

# The Military Uses of Artificial Intelligence (AI) and Their Implications on International Security

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## ABSTRACT

The two theoretical approaches to security studies; traditionalists and wideners defined the agenda of international security during the Cold War and its aftermath. The traditional approach is basically the realist/military/state-centric construct of security, which gained prominence during the Cold War and was widely aspersed after the Cold War by wideners' scholars calling for the need to expand its military-oriented security approach to incorporate non-military issues and non-state actors. The recent developments in the field of artificial intelligence (AI) has demonstrated that, this emerging technology would have a deterministic and potentially transformative influence on the military power, strategic competition, and international security in general. This research argues that, the various military uses of AI technologies and the national interest of powerful states to endlessly pursue these advanced technologies as preliminary for the future war in other to gain strategic advantages over potential emerging adversaries are depictions of traditional/realist construct of international security rationalizing its continuity and illustriousness. This research employs correlated secondary data within qualitative methodology to examine the various military uses of AI and their potential implications on international security.

**Keywords:** Artificial Intelligence (AI), International Security, International Relations (IR), Traditionalist, wideners, IR Theories.

## INTRODUCTION

The rapid growth of Artificial Intelligence (AI) in technological field enthraling commercial investors, defense intellectuals, policymakers, and international competitors can be substantiated in theoretical premises of international security. The Chinese government in 2017 unveiled its plan to take the lead in the field of artificial intelligence by 2030, which was immediately followed by the public announcement of Vladimir Putin in less than two months stating his intention to pursue the accumulation of this advanced technologies with the argument that *"Whoever becomes the leader in the field of AI will become the ruler of the world."* Predicated on this national interest, the U.S. National Defense Strategy, identified AI in January 2018, as the driving force to ensure the winning position of the United States in possible future wars. Consequently, the U.S. military has integrated AI systems into combat through the establishment of Project Maven, which uses AI algorithms for the identification and targeting of insurgents in Iraq and Syria (CRS Report, 2020). As put forward by Schwab (2016), there is a transitioning taking place to the present international system recognizing the Fourth Industrial Revolution (4IR), fundamentally changing our way of living, working, and relating with one another. This fundamental change is predicated upon new technological innovations (AI) fundamental to economic development and military power, which are essential attributes of national security of states. Consequently, this research aims to examine this technological advancement in military domain and its implications on international security.

The academic studies in the field of artificial intelligence acknowledged that, there is no universal acceptable definition of AI due to different approaches to its research. According to Smith & Neupane (2018), AI is defined as an area of computer science committed to the development of systems that are programmable to be taught and learn to make decisions and predictions within specific contexts. The European Commission defines it as *"systems with the ability to display intelligent behavior through the analysis of their environment"*

and taking actions with some degree of autonomy to achieve specific goals” (EC, 2018). AI is also defined by the Organization for Economic Co-operation and Development (OECD) as “a machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments. AI systems are designed to operate with varying levels of autonomy” (OECD, 2019b, p. 7). AI generally denotes “machines that are designed to respond to stimulation consistent with traditional responses from humans, given the human capacity for contemplation, judgment, and intention” (West 2018). Russell Stuart and Peter Norvig, in their book *Artificial Intelligence: A Modern Approach* (2009), identify four general aims of AI, which are; thinking humanly, thinking rationally, acting humanly, and acting rationally. These functions are derivable from different theories and methodologies including natural language processing (NLP), machine learning (ML), and robotics (Ndzendze & Marwala, 2023). One of the areas to recognize the significance of this technological innovation is in the field of international relations/security studies as put forward by Zięba (2004) cited by Sajduk (2019) that, the attributed factors of security of states such as the participants of international/national actors and the functioning of countries and international system are under the influence of the present scientific and technological revolution whereby this technological revolution guarantees the development of military strength of states through the construction of destructive and prolific military technologies.

The theoretical underpinnings of international security can be classified into two namely; traditionalists and wideners, which gained prominence during the Cold War and its aftermath. The Cold War period is described as the era of realist construct of international relations/security studies within the traditionalist approach and the end of the Cold War ushered in the era of liberalism and other theories of international relations/security studies described as wideners or the broadening of security agenda (Oluyemi, 2020). Contrary to the common argument of wideners' scholars that, the end of the Cold War represents the devolarization of realist/traditional security approach, this research recognizes several events that unfolded afterwards such as; the terrorist attacks of 9/11 and military reactions of United States/Western states to combat war on terror as well as the ongoing protracted armed conflicts in the world such as Israeli military occupation in Palestine, Russian invasion of Ukraine, recent military resurgence in Africa, Iranian missile attacks against Israel and Israeli retaliatory attack to have reinforced the position of realist/traditional construct of international relations/security studies and its preponderance. As a result, the advancement in military AI technologies is considered enthralling to this invigorated traditional/realist construct of international security. Artificial intelligence has a wide range of applications, which has defined its enormous and multi-faceted impact on the society at large thereby, it is found applicable to theoretical premises of security studies/international relations. According to Herrera (2003), technological innovation of artificial intelligence could be admittedly found in theories of international relations whereby its technological looms across different disciplines could be sources of social, economic, military and political change. The multidimensional impact of AI technologies incorporating military innovations, economic development, commercial sectors/non-state actors, environmental and societal factors could be considered as limitations to the basic tenets of traditional/realist approach to international security, justification of its suitability to both traditional and wideners' approaches of security studies/IR. As a result, this research only focuses on the military-uses of AI technologies and its implications on international security, which could be theoretically illustrated from different strands of the traditional/realist construct of international security.

It is noted that, AI technology has gained universal recognition since 1950s however, its growing application in commercial, administrative, and other procedures and interactions in recent decades has drawn the attention of scholars from different fields of study seeking to understand its implications in their areas of study as well as its methodological opportunities. For examples; Adams et al. (2021), examined the implications of AI fourth industrial revolution (4IR) for human rights in South Africa. Njotini&Mpedi (2021), examined the impact of AI on legal education. Mazibuko-Makena (2019) examined, AI impact on economics and livelihoods. Cilliers (2019), examined its impact on trade policy, particularly manufactured exports. Gentzkow (2018), wrote about the media and artificial intelligence leading to his discovery of automated journalism. Nah et al. (2020), examined the implications of AI for communication studies. Moreover, the field of international relations has also benefited from certain foundational texts of some scholarship works. A National Bureau of Economic Research (NBER) article written by Brynjolfsson et al. (2018) suggested that, the development of an AI-based machine translation system (eBay Machine Translation) would have significant impact on the growth of

international trade, a major trading platform (eBay's international trade). Bhaskar Balakrishnan (2017) wrote *"Technology and International Relations: Challenges for the 21st Century"* to examine the present and future role of diplomacy, an equalizing factor in the transfer and acquisition of science and technology in general. *"Future War: Preparing for the New Global Battlefield"* was written by Robert H. Latiff (2017) to examine the transformative impacts of emerging technologies, including AI, and their effects on military ethos, capabilities, and civil-military relations. *"The Political Economy of Robots: Prospects for Prosperity and Peace in the 21st Century"* was edited by Ryan Kiggins (2018) to examine the impacts of robots on international political economy including trade, norms, "state-sanctioned robot violence," and institutions among others. The book *"Technology and Agency in International Relations"* edited by Marijn Hoijtink and Matthias Leese (2019), focused on satellite imagery, digital payments, and drone systems as templates for governance and knowledge. *"Artificial Intelligence and International Politics"* written by Valerie M. Hudson (2020) and *"Artificial Intelligence and Emerging Technologies in International Relations"* written by Ndzendze and Marwala (2021) examined certain functions of artificial intelligence in international relations. Furthermore, It should be noted that, security studies/international security is one of the sub-fields of international relations (IR), in which theoretical underpinnings of the former are fundamental theories of the later thereby, the aim of this research to examine the implications of the military-uses of artificial intelligence on international security is illustrative of examining AI technology in IR theories and their relevance to the present global politics through the advancement of artificial intelligence (AI).

### **The General Overview of Artificial Intelligence (AI)**

Historically, the birth of artificial intelligence can be traced back to a workshop held in Dartmouth College in 1956 when the term artificial intelligence was coined by Marvin Minsky and John McCarthy during the workshop to separate it from related field such as; cybernetics (Haenlein & Kaplan, 2020) and by the mid-1960s, the U.S. Department of Defense started the massive funding of research into AI (Russell & Norvig, 2021). The period of 1970 witnessed a declination in the global excitement for AI and by 1980s, it started to gain preponderance just to encounter some commercial and functional failure by late 1980s (Russell & Norvig, 2021). The late 1990s and the early 2000s witnessed its resurgence due to a breakthrough in science and application of AI into some logistics, data mining and medical diagnosis coupled with advances of technology in computer games (Russell & Norvig, 2021). The present dispensation has witnessed a rapid development in the field of AI and some key driving forces to this possibility are summarized as; "(1) the rapid growth in computing performance; (2) the availability of "big data" sources; (3) improvements to machine learning approaches and algorithms (especially in the field of deep neural networks); and (4) the rapid expansion of commercial interest and investment in AI" (Johnson, 2019, p.1). Congressional Research Service Report stated that, the research in the field of AI started in 1940s and exploded in 2010 due to the same stated three enabling factors (CRS Report, 2020).

The possibility of creating machines as intelligent as human in the recent decades is predicated upon the advancement in digital platforms and computational power. Artificial intelligence generally connotes machines that are programmable to respond to stimulation accordant with traditional human responses, inbuilt with human capacity to contemplate, to assess and to predict accurately (West, 2018). Scholars and developers of AI have established two interrelated criteria of what AI is all about; intentionality and adaptability. The intentionality explains that, AI algorithms are designed with ability to use sensors, digital data, and remote inputs as well as synthesizing information from different sources in order to make analysis of data in real-time to act in accordance with these insights. This justifies the usual design of AI in tandem with machine learning (ML) and data analytics that constitute the capacity of AI to make intelligent decision. The function of ML is what distinguishes AI from ordinary computer programming, allowing AI to act and think like human. Deep learning (DL) is another factor that enables AI to learn from its so-called experiences. Adaptability explains the ability of AI to learn and adjust its behavior while assembling new information and making real-time decisions. The most prolific AI are those programmed with the ability to adjust to a changing condition continuously and repeatedly (West, 2018). This ability of AI includes the "alterations in financial situations, road conditions, environmental considerations, or military circumstances" (West 2018). It must be integrated in the AI algorithms to make decisions in such an adaptable way. This is also associated with the functions of

AI "as bedrock of the internet of things (IoT), which is an emerging technology based on sensors, cameras, and algorithms" (Ndzendze & Marwala, 2023, p.35).

It is found common that, AI is mostly associated with the robot and though, they have things in common but their integration is not always the same, which means not all robots are capable to function like AI and not all AI is physically integrated through robots. AI functions in both digital (cyber) and physical (robot), which are incrementally connected, it is like an agent in any software that can function in a digital platform and usually integrated with robotic for physical operations. Autonomous vehicle for example, is a type of robot that operates in physical world (Ndzendze & Marwala, 2023). It should be noted as well that, there is no universal acceptable definition of AI, John McCarthy defined it as "the development and use of machines to execute tasks which usually require human intelligence" (Hoadley & Lucas, 2018, p. 5). Russell & Norvig (2016) defined it as "the use of technology to carry out a task that would typically require human intelligence." Bundy (2017) defined AI as "the branch of computer science dealing with the reproduction or mimicking of human-level intelligence, self-awareness, knowledge, and thought in computer programmes" The meeting point of different definitions of AI describes it as a non-human entity programmed to work with human intelligence without or with limited human interference. AI is also classified into three; Artificial Narrow Intelligence (or Narrow AI), which has to do with algorithms that can only address specific issues, it can respond to different problems but with limited memory (Ajayi, 2020). Artificial General Intelligence (Deep AI/Strong AI) is the second category of AI programmed to address any task with the same level of human intelligence. The third and final category is termed Artificial Super Intelligence, which are AI embedded with ability not just to react and process like human but function far better than human capacity. Scholars of AI have predicted that, it would take many decades before advances in AI could get to this level. The currently available AI technologies fall into either one of the first two categories (Falode, 2021a).

### **Theoretical Framework: Approaches to International Security**

The contested nature of defining security is a universal acknowledged fact among its scholarship in the literature whereby many of its definition can be classified under different theoretical approaches to security studies. Ken Booth (2005) considered it as a 'survival-plus,' 'the plus is associated with the freedom from life-determining threats and some life choices. It is defined by Williams (2008) as alleviation of everything threatening to cherished values; especially those that particularly threaten the survival of a referent object if left unchecked. Security is defined as "the ability of states and societies to independently preserve their identity and functional integrity" (Buzan, 1991, p. 432). The theoretical approaches to security studies can be classified mainly into two; traditionalist/realist/neorealist construct of security that basically gained prominence during the Cold War and the wideners/broadening approach that emerged at the aftermath of the Cold War. The basic tenets of realist/neorealist theoretical simplifications of international relations are defining attributes of international security within the traditional security approach in which security is directly proportional to the accumulation of power as described by Stephen Walt's (1991) that, security studies seeks cumulative knowledge about the role of military force. This is a state-centric approach to security that apportioned state as principally both the referent object and securitizing actor. The neorealist theory prioritizes the military capability of states against the military external threats as the main agenda of national security thereby, a state is considered secured in the absence of military objective threats within the anarchical nature of international system (Oluyemi, 2020). The state becomes the primary focus of security, authority, and obligation and citizens must be identified with the security of states. There is no room for international cooperation among states whereby every state must firstly pursue its own self-interest, self-help, survival and security since it cannot rationally assume that other states will act in a cooperative fashion (Mearsheimer, 1994; Milner, 1993). The significance of military power in the traditional security approach is detailed by Saleh (2010) cited by Oluyemi (2020, p.3), "a tool used by states to demonstrate their strengths, to maintain territorial integrity, to ensure domestic or internal security, to acquire international recognition, to fight against every threat, to carry out diplomatic negotiations, to gain economic advantages, to secure geopolitical boundaries and for political propaganda" According to Mearsheimer (2013, p.77) realists hold firmly that power is the sole "currency" of international politics, states should gain power as much as possible to pursue hegemony. This theory summarizes that powerful states are exclusive actors of international system that is characterized with sovereignty, anarchy and absence of non-state actors. Military capabilities of state occupy

the main agenda of national security. States cannot rationally assume the intentions of other states so international cooperation is not achievable (Mearsheimer, 2013).

Realism is mainly classified into two which are classical realism (Thomas Hobbes, Thucydides and Niccolò Machiavelli) and neorealism (Kenneth Waltz and Mearsheimer). It is important to note that another branch of realism emerged, which has been heavily rejected by realist scholars known as neo-classical realism (Gideon Rose, Norrin M. Ripsman, Jeffrey W. Taliaferro, Steven E. Lobell, and Fared Zakaria). Classical realists focus on human nature as the primary reason to for competition, origin of war, importance of power and international conflicts. Thucydides for example argued that, the divergent ambitions of state are drivers of international conflict rooted in the human capacities for pride and fear. Structural realism argued that international system is the source of competition among states, balance of power and the need to pursue power for the survival of states. The international system creates incentives for all great powers regardless of their regime types, domestic institutions and culture. There are two key strands within neorealism which are; offensive and defensive. Defensive neorealists such as Kenneth Waltz (1983) argued that it is erroneous and unnecessary for states to endlessly pursue power due to the possibility of a backlash for wanting too much of it thereby, the maximization of sharing world power is deemed a foolhardy one. Offensive neorealist argued contrary to this stating that, it is highly needed for states to pursue more power as much as possible and under the right circumstances to pursue hegemony (Mearsheimer, 2001). The accumulation of overwhelming power is an ideal mean of ensuring the survival of states within international system. The emerging branch of realism that contradicted the basic attributed features of realism (self-help, state-centric and survival) is neo-classical realism, which presented a theory of foreign policy recognizing the domestic politics and non-state actors' involvement in national and international politics (Ndzendze & Marwala, 2023). This branch of traditional security approach is considered relevant to this research due to the involvements of non-state actors such as commercial sector and domestic politics in the proliferation and uses of AI military technologies.

The emergence of non-military issues at the aftermath of the Cold War such as; environmental issues, health related issues, migration issues, economic issues and political issues led to the most widespread call for redefining traditional security approach by a group of scholars described as wideners. They argued for the need to broaden security issues, referent objects and securitizing actors of the security to incorporate non-state actors in order to ensure the agenda of security incorporates non-military issues. Lin (2011) explained that, the rise of nonmilitary threats along with non-state actors, socioeconomic, cultural, and non-territorial threats at the aftermath of the cold war demand the need to enlarge the scope of security in order to properly address them. The wideners' approach to security studies is a term that generally describes the collectiveness of different IR/security theories on the need to incorporate nation-states and regional-local governments, international organizations, non-governmental organizations, public opinion, press, market, non-military issues and forces of nature to the agenda of security notably from vertical axis (individuals, groups, and states) to horizontal axis (political, economic, social, environmental, and humanitarian issues)(Durak, 2024). Prominent wideners' approach in clude: liberalism, peace theory, critical security studies, constructivism, human security, gender security (feminism), environmental security (green theory) and Copenhagen School reflective of the fact that almost all theories of international relations are found within the theoretical underpinnings of security studies (Durak, 2024). Liberalism (John Locke and Immanuel Kant) analyzes international politics based on mutual relations, cooperation, security, and peace. It recognizes the impact of state and non-state actors in international security such as; international organizations, non-governmental organizations, international conventions, and private transnational companies' initiatives. One of the famous scholars of classical liberalism Friedrich August von Hayek advocates the use of market forces to coordinate human activities with the claim that free trade among actors will decrease the likelihood of a conflict (Hayek, 1945).

Furthermore, the promotion of democracy, free functioning markets, international cooperation, and limited role of states, international organizations, non-governmental organizations, private individual and companies are prolific instruments of maintaining international security according to liberal theory. Social Constructivism argues that international relations/security is “*shaped by socially and historically constructed ideas as a social theory. These ideas, consisting of factors of collectively held beliefs, build the behavior and identities of actors*” (Wendt, 1999, p. 4). Based on this theory, this world is not purely a function of material (unlike liberalism) whereby activities, interests, and beliefs of actors are at the center of understanding the world,

which are socially constructed. The identity of actor plays a significant role in an actor's behavior and goals within international environment (Durak, 2024). Human security scholars argue on the need to ensure the prioritization of issues threatening the well-being of individuals to occupy the agenda of security. Individual is considered as the referent object of security (Collins, 2013). Gender security is explained based on the post-colonial feminists with the argument that gender subordination is one of the forms of oppression that women endure. Liberal feminist suggested the possibility to overcome biological differences between women and men through adequate training of women to equally participate in international affairs and military organizations while conservative feminists argue that, only men should be assigned with the duty of fighting wars, when women should render a supportive role in uniquely feminine ways and Cultural feminists are generally anti-war on a different basis (Durak, 2024). Copenhagen school shares commonalities with critical security studies on the need to redefine the realist/traditional approach, which is defined to be too narrow and insufficient to address the multidimensional threatening issues that gained prominence after the Cold War. They both stress on the political power and symbolism of the word security, implications of diverting issues outside ordinary politics into the security agenda as well as the need to avoid militarizing of issues and embrace addressing security issues without military violence (Filimon, 2016). The Copenhagen School can be traced back to the Copenhagen Peace Research Institute established in 1985 and its seminal work was *"Security: A New Framework for Analysis"*, co-authored by Barry Buzan, Ole Wæver and Jaap de Wilde that was published in 1998. Other associative texts of this approach is; *"Identity, Migration and the New Security Agenda in Europe"* by (Ole Wæver et al., 1993), or *"The European Security Order Recast. Scenarios for the Post-Cold War Era"* by (Barry Buzan et al., 1990). The Copenhagen School is predicated upon three main arguments; (1) the sectoral analysis of security studies whereby five sectors of security are defined (2) the use of a social constructivist theoretical understanding of security through the development of securitization studies, and (3) the introduction of regional security complexes (Charrett, 2009). The argument of Barry Buzan towards the need for security at different levels of analysis (Individual, state and global level), the involvement of non-state actors in security agenda (international organizations, international non-governmental organizations, private individual and companies), to focus on non-military issues and his classification of security into different sectors (military, economic, environmental, societal and political sector) constitute the collective understanding of the Copenhagen school of security studies. The multidimensionality of artificial intelligence (AI) can be substantiated in both traditional and widens approach to international security but the scope of this research focuses only on the military uses of AI thereby attention will be given to the traditional/realist construct of international security while the research has recognized the general IR theoretical premises of international security.

### **AI Military Technology and Traditional Approach to International Security**

AI military technology has revolutionized the military construct of security predicated upon the traditional security approach. Based on the state-centric attribute of this approach, which considers states as the primary actors of international system, the question of how states would incorporate AI military technologies whether domestically developed or acquired, into their arsenal would have happened to be a concern but the recognition of neo-classical realism has covered this theoretical gap. In addition, would AI become significant and predominant enough to re-conceptualize the determinants of powerful states within the international system? AI security applications have gained the attention of powerful states such as; the U.S., Russia, and China with their investments in technologies for prediction, analysis, and simulation thereby, the general overview of adopted strategy and AI financial investments of these states are indications of the extent at which AI is considered as powerful tool to gain geostrategic advantage (Ndzendze & Marwala, 2023). The present diffusion of AI systems has fundamentally changed from the past experiences where the diffusion of information technologies (IT) into defense between the periods of 1970 to 2010, the period described as IT-driven Revolution in Military Affairs (RMA), was dominated by the Western (mainly the U.S.) superiority in research and development of advanced military technologies, which were selectively disseminated to allies and strategic partners (Raska, 2016). The present era of AI development has put the United States in serious competition with China and Russia for the first time in history whereby the margin of military-technological advantages between great powers has been narrowed, expediting the strategic significance for disruptive defense and military innovation (Mahnken, 2012). This advancement of AI military technologies in these states has resulted to systemic competition over technological leadership in areas such as *"AI systems, robotics,*

cyber, additive manufacturing, advanced materials, synthetic biology, quantum computing, directed energy, space technologies, and many others" (Raska & Bitzinger, 2023, p.2).

The present advancement in AI military technology has been strongly effected by commercial-technological innovation for the military innovation (Raska, 2021). Massive military-industrial primes do no longer have the monopoly of driving this technological innovation whereby commercial sectors have taken the lead at producing advanced technologies with a dual-use potential, which are diffused into military applications. These diffusible technologies are stated by Hammes (2016) as additive manufacturing (3D printing), nanotechnology, space and space-like capabilities, artificial intelligence, and drones. They are also considered with potential to become challenging for human involvement in future warfare as well as changing the very character of war whereby algorithms and data would determine human decision-making and future combat, which is predicted to most likely demonstrate the use of Lethal Autonomous Weapons Systems (LAWS). The experiment of some air forces using AI algorithms as "virtual back-seaters", to control the aircraft's sensors, navigation, and detection as well as targeting adversary air threats leading to the reduction of workload for aircrew are increasingly demonstrating the future combat capability and exploration of development programmes (Davis, 2021). To explain further on the military uses of AI technologies, AI systems are used by advanced militaries to support decision-making and planning of military operations. AI is used to process a large amount of data from diverse intelligence, surveillance, and reconnaissance sensors, which are usable in logistics and predictive maintenance in order to ensure the safety of forces and availability of platforms and units (Raska & Bitzinger, 2023). As put forward by Horowitz (2018), AI is now capable of shaping the training and simulation, cyberspace operations for the detection and counteraction of advanced cyber-attacks, and robotics including autonomous systems such as drones. With the rapid growth of AI technologies, there is a prediction for an upcoming military-technological tsunami that would revolutionize the future military affairs whereby the past military programmes such as; weapons, tactics, training, acquisition, and operational approaches will be replaced with AI wave in defense and military-technological innovations, which includes; the development of advanced fighter jets matched with a team of unmanned aerial vehicles, hypersonic missiles, lethal autonomous weapons systems, directed energy or laser weapons, and capable technologies to compete in the space, cyber, and electromagnetic spectrum (Lingel et al. 2020). . There are also small and middle powerful states such as; Singapore, South Korea, Israel, Australia, and Japan with potential to develop advanced AI technologies due to their economic competitiveness, political influence and status that are presently pulling the weight towards the proliferation of AI-enabled sensors and autonomous weapons systems for the enhancement of their national defence capabilities (Barsade & Horowitz, 2018).

The debate on how AI has reinforced the military priority of states bed rocking the traditional/realist approach to security studies can also be supported with the views of prominent scholars of this theory concerning military technological advancement. Hans Morgenthau who is one of the main scholars of classical realism argued that "*the fate of nations and civilizations has often been determined by a differential in the technology of warfare for which the inferior side was unable to compensate in other ways*" (Morgenhtau, 1997, p.139). He explained further that, new military technologies particularly nuclear weapons have been able to transform the bipolar system of the world into multipolar system, in which many international actors (states) are empowered by the advancement in military technologies (Little, 2004). Kenneth Waltz is the founding father of structural realism also known as neorealism recognized the role of technology in shaping the capabilities of states and its indirect influence over international system. He argued during his late writings that "*realist theory, old and new alike, draws attention to the crucial role of military technology and strategy among the forces that fix the fate of states and their systems*" (Waltz, 1998, p.48–49). Robert Gilpin is another major scholar of neorealist theory who described technology as the main factor responsible for a systemic disequilibrium. In his quote; "*a military or technological innovation may dramatically reduce the cost and increase the benefits of territorial conquest and thereby encourage military expansion*" (Gilpin, 1981, p. 22). Congressional Research Service Report explained various AI applications for military defense stating the various areas of military that AI has been incorporated to in clude; intelligence, surveillance, and reconnaissance applications, as well as in logistics, cyberspace operations, information operations, command and control, semiautonomous and autonomous vehicles, and lethal autonomous weapon systems (CRS Report, 2020).

AI is considered helpful at optimizing military logistics in different ways such as; predictive analytics; this reflects the ability of AI to analyze large amounts of data from various sources, including supply chain systems and real-time data from the battlefield for the accurate prediction of demand for resources and anticipation of potential congestions. Route optimization is another logistic military advantage of AI which means it can optimize transportation routes and schedules by considering factors such as; road conditions, weather, and security risks. Inventory management is also a military logistic advantage of AI for the monitoring of inventory levels in real-time, predicting demand, and optimizing the distribution of supplies. Automated decision-making is a military logistic advantage of AI to automate decision-making processes, such as approving purchase orders or routing shipments ((Military. Africa, 2023). In the area of command and control, the U.S. military has started exploiting the potential of AI in the area of command and control whereby the Department of Defense (DoD) is developing many systems to support its concept of Joint All Domain Command and Control (JADC2) aimed to centralize planning and execution of air-space-, cyberspace, sea, and land-based operations (CRS Report, 2020). In the area of intelligence, surveillance, and reconnaissance; this has to do with the use of AI-powered systems for monitoring and analyzing large amount of data from various sources, including cameras, sensors, and other devices, to detect and respond to potential security threats. It is the use of AI to develop advanced surveillance systems that can monitor large areas and identify potential threats. AI intelligent surveillance can be useful for border security, perimeter security, battlefield monitoring and target recognition (Military. Africa, 2023). Project Maven is an example of this AI military advantage, which incorporated computer vision and machine learning algorithms into intelligence collection cells that would dissect footage from uninhabited aerial vehicles for the identification of hostile activity for targeting (CRS Report, 2020). In cyberspace operations, AI could be instrumental for cybersecurity by protecting highly secure military systems from cyber-attacks whereby any possible vulnerability can potentially compromise classified information and endanger military personnel and missions. These AI systems are capable of safeguarding programs, data, networks, and computers from unauthorized access (Military. Africa, 2023). Regarding semiautonomous and autonomous vehicles, these are autonomous machines that are programmed to independently identify and engage targets without human intervention. They are AI systems with potential to revolutionize warfare, supplying militaries with a powerful tool to swiftly identify and neutralize threats. They are programmed AI-enabled machines to respond to specific scenarios, granting them freedom to react rapidly and accurately to changing battlefield conditions such as; the use of autonomous drone to provide reconnaissance and surveillance to enable commanders make better decisions. The deployment of these systems to dangerous or remote locations would drastically reduce the risk of human personnel (Military. Africa, 2023). The use of AI for lethal autonomous weapon systems (LAWS) represents *"a special class of system that use sensor suites and computer algorithms to independently identify a target and employ an onboard weapon system to engage and destroy the target without manual human control of the system"* (CRS report, 2020, p.14).

### **AI military Uses and their Implications on International Security**

The debate around the application of AI to military sector is classified into three categories; enthusiasm, pragmatism, and denial. Enthusiasts argued that, AI is capable of revolutionizing warfare, change its character, nature and the way war takes place and generally affect military activities across the full spectrum of force (Payne, 2018). The ability of AI to facilitate the deployment of autonomous systems would result to robotization of warfare in which warfare will be revolutionized with fully autonomous weapons and vehicles with the conduction of sophisticated battle tactics, automatically adapting to enemy maneuvers, and instantly exploiting opportunities on the battlefield (Davis 2019, p.119). According to Horowitz (2018, p.47), *"the fielding of AI-powered systems operating at machine speed would increase fighting speed and confer a distinct advantage to AI-adopting forces over non-AI-powered forces."* Paul Scharre has used drone as an example to argue that an extreme transformation in warfare is fast approaching with the ability of swarm to react to shifting events faster than human expertise. *"These advances in AI and machine autonomy facilitate the effective skill of these cooperative, autonomous drones to act on the battlefield, to overcome an adversary utilizing maneuver warfare"* (Scharre 2018, p.387). Furthermore, the ability of AI to analyze vast set of data speedily and in huge quantities far ahead of human capability holding considerable military advantage could potentially afford war fighters with unprecedented visibility of the battlefield, reduce uncertainty, and be helpful with decision-making at all levels of combat (Rickli & Mantellassi, 2023).



Pragmatics also argued that AI would rapidly enter into battlefield and military structures but it will be less revolutionizing compare to enthusiasts, it will impact basically the operational and tactical levels, facilitating operations, and improving their efficiency. It is stated that the very nature of war is violent, chaotic, destructive, and murderous and this cannot change. It argues that, advances in technology cannot jettison inherent attributes of war such as; uncertainty and friction, as “no amount of computing power can anticipate that capacity of enemy to respond and adapt in unexpected ways” (Mallick, 2019). The approach of pragmatics toward AI's military application is predicated upon Clausewitz's interpretation that, the nature of war is unchangeable but the character of war might change in a relatively limited and less revolutionizing way. The contribution of AI is not considered revolutionary but simply evolutionary (Cleverl and et al. 2019). Deniers on other hand have argued for the recognition of advances in AI but focus mainly on its handicaps stating that, technological, organizational, socio-political, ethical, and legal principles would place limitations on the activities of AI thus rendering it suboptimal for military applications (Rickli & Mantellassi, 2023). Scholars of this school of thought argued that, some technical hurdles and organizational elements would constitute hindrances to the usefulness and disruptive potential of AI on the battlefield thereby, it will neither change the nature of war nor altering its character. They considered AI-related technologies as relatively immature and not applicable to the military sector in reliable and predictable way. Svenmarck et al. (2018) argued that, there is absence of real world, high quality, sufficiently large dataset needed to train algorithms and develop successful ML-based military AI applications. Predictability and understandability are essential to the military in fielding their weapons and the black box of AI, which means its inability of reasoning to produce an accurate outcome and its vulnerability to easy fooling techniques are defined as significant challenges for fielding autonomous weapons on the battlefield in the future (Svenmarck et al. 2018) cited by (Rickli & Mantellassi, 2023)

The military uses of AI have also been classified into three; as an analytical enabler; disruptor and force multiplier. AI as an analytical enabler explains the usefulness of AI in data-heavy aspects of military operations where there are needs for large data analysis (Sayler, 2020). These are areas where overload of data is highly consequential such as; Intelligence, surveillance, and reconnaissance (ISR), which is also described as one of the areas that requires a huge proportion of military investment (Morgan et al. 2020). Project Maven exemplifying this area is a U.S. DoD project developed to use computer vision algorithms for the assistance of drone targeting. According to CRS report, there are approximately 140 projects in development by the CIA alone to leverage AI to automate tasks such as; image recognition and predictive analytics (Sayler, 2020). AI system is not only capable to categorize and analyze more data than human analysts, but also highly effective at finding correlations in data, *“analyzing connections between data points, flagging suspicious activity, spotting trends, fusing separate elements of data, mapping networks, and even sometimes predicting future behaviors and trends”* (Horowitz et al. 2018, p.11). The conflict between Israel and Hamas in 2021 demonstrated how the Israeli Defense Force (IDF) made use of an advanced AI technological platform that centralized in data on terrorist groups in the Gaza Strip onto one system that enabled analysis and extraction of the intelligence (Ahronheim, 2021). The ability of this AI on big data analysis accurately mapped and destroyed Hamas' extensive underground tunnel network (Ahronheim, 2021). The United States and China have heavily invested in AI command-and-control structures, most in particular to create a “common operating picture” (Sayler 2020, p.13). The United Kingdom is also found with the fielding of AI in training exercises that assisted operational command and control. This is the AI that collected and analyzed data to supply information concerning the environment and terrain, which provided instant planning support and enhanced command and control process (Rickli & Mantellassi, 2023).

AI as a disruptor explains the use of AI to automate and assist with the production and promulgation of disinformation online, which has mostly eroded trust in democratic institutions. Advances in a branch of AI known as Natural Language Processing (NLP), which focuses on training computers to understand, process, and replicate human language have produced very concerning applications. With the advancement in machine learning (ML) and the growing availability of individual data on the internet, AI can now profile individuals with high rate of precision, predict their preferences and behaviors (Mansted & Rosenbach, 2018). Russia was able to influence the 2016 United States presidential election by buying ads on Facebook and Google, using automated bot accounts on Twitter, and troll farms for the creation of disinformation promulgated online ahead of the election, which disrupted the democratic process of the U.S. (Polyakova 2018; Mueller 2019). Deep-fake technology uses deep learning (DL) for altering of images, videos, and audio content and also able to

create them from the scratch. It fosters an environment of plausible deniability, where the possibility of an image or video being fake erodes our trust in what we see or hear depicting the disruptive potential of AI. A suspected deep-fake video of the president of Gabon in 2018 led to an attempted military coup in the country, which has demonstrated the potential impact of this aspect of AI even in the military domain. It has provided new tools for cyberattacks through the creation of convincing audio imitations in phishing attacks (Stupp, 2019). AI as a force multiplier argues that, military AI would become the only way for human to meet up with the increasing speed of war characterized with AI weapon systems. The need for autonomous weapon system to make decision autonomously in order to keep up with the tempo of war in a way that is faster than the capacity of the enemy will constitute the decisive advantage. Autonomous Weapon System (AWS) is defined according to the International Committee of the Red Cross (ICRC) as *"any weapon system with autonomy in its critical functions, a weapon system that can select and attack targets without human intervention"* (ICRC, 2021). The Israeli Harpy, Harop, Harpy NG, and the Orbiter 1K "Kingfisher" are, according to Boulanin and Verbruggen (2017, 115), the only operational loitering weapons that are known to be capable of acquiring and engaging targets autonomously. Another example of AI as a force multiplier is drone swarms, which can be defined as a collection of *"cooperative, autonomous robots that react to the battlefield as one at machine speed"* (Scharre 2018, p.385). What has been considered as the "First AI War" is the use of a drone swarm to locate, identify and strike enemy combatants in the Gaza strip by Israel (Rickli & Mantellassi, 2023). The ability of drone swarm to self-organize, choose targets, engage, and subsequently disperse indicates that it can be cost-effective way of damaging the opposition's army (Lehto & Hutchinson, 2020). Autonomous weapon systems (AWS) are classified into three according to Noone & Noone (2015, p.28), *"human in the loop systems, human on the loop systems, and human out of the loop systems."* Both human in the loop systems and human on the loop systems are available such as; the Iron Dome that was deployed by Israel depended on predictive missiles and rockets impact location to select its firing of defensive missiles.

The advancement in the military uses of AI has serious strategic implications on international security. Lynn-Jones, (1995) argued that, there is higher possibility of conflict and war when offence is considered more advantageous while peace and cooperation will be more likely when defence has more advantage. Rickli, (2018) argued that, the influence that AWS have on the offence-defence balance is a significant factor in analyzing AI implications on strategic stability. The use of AI in command-and-control structures, including automated decision-making and AWS could be seen shifting the balance of power to the side of offence. It is understandable that, the use of AI-powered weapon systems is more advantageous in the offensive use such as; the use of swarming tactics, which aims to overwhelm the opposition's defence systems and neutralize their defensive advantage. This illustrates the argument of Lynn-Jone that in a situation whereby defensive postures are not efficient, there is higher chances of conflict and strategic instability by incentivizing pre-emptive strikes. Another considerable factor of strategic implications of AI military uses is the opaqueness embedded in AI algorithms that could affect the offence-defence balance, which explains the inability to successfully and accurately assess the capacity of opposition (Horowitz, 2018). The capacity to assess the depth of automation of an adversary's arsenal, the quality of the code, the efficiency of the autonomous weapons, and their capabilities is almost impossible, which could result to a situation whereby states assume the worst of their rivals and over-estimate their defensive ability. The possibility of over-estimation of the destructive strength of adversary's weapon would potentially lead to arm races as predicted by the traditional security approach (Horowitz, 2019). This offence-defence balance is theoretically explained by different strands of neorealism (offensive and defensive neorealism) expounded within the theoretical framework of the study.

The rapid growth of AI proliferation is basically as a result of its nature as a dual-use technology whereby AI development in the commercial sector has augmented the military domain. Private corporations have represented the most powerful investors in AI technology including tech giants such as Microsoft investment of one billion USD in OpenAI, an AI research Lab dedicated to researching artificial general intelligence (AGI), or the acquisition of Deep-mind by Google for more than US\$500 million to conduct research in the same field (Vincent, 2019). This means that proliferation of weapons in the era of AI is not subjected to state funding only but also a function of powerful private sectors as noted by Morgan et al. (2020, p.13), *"we can reasonably expect most future military applications to be adaptations of technologies developed in the commercial sector"* This indicates the fact that multiple actors such as state and non-state actors will have access to certain degree of AI military applications. This is considered threatening as there are many terrorist

groups, insurgents and armed groups available in the world threatening the survival of states. For example, the shadowy group called the Free Alawites Movement claimed responsibility for an attack in 2018, in which 13 low-cost GPS-guided drones targeted Russia Khmeimim Air Base in Syria, which allegedly destroyed a US\$300 million Russian Missile System (Kallenborn, 2020). In 2017, the weaponized commercial drones of Islamic State was able to gain temporarily tactical air supremacy over the Iraqi armed forces during the battle of Mosul. In addition, AI could also be used for promulgating disinformation campaigns to influence public opinion by non-state actors (Rickli & Mantellasi, 2023). Arms race is no longer a possibility among the nation-states only as described by the realist construct of international security, states are now in ammunition race with non-state actors in possession of advanced AI military technologies in other to ensure their survival.

## DISCUSSION AND CONCLUSION

There are general features of artificial intelligence that defined its relevance to the arena of national security as stated by CRS Report (2020); it can be integrated into diverse of applications, which is an improvement to “Internet of Things” whereby different devices can be networked together for optimization of performance. Another attribute of AI is described as the dual-use of many of its applications which means AI applications are useful at both military and civilian domain such as; the ability of image recognition algorithms programmed to recognize dogs in You-tube as well as terrorist related activity. Lastly, the transparency of AI enabling ability means it can be integrated into any product and not be recognized immediately. World leaders have immediately recognized the transformative potential of AI as significant component of national security. For example; in 2016, The United States Defence Department (DoD) released a “*National Artificial Intelligence Research and Development Strategic Plan*” which is one of a series of studies on AI machine learning on the potential for AI to reinvigorate U.S. military dominance” The DoD also established the Defense Innovation Unit Experimental for the fostering of collaboration between the Pentagon and Silicon Valley. AI has been considered as fundamental redefinition of military power with the implication of reordering the balance of power whereby Russia has continued to develop multiple military-use of AI technologies as part of a broader strategic effort with the target of ensuring that, 30 percent of its entire military structure will be AI robotic by 2025. China also launched a national-level AI-innovation agenda for “civil-military fusion in an attempt to become “science and technology superpower”, and catalyzed by AlphaGo’s victory (Johnson, 2019). AI military technology is driving the world into multipolar structure, facilitating strategic competitions among the leading technological advanced countries, which is indication of its implication on international security.

Since the end of the Cold War, the general arguments of scholars classified as wideners' approach to international security have focused on the declination of military security as put forward by Baldwin, (1995) that, military threats have declined thereby military force is no longer relevant and there is a need to reform national security agenda. The Cold War era witnessed the preponderance of substantial military threats, arms race between the East and West and the need to manage inter-state armed conflicts were driving the management of armed forces for both deterrence and combat operations (Schnabel & Krupanski, 2012). This nature of threat justified the relevance of realist/traditional approach to international security and the end of ideological military war between the East and West (Cold War) is considered as an indication to the ending era of traditional security approach. Wideners' scholars such as Barry Buzan argues for the broadening of actors, issues and level of analysis of security studies as explained within the theoretical framework of this research. It is quite interesting that several emerging issues since the end of the Cold War to the present dispensation have justified the relevance of military security/traditional security approach such as; the attack of 9/11, the military war on terror, the forceful neoliberal agenda of the West (United States), conflicts of self-determination, Israeli military occupation in Gaza, resurgence of military coups in Africa, inter-religious armed conflicts, inter and intra states conflicts, ethnic conflicts, Iranian missile attacks against Israel and Israeli retaliatory attacks. Military security of states continue to play a deterministic and transformative role in national and international security, occupying the mean of states survival and their international influence whereby economic development has been prioritized to ensure military development. The emerging power of AI military applications has further transformed the military priority of nation-states to ensure national and international security such as; the need to prepare for future war, strategic competitions among powerful states, the changing nature of balance of power system, the changing nature of defensive/offensive future attacks, emerging

multipolarity, and the availability of advanced military technological weapons to non-state actors (terrorist or insurgent group) and its potential future threats to states and citizens are now occupying the agenda of national and international security. These are generally classified within the framework of realist/traditional approach to international security's transformation effected by the advancement in artificial intelligence military applications and utilities.

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