



## **The Impact Of Artificial Intelligence Management Upon International Security**

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### **Abstract**

*As a rapidly developing field based on technological development, Artificial Intelligence (AI) has significant impacts on developments regarding international security and policies. The main reason of this impact lies at the heart of the fact that states regard technological developments arising in the field of AI as an opportunity to enhance their hard powers. In this framework, states make efforts to plan their AI management activities, particularly collection and analysis of intelligence, creation of new logistics opportunities, development and management of cyber space operations in line with their aim to produce more sophisticated military weapons as compared to the past. In terms of their technological opportunities and economic development levels, the United States of America (USA), the People's Republic of China (PRC) and the Russian Federation (RF) are pioneers of using AI applications as a new generation security and hard power instrument. In this respect, competition with regards to utilisation of AI sector as a hard power, security and intelligence instrument between USA, RF and PRC directly affects international system. In the light of points indicated, this article will basically evaluate the impact of AI management planning on international security. In this scope, impacts of states' main approaches about AI management upon international security will be analysed from a realistic perspective in terms of concepts of balance of power, international competition processes and security dilemma. In the final section of this article, a future perspective on this matter will be set forth.*

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## **Yapay Zekâ Yönetiminin Uluslararası Güvenliğe Etkileri**

### **Öz**

*Teknolojik ilerlemelere bağlı bir alan olarak hızla gelişen yapay zekâ (YZ), uluslararası güvenlik ve politika ile ilgili gelişmelere de önemli etkilerde bulunmaktadır. Bu etkinin temel nedeni devletlerin YZ alanı ile ilgili olarak ortaya çıkan teknolojik gelişmeleri, askerî (sert) güçlerini artırmaya yönelik bir fırsat olarak görmelerinden kaynaklanmaktadır. Bu çerçevede devletler YZ yönetimine ilişkin faaliyetlerini, özellikle istihbarat toplama ve analiz etme, yeni lojistik imkanları yaratma, siber uzay operasyonları geliştirme ve yönetme, geçmişe kıyasla çok daha sofistike askerî silah türleri üretme amaçları doğrultusunda planlamaya gayret göstermektedirler. YZ uygulamalarının yeni nesil bir güvenlik ve askerî güç enstrümanı olarak kullanılmasına yönelik planlamaların öncülüğünü ise sahip oldukları teknolojik imkanlar ve ekonomi gelişmişlik düzeyleri kapsamında Amerika Birleşik Devletleri (ABD), Çin Halk Cumhuriyeti (ÇHC) ve Rusya Federasyonu (RF) yapmaktadır. Bu doğrultuda ABD, RF, ÇHC arasında YZ sektörünün bir askerî güç, güvenlik ve istihbarat enstrümanı olarak kullanılmasına yönelik rekabet süreçleri, doğrudan uluslararası sistemi de etkilemektedir. Belirtilen hususlar dahilinde bu makalede temel olarak YZ yönetimine ilişkin planlamaların uluslararası güvenlik üzerine etkileri değerlendirilecektir. Bu kapsamda devletlerin YZ yönetimi ile ilgili temel yaklaşımlarının uluslararası güvenliğe etkileri, güç dengesi, uluslararası rekabet süreçleri ve güvenlik ikilemi (security dilemma) kavramları kapsamında realist bir bakış açısıyla analiz edilecektir. Çalışmanın sonuç bölümünde ise konu ile ilgili bir gelecek perspektifi ortaya konmaya çalışılacaktır.*

**Anahtar Kelimeler:** *Yapay Zekâ, Askerî Güç, İstihbarat Kapasitesi, Uluslararası Güvenlik, Uluslararası Rekabet, Güvenlik İkilemi, Güç Dengesi.*

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### **Introduction: Basic Concepts Regarding Artificial Intelligence**

Foundation of AI, whose founding father is Alan Turing, was laid at a conference held at Dartmouth College in 1956 by leading scientists of that period. In this conference, Artificial intelligence was presented as AI and it was proposed that the potential of designing smart computers be researched (Dortmount, 1956). Over the span of 60 years, such technologies have gained a new dimension with the increase in processing the speed of computers, developments in AI researches and creation of systems to human intelligence (ITU Vakfi Dergisi, 2017: 17).

Nowadays AI products, models and applications penetrate many fields from defence sector to manufacturing. States and international companies remarkably invest in AI Technologies and plan enormous manufacturing programmes. In this respect, AI sectors increasingly become a huge industry. Besides, states regard this field as a new opportunity in terms of building defence and attack capacities.

As indicated, rapid evolution of AI and robotics technology leads states to be closely involved in AI products within the scope of their defence and security needs. Robots thinking like humans take part in business and production processes and facilitate human lives. This situation, however, causes emergence of new situations also in defence and security needs of states. Consequently, although AI technologies remarkably ease our lives, it accelerates the emergence of a new process for humanity in the fields of business, endeavour, security, economy, social relations, psychology and security.

Before defining AI concept, it will be an accurate approach to carry out a short evaluation with regards to historical development of the concept within the scope of this article's purpose. First ideal examples of AI are observed in Greek mythology. For example, God Hephaestus and architect Pygmalion create a smart machine Talos to protect a woman called Europa by running around the island of Crete three times a day. Muslim scientist El-Jazari accommodated some robot designs that do not use computer programe in his book written in 1206. Immediately after Alan Turing's introduction of Turing Test in 1950 as a measure of machine intelligence, first practical examples of AI were given by writing programmes playing chess and check. In the 2000s, chess games between Deep Blue, chess software of IBM, and world chess champion Garry Kasparov were first concrete examples of AI's becoming a popular concept in today's world. Another

AI model, Watson, prepared for a TV show again by IBM in 2011 has later transformed into an AI product. This product was started for the purpose of diagnosing in healthcare sector (İnce, 2017: 16-17).

On the other hand, it should be indicated that there is no widely accepted definition of AI. In this scope, it should be expressed theoretically that AI's functioning is based on the principle of machine's simulation of human intelligence. And thus, AI can be defined as *"machines with the capacity of thinking and creating beyond the framework they are programmed by people"* (İnce, 2017: 16). In another definition, AI is described as *"Any artificial system that performs tasks under varying and unpredictable circumstances, without significant human oversight, or that can learn from their experience and improve their performance. They may solve tasks requiring human-like perception, cognition, planning, learning, communication, or physical action."* (CRS Report, 2018: 2-3). Of course, there might be deficiencies in these definitions. After all, AI is a concept evolving through changes over time in the light of human perception, scientific discoveries and technological developments.

In terms of international relations and security, the impact of opportunities and capabilities emerging with AI upon international system is remarkable. Although this field has been accepted as a technical issue, it is obvious that it bears results beyond conventional security approaches in international relations. Therefore, we think that viewing AI only as a technical matter is to address this issue with a narrow perspective and we will encounter challenges while analysing political and social consequences of these results. In this respect, it can be argued that AI triggers military competition processes among states in terms of international relations discipline. Therefore, it is clear that developments in AI technologies bring new opportunities and capabilities to states in collection and analysis of intelligence, production of more efficient military equipment and instruments, facilitation of military logistic opportunities, and planning sophisticated cyber-attacks. Thus, consequences of these new opportunities and capabilities must be analysed carefully in terms of national and international security.

In addition to this, there are also some disadvantages of AI, along with efficient military advantages provided by AI resulted technological opportunities. And it can be suggested that this situation causes emergence of challenges that have not been experienced before in terms of global power struggle of states. In

this framework, it is obvious that the stage of use of AI products, models and applications related to security and defence cause some complications about processes that ensure human and machine harmony in real conflict zones. Another disadvantage that must be stated is challenges in transforming data rapidly supplied with AI products, models and applications in defence sector into planning with human intelligence (CRS Report, 2018: 1).

In spite of big advantages, it puts forward in the fields of defence and security, many years are yet needed to use AI products, models and applications in armed forces of states with full capacity (Executive Office of the President, 2016). It is clear, however, that these periods will not take long considering the economic size AI sector has reached in recent years. For example, technology companies in the USA invested \$20-30 billion in AI sector in 2016. It is anticipated that this figure will reach \$ 126 billion in 2025. It is asserted that implicit expenses made by USA's Department of Defense on AI products, models and applications were \$ 600 million in 2016 (Govini, 2017).

As seen, AI technologies have reached a level that cannot be ignored in defence and security plans of states in terms of new opportunities and capabilities. Investments on AI products, models and applications based on defence and security sectors of both private sector and public sector have been rapidly increasing. States regard AI sector-based developments as an opportunity to enhance their military capacities. It can be discussed that AI based technologies in the fields of defence and security are dominated by USA, PRC and RF at the rate of their economic power and technological development levels. In this article, the impact of AI management planning upon international security will mainly be analysed. Besides, plans of USA PRC and RF on management of AI sectors will be addressed. Within the scope of these plans, AI based developments will be evaluated in a realistic perspective within the scope of international security, balance of power, international competition processes and "security dilemma". As a consequence, it will be sought to present a future perspective on this matter.

### **Artificial Intelligence: The Balance of Power, International Competition and Security Dilemma**

Within the scope of realistic paradigms, there is a continuous struggle of power in the international arena. Within the scope of this paradigm, it can be

discussed that states always try to gain power while trying to weaken their opponents. It can be claimed that “balance of power” concept has emerged as the single mechanism to protect international peace as a result of these endeavours. In international arena, peace and order prevail when power of a state is balanced by an opponent state’s or alliance’s power. From a realistic point of view, there is no chance to constitute and sustain peace. Morgenthau tried to prove that solution way such as “common security” and “world state”, which were asserted by idealists, were invalid by displaying many examples and arguments (Ari, 2010: 167-168).

According to realists, inconsistencies in international structure pose a threat to states’ security. In order to provide support against possible threats, states may sign alliance agreements. States, however, do not trust too much in these alliances for their securities and try to reach a power that can provide their securities. Realists claim that all states acting with the desire to reach maximum power seek to prevent this kind of aims of each other and resulting balance of power is a significant element providing stability (Kegley and Charles, 1995). At this point, according to Waltz, it is necessary to express that balance of power demonstrates continuity. Again, according to Waltz, in both bipolar and multipolar systems, balance of power is the main feature of these systems. Balance of power approach is fundamental in the sense of security. This mechanism functions as regulatory mechanism of international system and thus ensures stability and constitutes security of states as well as security of international security (Waltz, 1979: 47).

As observed, in terms of realist paradigms, states intend to increase their power to ensure their securities as a natural consequence of anarchy within international system and competition processes among states. Within the scope of this purpose, they closely follow technological developments. And they interpret these developments as new opportunities in terms of increasing their military powers. AI technologies are very crucial for states to ensure their security. Throughout history, technological developments have had direct impacts on international security and competition processes. For example, nuclear power capacities and technologies of states have directly affected all power struggles during the Cold War period.

Also, management of AI products, models and technologies is recently under the influence of power struggle and competition processes among states. Global investments in AI sector triggers armament race among states. For example, PRC, announced its national AI strategy plan to public in 2017. According to this

plan, PRC targets to be the leading country in AI sector. It is also obvious that this objective carries military purposes (Press, 2017). Similarly, RF has declared that it produces nuclear submarines, tanks and other military vehicles that can be controlled by AI and carry ballistic missiles (Bendett, 2018).

Other states, at the rate of their economic sizes and technological developments, like RF and PRC, invest in AI sector in a way that triggers global military armament race. For example, at this point, investments of South Korea and Singapore from Southeast Asia, countries relatively advantageous in terms of technological progress capacities, on AI sector have both military and commercial objectives. Canada, New Zealand, Australia and some European countries with high welfare level and having a problem with increasing their military personnel capacity regard AI Technologies as a new opportunity to fill this gap. Therefore, these countries allocate a considerable budget to AI sector in order to increase their military capacities.

Likewise, in France's national defence strategy published in 2017, AI sector was defined as a field providing "operational superiority". Also both Israel Defence Forces (IDF) and General Cohen Inger responsible of AI activities defined AI activities, in a media briefing held in 2017, as: "*can influence every step and small decision in a conflict, and the entire conflict itself*" (Horowitz, 2018: 10-11). Another state viewing AI Technologies as a significant field in global leadership competition is the United Kingdom (UK). UK government published an Artificial Intelligence Sector Agreement in April 2018. This agreement is a part of a bigger and more comprehensive industrial strategy. This document aims to position UK as a global leader in AI area. Objectives of this agreement are to strengthen cooperation between private and public sectors, invest in AI sectors, improve digital infrastructure, and enhance AI capacity (GOV.UK, 2018).

Not only states but also institutions, for example the European Union, have plans for developing their AI strategies. In this scope, European Commission declared a document entitled "Communication AI for Europe" in April 2018. This is a 20-page document displaying the EU's approach to AI. With this document, the European Commission aims to increase EU's technological and industrial capacity and accelerate public and private sectors to comprehend developments related to AI, get Europeans prepared for socio-economic changes put forward by AI, and prepare an appropriate ethical and legal framework in the field of AI. In

addition, it is known that EU aims to increase its AI investments from € 500 million in 2017 to € 1.5 billion until the end of 2020 (EU Commission, 2018).

On the other hand, while winning a military victory was regarded in proportion to manpower and successful organisation of this power in the first periods of history, these processes based on technological progress are shaped depending on the depth of economic and technological capacity. In this respect, it is not difficult to predict that AI products, models and instruments will dominate future wars and conflicts. However, it is too early to express AI technologies will be able to be used with full capacity in war and conflict areas in a short while. In addition to this, AI telecommunication products enhancing coordination between military forces on site and AI technology-based image recognition systems are started to be actively used in conflict areas by military forces of states. Again, algorithms enhancing accuracy of war plans and enabling real-time operations and smart ammunition systems increasing target hit rates are actively used in conflict areas by land and naval forces in particular (Horowitz, 2018:13). It can be easily asserted that all these new generation AI technologies also trigger competition processes among states and increase armament race.

As indicated above, it is clear that technological innovations affect struggle of power, balance of power and armament race processes among states. Throughout history, this view has been supported by examples such as the beginning of use of machine gun in war areas, active use of railways and telegraphy systems during WWI, and activities of tanks and aircrafts during WWII. AI products, models and technologies, similar to technological developments, have a capacity to influence military competition and thus balance of power among states. At this point, contribution of space competition and military competition processes in the Cold War period between the USA and the Union of Soviet Socialist Republics (USSR) to the development of Internet technologies and, in this context, the emergence of the field named cyber space should be remembered (Daricili, 121-125).

In principle, contribution of AI technologies to future conflict and war areas will directly be related to the success of states' organisational plans to adapt such technologies to their military capacities. Whatever the future success of these plans will be, it can be claimed that states will be facing a "security dilemma" against adaptation of AI technologies to military capacity.

As known, “security dilemma” approach of realist theory has an important impact in the maturity process of real politics paradigm understanding of security analyses. In its basic meaning, “security dilemma” concept is expressed as follows: when a state perceives a threat from another state and bears arms, the state perceived as a threat responds likewise (Jervis, 1978: 167-175). According to security dilemma model, behaviours of a state to ensure its security threaten the security of its current or potential enemies and jeopardise these actors (Ari, 2010: 198). According to this, State B perceiving threat from State A bear arms against State A or joins alliances; however, armament of State B, in return, brings security concerns of State A into the forefront and this situation causes State A to bear arms. In this situation, both states will bear arms against each other (Bilgiç, 2011: 123-124). Although they took part in the same bloc during the Cold War, armament race between Turkey and Greece, perceiving each other as threat, sets an example for security dilemma (Sandıklı and Emeklier, 2014: 8).

Similar to armament competition between Turkey and Greece, competition process between the PRC and the USA can be given as an example to “security dilemma” state emerged within the scope of utilisation of AI technologies in the fields of security and defence (Horowitz, 2018: 20). As indicated, PRC, declared its national AI strategy plan to the public in 2017. According to this plan, PRC, aims to be the number one country in the world in AI sector. This can be accepted as a clear challenge to the USA, the number one in the world in AI sectors. Competition process emerged with this challenge will, of course, have some consequences in the military field. These are armament competitions emerged within the scope of AI technologies and assessments of threat perceived among two states mutually. It can be strongly evaluated that this threat assessment may, in the future, be evolved into a process, which bears similarities with an armament competition within the scope of military and technological developments between USA and USSR in the Cold War period.

Another competition experienced between PRC and USA in respect to objective of development of AI sectors is AI strategy plans consecutively announced by two states. For example, in 2016, a roadmap focusing on AI sector development objectives by the Obama government was announced (Felten and Lyons, 2016). In return, PRC, almost with a retaliation motivation, prepared its national AI strategy plan in 2017. In response to PRC’s move, the Trump management replied by issuing an “Executive Order on Maintaining American

Leadership in Artificial Intelligence” on 11 February 2019 (White House, 2019). This situation is accepted as a sign that AI product, model and technology development plans of both countries will continue to be reciprocally perceived almost as a threat. Besides, this situation can be evaluated as a concrete indication that AI technology-based armament race and competition processes between USA and PRC will be observed frequently. It is evident that PRC invests more heavily on AI sectors compared to USA (Metz, 2018). However, it can be claimed that it is too early to see real results of these investments. And yet, considering fast technological progress the world has been going through in recent years, it is also likely that PRC’s move has the capacity to influence balance of power between two countries in favour of PRC.

It is necessary to also include RF to competition processes between PRC and USA in terms of development of AI products, models and applications. RF is an important actor in AI sector due to its technological development level, military capacity, economic opportunities rapidly developed in recent years based on its energy source income and strong management systematic under the leadership of Putin. At this point, it will be necessary to draw attention to Putin’s emphasis over AI in his statement in 2017. In this statement, he expressed that “*artificial intelligence is the future, not only for Russia, but for all humankind...It comes with colossal opportunities, but also threats that are difficult to predict. Whoever becomes the leader in this sphere will become the ruler of the world.*” (RT, 2017).

At this stage, in line with the purpose of this article, it will be beneficial to analyse USA’s, PRC’s and RF’s strategy to develop AI products, technology, software and models. The impact of AI sector-based development upon international security and competition processes will be better understood only in this scope.

### **Artificial Intelligence Management: Military Objectives of United States of America, People’s Republic of China and Russian Federation**

USA is the leader actor at global level with regards to management and formation of AI sectors. The very main reason is USA’s technological supremacy and powerful economic capacity. As indicated in this study, two national AI strategy documents were accepted in 2016 and 2019 under Obama and Trump

governments respectively with the aim of accelerating AI investments. Main aim of these documents is to maintain its global leadership in AI industry.

USA, as a state succeeded to adapt AI products, models and technologies to its military capacity, has been using this technology actively in conflict zones. For example, USA Armed Forces successfully used remotely piloted aircrafts (RPA) working in coordination with image recognition algorithms in terror operations in Afghanistan (CRS Report, 2018: 2). Likewise, USA Army has actively utilised AI algorithms helping to identify radical terror targets in Syria and Iraq within the scope of an AI operation called “Project Maven”. Machine learning algorithms used within the scope of Project Maven recognise terror targets and forward this information to RPAs and subsequently RPAs eliminated these terror targets (U.S. Department of Defence, 2017).

It is claimed that the Central Intelligence Agency (CIA) has been using 137 different projects similar to Project Maven (IARPA, 2019). Not only in military attack power and intelligence field but also in the process of performance of logistic activities, AI algorithms that foretell technical error potential are used by USA Air Force (Weisgerber, 2017). It is also suggested that anti-virus programs supported by AI technologies and with the capacity of prior identification of changes within the system are used in cyber defence capacities of USA intelligence and security units (CRS Report, 2018: 10). Besides, it is also known that USA Air Force commands and control its air, space, maritime and cyber space operations through an AI system called Multi-Domain Command and Control (MDC2) (JAPPC, 2019). In addition, it is stated that the Air Force Research Lab is creating a new computer algorithm, which can be used in F-35 aircrafts. These algorithms allow fighter pilots to control armed drones from inside their own cockpits (Loyal Wingman, 2018).

As can be seen, USA armed forces and security and intelligence institutions have actively been using AI technologies in real site operations. In this article, some activities evaluated as significant and included in open sources are presented. Apart from these, it can be easily explained that USA has more sophisticated and covert AI projects. In addition, it is known that USA is in a serious competition with PRC and RF particularly in AI industries.

As stated, PRC is the most important competitor of USA with regards to utilisation of AI technologies for military purposes. It is indicated that PRC’s investments on AI sector up until 2030 will be \$ 150 billion (China State Council,

2018). With regards to displaying PRC's AI Technologies, it is necessary to mention that an AI company named Baidu created AI software capable of surpassing human-levels of language recognition in 2015, one year before Microsoft did the same (CRS Report, 2018: 17-18). At this point, it is well-known that PRC's AI programs closely pursue USA's AI plans. PRC have been closely pursuing USA's all products, models, technologies, program and algorithm in AI sector and trying to produce more developed versions of these activities. In this respect, it can be asserted that AI algorithms of PRC used for military purposes, like that of USA's, focus on logistic activities such as intelligence collection, image recognition, command and control of military operations. Apart from these, PRC has great efforts in producing unmanned aerial vehicles (UAVs). On the other hand, in open sources, it is indicated that PRC, like applications of USA, has projects that enable smart anti-virus programs to be used in cyber defence capacity (Kaina, 2017).

Another important initiative of PRC with regards to development of AI sectors is the formation of Military-Civil Fusion Development Commission in 2007. This Commission serves to ensure that AI activities of private sector comply with PRC's military and security objectives. With the formation of this commission, PRC will gain an open position to integrate AI products, models, technologies, programs and algorithms into its military capacity (He, 2017).

On the other hand, PRC has a crucial handicap with regards to all of its products, models, technologies, programs and algorithms in AI sector. This is the fact that PRC's AI technologies are not yet used in hot conflict and war zones. In this respect, although it is known that PRC has the given technologies, they have not been tested in real conflicts and war zones. Whereas, USA, have successfully been using its AI products, models, technologies, programs and algorithms for many years in tough conflict zones in Afghanistan, Iraq and Syria (Kaina, 2017). Another handicap of PRC in relation to AI sector is that unlike USA it does not have qualified engineers to work in this field. Whereas AI sectors in USA actively operating with profit motivation can easily transfer the most qualified engineers to USA with high salaries and quality life standards (Barton and Woetzel, 2017).

It can be assessed that, compared to PRC and USA, RF's opportunities and capabilities in AI sector follows a relatively lower profile course. However, this evaluation will not change the fact that RF is a powerful global actor in AI industries. In this regard, Russian Military Industrial Committee's objective to

design 30% of military equipment until 2025 by benefiting from robot technologies is remarkable (Wired, 2017). In addition to this, in 2016 RF constituted a similar organisation to that of USA's Defence Advanced Research Projects Agency (DARPA) and accelerated its objective to develop AI Technologies in defence sector (CRS Report, 2018).

Main aim of RF's AI projects in defence and security sector is to develop systems that ensure increasing its military capacity, and to ensure that robots are used in war zones. In line with this aim, it is claimed that many projects are being carried out by RF in a covert way. In this respect, Viktor Bondarev, chairman of the Federation Council's Defence and Security Committee, said that "*artificial intelligence will be able to replace a soldier on the battlefield and a pilot in an aircraft cockpit*" and he later announced that "*the day is nearing when vehicles will get artificial intelligence.*" These statements are remarkable since they display RF's objectives (Bendett, 2017).

In addition to these, it is indicated that RF successfully tested two unmanned ground control systems called Neretha and Soratnik and aim to present them to the service of RF Armed Forces (CRS Report, 2018). Furthermore, some defence analysts also claim that as an instrument of RF's modern information strategy, there are some covert plans to use AI applications for the purpose of espionage and propaganda. It is also stated that RF, through this kind of AI applications, aims at disseminating fake news, articles, images and videos to target communities through social media (Allen, 2017). Together with this, RF introduced its Tu-22M2M PSC bombardment airplane equipped with AI technology to the media with a ceremony in 2018. During the introduction of Tu-22M2M PSC, produced by Russian defence industry manufacturer Tupolev, it is declared to the public that Tu-22M2 bombardment airplane was modernised, as a result of this a high-level airplane model equipped with AI was produced in terms of technical features and hardware. After completion of airplane's tests in 2021 the first lot will be delivered to Russian Air Forces in 2021 (AH, 2018).

Chairman of Russian Defence Company Rostec, Sergey Chemezov, announced in February 2019 that RF has been developing an AI-operated decision-making system to protect the land borders of RF. In his statement, Chemezov stated "*Rostec is in the process of creating decision-making intelligent systems for protecting Russia's land border, these systems collect ground, maritime and air data, estimate the situation in guarded zones and help to plan the function of*

*border control agencies and address operation tasks, the system includes a group of air and ground robots, which can operate independently, constantly monitor large swathes of land, and promptly inform security agencies of any situation changes, the system can independently determine the coordinates of any target, identify and trace various objects” (Tass, 2019).*

As indicated, Putin’s “*Those who dominate AI will dominate the world*” statement in 2017 is crucial in terms of the significance RF attributed to AI. However, despite Putin’s assertive remarks, it is evident that compared to RF, PRC and USA has bigger, more sophisticated and more rapidly growing digital technology opportunities and capabilities. On the other hand, it can be argued that, in the future, due to Putin’s efficient leadership, military aspect of RF’s state policies on AI will evolve into a more aggressive nature compared to USA and PRC. It is indisputable that RF has a solid educational infrastructure on this matter (Intellfor, 2019).

On the other hand, in order to better understand the aim of this article, the AI machines, models, programs and, algorithms mentioned in the article, which are used actively or being developed in military and intelligence operations, are given in the table below:

**Table1:** AI Machines, Models, Programs and Algorithms Mentioned in the Article, Used Actively or Being Developed in Military and Intelligence Operations.

Country	Actively Used	Under Development	Field of Use
The USA	Image Recognition Systems		Remotely Piloted Aircraft (RPA)
The USA	Algorithms		Identifying Radical Terrorist Targets
The USA	Algorithms		Logistic Military Operations
The USA	Anti-Virus Programs Supported by AI		Cyberspace Operations

<b>Country</b>	<b>Actively Used</b>	<b>Under Development</b>	<b>Field of Use</b>
<b>The USA</b>	AI System Called Multi-Domain Command and Control (MDC2)		Force Commands and Control its Air, Space, Maritime and Cyberspace Operations
<b>The USA</b>	Algoritms and Programs		Intelligence collection from Open Sources (Open Source Intelligence/OSINT)
<b>The USA</b>		Algoritms	For Fighter Pilots to Control Armed System from inside the Cockpits of F-35
<b>The PRC</b>	Unmanned Aerial Vehicles (UAV)		Military and Logistic Operations
<b>The PRC</b>	Algoritms		OSINT
<b>The PRC</b>	Anti-Virus Programs Supported by AI		Cyper Defence Operations
<b>The PRC</b>	Algoritms		Cyber Espionage Operations
<b>The RF</b>	Algoritms		Cyber Espionage Operations
<b>The RF</b>	Algoritms		Propaganda and Manipulative Operations
	Decision Making System operated by AI		Border Security
<b>The RF</b>		Algoritms	Fighter Pilots to Control Armed System from inside the cockpits of Tu-22MZM PSC
<b>The RF</b>		Tanks, Nuclear Submarines, Other Military Vehicle and Robots Operated by AI	Military

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### Conclusion

Developments in AI technologies have now reached a multidimensional level influencing every aspect of economic and social life. In addition, it will be very beneficial to evaluate development of general-purpose computers with the aim of building a perspective on the future of AI. Initial use of general-purpose computers dates back to the 1950s. By even taking the speed in the development of 70-year old computers into consideration, there is no need to be an oracle to say that AI technologies will more efficiently, rapidly and sophisticatedly affect economic and social life.

Within the scope of this evaluation, it can be easily expressed that AI products, models, technologies and algorithms will be further used in the military field in the future. In this respect, by remembering that over the years military technologies are replaced by brand new technologies, it is obvious that AI will also play a significant role in the power capacities of future armies. As indicated in this article, considering current contributions made by USA, PRC and RF to their military and security capacities, it is evident that AI will have a remarkable impact among competencies a powerful army should have in the future. In this regard, it can be stated that AI will mainly shape power structure of future armed forces in the fields of quick decision making, renewal, high performance measures, education and exploration/intelligence, logistics, etc.

In terms of the ability of quick decision making in the management of an army, it is evident that AI will provide significant contributions in variable operational environment of the future. With regards to renewal, since autonomous systems do not get tired and can be easily replaced, the contribution of AI to armed forces will be at an efficient level in the future. AI technologies, that can calculate many possibilities as a result of high processing power, will be able to present significant contributions to armed forces also on the subject of performance. AI applications will play a significant role in the future of armed forces in the fields of officer training, combat pilot training, technician training, and etc.

As indicated, AI technologies have already been used actively in military and security capacities of states. The pioneer actor of such activities is USA. It successfully benefits from AI algorithms in terror operations in Afghanistan, Syria and Iraq. In addition to this, PRC has reached a capacity almost challenging USA

in AI sectors through its plans in recent years, official documents it has prepared, institutional structures it has constituted and budget increases.

On the other hand, USA's and PRC's efforts for adapting AI products, models, technologies and algorithms to military capacity have significant consequences in international relations area within the scope of security analyses. Struggle of power between two global actors can be evaluated with respect to analyses conceptualised as "security dilemma" in the international relations discipline. As analysed in detail in this article, USA and PRC's investments on AI technologies in the fields of defence and security can be regarded as indications of mutual threat. An example verifying this situation is official strategy documents mutually announced in the field of AI between the years 2016 and 2019. It is possible that this threat perceptions may also continue in the future and an almost armament race between two states may start.

On the other hand, with regards to realist approaches about provision of balance of power within international system, there will be some consequences of competition in AI sectors between USA and PRC. Particularly PRC has shown great effort with respect to the recent developments in AI sector. It is clear that PRC plans to improve some initiatives to build a strong AI capacity. Therefore, some analyses explain that PRC may gain an advantage over USA by benefiting from advantages AI sectors provide in connection with global power struggle. At this point, it should be remembered that PRC has some disadvantages. AI technologies already adapted by PRC to military capacity have never been used in real terms in any conflict or war environment. Besides, compared to USA, PRC has difficulties in employing qualified engineers to work in the field of AI technologies. Contrary to this situation, USA can easily transfer the most qualified AI engineers across the world to its country by providing high salaries and better life conditions.

RF should also be included in future perspectives between USA and PRC as expressed above. Thanks to its technological opportunities, military power structure, efficient management systematic under the leadership of Putin, budget opportunities increased in recent years, RF is considered by some analysts that it has a lower profile compared to PRC and USA with regards to the development of AI products, technologies, algorithms and models. This may be considered to be an accurate evaluation. However, at this point, it should be remembered that RF has a technological legacy to adapt new generation technologies to its military capacity.

As known, RF, together with space race, which began in the 1960s, has been able to rapidly adapt new generation technological developments to its conventional power structure. As explained in detail in this article, considering military vehicles, robot systems, border security mechanisms, and combat aircrafts, which are controlled by AI algorithms and will be started to be used gradually by RF armed forces in the future, RF should be accepted as a significant actor in global struggle of power in relation to AI sectors.

USA, PRC and RF are significant actors at global level with regards to the adaptation of AI technologies to power structure of armed forces of these states and enhancement of their security and intelligence capacities. In this respect, it is obvious that the global AI sector serving military purposes have already been dominated by these three states. It is strongly assessed that this situation will also continue in the future. In addition to this, there are also strong indications that mutual threat perceptions between USA, RF and PRC in relation to AI sector plans may be evolved into a new armament race, struggle of power and international competition. This situation is also triggered by lack of international agreements and legislations regulating the use of AI sectors for military purposes. As analysed in this article, it is also evident that all these developments will have major impacts upon the security of international system.

### **Genişletilmiş Özet**

YZ teknolojilerindeki gelişmeler, günümüzde sosyal ve ticari yaşamın her alanına nüfuz eden çok boyutlu bir düzeye ulaşmıştır. Yaklaşık 70 yıllık geçmiş olan bilgisayarın gelişimindeki hıza bakarak dahi YZ teknolojilerinin çok daha etkili, hızlı ve sofistike bir şekilde ticari ve sosyal yaşama etki edeceğini söylemek için kahin olmaya gerek bulunmamaktadır.

YZ ürün, model, teknoloji ve algoritmalarının askerî alanda gelecekte daha fazla kullanacağı rahatlıkla ifade edebilecektir. Yıllar geçtikçe, zamanın askerî teknolojilerinin yerini yepyeni teknolojilere bıraktığı hatırlandığında, YZ'nin de geleceğin ordularının güç kapasitelerinde önemli bir rol oynayacağı açıktır. YZ'nin ABD, ÇHC ve RF'nin askerî ve güvenlik kapasitelerine yaptığı güncel katkılar dikkate alındığında, gelecekte güçlü bir orduya sahip olması gereken yetenekler arasında YZ'nin önemli etkiye sahip olacağı kesindir. YZ'nin geleceğin silahlı kuvvetlerinin temel olarak güç yapısında hızlı karar alma, yenilenme, yüksek

başarım yetenekleri, eğitim ve keşif/istihbarat, lojistik konularını şekillendireceği belirtilebilecektir.

Bir ordunun yönetiminde hızlı karar alabilme kabiliyeti açısından, YZ'nin geleceğin değişken harekât ortamında önemli katkılar sağlayacaktır. Yenilenme konusunda, otonom sistemlerin yorulmadığı ve kolay ikame edilebilir olduğu dikkate alındığında, YZ'nin silahlı kuvvetlere yapacağı katkı gelecekte oldukça etkili düzeyde olacaktır. Birçok olasılığı hesaplayabilen YZ teknolojileri, başarım konusunda silahlı kuvvetlere önemli katkılar sunabileceklerdir. Subay, savaş pilotu ve teknisyen eğitimi gibi alanlarda YZ uygulamaları, silahlı kuvvetlerin geleceğinde önemli rol oynayabileceklerdir. İstihbarat alanında görüntü yazılımları, fotoğraf, video vb. verilerin hızlı ve güvenilir analizi, yüz tanıma sistemleri konularında YZ teknolojileri devletlere yeni imkanlar kazandıracaktır.

YZ teknolojileri hâlihazırda devletlerin askerî ve güvenlik kapasitelerinde aktif bir şekilde kullanılmaktadır. Bu tür faaliyetlerin öncülüğünü ise ABD yapmaktadır. ABD, Afganistan, Suriye ve Irak'taki terör operasyonlarında YZ algoritmalarından başarıyla istifade etmektedir. Bu itibarla YZ ürün, model, teknoloji ve algoritmalarının askerî kapasiteye adapte edilmesi konusundaki küresel liderlik rolü, hala ABD'dedir. Bununla birlikte son yıllarda yaptığı planlamalar, hazırladığı resmî belgeler, tesis ettiği kurumsal yapılanmalar ve bütçe artışları ile ÇHC, YZ sektörlerinde ABD'ye adeta meydan okuyan bir kapasiteye ulaşmıştır. Bu itibarla ABD ve ÇHC arasında, küresel YZ endüstrisinin liderliğini elde etme konusunda bir güç mücadelesi bulunmaktadır.

ABD ve ÇHC'nin YZ ürün, model, teknoloji ve algoritmalarının askerî kapasiteye adapte edilmesine yönelik çabalarının, güvenlik analizleri dahilinde uluslararası ilişkiler alanında önemli sonuçları bulunmaktadır. İki küresel aktör arasındaki güç mücadelesi uluslararası ilişkiler disiplininde güvenlik ikilemi şeklinde kavramsallaştırılan analizler dahilinde değerlendirilebilir. Makalede detaylarıyla analiz edilmeye çalışıldığı haliyle, ABD ve ÇHC savunma ve güvenlik alanlarında YZ teknolojilerine yapılan yatırımları karşılıklı olarak bir tehdit emaresi olarak görebilmektedirler. Bu duruma doğrulayan bir örnek olarak ise ABD ve ÇHC'nin 2016-2019 yılları arasında YZ alanında karşılıklı olarak ilan ettikleri resmî strateji belgeleri gösterilebilir. Bu tehdit algılamalarının gelecek dönemde de süreceği ve YZ sektörü kapsamında iki devlet arasında adeta bir silahlanma yarışı başlayabileceği de olasılıklar arasında görülmelidir.

Uluslararası sistemdeki güç dengesinin sağlanmasına yönelik realist yaklaşımlar dahilinde, ABD ve ÇHC arasındaki YZ sektörleri ile ilgili rekabetin bazı sonuçları olabilecektir. Özellikle son yıllarda YZ sektörünü geliştirme konusunda ÇHC, çok büyük bir gayret içerisinde. Bu gayretleri dahilinde ÇHC, 2030 yılına kadar YZ sektörlerine yönelik yatırımlarının 150 milyar ABD doları olacağını resmî olarak kabul etmiştir. Bu çok önemli bir bütçe anlamına gelmektedir. Bu durum ÇHC'nin YZ konusundaki kapasitesini geliştirmeye yönelik inisiyatiflerini net bir şekilde ispat etmektedir. Bu nedenle küresel güç mücadelesi noktasında YZ sektörlerinin verdiği avantajlardan istifade ederek, ÇHC'nin ABD'ye üstünlük sağlayabileceği kimi analizlerde yer almaktadır. Bu noktada ÇHC'nin bazı dezavantajları olduğu hatırlanmalıdır. ÇHC'nin hâlihazırda askerî kapasitesine adapte ettiği YZ teknolojileri pratik olarak hiçbir çatışma ve savaş ortamında kullanılmamıştır. Ayrıca ABD'ye kıyasla ÇHC, YZ teknolojilerinde istihdam edeceği yetenekli mühendis temin etmede zorluklar yaşamaktadır. ABD ise daha iyi yaşam koşulları ve iyi ücretler ile dünyanın her yerinde en nitelikli YZ mühendislerini rahatlıkla ülkesine transfer edebilmektedir.

ABD ve ÇHC arasında yukarıda ifade edilen gelecek perspektiflerine RF'de dahil edilmelidir. RF'nin ÇHC ve ABD'ye kıyasla YZ ürün, teknoloji, algoritma ve modellerinin geliştirilmesi konusunda daha düşük profile sahip olduğu da kimi analizlerde yer alabilmektedir. Bu noktada RF'nin yeni nesil teknolojileri askerî kapasitesine adapte etme konusundaki teknolojik mirası hatırlanmalıdır. Bilindiği üzere RF, 1960'larda başlayan uzay yarışı ile birlikte ortaya çıkan yeni nesil teknolojik gelişmeleri süratle konvansiyonel güç yapısına adapte edebilmiştir. RF'nin sahip olduğu balistik ve güdümlü füze teknolojisi bunun en iyi örneğidir.

YZ teknolojilerin silahlı kuvvetlerinin güç yapısına adapte edilmesi, güvenlik ve istihbarat kapasitelerin artırılması konularında, ABD, ÇHC ve RF küresel düzeyde önemli aktörlerdir. Bunlarla birlikte ABD, RF ve ÇHC arasındaki YZ sektörlerine yönelik planlamaların karşılıklı tehdit algılamaları ile birlikte yeni bir silahlanma yarışına, güç mücadelesine ve uluslararası rekabete doğru evrilebileceğine yönelik kuvvetli emareler de söz konusudur. Bu durumu YZ sektörlerin askerî amaçlarla kullanımını düzenleyen uluslararası anlaşmaların ve düzenlemelerin eksikliği de teşvik etmektedir. Tüm bu gelişmelerinde uluslararası sistemin güvenliği noktasında makalemizde analiz edildiği şekliyle önemli etkileri olacağı da ileri sürülebilir.

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