very small compared to the budget provided by the Indonesian Military. Additionally, R&D values are excessively marked up, and R&D proposals cannot be accounted for in front of the R&D program testers and assessors from Srenad.

Therefore, the following approaches or actions can be taken to get beyond these challenges:

Development of organizational competencies and human resources that can answer the challenges of developing the main tools of modern weapons systems so that the products resulting from the forthcoming Ditpalad R&D are products that have appropriate quality and are efficient

a. The limited infrastructure and facilities LIPI, universities, and commercial R&D institutes own are committed to generating R&D products that benefit the TNI, which makes it difficult for other parties to participate in R&D activities.
b. The TNI needs to conduct a review of the defense equipment capabilities that must be owned by units within the ranks of the TNI, especially those related to security in border areas, in order to anticipate developments in information technology advances and AI-based weaponry capabilities as well as other supporting facilities. The status of a country in the international political system is significantly influenced by technology and human resources. Secondly, modernity of the Alutsista, including the development of AI technology in war operations, is seen as extremely urgent because it necessitates TNI professionalism, which is manifested through the development of AI, with the increasing intensity and escalation of threats as a result of developments in the strategic environment. technology in war operations.

CONCLUSIONS AND RECOMMENDATIONS

In the military world, artificial intelligence (AI) mastery is becoming more and more important. Many nations are working to develop AI in order to preserve their national sovereignty and strike a balance between their military prowess and that of other nations. Military and non-military challenges from within and beyond the nation, along with the development of conflict in generation 6, put sovereignty, territorial integrity, and national security at peril. The Indonesian National Armed Forces (TNI) must be flexible in light of the dynamics of the world's swift technology advancements, which includes updating defense equipment with artificial intelligence (AI) functionality. Due to increasingly sophisticated danger patterns, the TNI must deploy artificial intelligence, making technological advancements crucial to safeguarding the security of border areas. Keeping the Republic of Indonesia's unitary state intact comes with a "fixed price," one of which is preserving the security of the border region. Artificial intelligence (AI) tools (Such as drones, radar, signals, etc.) will be used to the fullest extent possible to carry out the mission of securing border areas.

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