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ARTIFICIAL INTELLIGENCE IN THE CONTEXT OF DEFENSE INDUSTRY: THE COMPARATIVE STUDY ON RUSSIAN AND THE US NATIONAL AI STRATEGIES

PREPARED BY

KHAIPNAZAROVA MILAVSHA

MASTER THESIS

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BAŞKENT ÜNİVERSİTESİ AVRUPA BİRLİĞİ VE ULUSLARARASI İLİŞKİLER ENSTİTÜSÜ

Siyaset Bilimi ve Uluslararası İlişkiler Anabilim Dalı Uluslararası İlişkiler Tezli Yüksek Lisans Programı çerçevesinde Milavsha Khaipnazarova tarafından hazırlanan bu çalışma, aşağıdaki jüri tarafından Yüksek Lisans Tezi olarak kabul edilmiştir.

Tez Savunma Tarihi: … / … / ……..

Tez Adı: Artificial Intelligence In The Context Of Defense Industry:
The Comparative Study On Russian And The US National AI Strategies

Tez Jüri Üyeleri (Unvanı, Adı - Soyadı, Kurumu)	**İmza**
Dr.Öğretim Üyesi Haluk Karadağ, Başkent Üniversitesi	…….
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BAŞKENT ÜNİVERSİTESİ AVRUPA BİRLİĞİ VE ULUSLARARASI İLİŞKİLER ENSTİTÜSÜ YÜKSEK LİSANS TEZ ÇALIŞMASI ORİJİNALLİK RAPORU

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Tez Başlığı: Artificial Intelligence In The Context Of Defense Industry:
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1. Kaynakça hariç

2. Alıntılar hariç

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ABSTRACT

Every state has to provide its own security since there is no higher authority to apply in the international system. This upper authority gap constitutes the anarchy of states that tend to solve the perceived problems on their own. In this environment of anarchy, states have made many new initiatives to ensure their safety and to maintain their existence. In the 21st century, with the development of technology, states have increased their investments in the defense industry against the elements that threaten their security. In this study, Russian and American national strategies on AI will be analyzed to determine the potential of Russia in AI-integrated defense industry. The study was limited to analyze AI national strategies of the USA and Russia. Due to the fact that China is an important international actor in the artificial intelligence competition, a general assessment will be made of it, but this will be excluded from the scope of the study. Furthermore, this research gives an overview on the capacity of Russia in AI-integrated defense industry and explains aspirations of Russia to be a leading state in the international arena in this field.

Keywords: Artificial Intelligence, Defense Industry, AI National Strategy, Russia, USA.

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ABBREVIATIONS

AI-Artificial Intelligence

DARPA-The Defense Advanced Research Project Agency

DDos-Distributed Denial-Of-Service

IBM-International Business Machines Corporation

ISR-Intelligence Surveillance and Reconnaissance

LAWS-Lethal Autonomous Weapon System

LOGSA-Logistical Support of the Army

MIT-Management of Information Technology

MoD-Ministry of Defense

NATO -North Atlantic Treaty Organization

OECD-Organisation for Economic Co-operation and Development

PRC-People's Republic of China

RF-Russian Federation

SIPRI-Stockholm International Peace Research Institute

USA-United States of America

1. INTRODUCTION

In the 21st century, with the developments in the fields of information and communication, there have been some changes in the security perceptions of the states. Considering the absence of the upper authority in the international arena, states' ability to maintain their existence is directly related to their own power. States need to increase the capacities of their forces in both the economic and military spheres in order to increase their presence in this anarchic environment. In particular, the capacity increase on the defense industry protects the states against external threats and also allows external intervention, which may pose a threat to their security. In recent years, the importance of artificial intelligence has been discussed by security experts in this field because of its widespread coverage in many fields, from science to politics, has generated controversy and taken a place in the literature.

Military technology is changing, but the competition for power in the world continues. Artificial intelligence offers different technological opportunities that have the ability to shape the future, but they do not define it. Countries, groups, and individuals have choices about how they use and respond to different uses of AI.

With the intention of accelerate the development and implementation of intelligent technologies, the leaderships of many countries are developing national strategies in favor of the development of artificial intelligence, containing practical steps to introduce new solutions in the economy, as well as creating national organizations to popularize and promote artificial intelligence. The previously approved 35 national strategies, which include the strategies of countries ranging from the USA, China and Russia to Argentina, in 2021, 9 more new ones were added: Turkey, Chile, Slovenia, UAE, Ireland, Vietnam, Great Britain, Brazil, Austria, including the release of an updated version of Japan's strategy. Also in recent years, the number of countries in which society makes increased demands on the ethics of AI is rapidly increasing. More than 20 countries have approved codes for private or public organizations. At the state level, documents are approved in 9 countries, including: the USA, Canada, Great Britain, the United Arab Emirates, Japan and others. In 2021, Russia joined them.

Moreover, leadership in artificial intelligence will be not only in the technology itself, but also in how society controls the technology. Besides, differently from the space race, at any rate, it's similar new technologies will be created for commercial purposes where private sector companies prevails than governments.

It will be a big problem for the governments in internal and external levels for the narrowing the break between the development of artificial intelligence technology and its productive utilization. The utilization strategies of technologies will become crucial because we still have no clue either the major item in the period of development AI technologies will be the creation of technology itself, or becoming the first to find out in applying technology. Based on historical experiences it can be said that second item will become crucial for the global power equally in military and economic domain.

In particular, the study focuses on how Russia is applying AI to its military capabilities in comparison to the United States based on their national AI strategies. This study is part of the author's efforts to provide timely, accurate and up-to-date information and analysis on the AI field in Russia. Mainly it's based on Russian-language and English-language materials from open sources. In some parts of this study the NATO's perspectives on AI has considered and mostly made connections with USA's perspectives on it as they have similar points on mentioned items.

The first chapter focuses on the terminology and historical background of artificial intelligence and describes technological developments in the field of artificial intelligence in some countries. After, has been provided a theoretical background on the AI-integrated defense industry, especially, has been explained Russia's aspirations of becoming a leading state in this field. Neorealism approach of realism has taken as a defining theory of the Russian goals for the leading position in the developments of AI-integrated defense industry. In the second chapter, the links between artificial intelligence and defense industry are analyzed. It focuses on AI-integrated areas in defense industry and examines main areas as Intelligence Surveillance Reconnaissance, Logistics, Cyberspace and Lethal Autonomous Weapons. Furthermore, the opportunities and challenges and its' impact on international system were discussed. In the third chapter, this research provides an overview of comparison of Russian and American AI national strategies. Afterwards, data on the significance of artificial intelligence in Russian defense industry has presented. In the conclusion section, data related to the subject has analyzed.

1.1.The Subject and Importance of the Study

The subject of the thesis is modern international relations, in particular the national strategies of states in the field of artificial intelligence in the example of two countries as Russia and USA. Thus, this research shows the links between the defense industry and artificial intelligence, the developments of Russia in the field of military technologies with artificial intelligence.

The chronology of the work covers the modern period in which the artificial intelligence research area began in 1956, but an outbreak of involvement in AI began around 2010 by virtue of the overlap of three stimulating developments: accessibility of "big data" sources, improvements in approaches machine learning and increasing the computing power of a computer.

This study is the first research in its field that analyzes the capacity of Russia's AI-integrated defense industry by comparison AI national strategies of the USA and Russia. The study is in accordance with information available in the public field. This research does not claim to be a general outline, instead of it focuses on the most important features.

1.2. Aim and Research Question of the Study

The research question of this study. Russia aims to be the leading country that can use artificial intelligence technologies in the defense industry.

The aim of the study includes:

• Explain the terminology and historical background of artificial intelligence,

• Indicate AI-integrated defense industry in the context of international relations theories,

• To analyze the link between artificial intelligence and defense industry and to examine its components,

• To examine the effect of artificial intelligence on the international system in different contexts,

• Evaluate the opportunities and challenges of artificial intelligence

• Examine the importance of artificial intelligence in the defense industry of Russia.

• Make a comparison of national strategies on AI of countries such as Russia and the USA.

• To outline the technological developments in the Russian military system.

1.3. Hypothesis of The Study

1) The Russia will take a leading position that will use artificial intelligence in the warfare very effectively.

2) The increase of using artificial intelligence in the battles of future will be inevitable.

2. LITERATURE REVIEW

Sources of research. To solve the problems in the work were studied the following groups of sources:

1) legislative acts;

2) government documents of a program nature;

3) the main programs of countries on national strategy of artificial intelligence;

4) speeches, statements, appeals of state and political figures.

Issues of prospects and problems of the "artificial intelligence in the context of Russian defense industry" in general, and around it are well represented in foreign studies. During the period of the announcement of countries' research on artificial intelligence, a large number of papers were published. These scientific papers highlight various aspects of national strategies, which imply the need to systematize them in compliance with the goal and objectives of the thesis. This research explores how Russia is applying AI to its military capabilities. This study is part of the author's efforts to provide timely, accurate and up-to-date information and analysis on the AI field in Russia. It is mainly based on Russian-language and English materials from open sources.

Considering the different literature of this topic, it is necessary to mention the scientific articles of researchers, such as Vadim Kozyulin, V. Burenok, Michael Horowitz, Elsa Kania , Samuell Bendett, Paul Sharre. In their scientific articles, these authors consider the development and prospects of the artificial intelligence in defense sector, pay great attention to the prerequisites of the strategic competition of countries in the era of artificial intelligence. Also can be distinguished the works of Greg Allen, Chan Taniel, Ptichkin Sergey, Leonid Bershidsky. The analysis of the works that affect the problems of this thesis,

leads to the conclusion that in foreign literature accumulated significant material, however there can be seen a lack of domestic materials.

3. METHODOLOGY AND LIMITATIONS

To analyze Russia's leading position, we compared it to the US in terms of strategic AI capabilities. To better explain and determine the position of Russia on developments of new technologies in defense area, the AI national strategy of USA has taken in the aim of make a comparison to establish clear perspective.

In the method of the research, a qualitative research and literature review methods are used as a main methods. In the study, besides the defense tools of the states on artificial intelligence, the AI national strategies of two countries as Russia and USA were included. The main aim of this research is to provide equally the integrity of the subject and the idea that Russia has the potential to be a leading country in the international arena in AI-integrated defense industry that's also mentioned in Russian National Strategy on AI. Books, online internet resources, academic articles, reports published by research centers as well as documents on official sites of states are used. Throughout the work, conspiracy theories and non-experts in the field have been taken care of as much as possible.

This research illustrates some of the developments in the field that are presently in progress or in stage of development, with different levels of autonomy or apply of AI. Due to the non-availability of all technical information, the author does not draw outcomes from these proposed degrees of autonomy and manual control. In the limitations of the study, defense industry and AI, its' integration into Russian defense sector, comparison of AI national strategies of Russia and USA are discussed. Some other countries are also working in this field. However, the study is conducted on the mentioned countries. In particular, the research explores how Russia is applying AI to its military capabilities. In addition, the research provides a discussion on the opportunities and challenges of AI and its' impact on the international system from different perspectives.

4. CONCEPTUAL THINKING ON AI

4.1.Historical Background of AI

The systems of artificial intelligence are incorporating in different sectors to promote better and faster solutions based on decision-making models that include machine learning, facial recognition, deep learning, speech recognition and etc.

The term of artificial intelligence has not general determination as it has investigated and applied in different scope. AI relates to the simulation of human intelligence in machines programmed to think and replicate human-being/actions. There is no broad consensus on the determination of AI as it can be integrated into the various domains.

One of the field's founders, Herbert Simon, voiced dissatisfaction with the term's grandiose picture, but allowed, “At any rate, 'artificial intelligence' is here to stay....It will eventually become idiomatic enough that it will no longer be the focus of cheap rhetoric.”[1]

According to the Bellman, "The automation of activities associated with human thought, such as decision-making, problem-solving, and learning." Kurzweil explains in this way: "The art of making machines that execute functions that would require intelligence if performed by humans." Also, there is another broader definition by Winston which says that artificial intelligence is “the study of computations that enable perception, reasoning, and action."Luger and Stubblefield stated that artificial intelligence is "the discipline of computer science devoted to the automation of intelligent behavior."[2]

“The potential of computer systems to do tasks that ordinarily require human intelligence,” according to the Defense Science Board's Summer Study on Autonomy in 2016.[3]

The AI technologies can be defined as the technologies that simulate human actions based on the achievements of trials and operate like a human including perception, cognition, planning, learning, communication and physical action. The investigations in the AI has started in the mid of twentieth century, but factors as the assess of big data sources,

[1] Herbert A. Simon, The Sciences of the Artificial, 3rd ed., Cambridge, Mass.: MIT Press, 1996, p. 4.
[2] Andrew W. Moore, “AI and National Security in 2017,” Presentation at AI and Global Security Summit, Washington, DC, November 1, 2017.
[3] Defense Science Board, 2016, p. 5.

developments of machine learning approaches, enlargement in computer processing power caused the interests of governments in 2010.

Many improvements in the field of artificial intelligence were made during the 1950s, thanks to an increase in research-based results in AI by numerous computer scientists and others.

In 1950, Alan Turing wrote "Computing Machinery and Intelligence," in which he developed the concept of The Imitation Game, which posed the question of whether machines can think. The Turing Test, which measured machine (artificial) intelligence, was based on this proposal. Turing's research looked on a machine's ability to think like a human. The Turing Test became a key component of artificial intelligence philosophy, which examines computer intelligence, consciousness, and ability.[4]

In 1956, John McCarthy mentioned the term of artificial intelligence at the conference at the Dartmouth University. This conference in the Dartmouth College in the summer of 1956 is regarded as the discipline's birthplace. John McCarthy is the founder of functional programming and the inventor of the Lisp language. However, Alan Turing formed the idea of this type of systems in 1935. Alan Turing offered a definition of an abstract computing machine, consisting of unlimited memory and a scanner moving back and forth over the memory. Nevertheless, in 1950, scientist suggested to consider as intelligent those systems that in communication will not diverge from a person.[5] In 1951, Christopher Strachey wrote the earliest successful artificial intelligence program which year later played checkers with a man; impressed the audience with its' ability to forecast moves of players. In that regard, after that year Alan Turing published an article on chess programming.

Simultaneously, Alan Turing has designed an empirical test for evaluating machine intelligence, which shows how much an artificial system has advanced in learning to communicate and whether it can impersonate a person.[6]

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[4] Rebecca Reynoso, A Complete History of Artificial Intelligence, https://www.g2.com/articles/history-of-artificial-intelligence

[5] J. McCarthy, M. L. Minsky, N. Rochester, and C. E. Shannon, "A Proposal for the Dartmouth Summer Research Project on Artificial Intelligence," August 31, 1955, published in AI Magazine, Vol. 27, No. 4, 2006.

[6] Alan Turing, "Computing Machinery and Intelligence," Mind, LIX/236 (1950), pp.433-460.

Joseph Weizenbaum developed the Eliza program in 1965. The Eliza program is can be regarded as a prototype of modern Siri. Joseph Weizenbaum is a specialist in Management of Information Technology (MIT). Then, the Stanford Cart was invented in 1973, which is the first computer-controlled unmanned vehicle. At the end of the 1970s, started to decline interest in AI.[7]

Artificial intelligence received a new development in the mid-1990s. The most famous example is the International Business Machines Corporation (IBM) Big Blue supercomputer, which defeated Garry Kasparov- world chess champion in 1997.[8] Today, such networks are developing very quickly due to the digitalization of information, an increase in its turnover and volume. Machines quickly analyze information and learn, subsequently they really acquire abilities that were previously considered a purely human prerogative.

Artificial intelligence, as it mentioned before, is the property of complex systems to perform tasks that are usually inherent in humans. There is a misunderstanding in the literature to detect the difference between automation, autonomy and artificial intelligence. To better find out the fine points of AI, it is important to understand the difference between automated and autonomous systems. An automated system is a system in which a computer reasons with a clear structure based on rules. In addition, the system makes the reasoning deterministically, which implies that for every input output the system will always be the same (until something goes wrong). An autonomous system is a system that thinks probable based on a set of input data, which means that it shapes assumptions about the best possible plan of action when entering sensor data. Compared to automated systems, autonomous systems with the same inputs will not necessarily behave the same way every time; rather, these type of systems will produce a range of behaviors.

Artificial intelligence pretends to be an "electricity" or internal combustion engine of nowadays which can apply in both civil and military domain to solve multi-level tasks at the same time. Due to its' general-purpose attitude the artificial intelligence seems to be more than a weapon, which makes it different from military weapon as missile or tank and etc.

[7] Ayshe Cemilova, Iskustvenniy intellekt: kratkaya istoriya, razvitiye, perspektivi, 5 August 2021, https://timeweb.com/ru/community/articles/chto-takoe-iskusstvennyy-intellekt
[8] "Google Achieves AI 'Breakthrough' by Beating Go Champion," BBC News, January 27, 2016.

In recent years, have been suggested many definitions of AI, however, the common element for all of them is that computers with the right software can be used to resolve problems that humans can do, also interact with humans and the world and create ideas as human-beings. Put differently, although the mechanisms that generate to AI are "artificial", the intelligence that the AI planned to approach is equivalent to human intelligence.

At the dawn of science, processing inputs from the outside world required extensive programming, which restrained early AI systems to a very narrow set of inputs and positions. Despite that, thereafter, computer science has worked to improve AI-enabled computing systems' abilities.

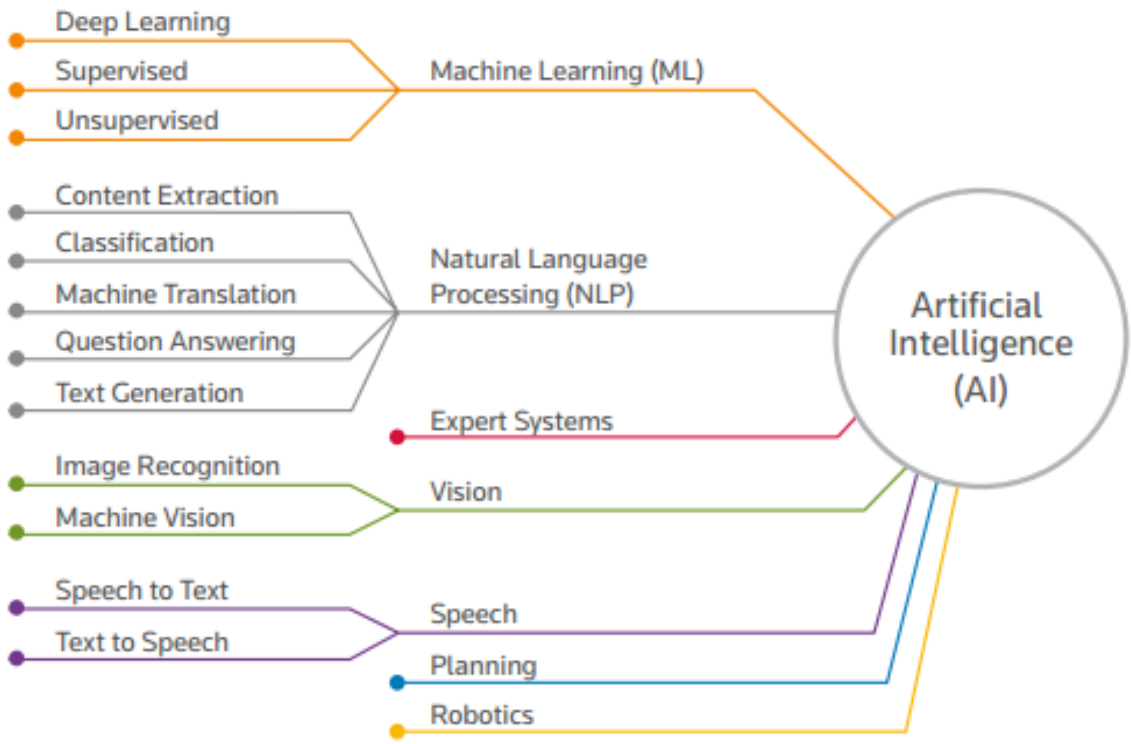

Figure 1. Different branches of AI capabilities

Due to the emergence, availability and accessibility of the overall AI technology there is a large number of use cases of AI technologies. The technologies can be gathered in this 7 capacities. (Figure 1).[9]

There are different types of artificial intelligence systems on the literature which divided due to capability as generations or layers. Artificial narrow intelligence - the system where machine intelligence compared with human brain for specific tasks. It can equal or exceed human intelligence in some domains. For instance, it can be seen or practiced in the internet sphere, in the games with integrated AI, in the banking sector, google translator, SIRI voice assistants and etc. Where AI systems applied for specific tasks, present limited performance. Artificial general intelligence- machine intelligence that meets all the capabilities of a human through any activity. Artificial superintelligence- machine intelligence that go beyond human intelligence in performing any activity.

Recent breakouts in the field of artificial intelligence concentrated on the field of the autonomous weapon system and their repercussions and their affect in the international arena than the creating safety atmosphere. Because there is obvious rivalry between some leading countries in the AI, consequently, it affects the balance of power, therefore, we should have a better thought about impacts of AI on the security of the countries and the stability in the international arena. After the two world wars there was a question about security dilemma, it was about rational enhancement of the weapons from sides to increase their security, even if sides have no desire to start a war, accumulation of weapons from both sides defined as an aggression as a respond to each other created less secure environment. From the beginning of the first steps in producing weapons to our days advanced military weapons always caused the dilemma of the security. The development of new technology means the ambiguity in every sphere about the capability, especially in the military area. The ambiguity emerges with the development of weapons and about its' application, how it will be used and in which level it will be influential. As an example, the Soviet Union and Germany in the World War II; the US and Soviet Union in the period of the Cold War, all of them knew their capability of military power. However, no one knew for sure how that weapons will be used in the battle and how powerful they can be, in repercussions of started the nuclear armament race. The advance in the artificial intelligence brings the ambiguity of both form, how it will be

[9] MILLS Michael, Artificial intelligence in law:the state of play 2016, p.3, https://www.neotalogic.com/wp-content/uploads/2016/04/Artificial-Intelligence-in-Law-The-State-of-Play-2016.pdf

used and how powerful it will be. The possibility of using AI in innovative and unexpected way may aggravate the subsisting security concerns.

Popular literature on AI, as a rule, focuses almost exclusively on the development of technology. Technology plays an important role in shaping world politics in the history of humanity. Many centuries ago, technologies like the printing machine enabled the development of the word written. They laid the foundation for new types of political protest and action.[10]

In the 20th century, nuclear weapons meaningfully enhanced the destructive potential of many countries. Although, the relative impact of the technological change often depends on the way of adoption by people, organizations and societies, use technology and on the underlying features of technology. However, AI appears considerably more like an internal combustion engine or electricity rather than a weapon. AI is a general -purpose technology, an enabler with a mass of applications. These features makes the AI great and wider than a rocket, submarine or tank.[11] Following key drivers can be considered as a main in the background of speedy progress of AI technologies. First driver is the recognizable growth in computing performance through decades. Second factor is the growing availability of large datasets for training machine- learning systems. Thirdly, developments in the application of machine learning technics and the last one is significant and speedy growing commercial investments in this field.[12]

Artificial intelligence is regarded as one of the most vivid technological game modifiers of this century, it's already beginning and anticipated to be a game changer on different aspects of life in private and public level. It can be seen in many sectors as financial markets, economy, security in domestic and international, logistics, defense systems social life and etc. The volume of available literature on public domain on AI in the military-technical field is comparatively low and highly conditional on defense. Unlike other disciplines (such as health, education or finance) where the overall perspective is that major and even devastating AI changes will lead to the core of these areas of human activity.

[10] Jeremiah E. Dittmar, "Information Technology and Economic Change: The Impact of the Printing Press," Quarterly Journal of Economics 126, no. 3 (August 2011): 1133-1172, https://doi.org/10.1093/qje/qjr035.

[11] Michael Horowitz, Artificial Intelligence, International Competition, and the Balance of Power, Texas National Security Review, Vol 1, Iss 3 May 2018

[12] Greg Allen and Taniel Chan, Artificial Intelligence and National Security, Belfer Center for Science and International Affairs, 2017, https://s3.amazonaws.com/files.cnas.org/documents/AI-NatSec-Allen-Chan.pdf?mtime=20180319093700 15p

Therefore, the military focus on AI remains constant in the nowadays' operating paradigm of warfare with enemies and winning, primarily from the continuity between "conventional" and "guerrilla" today.[13]

In addition, research of artificial intelligence mostly has favored from a huge boom in level, diversity, sources of funding and talent, as well as from major private sector players such as Apple, Amazon, Baidu, Google, Facebook, IBM, and Microsoft.[14] For the most private companies, AI systems are increasingly becoming more than just another asset with which slightly increase existing profits. Conversely, they are at the center of the enterprise's business model. Research on AI has also profited from traditional top managers' investment in research, including from the automotive industry – with $1 billion in Toyota and (in February 2017) Ford Motors investment programs, along with major Mercedes-Benz, BMW programs, as well as the pharmaceutical sector.[15] The strong combination of powerful equipment, wide financing, open (relatively) development and large (labeled) test data sets have led to outstanding achievements in many areas. This includes the natural language processing area that hasn't been solved in a long time: starting from the famous IBM Watson 2011 Jeopardy! victory continued with the public introduction of voice Virtual Personal Assistants (such as Apple's Siri or Microsoft's Cortana), the culmination of DeepMind 2015 project, which trains the deep neural network in more than 300,000 CNN and Daily Mail articles.[16]

Other improvements have come in face recognition, with different algorithms Google (GoogLeNet), Facebook (DeepFace – 2013), and Yahoo (DeepDense -2015)[17] have been obtained better than the human identification level. After all, Google DeepMind has made

[13] Jeffrey A. Friedman, The 2006 Lebanon Campaign and the Future of Warfare: Implications for Army and Defense Policy (Lulu. com, 2011),
[14] Nazre and Garg, "A Deep Dive in the Venture Landscape of Artificial Intelligence and Machine Learning."
[15] Stephan De Spiegeleire, Matthijs Maas and Tim Sweijs, Artificial intelligence and the future of defense: strategic implications for small- and medium-sized force providers
[16] Emerging Technology from the MIT Tech Review, "Google DeepMind Teaches Artificial Intelligence Machines to Read," MIT Technology Review, 2015, https://www.technologyreview.com/s/538616/google-deepmind-teaches-artificialintelligence-machines-to-read/.
[17] Cf. Emerging Technology from the MIT Tech Review, "The Face Detection Algorithm Set to Revolutionize Image Search," MIT Technology Review, 2015, https://www.technologyreview.com/s/535201/the-face-detection-algorithm-setto-revolutionize-image-search/.

prominent progress in developing AI self-learning agents that can perform superhuman in common video games (AlphaGo-2016)[18] and the game go (ATARI Deep – Q– 2013).[19]

For those who are not familiar with this field or who are very familiar with it, it may seem that artificial intelligence development is associated with a single technology, sometimes because it aims to reproduce human intelligence (singular)-a unified search for developing the brain nucleus in machines that humans have. However, nothing can be more remote than facts: in practice, AI is a collection of different areas that work on a variety of technologies that allow intellectual behavior to arise by working together in related environments, which are far from using only technology or a single discipline.[20]

AI-driven growth is likely to be highly uneven. By 2022, the added value of AI could be nearly $ 4 trillion. By 2030, the largest economic growth is expected in China and North America, which will account for 70% of the global economic impact of AI. The winner-take-all dynamics of AI benefits require strong regulation: concentrating AI systems in the hands of just a few high-income countries could leave developing countries far behind. These countries will not be able to take advantage of AI technologies or will benefit from them very little and, more importantly, will not have ownership of such technologies.[21]

Researchers from different countries are actively studying the threats that the malicious use of AI poses to society as a whole and to certain spheres of human activity, be it politics, economics, military affairs, defense industry and etc. However, threats directly to international information and psychological security haven't been yet identified as an independent one scope of consideration. Meanwhile, the use of AI to destabilize international relations through targeted high-tech information and psychological impact on people is an obvious great danger.

Which countries benefit from AI depends partly on where military innovation takes place. Immune institutions, such as private companies and academic departments, push the

[18] Volodymyr Mnih et al., "Playing Atari with Deep Reinforcement Learning," 2013.; Cade Metz, "Teaching Computers to Play Atari Is A Big Step Toward Bringing Robots Into the Real World," WIRED, 2015, https://www.wired.com/2015/12/teaching-ai-to-play-atari-will-help-robots-make-sense-of-our-world/

[19] In February 2017, another AI company, Libratus, also announced a breakthrough in AI systems playing poker against the best human players. cf. Cade Metz, "Inside the Poker AI That Out-Bluffed the Best Humans," WIRED, 2017, https://www.wired.com/2017/02/libratus/.

[20] Stephan De Spiegeleire, Matthijs Maas and Tim Sweijs, Artificial intelligence and the future of defense: strategic implications for small- and medium-sized force providers, Hague Centre for Strategic Studies, 2017, pp.20-39

[21] Razrabotka rekomendatsii ob eticheskih aspectah iskusstvennogo intellekta, https://ru.unesco.org/artificial-intelligence/ethics

limits of what is possible in the field of artificial intelligence. While some AI and robotic companies such as Boston Dynamics receive military research and development funding, others such as DeepMind cannot actively reject and reject interaction with military organizations. Unlike mostly military stealth technology, artificial intelligence uses a variety of technologies such as shopping, agriculture and stock trading and etc.[22]

4.2. AI Integrated Defense Industry in the IR Theories

In political science, ideas that shape national security approaches originate from different theoretical approaches. For this reason, based on the concept of politics, security, threats, power, interests, such as the basic components of security will be sought among these political ideas. There are different disciplines that explain the way the international systems' work and one of the main disciplines can be assumed as a realist theory. Realist theories also considered to be divided into classical realism and neo-realism perspectives. Realists claim that the main element that determines the foreign policy of the states is the desire to dominate others, just as in humans, and put security considerations into five basic arguments. First, they see the main actors of the international system as sovereign states. Second, they assume that the structure of the system is anarchic. Third, the current anarchic order they acknowledge that the only obstacle to achieving the goals of states is the forces of other states. Fourth, they foresee that states will always maximize their interests. Fifth, they argue that wars are made for security and power as a result of conflicts of interest.

According to realism, security means, in the simplest definition, the potential of states to eliminate an armed threat, that is to say, with military strength the state continues to exist. The only way to protect its territorial integrity and national sovereignty is to have good laws and strong armies, which is the starting point of the state-centered realist security approach.[23]

Conflicts and wars are seen as the most fundamental concepts of security studies, since the realists see international relations as a struggle for power and interest among the nation-states. In our reality, the ultimate goal of all countries is to ensure their security in an hostile and anarchic environment, and therefore all policies are determined by the power

[22] Clemency Burton-Hill, "The Superhero of Artificial Intelligence: Can This Genius Keep It in Check?" Guardian, Feb. 16, 2016, https://www.theguardian.com/technology/2016/feb/16/demis-hassabis-artificial-intelligence-deepmind-alphago

[23] Lebedeva M.M. Glava 2. Teoreticheskiye shkoli v mejdunarodnih issledovaniyah. Realizm i neorealism// Mirovaya politika. -2-e izd., ispr i dop. –M.: Aspect-Press, 2007. –C.28-35.-365 pp

calculations that will provide national security. In realism, the security of the state is ensured and therefore the security of the individual is ensured. For this reason, while the war and security issues in reality are considered high-level politics, social and cultural issues and the economy are seen as low politics.[24] Because economic issues are less concerned about national security than military issues. The classical realism and neo-realism perspectives explain national security in different ways and according to these approaches the state is the crucial actor of international relations. The interests of the state and survival of it in the international system plays a vital role. The tool to ensure the survival of the state, which is the basic unit of analysis, is the element of power. The security understanding of realism is based on the power elements of the states and the way these elements shape international relations via the "power struggle". There are important factors affecting the power potential of states. While geography, demography, resources and geopolitical elements are among these, the power element is basically defined through military power.

Factor of power is a main tool for ensuring the survival of the state. This tool is also is the main unit of analysis in the international system. Realism's understanding of security is founded on the strength elements of states and how these elements form international relations through "power struggles". Many criticial factors affecting the power capability of states. The main factors can be assumed as geography, demographics, resources, and geopolitical elements. The factor of the power is primarily defined through the military power.

Realists consider that there is no central authority in the international system, therefore states live in a context of anarchy.

The origins of the school of political realism go back to the works of Thucydides, Machiavelli, Hobbes, etc. In the school of realism there are some important names as Edward Hallet Carr, Reinhold Niebuhr and Hans J. Morgenthau. Hans Morgenthau (1904-1980), American political scientist, is known as a founder of the classical approach of realism. The common understanding for all realists is that man is a creature guided in his behavior by selfish interests manifested in the constant struggle for the survival. This assumption is also contemplated in international politics. [25]

[24] Tsigankov P.A., Teoriya mejdunarodnih otnosheniy, 2003
[25] Realism and neorealism , https://all-politologija.ru/knigi/politologiya-kurs-lekcij-ovcharova-litvinchuk/realizm-i-neorealizm

The school of realism formed in the 1940s in the United States. G. Morgenthau believed that international politics is always a struggle for power. He wrote the book "Politics Among Nations: The Struggle for Power and Peace" published after the Second World War, which formed the basis of classical realism. Realists advocate the "power" concept of politics. According to Morgenthau's "thoughts, the power idea of politics stems from the essential tendency of man to dominate". This principle also determines the behavior of states.[26]

Realists continue to debate whether the international system will be safe in the future, and whether the anarchy will end. An issue that almost all realists have in common is that the security concerns of states will continue in the post-Cold War period. States may resort to cooperation after the Cold War to solve the security problem, but the important point is the sustainability of cooperation. The biggest obstacle to sustainability is the distrust between states and the possibility of conflicts of interest with the cooperating states, despite the possibility that states' interests may change over time.

The First World War, the post-war order and the economic depression of 1929, as well as a broken international system under these conditions, formed the basis of Carr's thoughts. His most important article in this field is "The Crisis of Twenty Years". In this article, Carr emphasized the preservation of the post-war order. However, at the same time, he noted that as a result of the heavy economic and political obligations imposed on the defeated states, the Second World War broke out. He also cited the Versailles Agreement as the reason that brought Hitler to power. Carr mentioned that the international system is anarchic and it is difficult for states to establish long-term organizations among themselves.

From a completely different point of view, the American theologian Reinhold Niebuhr (1892-1971), was one of the persons who has an important influence on the emergence of classical realistic thought. It can be seen from Niebuhr's views on human nature. Theologian argues that liberals exaggerate morality, which is in his perspective always sinful and aggressive. In A Moral Man and an Immoral Society, Niebuhr says that there is a "natural egoistic impulse with which all life is bestowed."[27] The point is not only that people cannot surpass their own interests, but also that the larger the scale in which peoples operate whether in social or global, they are further from any ideals.

[26] Morgenthau , H. (1962) Politics in the Twentieth Century . Chicago : University of Chicago Press .
[27] Reinhold Niebuhr , Moral Man and Immoral Society, New York, 1932, pp.190-198

One of the key elements in the theory of realism is the national interest of the states. The foreign policy of the state should aim the protection the national interest. The ‘national interest’ conception developed by H. Morgenthau and defined in terms of power. National interest is the consciousness and repercussions in the leaders’ performance of the fundamental needs for the nation state, which expressed in providing national security and in establishing environment for the preservation and development of society. In the international arena, all states and nations strive to satisfy the primary need - the need for physical survival, to protect their physical, political and cultural identity against external attacks.

Along with the concept of national interest, the key role in the theory of political realism belongs to the concept of balance of power, which characterizes the situation of balance amongst states as an environment for maintaining peace and stability. Such approach of this theory based on Hobbes' interpretation of international relations as a hostile environment. In this approach, states are constantly vulnerable to the threat of attack, therefore forced to maintain a power capability comparable with rivals. Some states attempt to gain influence over others through foreign policy, expanding and strengthening their dominant position, and ensuring their superiority. Only by using the aggressive counteraction of another subject in international politics is it feasible to limit one subject's power desire. Realists believe that the international balance of power is the most effective means of maintaining peace. Because conflicts result from violations of the balance of power, creating and maintaining a balance of power is an important goal in international politics.

H. Morgenthau's and other realists' concepts have been chastised for their one-dimensionality and simplicity in comprehending the complex structure of international relations (almost everything is explained by the struggle for power, the achievement of a balance of power or its violation). The realists ignored the impact of economic, intergovernmental, and other structures, as well as trends in integration and international cooperation, on international politics.

By the end of the 1970s, neorealism (also known as structural realism) had emerged as a political realism movement. Kenneth Waltz, an American political scientist is considered as a founder of it. In defining international relations, neo-realists have made certain additions to realism. Neo-realism draws a structural framework on the base of the

view that the international system consists of sovereign states and that these states are functionally similar elements, while it asserts the view that the element that distinguishes states from each other is the distribution of power. In a general sense, neorealism constitutes an international policy philosophy by adding system analysis to unit-level analyses of classical realism.[28]

While maintaining fundamental realism postulates (such as the balance of forces and the primacy of national interest), neorealism considers the impact of economic players on politics. Politics is driven by a struggle for power as well as economic resources. K. Waltz linked international relations to the market, where governments compete to enhance their economic and other positions in order to increase their influence. The position of the system (structure) of international relations as a factor of influence on the state, producing limits or, conversely, advantageous conditions for its foreign policy action, is introduced into the analysis of world politics by neorealism.[29]

Although Waltz does not dismiss the concept of human nature, he feels it only applies to individuals and should not be used to explain how the international system functions. He speaks of three pictures in his debut book, Man, State, and War (1959),: individual, domestic, and international. There are three basic assumptions that determine the approach of neo-realism: anarchic system, the security-priority behavior of states, distribution of power, which determines the positions of the actors in the system.

According to neo-realists, the reason that the international system is anarchic is because it comes from the nature of the international system.[30] Since this environment of anarchy is due to the nature of the international system, there is no solution to end the anarchic order, and the environment of anarchy will remain constant. This means that states will always consider the possibility of resorting to violence when adopting their own policies.

The most important thinkers of neo-realists are Kenneth Waltz and John Mersheimer. Waltz and Mershaimer do not reject the fact that states should cooperate with each other. The point they reject is that these cooperations between states are not sustainable. They use the rapid development of military technologies and the constantly changing balance of power

[28] Kenneth Waltz, Theory of International Politics, 1979, New York : McGraw-Hill .
[29] Andrew Linklater, "Neo-realism in Theory and Practice", Ken Booth and Steve Smith(ed.), International Relations Theory Today, Cambridge: Polity Press, 1995, 341-361, pp.160-224
[30] (Waltz 1979). ibid

in the world to support their views. John Mearsheimer predicted that anarchy would spread again in the international arena in the post-Cold War period, instead of a unipolar world, and that international relations will shape accordingly.[31]

According to neo-realists, when states cooperate with other states to protect their national security, they see this cooperation as relative gain, not absolute gain. That's why they look at how much they gain instead of a win-win approach in cooperation. The view that states desire to increase their gains make impossible to maintain the cooperation and its' sustainability. Cooperation between nations can be realized, but only to a limited extent, according to the neo-realist viewpoint. Security issues, on the other hand, will dictate the bounds of collaboration, regardless of the level of cooperation, and will be based on the dominant logic of security competition. As a result, talking about a long-term, permanent peace or a world free of power battles is impossible. The structural realism claims that the most important feature of great powers is their military strength. In this way, it can make its power felt over others in the international system. Capturing important positions in the international system is also related to great military power. However, this status of great states may change over time.

In neo-realism, hegemony is defined by dominance, self-interest, and the use of power over others. It's commonly thought of in terms of military prowess, which is predicated on what Waltz refers to as material superiority. The number of great powers distinguishes world systems as unipolar, bipolar, or multipolar, respectively.

Neorealism can be divided into defensive and offensive realist theories. Waltz favors a defensive approach. This makes security a fundamental issue, and it claims that states should act defensively and defend the status quo because of their concern for security forces. The amount of powers in the system is an important consideration. Indeed, striving to become a hegemon is the best way to ensure security. In addition to Kenneth Waltz, there are other thinkers, who work on this subject and produce ideas about the power struggle. When we examine structural realism, another important name we come across in the international arena is John Mearsheimer. One of ideas that he represent is offensive realism, was mentioned in his book The Tragedy of Great Power Politics. J. Mearsheimer claims that states are power maximizers and denies the thought of status quo powers.[32] Those who

[31] Mearsheimer J., International Security, Vol. 15, No. 1. 1990, pp. 5-56.
[32] Mearsheimer, J.J. (2001). The tragedy of great power politics. New York: W.W.. Norton & Company, p.35

already occupy a strong position should also, don't miss out on the chance to derail any possible threat from a growing power, because delaying will allow this power to strike at a later time. This refers to how the United States should respond to the rise of China, and suggests taking an aggressive rather than a peaceful position. The thought of offensive realism says there are five elements that must arise in the struggle of states for power. When these five mentioned reasons impose their own elements arises the struggle for interstate power. One of the five elements that reveal the power struggle in offensive realism is that the most important actors of the system are the states. All of these states have aggressive military power. The fact that they are all inclined to attack leads to the formation of insecurity in the sense of attacking and defending. No state can understand the other states' intentions. The reason of doing this is striving for the survival. Otherwise, it means that they act against their security and safety. [33]

Criticism of neorealists

Neorealists argued that, because war is a result of the international system's anarchic nature, it is likely to persist in the future. They claim that the orderliness of the international system's principles has not fundamentally changed since Thucydides' time, despite the introduction of nuclear weapons.

Neorealism was the dominant theory of international relations from its debut in 1979 to the end of the Cold War. The theory's failure to explain the Soviet Union's rapid and peaceful demise called into question Waltz's contention that bipolar regimes should be more durable than multipolar systems. According to Waltz, stability is sometimes mistaken with length, which is not the same as peace, and the bipolar system was more stable in the latter meaning. Another major criticism of neorealism (and classical realism in general) is its inability to explain the ongoing great power peace and increased state cooperation since World War II. Alternative explanations that emphasize on the functions of institutions, norms, and internal regimes have proven to be a viable alternative to realistic theories, despite realistic theories continuing to have a significant influence on contemporary research and thinking.

Others have claimed that governments do not engage in the balanced behavior promised by neorealism, but rather prefer to join the bandwagon, or the stronger side, in

[33] Tayyar ARI, Uluslararasi İlişkiler Teorileri, 8.Baski, Mkm Yayıncılık, 2013, s.170

international crises. Waltz responds that while his theory explains the acts of intermediate and great powers, and that tiny vulnerable states are often the winners, their actions do not have a large impact on the direction of international affairs.

Adequate availability of weapons, military equipment and the possibility of its maintenance and modernization are the foundations of the security and defense capability of any state. Modern geopolitical trends in the world show that sufficient military power is a key argument for maintaining stability and peace. This is evidenced by new security risks, the growth of military spending in the world in recent years (according to SIPRI, in 2018, costs exceeded $ 1.7 trillion),[34] the active deployment of defense industries in a number of countries, as well as the persistence of dozens of armed conflicts in different regions of the world.

In addition to obvious reasons such as supplying army, reducing purchases from other states, developing industrial base, there is also the development of science and technology in general, the presence of a powerful production base, as well as the presence in the country of scientific and industrial base, which also influences the success in international politics.

Russia is one of the world's largest countries, with a long history and a diverse cultural heritage. Today's Russia is undergoing large-scale sociopolitical and economic transformations that are laying the groundwork for the country's future development.

Despite the challenging international circumstances and internal challenges, Russia objectively continues to play an essential role in global processes due to its tremendous economic, scientific, technical, and military capabilities, as well as its unique strategic location on the Eurasian continent.

The desire to increase their military security has been the foundation of international community countries' military policies. Military security is an important component of national security because it determines the state of a country's defense capability and its ability to protect national interests through the use of armed violence. Military security refers to a country's ability to withstand the outbreak of war, its participation in one, and, in the event of a conflict, to minimize damage and harmful effects to the country's national security.

[34] SIPRI database on arms spending, https://www.sipri.org/databases/milex

To maintain military security, Russia needs to maintain its military potential at a level sufficient for defense in the event of a crisis situation in the immediate vicinity of the state border. The required level of military security is achieved in the presence of the entire complex of structural components, both purely military and political-diplomatic, economic, ideological and others, by purposeful and coordinated efforts of state institutions.

The military component includes the military organization of the state, created to ensure military security relying on military force.

The military component assumes the presence of certain quantitative and qualitative indicators that include:

- the size of the Armed Forces, including command and control systems, other troops, military formations, and bodies;

- the level of training of troops and forces that determines their combat effectiveness and combat readiness;

- technical equipment of the Armed Forces and other troops (military equipment, ammunition, military-technical property);

-the presence of stocks of weapons and military equipment contained in arsenals, bases and warehouses;

-the state of the military infrastructure (stationary facilities) designed to ensure the training of troops (forces), strategic and operational deployment and conduct of hostilities.[35]

Russia's national interests in the military sphere are to protect its independence, sovereignty, state and territorial integrity, to prevent military aggression against Russia and its allies, and to provide conditions for the peaceful, democratic development of the state. According to the defensive approach of neorealism, Russia tries to protect its' security and territorial integrity. Also, the factor of increasing its' power maintains the aspirations of Russia to keep dominance and strengthen it in regional and international level by accelerating the pace of technological developments and integrate new technologies as artificial intelligence into defense sector. Aforementioned, neorealism defensive approach doesn't reject cooperation of states for the sake of states' interests, thus, Russia also

[35] Voyennaya poltiika i problemi obespeceheniya voennoy bezopasnosti rossiyskoy Federatsii, https://flot.com/publications/books/shelf/safety/9.htm

emphasizes openness to dialogue and cooperation on the development of new technologies for the defense sector. Another crucial aspect of defensive neorealist approach says that military power and capability can define the material superiority of the state which is emphasized on official documents on national strategy of the Russian Federation. In addition, Russia uses the sale of weapons to promote its foreign policy interests, including the development of defense relations and the strengthening of Russia's regional and global influence. Russia is the world's second largest arms exporter after the US. Russia exports weapons to more than 45 countries and has accounted for about 20% of global arms sales since 2016.[36] Supporting defense relations and developing new weapons is important for Russia to demonstrate global military, diplomatic and political power, and such relations are part of Russia's foreign policy.

4.3.Technological Developments and AI in Warfare

Many countries are trying to develop new technologies with integrated AI, states like the USA, China, Russia are at the forefront of this competition. Firstly, technological disruptions are taking place in civil and military domains. The defense sector is playing significant role in the competition between powerful states to test their potential power.

Especially, recent progresses in artificial intelligence propose that these technologies will have inexorable and revolutionary effects on the military power of states, strategic rivalry between states. After World War II, autonomous systems were used in military technology and the defense sector to some extent. Recent advancements in machine learning and artificial intelligence, on the other hand, mark a watershed point in the application of cognitive solutions and automation to improve "battle space awareness."

One of the fields of AI investigation is the national security field. The technology is for multipurpose apply because of its possibility of combining into all things as the founder of Wired Magazine, Kevin Kelley argued, the technology of AI will have the possibility of revival objects as electricity’s possibility century ago. Everything that electrified will cognitize. AI applications for both military and civil use. AI is compatible clear as its combination into an object isn’t directly distinguishable. Nowadays, the armed forces are

[36] Russian Arms Sales and Defense Industry, Congressional Research Service
October 14, 2021, https://crsreports.congress.gov

associated with the imagine of contemporary age of development of technology and industry. The armed force was used in other form and by various actors in international system until the nation state has become the dominant actor, and the ability of defence forces differed from the age of industry upheaval where the AI will influence all the fields which will lead to the significant changes. The AI systems can be applied in different contexts such as algorithmic targeting, automating cyber operations, mission handoff, Situational Awareness and Understanding, Automated Planning and Manpower Allocation and etc.

The physical technologies caused the industrial revolution which altered the everything: polities, societies, economies, cultures and etc. One aspect of the revolution which is not so noticeably changed everything from the top to the bottom is socio-technological innovation that developed and invaded communities. The introduction of AI into the management system significantly expands the possibilities for the operational collection and analysis of information of a public nature, which makes it possible to make socio-economic decisions and form certain aspects in domestic politics. Innovative advances in AI bring not only benefits to economies, but also risks to provoke real conflict between countries. And therein lies the grave danger of new technologies. Humanity lives in the wrong expectation that technology will be the key to solving problems in this area, and renewable energy will save future generations from looking for complex solutions that require lifestyle changes.

The technological breakthroughs are taking place in many states as US, Russia, China, UK, India, Turkey and etc. Achieving a leadership position in the field of artificial intelligence is viewed by many countries as a claim for global domination. It is assumed that AI will make it possible to achieve superiority in science, industry and the military. Russia also entered this race by adopting the National Strategy for the Development of Artificial Intelligence and the corresponding federal program.

The official history of artificial intelligence in Russia began in January 2019, when President Vladimir Putin instructed the government, Sberbank and other interested organizations to develop and present suggestions for a national plan for the development of artificial intelligence.

Despite the fact that there is a global consensus that AI should serve the greater good, only the European Union stresses ethics, while the United States, China, and Russia fear that over-regulation will cause a delay. For any country to attain technical independence, it is

critical to establish ownership over its own data. Second, large data is a critical component in the development of effective AI systems. In terms of data openness, there are two global tendencies. The American strategy, which was backed up by the Organisation for Economic Co-operation and Development (OECD), centered on "data access without borders," while the Chinese approach severely controls information flow across national borders. The United States and China account for 90% of the market value of the world's top 70 digital platforms. Europe accounts for 4% of the total, whereas Africa and Latin America combined account for barely 1%.[37]

The rapid development of artificial intelligence technologies creates a noticeable tension in the international community. It manifests itself in the global race for AI leadership, discussions on key issues of regulation of AI-technologies.

Although the AI environment today is highly competitive, the main priorities of states in the development of artificial intelligence, in general, coincide. There is a consensus in the world that all AI development should be in the interests of humans; that the creation and use of AI products must meet certain ethical standards; it is preferable to create new standards and rules with the cooperation of the entire world community; and the general progress will be served by the exchange of information and technologies, open databases, the presence of a wide expert community and the global labor market.

The world championship in the field of AI has become part of a larger task for the People's Republic of China (PRC) to return its' lost position of a technological leader. In three phases, by 2030, China sees itself "at the forefront of innovative countries and economic forces."[38]

The Chinese Strategy is focused on competition rather than interaction. It notes that the leading countries of the world today are trying to seize the initiative in a new round of international scientific and technical competition, and China should "firmly seize the strategic initiative at a new stage of international competition in the development of AI."

"Maintaining the United States' global leadership in AI" is a priority for Washington. Donald Trump launched the American AI Initiative in February 2019 and signed the

[37] Vadim Kozyulin, Mnogostoronnee sotrudnichestvo v oblasti reguylirovaniya ispolzovaniya tehnologiy iskustvennogo intellekta, Pir-Press, 2021 https://mail.pircenter.org/media/content/files/14/16167308390.pdf

[38] A Next Generation Artificial Intelligence Development Plan, July 20, 2017 https://chinacopyrightandmedia.wordpress.com/2017/07/20/anext-generation-artificial-intelligence-development-plan/

Executive Order to Maintain America's Leadership in Artificial Intelligence, which states: "Continued American leadership in the field of artificial intelligence is of paramount importance for maintaining the United States' economic and national security and shaping the global evolution of artificial intelligence in accordance with our country's values, policies, and priorities."[39]

Washington concentrates government agencies on “building an international environment that supports American artificial intelligence research and innovation and opens markets for American artificial intelligence companies while safeguarding technological advantages in the area."[40]

An example of how the United States can "protect advantages" is the confrontation of the American government with Chinese companies Huawei Technologies, ZTE, China Mobile and China Unicom. The most significant project in the US Department of Defense, testing AI technologies not just in the defense industry, also in the military affairs on an ongoing basis, is the Algorithmic Warfare Unit (Project Maven).

The advanced military powers of the world distinguish the importance of AI system and its quality of replacing soldiers which face various issues as scope, difficulty, time, sustainability and advancement over the people’s decision making. AI’s possibilities show the perspectives as high quality analysis, ability of decision making, time speed up and other peculiarities in any situation. That’s why world’s advanced military forces are investing in AI technologies and developments of them therefore, AI systems are adapted to the underpinning needs about the improvement of military doctrines, which has the ability of replacement the pattern of deterrence and hostilities in the following years.

Artificial intelligence is not only Russia's future, but humanity's future as well. The person who rises to the top in this sphere will be the world's ruler.[41] These words of Putin another illustration of the race for leadership in the military use of artificial intelligence, which joined the United States, Russia and China. All three countries have declared "smart

[39] Maintaining American Leadership in Artificial Intelligence: Executive Order 13859 of February 11, 2019 // Federal Register, https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence
[40] Maintaining American Leadership in Artificial Intelligence: Executive Order 13859 of February 11, 2019 // Federal Register, https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence
[41] Putin:lider v sfere iskustvennogo intellekta stanet vlastelinom mira, 1 September 2017, https://ria.ru/20170901/1501566046.html

machines" an essential aspect of state security. Intelligence processing software, autonomous flying or ground drones all designed to make the soldier stronger.

One of the reasons for China's rapid development in the field of artificial intelligence is the abundance of data. The Chinese in everyday life pay online more often than any other country, order more goods at home, actively use services for the sharing of bicycles and so on. The state is deploying large-scale facial recognition and identification systems, a project to automate the work of the whole province by 2020 and the creation of "smart cities". All this produces a huge amount of information on which to train artificial intelligence. In 2017, Chinese startups in the field of artificial intelligence received 48% of all global venture investments in this area, and Americans 38%. However, the race in artificial intelligence today is not like the race to create nuclear weapons. Experts note that, despite the competition and the thickening of colors in the media, Americans and Chinese often work together in the same companies, and research centers of it giants from these countries can be both in China and in the United States. So, Google opens laboratory for the study of artificial intelligence in China, and the Chinese "Baidu" and "Tencent" have lab in the USA. The connection between Silicon Valley and Shanghai is closer than it seems at first glance. AI inevitably converges with traditional foreign policy issues as a basis for transformations. At the highest level, this is the impact of the world powers on the balance. The potential of AI to promote national economic interests and security interests has caused fierce competition between governments to gain strategic advantage. China's national AI strategy shows how seriously governments are taking this technology and making big bets on the future of this industry .[42]

[42] Michael Horowitz, Artificial Intelligence, International Competition, and the Balance of Power, Texas National Security Review, Vol 1, Iss 3 May 2018, pp.33

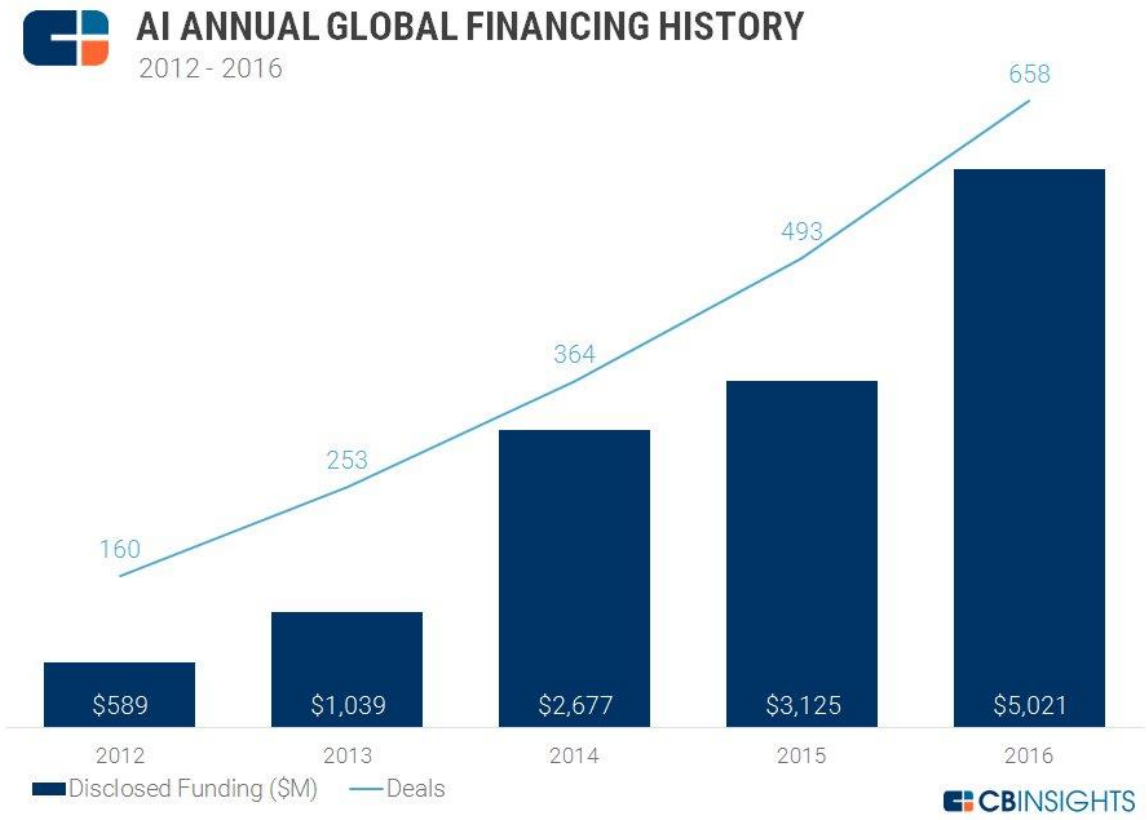

Figure 2. AI annual global financing history from between 2012-2016[43]

[43] https://ylucleo.files.wordpress.com/2017/06/cb-insights_state-of-ai-report.pdf

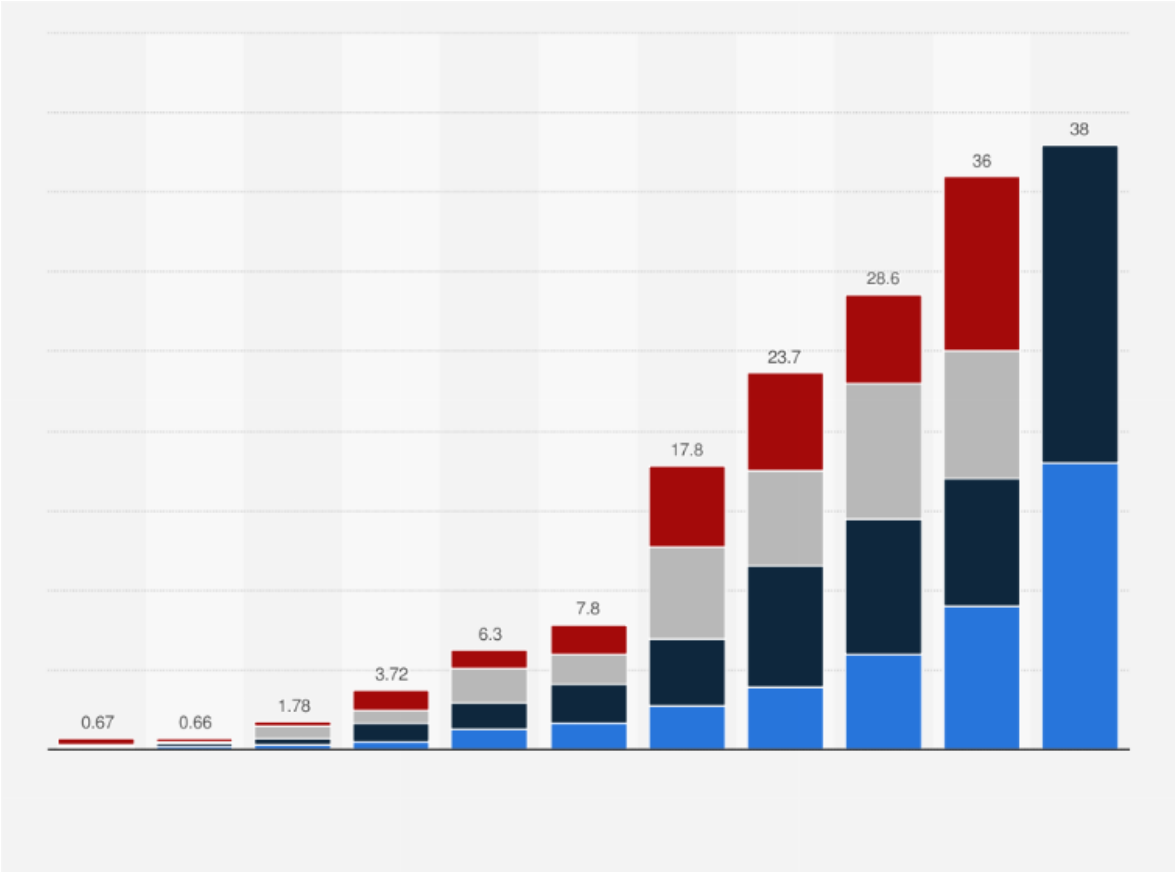

Figure 3. AI funding worldwide 2011-2021, by quarter[44]

Artificial intelligence startup financing has increased dramatically over the last decade, from 670 million dollars in 2011 to 36 billion dollars in 2020. Given what we know about AI startup funding in the first and second quarters of 2021, it appears that the entire year of 2021 will witness increases in AI startup investment.

Investments in AI worldwide are rising as an arms race for economic and security purposes. States as China, US and Russia are applying new national security concept due to development of AI technology that changes the course of the global politics. In 2017, China announced a national strategy for artificial intelligence and said AI represents a serious strategic opportunity, and proposed a strategy to create the advantages of China's pioneer

[44] Statista Research Department, Jul 30, 2021

and coordinate world leadership in AI technologies.[45] Russia is also making great investments, especially in the military arena.

These countries are not the only entities that are interested in using AI in the field of national security. The nature of AI technology, like robotics, makes many countries well prepared to develop and deploy it for military purposes. Commercial incentives for AI development, as well as the dual-use nature of many AI applications, indicate that advanced information economies in Southeast Asia are poised to become AI leaders, or at the very least rapid followers. Singapore is a leader in artificial intelligence investing (both military and non-military). AI research is also progressing in other Southeast Asian countries. South Korea has developed the SGR-A1, a semi-autonomous weapons system aimed at defending the demilitarized zone against North Korean attacks.[46]

Adapting to the changing character of conflict is now a tremendous task for government and military leaders, according to academics, and the scope of this challenge will only rise in the future decades as the potential of this era is unveiled. The use of fourth-industrial-revolution technology in hostilities, which are poorly covered by international law, may result in the threat of an uncontrolled environment. Experts say the biggest worry is that advancements in military artificial intelligence, machine learning, and robots might lead to a link being removed from the chain of human decision-making.

The process of forming policy in the AI arena is now exacerbated by the vulnerability of narrow AI approaches, both because of potential adversary deliberate acts and because of some inherent uncertainty in AI systems. The convergence of cybernetics and information security, in particular, will necessitate extensive cooperation to ensure that artificial intelligence systems are not only advanced but also safe to use.

Rivalry around the world in the field of military artificial intelligence continues to grow, and there is a general opinion indicating that the arms race in the field of artificial intelligence continues. However, any benefits that are possible in the short term may be short-lived, many countries and a host of growing powers include AI in their political and military strategies. In light of the ever-increasing tide that promotes AI hopes around the

[45] Webster G., Creemers R., Triolo P. And Kania E., China's Plan to 'Lead' in AI: Purpose, Prospects, and Problems, Aug. 1, 2017, https://www.newamerica.org/cybersecurityinitiative/digichina/blog/full-translation-chinas-new-generation-artificial-intelligence-development-plan-2017/

[46] Michael Horowitz, Artificial Intelligence, International Competition, and the Balance of Power, Texas National Security Review, March 15, 2018, pp.30-40

world, temporary advantages are unlikely to provide long-term military superiority. For example, China and Russia will eventually have their own versions of multi-mode ISR along with accurate pulse and layered protection.[47] These are not primarily technical issues. AI increases the effectiveness of many tactical and strategic systems, but it does not give anyone the ultimate one-sided advantage. The war is going on and the AI burns most of these changes, but there is nothing yet to see if the deterrence calculation is sustainable. While competition that maintains the balance of power can be balanced, accompanying uncertainty has historically led to the wrong calculations and conflict of the great powers.

Gregory Allen, an employee of the non-party analytical "Center for new American Security", said: "the US, Russia and China agree that artificial intelligence will be a key technology, and its development will depend on the power in the world." He also refers to a recent report commissioned by the office of the director of national intelligence, which states that artificial intelligence can affect the course of military conflicts no less than nuclear weapons.[48]

In July, the State Council of China published a detailed strategy designed to make the country a "leader and world center of innovation in AI" by 2030. Among the provisions of the strategy, there are commitments to invest in AI-related research aimed at progress in defense and national security. It is known that Pentagon has been developed a strategy known as "Third Offset", the purpose of which is to obtain with the help of AI the same advantage over potential opponents as once with a nuclear bomb. In April, the Department of Defense created a military cross-functional algorithmic group just to improve AI technologies, including machine vision, in the Pentagon. This time, the arms race promises to be different, because, unlike nuclear weapons or stealth technology, artificial intelligence can be used for both military and civilian applications. China is trying to directly link commercial and defense developments. For example, the state machine learning laboratory, which opened in February, is managed by specialists from the country's largest search engine, Baidu. Another partner of the project is Beihan University, a leading center for the creation of military drones. The U.S. Department of Commerce has even restricted the sale of certain goods to this organization for national security reasons. The US government has

[47] AI and the Military: Forever Altering Strategic Stability, February 13, 2019, Technology for Global Security, 26 p
[48] Horowitz M., Allen G., Kania E. and Scharre P., Strategic Competition in an Era of Artificial Intelligence, July 2018, Center for a New American Security, p.27

no way of ordering commercial companies to cooperate with the military, and Defense Secretary James Mattis during a recent trip to the West coast, visited the offices of Amazon and Google, said that his Department should cooperate more closely with the business. In particular, the Pentagon plans to increase spending on its DIUx project, created by the Obama administration, which is designed to help small technology companies to conduct joint projects with the military. In Russia, the technology sector is smaller than in the US or China, which puts the country at a disadvantage in this race. On the other hand, there are strong scientific and technical schools and staff. However, advanced technology is not everything, it is also important how the available opportunities are used. Samuel Bendett, researcher on the Russian military complex, which works at the U.S. Naval Analytical Center (a non-profit organization with state funding) said that in recent conflicts in Syria and Ukraine, Russia has demonstrated that much can be done without the latest technology. In particular, although the Russian drones are cheaper and can fly short distances, rather than American, they are very effective.[49] Allen suggests that Russia may use machine learning in intelligence and propaganda campaigns more aggressively than its rivals. According to him, automation can improve the effectiveness of hacker attacks and campaigns in social networks.[50] Putin suggested that Russia's advances in artificial intelligence could make the world a safer place — presumably with the stabilizing effect of nuclear deterrence in mind. According to him, "it would be highly undesirable if someone won a monopolistic position."[51] Military technology is changing, but the competition for power in the world continues.

Artificial intelligence has great potential to influence the balance of power in the global economy and in military competition. Although AI has a long history, AI has begun to produce results over the past decade, especially because of recent rapid breakthroughs in machine learning and greater data and computing power available. No matter how important recent progress is, AI remains largely problematic and context-sensitive. It turned out to be

[49] Samuel Bendett, "In AI, Russia Is Hustling to Catch Up," Defense One, April 4, 2018, https://www.defenseone.com/ideas/2018/04/russia-races-forward-aidevelopment/147178/.

[50] For Superpowers, Artificial Intelligence Fuels New Global Arms Race, ttps://www.yahoo.com/news/superpowers-artificial-intelligence-fuels-global-110000801.html?guccounter=1&guce_referrer=aHR0cHM6Ly95YW5kZXgucnUv&guce_referrer_sig=AQAAAFQuDO_u6pjO7Ia_nI-rvq8-f9-d-cbv8tE2w2VzvW-DzMkmvwQKCgA7kvQchGAENRK1xLZeH7foaJbZVJQzHV36PyrvMhgtqyJS9otdLEQL6qK7KG-akWMQBUVuVyGahPB-TMLWay55dVciQnTDhyw5RyyxPmEC54thc63eaxo8

[51] Putin ob iskusstvennom intellekte: Tot, kto stanet liderom v etoy sfere, budet vlastelinom mira, 1 September 2017, https://gordonua.com/news/worldnews/putin-ob-iskusstvennom-intellekte-tot-kto-stanet-liderom-v-etoy-sfere-budet-vlastelinom-mira-205300.html

extremely difficult to translate progress in some areas into others, even into those that are closely related. The need of developing robust supporting capabilities for AI, the AI ecosystem, which is critical for effective AI adoption, has been overlooked by both the public and private sectors. The AI ecosystem includes skilled labor and competent management; digital ability to collect, to process and use data; the investment climate and policy framework required for AI to thrive, as well as technical basis of trust, security, and reliability. The government maintains its role in mastering more complex technologies that do not provide quick return on investment for the private sector; developing the tools needed to establish the reliability of AI (including trust, explainability, validation, verification, and security) for critical applications of state and national security; and development and strengthening of the ecosystem of AI.

In addition, states will be pushed to build autonomous systems as rapidly as possible in order to stay ahead of their competitors in the AI arms race, and they will have little time to consider properly the long-term implications of introducing such new technologies. In next chapter will be explained the ties between artificial intelligence and defense industry and how developed the process of integrating artificial intelligence technologies into the defense industry.

5. AI IN DEFENSE INDUSTRY

5.1. Defense Industry and AI

It’s disputable that, global defense industry was not on the same scope before World War II, as it does nowadays. Simultaneously, arms production has been a minor matter for most of history, a small business, and rather sporadic, that has risen and fallen as wars and conflicts escalated and weakened. The defense industry was a sphere received a lack of attention of many scholars, politicians and economists. However, this course of situation started to change after the World War II and push states for tough competition of arms race in the period of Cold War. Two big powers of Cold War era the USA and the Soviet Union intensified their defense industry in a way of being superpower. The escalation of conflict as Cuban Missile Crisis paused those two states in gaining and developing new types of weapons as nuclear weapons and etc., for a meanwhile, though after Cold War it’s seen a huge amount of arms trade which still continues to grow. The World Wars and Cold War in

the 20th century affected the character, scale, and scope of the defense industry, hence that century assumed as a turning point of the defense sector. After the collapse of Soviet Union, the end of the Cold War, many countries in the world reduced their national defense budget that led to competition of defense industry companies and export markets. This declines stopped in the late 1990s, when outbreaks of local disputes (Serbia, Kosovo, Rwanda, Haiti, etc.) began to threaten neighboring countries and global stability. The events of September 11, the proliferation of local disputes, the active role of states as the United States, Russia, China, Western Europe in these conflicts led to an increase in defense spending around the world, although it did not return to the high levels of the Cold War era. Afterwards, however, continued to grow that still shows a high level of development of defense industry and expenditure on it. It appears that economic pressure pushed the defense to limit the spread of advanced conventional weapons. Furthermore, it erased the division of the defense industry and forced companies and governments to cooperate as well as compete across borders. The result of this new environment was the emergence of a small group of defense giants in the United States and Western Europe. In countries like Russia and China the defense industry continued to be under the government control mostly, but after a time divided between government and private companies. In worldwide, today, defense industry and defense policies defined by market structures which plays an important role.

The defense industry is a permanently mutating and evolving sector, for this reason, it creates many challenges to analyze and assess certain data on it. The defense industry is a strategically essential sector of many countries, especially big powers in our decade. The defense industry includes public organizations and private firms engaged in research and development, production, maintenance of military equipment and structures. Defense R&D is a critical component of arms-producing countries' national innovation systems. While the technology is neither unique nor successful in and of itself, it is seen as critical to threat analysis and military dominance. As a result, merely maintaining the technological effort is considered as a requirement rather than an option for combating unforeseen and sometimes unpredictable foes. This viewpoint also explains why many states continue to devote a significant portion of their budget on defense. Maintaining technical superiority necessitates a well-thought-out technology policy with operational and financial ramifications.[52]

[52] Renaud Bellais & Daniel Fiott, Technology and the defense industry: real threats, bad habits, or new (market) opportunities?, 2017

The defense sector has been characterized numerous times in a variety of studies and even by a number of public and commercial organizations. Innumerable definitions of what the defense industry is reflect a wide range of explanations and opinions.

The defense industry is a worldwide industry that manufactures weapons, military technologies, and equipment. Commercial companies involved in military research and development, production, and service are included. They're known as the government's defense contractors. The government controls the defense sector in a number of ways, including as an owner, controlling shareholder, source of R&D money, and the primary consumer.[53] According to the Aerospace and Defence Industries Association of Europe the defense industry is a highly regulated industry that creates long-lasting systems based on cutting-edge, high-end technology with the goal of delivering military superiority over prospective enemies. According to ASD, governments' unique involvement on this monopsony market is governed by specific rules and funding programs.

According to the Russian Defense Ministry the country's defense industrial complex (DIC) is tasked with two main tasks: first, to provide the country's Armed Forces with modern weapons and military equipment in sufficient quantities to maintain the country's security; and second, to develop and produce science-intensive civilian products, given that virtually all high-tech mechanical engineering has been concentrated in the defense industries since Soviet times. In the text mentioned above, the word "defense industry" refers to a group of businesses and organizations that work together to create and manufacture military and civilian products.[54]

Military affairs include everything from military personnel and veterans to equipment and infrastructure, as well as the procedures, doctrines, organizational concepts, and technology that help the military achieve its strategic and tactical objectives.[55] This may vary from country to country.

In this study defense industry and the military affairs that has wide range of branches discussed in different levels. With the integration of artificial intelligence technologies into

[53] Kondratyev Vladimir, “Globalnaya oboronnaya promishlennost”, Perspektivi, 2013, http://www.perspektivy.info/rus/ekob/globalnaja_oboronnaja_promyshlennost_2013-04-24.htm

[54] A.Sokolov, Analiz finansovo-ekonomicheskogo sostoyaniya predpriyatiy oboronnoy promishlennosti Rossiyskoy Federatsii v 2000-2007 godah, Vestnik NGU, Seriya:Sotsiyalno-ekonomicheskiye nauki, Tom 9, 2009

[55] Military Affairs, Rand, https://www.rand.org/topics/military-affairs.html

the defense industry, its wider use, the strategies and doctrines developed for it will not only be discussed with its effects on the defense industry, but also with its increasing impact on the armed forces.

The defense industry is an important level of industrialization within the ecosystem and distinguished as one of the most effective power tools of political and economic power. Defense production is an area of production (industry) of the state, which is a set of research, testing institutions, organizations and industrial enterprises that carry out the development, testing, production and disposal of weapons, military and special equipment and other property for the armed forces (power structures) of the state. In the 21st century intelligence, surveillance and reconnaissance, space, electronic warfare and cyber are getting more significant, certainly enhancing arms race in this sector between big states. Some authors narrow the concept of defense production by showing it to be the most important, but not the only, however integral part of the military-industrial complex, which, according to some, does not correspond to the definition of the military-industrial complex. The main goal of defense industry for states is to develop and manufacture products that they can utilize for the protection of the country and its' national interests and citizens.

As it is mentioned above, the realist approach emphasis on power of the state and self-interest in the international relations, therefore emphasizes the importance of the defense sector to the power. Nowadays, the defense industry plays one of the main vital roles in the existence of the state and takes leading place in making national policy of any state. Defense industry considers the industrial base, industrial potential, technological development and innovation. For the development of defense industry countries need to allocate a big amount of budget.

The most important thing that should be known to all citizens is the fact that national defense is carried out under the flag of the country and in the name of preserving and protecting the national territory, its traditions and its benefits. The main defense industry provides weapons, ammunition, missiles, military aircraft, vehicles and ships, electronic systems and their components, increasingly, AI integrated systems, the means to conduct cyber warfare. The defense industry in a narrower sense, three categories of weapons were involved: *land-based weapons*, including small arms; *naval systems*; *aerospace systems, cybersecurity, AI integrated weapons*.

Defense industry is getting closer ties with new advanced technologies that afford to change the nature of warfare. The given sector is transforming day by day and getting new shapes by the development of technologies. Nowadays, the trend of AI integrated defense industry takes a significant role in the national defense of the states and the competition of arms race takes place in this field. Many important experts and researchers of this decade note that AI integrated defense technologies have the ability to modify and change the direction of warfare, at the same time apprehend of repercussions of mismanagement. Because new autonomous systems can make it possible to get control based on certain input data and work out different types of human behavior. Technological superiority is regarded the key element for achieving defense effectiveness, and research and development plays an important role in accessing appropriate advanced technology. One of the reasons that powerful states spend such a large amount of their expenditures on military is because of this.

The supremacy of the technology-driven paradigm can be explained, at least in part, by the evolution of international relations and the transformation of threats since the late 1980s. Otherwise, military forces can consider technology as a method of averting dangers (both technically and operationally) and improving their ability to manage more complex settings.

The military capability of states is one of the main pillars designating the position of a state in the international arena. In the literature, there are many definitions on given term, in general, military capability can be determined as an ability to obtain a specified objective of wartime and is defined by the structure, modernization, combat readiness, stability. (U.S. Department of Defense definition). The scale of modernization depends on technical perfection mostly, equipment and weapons systems. Conventional type of wars from the World War II are steadily dissolving and moves into cyberspace.

Technology, legislation, ethics, culture, social, political, and military organization tactics, and other elements that evolve over time and space all have an impact on warfare. The nature of warfare is changing "depending on what tools become available and how they affect how the military is organized to wage war."[56]

[56] Michael C. Horowitz, “Artificial Intelligence, International Competition and the Balance of Power”, Texas National Security Review, Vol. 1, No. 3, May 2018, pp. 46-47, at file:///C:/Users/JASH/Downloads/TNSR-Vol-1-Iss-3_Horowitz.pdf.

According to many researchers, artificial intelligence (AI) and innovative automatic systems will become an integral part of future armed conflicts. Artificial intelligence has evolved very rapidly in recent years, resulting in a wide range of applications, both civilian and military. It is a matter of fact that the armed forces are driven by the need for change, as they steady strive to create better, faster and stronger weapons or technologies, and this is exactly what AI can provide. AI is considered as a 4th Industrial Revolution and should be seen as an "enabler" or "electricity" rather than the specific type of weapon. Based on the analysis of the emerging trends in the near future, the priority objects for the introduction of artificial intelligence in the military sphere will be:

-systems for processing and integrating information and intelligence data, including acoustic (sound and voice), optical, radio-electronic classifications on this basis of threats and identification of targets;

-control systems for group actions of robotic, crew and mixed groupings of military and military equipment, including reconnaissance, strike-reconnaissance, support, including both macro- and nanorobots.

-optimal target distribution systems based on intelligence about the enemy (including data on troops, weapons and their effectiveness) and assessment of the capabilities of their troops and weapons, military and special equipment (AI will allow you to quickly identify and prioritize hitting targets, form plans for subsequent actions of troops, respond flexibly to changing situations in real time).[57] One of the most obvious uses of artificial intelligence in the near future is to control swarms of unmanned aerial vehicles (drones). Drone swarms of hundreds of units can destroy or paralyze existing weapons systems such as tanks, anti-aircraft missile and rocket-artillery systems, aircraft, submarines and surface ships.[58]

Artificial intelligence will speed up and improve the process of locating and attacking strategic military targets. This will help improve target identification accuracy and reduce collateral harm. AI will also enable more advanced web-like procedures, bringing together different sensors and platforms to manage complicated data flows and offer meaningful information to human and machine operators across all domains.[59] In times of war, many

[57] V.Burenok, Iskistvenniy intellect v voennom protivostoyanii budushego, Voennaya Misl, N4-2021
[58] Burenok V.M. I gryanet dron, Royevoy intellect mojet obestsenit effektivnost samogo sovremennogo orujiya// Voenno-promishlennit kuryer, № 42 (657), 2 November 2016
[59] AI Fusion: Enabling Distributed Artificial Intelligence to Enhance Multi-Domain Operations & Real-Time Situational Awareness, Carnegie Mellon University (2020), http://www.cs.cmu.edu/~ai-fusion/overview.

military applications of AI will complement, not replace, the role of humans. AI tools will improve how military personnel perceive, understand, make decisions, adapt and act during their missions. In the future, with the advent of quantum computers, which make it possible to multiply the speed and volume of computational operations, artificial intelligence can be used in the design of new types of weapons, new materials, new structures, and even in the development of new strategies for waging war.

5.2 AI Integrated Areas in Defense Industry

Prospects for the development of advanced countries' armed forces, weaponry, military, and special equipment are associated primarily with informatization, robotization, and automation of troop and weapon command and control. Recently, the concept of systems with artificial intelligence has been added to this notion. At present, the use of weapons, military and special equipment equipped with automated control systems is algorithmically provided to a greater extent than command and control of troops. This can explained by a narrower range of options for the combat use of weapons and equipment (a narrower subject area). Because comparable scenarios do not recur during combat operations, it is nearly hard to construct algorithms that are suitable for all cases of troop command and control. As a result, automation of these activities is now only used to prepare preliminary data for commander decision-making.

In figure below, some examples of artificial intelligence algorithms used in military systems are presented. The mentioned examples relate to particularly important areas of the army's activities in terms of safeguarding the state's proper functioning and security, as well as performing modern military operations on the battlefield, they play a critical role. The systematization employed (shown in Figure 3) is a review of the literature relating to the type of military applications or the field of applications to various artificial intelligence algorithms used to solve this challenge.[60] To better comprehend the evolution of AI in the armed services, all sectors and individual algorithms are briefly presented. Artificial neural networks in military applications have enormous promise across the board; they can aid in

[60] Marta Bistron and Zbigniew Piotrowski, Artificial Intelligence Applications in Military Systems and Their Influence on Sense of Security of Citizens,
Electronics 2021, 10, 871. https://doi.org/10.3390/electronics10070871

land, sea, air, and information warfare. According to this paper, artificial intelligence has military uses in logistics, transportation, armed attack analysis, and communication.[61]

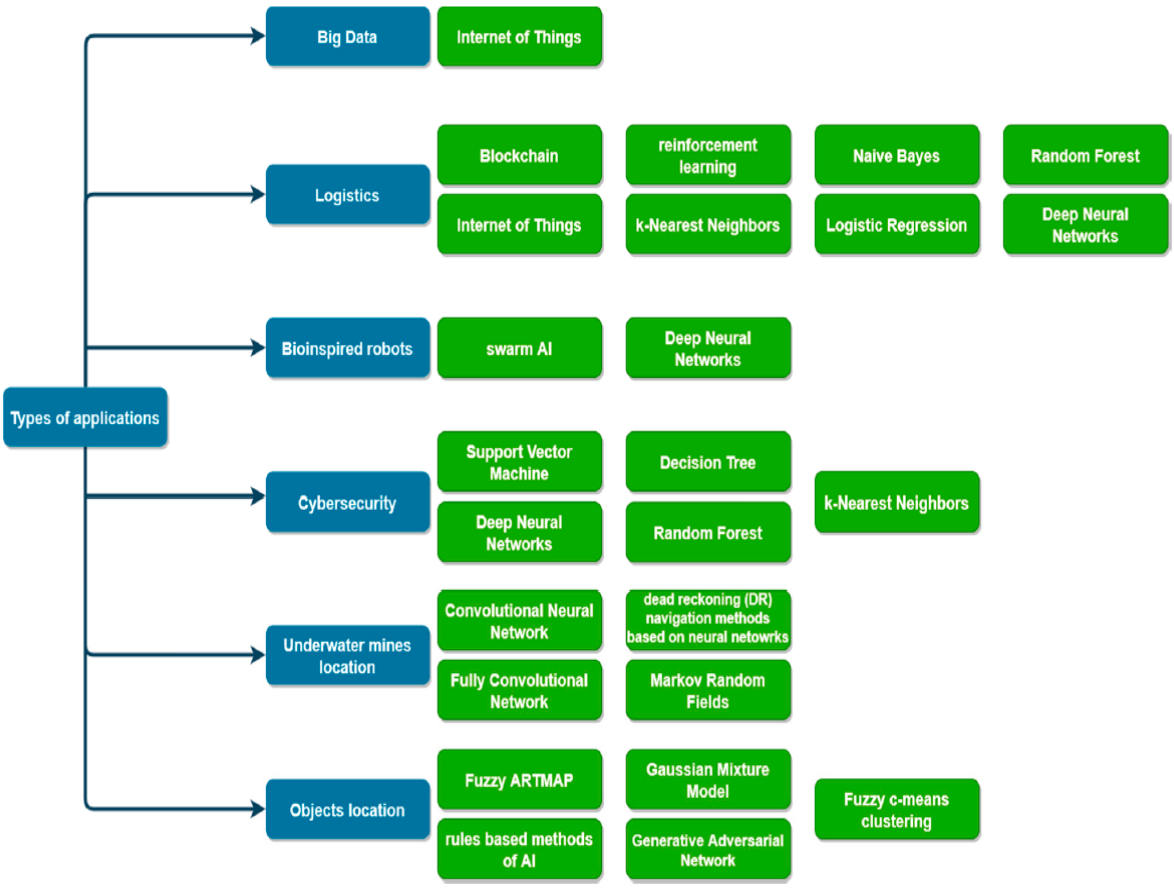

Figure 3. Offered systematization in the review of military applications.

As for artificial intelligence systems, the main areas of its application in the defense sector (directly and indirectly) can be: Intelligence, Surveillance and Reconnaissance; Logistics; Cyberspace; Lethal autonomous weapon systems (LAWS) and etc. These areas included in this research as a main areas in defense sector with artificial intelligence.

[61] Svenmarck, P.; Luotsinen, L.; Nilsson, M.; Schubert, J. Possibilities and Challenges for Artificial Intelligence in Military Applications. In Proceedings of the NATO Big Data and Artificial Intelligence for Military Decision Making Specialists' Meeting, Bordeaux, France, 31 May 2018.

5.2.1 Intelligence

ISR (Intelligence Surveillance and Reconnaissance) systems provide critical intelligence gathering, exploitation, and battle management capabilities to coalition and national command authorities. At all levels of command, ISR systems support the full range of component commanders. Intelligence Monitoring and Intelligence systems ensure coalitions and national command institutions with key capabilities for the collection, operation and execution of war operations. ISR systems support a wide variety of component commanders at all command levels. In addition, the national command authorities and the coalition can use the exploited ISR information while developing military-political options in the area of operation for military and civil operations. As a result, ISR information can assure crucial information for military commanders and civilian counterparts operating in the same area of operations, and will likely be required for emergency operations ranging from disaster relief to salvage to military confrontations.[62] Object identification is a natural starting point for artificial intelligence to the military because it involves picking photos and data collected from satellites and unmanned aerial vehicles to search for military-relevant items such as missiles, personnel, and intelligence data. Object identification, on the other hand, is only the first step in the process. The importance of intelligence, surveillance, and reconnaissance (ISR) in multi-domain situational awareness cannot be overstated. As the battlefield stretches over all spheres: sea, land, air, space, and cybernetics on a global scale, this knowledge is becoming increasingly crucial. Command, control, communications, computers, intelligence, surveillance and reconnaissance are all achieving new heights of efficiency, allowing data to be collected and processed at an unprecedented scale and speed. AI is effective in intelligence because of the large datasets available for analysis and helps automate the job of human analysts who currently spend hours analyzing and screening movies for usable information.

AI can be executed to develop intelligent and autonomous weapons systems, including military robotic and cruise missiles, such as unmanned aircraft and submarines. These weapons systems, which may use AI to automatically monitor, distinguish, and

[62] John Mahaffey, Observations on the Dissemination of ISR Data Employing Network-Enabled Capabilities in the Coalition Environment, June 2005, https://www.researchgate.net/publication/235204153_Observations_on_the_Dissemination_of_ISR_Data_Employing_Network-Enabled_Capabilities_in_the_Coalition_Environment

destroy enemy targets, are commonly used for information collection and management systems, knowledge base systems, Decision Support Systems, Mission Implementation Systems, and other applications.[63] Merge the data with the support of AI, information processing and analysis of intelligence. AI can be used to efficiently process sensor data and raw intelligence, including intelligent detection and multi-sensor data fusion automation to increase situational awareness. Furthermore, incorporating deep learning algorithms into the satellite image processing process can greatly speed up the procedure. Sub-conventional operations can benefit from AI-assisted information processing and intelligence analysis.[64]

The first phase of a Maven Project[65] includes the automation of the operations intelligence to support the campaign against ISIS. In particular, the Maven project team combs the desert with images of aerial vehicles and computer vision algorithms and machine learning to collect intelligence cells, which determine the activity of the enemy to auto-targeting. AI is now being developed to automate the labor of human analysts who spend hours qualifying videos for actionable data, allowing analysts to make more effective and quick decisions based on possible data.[66] Drones ensure continuous surveillance and rapid attacks on targets, and small robots are used to neutralize homemade detonators. In addition, the intelligence community is working on a number of publicly disclosed AI research initiatives. Currently, the Central Intelligence Agency (CIA) has roughly 140 projects in the works that use AI in some way to do tasks like image identification and predictive analytics.[67]

ISR with artificial intelligence support that enables to detect, track and target various enemy weapons systems, increases the possibility of striking strategic targets such as aircraft carriers, mobile missiles or nuclear weapons. This ability and the idea of its existence can disrupt the established ideas about the stability of deterrence, especially if it turns out to be

[63] Deepak Kumar Gupta, Military applications of artificial intelligence, 2018 http://www.indiandefensereview.com/military-applications-of-artificial-intelligence/

[64] Deepak Kumar Gupta, Military applications of artificial intelligence, 2018, http://www.indiandefensereview.com/military-applications-of-artificial-intelligence/

[65] According to the defense department of USA, Project Maven, also known as the Algorithmic Warfare Cross-Function Team, launched in April 2017. Among its objectives, the project aims to develop and integrate "computer-vision algorithms needed to help military and civilian analysts encumbered by the sheer volume of full-motion video data that DoD collects every day in support of counterinsurgency and counterterrorism operations," according to the Pentagon.

[66] Jack Corrigan, Three-Star General Wants AI in Every New Weapon System, NOVEMBER 3, 2017, https://www.defenseone.com/technology/2017/11/three-star-general-wants-artificial-intelligence-every-new-weapon-system/142239/

[67] Patrick Tucker, "What the CIA's Tech Director Wants from AI," Defense One, September 6, 2017, http://www.defenseone.com/technology/2017/09/cia-technology-director-artificial-intelligence/140801/

possible to deliver a disarming counter strike against the forces of retaliation of the enemy. The combination of offensive weapons capable of "finding, fixing and ending" a significant part of the enemy's strategic assets, with defensive systems capable of knocking down the remaining means of retaliatory strike, can challenge the fundamental principles of deterrence based on mutual vulnerability.[68] The battlefield advantages of ISRs and AI-driven autonomous systems could reduce the time available to diplomacy to prevent or manage crises. Many of the positive regional deterrence impacts that may ultimately result from an integrated intelligence, defense and combat management complex may not be achievable, at least in the near future. An overarching architecture and strategy for complex new AI ISR/combat control systems does not yet exist.[69]

5.2.2. Logistics

Logistics is the important point in case of military operations. As statement goes, "knowledge is power" and artificial intelligence is capable of expanding the information that is in the hands of the decision maker and allows them to make more effective, more informed decisions. Logistics, distribution, and supply chain are all components of a very complicated and sophisticated process that refers to the delivery of goods or services to a given area at a predetermined time. Military history is inextricably related to logistics history. To supply the armies, the ancient Romans had already devised effective logistics systems.[70]

In military logistics and transportation, artificial intelligence is likely to play a vital role. Efficient transportation of cargo, ammunition, weapons and troops is the most important part of successful military operations. The AI can help a larger army change the tooth-to-tail ratio and absolve additional soldiers for crucial areas such as combat and intelligence, surveillance and reconnaissance.

When it comes to logistics and service methods, there are numerous advantages that may be realized in the organization. AI offers more efficient logistics support and maintenance opportunities for military equipment.[71] AI is expected to play an important role

[68] Zachary Davis, Artificial Intelligence on the Battlefield,(2019) Institute for National Strategic Security, National Defense University, https://www.jstor.org/stable/10.2307/26803234
[69] Zachary Davis, Artificial Intelligence on the Battlefield (2019)
[70]Campbell, D.; Roth, J. The Logistics of the Roman Army at War (264 B.C.-A.D. 235). J. Rom. Stud. 2000, 90, 224.
[71] Marcus Roth, Artificial Intelligence in the Military – An Overview of Capabilities, 2019, https://emerj.com/ai-sector-overviews/artificial-intelligence-in-the-military-an-overview-of-capabilities/

in military logistics and delivery. The operative transport of goods, munitions, weapons and soldiers is an important part of successful military operations. Integration of AI with military service may reduce the delivery cost and reduce maintenance effort. It also allows military fleets to easily detect abnormalities and quickly predict the failures of components. Lately, the U.S. Army has partnered with IBM to proactively identify the maintenance problems of Stryker war machines and to use the Watson artificial intelligence platform.[72]

The artificial intelligence in the area of the armed logistics may have a prospective future. For example, the Air Force is experimenting using AI to anticipate aircraft maintenance. Another sample of repairing monolithic maintenance plans for the entire fleet when the aircraft failed, the air force is putting an AI-powered approach to adapting maintenance regimens to the demands of specific aircraft to the test. Currently used by the F-35 Automated Logistics Information System, this approach takes real-time sensor data embedded in aircraft engines and other embedded systems and sends the data to the forecasting algorithm to determine when technicians should look at the aircraft or replace the parts.[73] Analogically, the operations of Logistical Support of the Army (LOGSA) has signed a contract for the maintenance of special programs IBM Watson (the same software AI, which won two Champions Jeopardie) on the basis of information received from sensors 17 installed in each vehicle of the fleet for the Stryker. In September 2017, LOGSA launched a second project that will use Watson to analyze traffic flows for track distribution, trying to determine the maximum time and sufficient tools to deliver consumables. This task is currently performed by human analysts saving about 100 million dollars a year and analyses only 10% of delivery requests; with Watson, the army can analyze 100% of delivery requests and potentially save more in less time.[74]

Simulation system has helped optimize business and has a huge potential to help AI plan and maintain efficient and efficient supply chain. Russell and Norvig stressed: "in the Gulf crisis in 1991, U.S. forces launched a dart tool for logistics planning and shipping planning. It had to take into account the starting point, destination points, routes and conflict resolution between 50,000 vehicles, including cargo and people at the same time, and

[72] Tejaswi Singh and Amit Gulhane, 8 Key Military Applications for Artificial Intelligence in 2018, https://blog.marketresearch.com/8-key-military-applications-for-artificial-intelligence-in-2018
[73] Marcus Weisgerber, Defense Firms to Air Force: Want Your Planes' Data? Pay Up, 2017 https://www.defenseone.com/technology/2017/09/military-planes-predictive-maintenance-technology/141133/
[74] Adam Stone, Army logistics integrating new AI, cloud capabilities, 2017, https://www.c4isrnet.com/home/2017/09/07/army-logistics-integrating-new-ai-cloud-capabilities/

between all parameters. AI planning methods allowed him to create a plan within a few hours, which will take weeks with old techniques.[75]

During the 1991 Persian Gulf crisis, US forces used a-Dynamic Analysis and Re-planning Tool (Cross and Walker, 1994) to automate transportation logistics planning and scheduling. At any given moment, up to 50,000 vehicles, freight, and people were involved, and all factors had to be taken into account, including starting places, destinations, routes, and dispute resolution. AI planning approaches enabled for the creation of a plan in hours that would have taken weeks with traditional methods. This one application, according to the Defense Advanced Research Project Agency (DARPA), more than paid for DARPA's 30-year AI investment.[76]

5.2.3 Cyberspace

An equally important area of application of AI systems in the military sphere is cyberspace. The capabilities embedded in the artificial neural network can identify threats and their potential danger, independently create and modify software in order to protect against them. It is unlikely that there will ever be another conventional military conflict where will absent components of information and cyber warfare. AI will play a main role in the deployment of these new weapons. This is about hacking and data theft, as well as cyber -attacks aimed at causing damage to people and property.[77] The intellectualization of cyber operations and the conduct of propaganda and counter-propaganda on the network is also a promising topic when artificial intelligence selects the necessary information tactics for working, for example, in social networks.

Cyber security threats come in a multitude of shapes and sizes. Artificial intelligence is capable of playing a major role in preventive measures for an army. Today's software can recognize various digital states, such as an e-mail or a new flash drive, and can then block the cyber threat that is waiting for a military operator before malware becomes active. The threats of cybersecurity can be in multitude of shapes and scales. Artificial intelligence can play crucial role in protection of armed forces as nowadays the new technologies has the

[75] Artificial Intelligence In Military Application Information Technology, https://www.ukessays.com/essays/information-technology/artificial-intelligence-in-military-application-information-technology-essay.php
[76] Ben Gesing and Steve J. Peterson , Artificial Intelligence In Logistics, 2018
[77] Ben Scott, Stefan Heumann and Philippe Lorenz, Artificial Intelligence and Foreign Policy, January 2018

possibility to define different digital states, as a tool to implant malicious software, then can disable the cyber threat that's waiting for a military operator before malicious software becomes active. AI system is needed for the cybersecurity resolution in a high level, on account of the risks related to the data infringements in defense and military networks. Machine learning appears to be used by some AI businesses and defense contractors to develop security technologies that can detect and forecast threats before they harm networks.

BAE Systems is a military, security, and aerospace business company in London. DARPA and BAE Systems have agreed to collaborate on CHASE, software tools that use artificial intelligence to identify and predict cyber threats to large enterprise networks. Labeled datasets indicating "normal" values for various metrics from internal network servers and intrusion detection systems without artificial intelligence may be required by the CHASE software initially. This would enable the software to establish a baseline reading for normal network operation.[78]

AI supported systems has the ability to defend data from any unapproved access, can record the pattern of cyberattacks and improve counter-attack tools to tackle them, while military systems are often unprotected to different cyber attacks and it leads to casualty of confidential armed forces data and hazard to the system of armed forces. The implementation of the artificial intelligence to the cybersecurity can extract the high level of benefit because the artificial intelligence can intensify the security productivity and ensure the protection against a growing number of complex threats in cyber area. In addition to the great prospects of AI, there are risks and challenges in providing cybersecurity. In order to future enhance the maturity of cyber security, it is necessary to have a coherent view of the cyber environment of organizations where AI is combined with human understanding, because neither people nor the AI alone can prove overall success in this field. Therefore, social responsible use of AI methods will be necessary to reduce further the associated risks and problems.

"AI can be used to strengthen the protection of critical military networks and information systems, scale the impact of aggressive cyber attacks, and inform the cyber security decision-making Command in distributed denial of service (DDoS), pattern matching, statistical analysis, machine learning and large data analysis can be determined and mitigated. The analysis of software vulnerabilities can be based on the AI "fuzzing"

[78] Marcus Roth, Artificial Intelligence in the Military – An Overview of Capabilities, 2019, https://emerj.com/ai-sector-overviews/artificial-intelligence-in-the-military-an-overview-of-capabilities

method, which can be used to test penetration for attack or defense, and intrusion detection and prevention methods can be handled by deep neural networks. In particular, given the speed of cyber operations, AI can serve as an important tool for rapid management. Cyber AI applications can be used by non-public actors."[79]

In the field of cybersecurity, artificial intelligence will help to address challenges that were previously impossible to solve using traditional methods. Using AI will increase threat detection, reduce response time, and improve ways to detect security perimeter breaches in the real world. Furthermore, AI has the potential to close current gaps in information security that have arisen as a result of the rapid development of modern technologies, especially the Internet. As in any other field, in cybersecurity, AI helps to analyze quickly large amounts of data, releasing operators from repetitive, frequently monotonous tasks Improved analytics and the elimination of the human aspect can help detect and resist new assaults more efficiently.

In general, the prospects for the use of AI in cybersecurity are extensive and it will be impossible to do without AI technologies in the medium term. Modern AI is a system that can detect abnormalities that aren't explained by established rules. This is its primary benefit over traditional information security systems that rely on a set of rules established by humans. In the man-machine partnership, artificial intelligence serves as an aid. Perhaps man's function will diminish with time, and machines will grow more self-sufficient. However, without the participation of the operator tandem, the system is now unable to function. As for efficiency, AI technologies do not yet lead to any radical changes in the fight against criminals, but in the medium and long term, progress will go along this path, these systems will be analyze by AI technologies. The structures, organizations and countries that were the first to use these approaches will benefit. The greatest influence from the AI systems are network security, proactive detection of compromised nodes in the network and the collection and analysis of events. There are also solutions that apply machine-learning algorithms to tackle problems like detecting abnormalities in the work with file resources, databases, and business systems, as well as detecting employee fraud.

5.2.4 Lethal Autonomous Weapon Systems (LAWS)

[79] Deepak Kumar Gupta, Military applications of artificial intelligence, 2018, https://www.claws.in/1878/military-applications-of-artificial-intelligence-deepak-kumar-gupta.html

The evolution of military affairs is associated with the development of technology as closely as any other sphere of state or public life. The image of the war of the future has long been associated with the participation of robots, causing heated discussions in military-political circles and humanitarian organizations. Particularly acute discussions concern the prospects for the use in military purposes of deadly autonomous systems - combat vehicles, to one degree or another equipped with artificial intelligence and capable of making decisions in the long run. LAWS is very difficult to define, there is still no universally accepted definition of, the proposed definitions may cover a number of combat systems that have been in service with the armies of the world for several decades (in particular, air defense systems, anti-ship missiles, cruise missiles, air - to-air missiles, active protection systems for armored vehicles, bottom mines, torpedoes, etc.). Technologies for group control of "swarms" of robots are being intensively developed in many countries in the direction of creating advanced systems of armed combat in the air and at sea (for both surface and underwater operations). The issues of creating space systems for various purposes based on AI-controlled mini-nanosatellites are being worked out, which will ensure both an increase in the efficiency of their immediate tasks and stability in the face of enemy opposition. Autonomous weapons systems propose potential advantages in future wars, but also pose many legal and ethical challenges in addition to the essential risk of devolving decision making to machines.

The question of the introduction of this type of weapons is still new to the international agenda, it is at the intersection of political, legal, technological and ethical and moral considerations. That is why the development of a unified approach by States or international organizations is difficult. Under autonomous weapons can mean any combat system that operates autonomously — in the air, at sea or on the ground. Autonomous weapons systems (also called, deadly autonomous weapons or killer robots) are independent, without human intervention, searching, scouting and hitting targets.

Autonomous weapons can select and engage targets without human intervention. This is a military armed platform moving through the air, on the ground/water and equipped with a variety of sensors. The cybernetic device of AI, capable at its discretion without human control and to navigate, move on the ground, find a target, move to the destruction of manpower and equipment of the enemy in accordance with the operational and tactical plans of the given command. Adopted today this kind of weapons to call LAWS (Lethal

autonomous Weapon system) — deadly Autonomous robots.[80] Today there are few weapons systems responsible for such critical functions as the detection and defeat of targets. For example, some defensive weapons systems have Autonomous interception modes for guided and unguided missiles, artillery shells and enemy aircraft at close range. So far, these systems are usually stationary and operate autonomously for a short time, only under strictly defined circumstances (for example, with a relatively small number of civilians and objects) and against a limited list of types of targets (for example, mainly ammunition or vehicles). However, in the future, autonomous weapons systems may function outside a rigidly defined spatial-temporal framework, confronted with a variety of rapidly changing circumstances and, possibly, directly choosing people as a target.

The apparent benefits of fully autonomous weapons systems exceed the concerns. Proponents of these weapons systems claim that the new technology can save soldiers' lives, process data faster than previous systems, and will be immune to fear and rage, which could result in civilian casualties. However, fully autonomous weapons systems raise lot of serious questions. First, the transfer of life and death decisions to machines goes beyond morality. Secondly, fully autonomous weapons systems face serious problems of non-compliance with international humanitarian law and human rights. Third, they will create a gap at the level of accountability, because it will be difficult to hold someone accountable for unforeseen harm caused by an Autonomous robot.[81]

In the last three or four years in the world is gaining momentum for the prohibition of "Autonomous combat robots". The ban is supported by non-governmental organizations "Stop Killer Robots", "Article 36", "International Committee for Robot Arms Control", well-known businessman, such as Elon Musk, Steve Wozniak, Nobel prize winners, scientists and programmers in the field of artificial intelligence and even entire corporations. Fully autonomous weaponry, according to some, will be unable to comply with International Humanitarian Law (IHL) and will cause difficulties in the definition of people accountable for robots' illegal activities. Others believe that, even if one day “terminators” will be able

[80] Grigoriy Povolotskiy, Avtonomniye boeviye roboti-budet li novaya gonka voorujeniy?, Mezhdunarodnaya Zhizn, 2015 https://interaffairs.ru/news/show/13621,
[81] Making the Case The Dangers of Killer Robots and the Need for a Preemptive Ban, https://www.hrw.org/report/2016/12/09/making-case/dangers-killer-robots-and-need-preemptive-ban.

to perform "combat functions" more accurately, accurately than live fighters, then autonomous use should be banned in the interests of the highest value - human dignity.[82]

Due in large part to the negative information background, a number of systems capable of fully independent combat operations are today used in remote control mode or under operator control. But there is no doubt that the military of some states are already developing programs that, in a critical situation, will allow them to turn remotely controlled systems into autonomous strike robots. Although the requirements for compliance with the laws of war and the principles of international humanitarian law also apply to the use of LAWS, many experts and public figures consider it necessary to prohibit LAWS in a preventive manner or to adopt special international regulation in respect of such autonomous systems.

5.3. AI Opportunities and Challenges

The debates in artificial intelligence are increasing day by day because of extremely developing technology. In addition to being an important power factor in the policies of states, sometimes perceived as an existential threat to humanity. In the result of researches, discussions on opportunities and challenges in the context of artificial intelligence directly related to society, economy and politics, because of this relationship, it is important to analyze opportunities and challenges in order to find it out the issue better.[83]

Artificial intelligence is one of the most popular and controversial topics on the modern international agenda. Advances in machine intelligence technology and artificial neural networks are paving the way for the creation of a super-powerful intelligent system that commonly called artificial intelligence. The widespread introduction of artificial intelligence technologies can provide states with significant economic advantages through increased production efficiency, enhance scientific potential, ensure information security and superiority in conventional weapons. Artificial intelligence enables computers to learn from their own experiences, adapt to the parameters they are given, and do jobs previously only feasible for humans. Deep learning and natural language processing are fundamental in

[82] Vadim Kozyulin, Smetonosniye avtonomniye sistemi voorujeniy:problem sovremennogo mejdunarodno-pravovogo regulirovaniya i perspektivi ih resheniya, Mejdunarodnaya zhizn,2019 https://interaffairs.ru/jauthor/material/2152

[83]AI Policy Challenges And Recommendations, https://futureoflife.org/ai-policy-challenges-and-recommendations/?cn-reloaded=1

most AI applications, from computer chess players to self-driving cars. Computers may be "trained" to execute certain jobs using these technologies by processing massive volumes of data and recognizing patterns.

But, like any dual-use technology, AI carries not only benefits, but also risks, and risks of a global scale, especially if there is a monopolization of key technologies in one of the powers, and if AI becomes a weapon of psychological and information warfare or cyber warfare. “If someone can establish a monopoly in the field of artificial intelligence, then the consequences are evident to all of us - he will become the ruler of the world,” Russian President Vladimir Putin stated at a meeting on AI technology development.[84]

At the same time, the development of proprietary artificial intelligence technologies and its use for national security and defense purposes make it possible to compensate for the enemy's power in strategic areas. This is why it is believed that AI is the third revolutionary innovation in military science after the invention of gunpowder and nuclear weapons.[85] The United States seeks to take a leading position in AI research and use to develop cyber weapons and autonomous weapons that can be used both to monitor the enemy and to attack. China is also actively working in this direction. Unlimited cyber opportunities are now the main risks of such technologies.

In the past few decades, in addition to political and military threats, five interconnected negative trends have emerged, these five global crises are:[86]

1. Climate change;

2. Beginning of mass extinction and decline in biodiversity;

3. Destruction of ecosystems, which in turn destroys human life support systems;

4. Pollution of soil, water and air with harmful emissions that negatively affect basic biological processes, cause serious diseases and undermine the ability of people to cope with other problems;

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[84] Putin:Monopolist v sfere iskustvennogo intellekta mojet stat vlastelinom mira, TASS, 2019 https://tass.ru/ekonomika/6489864

[85] Tretya revolyutsionnaya innovatsiya v voennom dele, Byuro voenno-politicheskogo Analiza 2018, http://bvpa.ru/%D1%82%D1%80%D0%B5%D1%82%D1%8C%D1%8F-%D1%80%D0%B5%D0%B2%D0%BE%D0%BB%D1%8E%D1%86%D0%B8%D0%BE%D0%BD%D0%BD%D0%B0%D1%8F-%D0%B8%D0%BD%D0%BD%D0%BE%D0%B2%D0%B0%D1%86%D0%B8%D1%8F-%D0%B2-%D0%B2%D0%BE%D0%B5/

[86] “Globalniye tendentsiyi 2030: Alternativniye miri”, Natsionalniy Sovet po razvedke https://www.nkibrics.ru/system/asset_publications/data/53c7/b3a1/676c/7631/400a/0000/original/Global-Trends-2030-RUS.pdf?1408971903

5. Rapid growth of the human population, accompanied by old patterns of production and consumption.

It’s worthy to note, that technology is not at a point where it can simply hang out to solve any problem. Customization is required and depends largely on the specific data used to train models. Experience in both technical and field-specific fronts is essential for success. It is ideal for large contractors and newcomers to solve similar challenges for commercial customers and to overcome the challenges of large-scale institutional challenges. They can translate the department's strategic questions into mathematical models by carefully analyzing the data using the best available tools and evaluating the results within the unique context of the army's missions.[87]

Artificial intelligence, according to scientists, has a lot of potential for improving human life and economic competitiveness in a variety of ways, as well as solving some of society's most pressing problems. Simultaneously, AI brings new threats and has the potential to displace people in some industries, necessitates new skills and adaptation to changing labor needs, and may increase socioeconomic inequalities. Strong public and private sector investment in learning about AI methodologies and acquiring AI abilities has been significant in recent years, accompanied by a high demand for persons with competence in AI.

The emergence of systems, even simply autonomous or adaptive, and even more so general or strong AI, is associated with several threats of different scale that are relevant today. Firstly, intelligence may not be a threat to a person, not necessarily a strong, general, human or super-human level, since it is enough to have an autonomous system operating with large amounts of information at high speeds. On its basis can be created so-called "autonomous system deadly weapons" or Lethal Autonomous Weapons Systems (LAWS), the simplest example of which drones for contract killings, printed on 3D-printers both on a mass scale and in small batches in artisanal conditions.

Secondly, a threat to the state may be a situation where another state (potential enemy) receives weapons with more adaptive, Autonomous and General Artificial Intelligence with increased reaction speed and predictive ability.

[87] James Marceau and Barry Scharfman, Right AI Strategy a Must for Military Superiority, 2019, http://www.nationaldefensemagazine.org/articles/2019/5/20/viewpoint-right-ai-strategy-a-must-for-military-superiority

Thirdly, the threat to the whole world is posed by the situation arising from the previous threat, when states enter a new round of the arms race, improving the levels of intelligence of Autonomous means of destruction - as it was predicted by Stanislav Lem a few decades ago.[88]

Fourth, the threat of any party, not necessarily a combat, but also an industrial or household intellectual system with a certain degree of autonomy and adaptability, has the ability to get not only purposeful actions, but also conscious goals, while setting an autonomous goal can lead to the development of goals that contradict the goals of a person and people. The possibility of achieving these goals will be much greater, due to its higher speed, more processed information and greater predictive ability.

Fifth, the transition to a new level of development of production relations in a capitalist society is a threat to society, when a smaller part of the population is able to control material production. It's excluding the vast majority of the population from that due to even greater automation, which can lead to even greater social stratification, a decrease in the efficiency of "social elevators" and an increase in the mass of "extra people" with corresponding social consequences.

Finally, the autonomization of global computing systems for data processing, information dissemination and decision-making based on global networks can pose a threat to humanity as a whole, since the speed of information dissemination in such systems and the scale of the impact can lead to unpredictable social phenomena from the standpoint of existing experience and management models. For example, the introduced system of social credit in modern China is a unique experiment of civilizational scale with unclear consequences today.

AI-driven growth is expected to be exceedingly uneven. AI's additional value might be approximately $ 4 trillion by 2022. China and North America are predicted to have the fastest economic growth by 2030, accounting for 70% of the global economic impact of AI. Because AI benefits are winner-take-all, rigorous control is required: putting AI systems in the hands of just a few high-income countries risks leaving developing countries far behind. These countries will be unable to benefit from AI technologies, or will gain only marginally from them, and will more significantly, lack ownership of such innovations.[89]

[88] Stanislav Lem, Mir na zemle, antologiya Operatsiya "Vechnost" 1988, M,:Mir,1988
[89] Razrabotka rekomendatsii ob eticheskih aspektah iskusstvennogo intellekta, https://ru.unesco.org/artificial-intelligence/ethics

The only disadvantage of artificial intelligence is that AI computers are not human. When all the benefits and risks of artificial intelligence are summed up, machines can complete tasks faster, more accurately, and in less time. While AI can temporarily replace a variety of work roles, technology will ultimately boost global production, and people will always be needed. We may learn from history about how the invention of steam engines revolutionized manual labor and ushered in the industrial revolution. Regardless, artificial intelligence's significance and impact on global sectors are apparent. It improves by leaps and bounds every day to automate day-to-day tasks while remaining adaptable and long-term.

Despite a certain amount of skepticism of scientists, there are areas where the application of AI will have, apparently, a revolutionary effect. Most experts agree that such an area can be considered military affairs. Already, AI technologies used in the management of military construction, the daily activities of troops and in maintaining their combat readiness, the development of weapons systems, the management of the air force and troops in armed conflicts, etc. One of the most promising areas in this sphere is the possibility of automatic recognition and tracking of targets for robotic platforms and, as a result, autonomous decision to kill. In 2017-2018, a number of research works on these topics were conducted in leading countries of the world (USA, China, Great Britain, etc.).[90] Currently, there is an active discussion of the problem of safety of artificial intelligence (AI) for humans. Although a full-fledged AI as such hasn't created yet, but automation has long been part of the management and production processes. Today computers are able to drive cars, recognize speech and faces, analyze huge amounts of data. Artificial intelligence has a large number of applications, and defense is no exception. The creation of AI becomes the number one task for national security. In fact, a global race of innovative weapons is beginning, involving all the major powers. While automatic systems are limited, and decisions on the use of weapons takes the man himself. AI should completely remove a person from making a decision and at the same time preserve the life and health of the military. There is a huge number of opportunities use of weapons with AI. These are missile boats, armored vehicles, drones that can independently find and destroy targets. With the help of AI, can be combined a huge number of drones into a controlled "swarm" to carry out a mass attack. These are

[90] Boulanin V., Verbruggen M. SIPRI Mapping the development of autonomy in weapon systems. Solna: SIPRI, 2017

systems of military communications and global positioning with the designation of the coordinates of the target and calling of percussion means.

Simultaneously with the intensification of R & D in the field of military artificial intelligence in the international community at the present stage, the debate on the ethics and legality of the creation of and applications of these systems. For example, in January 2018, prominent world scientists signed an open letter urging experts to think about the desire to create an increasingly strong artificial intelligence. "We recommend extensive research aimed at to ensure the reliability and friendliness of AI systems with growing power. AI systems have to do what we want them to do. This appeal came from leading experts in artificial intelligence from Google, Facebook, Microsoft and other industrial centers. In March 2018, about 300 research groups around the world began to study the preservation of the goodwill of artificial intelligence."[91] Thus, experts point to the threat of military use of AI, this is due to the drastic reduction in the time for strategic decision-making in military command and control (Communications, command and control) and intelligence gathering and analysis (intelligence, surveillance and intelligence). For example, the military programs of the Pentagon-Maven, COMPASS, Diamond Shield – are aimed at ensuring that supercomputers take on the work of analyzing various data and preparing scenarios for the political and military guides.[92] Experts also warn that the technology of production of deadly autonomous systems (LAWS), their components and software are likely to be widespread in the world in the absence of their complete ban, so many members of the world community in favor of a complete ban on their development. The main argument against LAWS – their use is contrary to the principle of humanity and the requirements of public consciousness.

AI also changes the balance of power between global actors and alliances in a variety of ways. First, effective integration of complex and commercially available AI systems provides the rest of the small actors with capabilities, power and competitive advantage in terms of population and economic muscle. Second, AI allows non-state actors to enter the game (or battlefield). Terrorists and extremist groups can acquire these tools and use them to wage war or influence operations just as effectively as traditional state actors. Third, AI has the potential to destabilize the world's most powerful security organization's built-in relationships and processes. Over the last few years, the US has urged other members of the

[91] Autonomous weapons are a game-changer // The Economist. 2018. 25 January. URL: https://www.economist.com/special-report/2018/01/25/autonomous-weapons-are-agame-changer

[92] Kozyulin V. Tri gruppi ugroz smertonosnih avtonomnih system// Ros.sovet po mejdunarodnim delam, 2018 http://russiancouncil.ru/analytics-andcomments/analytics/tri-gruppy-ugroz-smertonosnykh-avtonomnykh-sistem/ "65+8658ваып65856

North Atlantic Treaty Organization (NATO) to devote 2% of their GDP to defense spending in order to close the capacity gap. However, as it happens, the U.S. investment and respect the potential of AI is far behind the European allies. If the current trend continues, the power gap may widen due to AI's exponential rise.[93]

OPPORTUNITIES	CHALLENGES
Weapons-increased reaction speed and predictive ability	Killing machine
Security for country and people	Barriers to data collection and sharing
Boots national output	Uncontrollability of competition
Beneficial intelligence	Undirected intelligence
Social benefit	A threat for humanity
Improved economic outcomes and productivity	Legal and regulatory hurdles
Improved problem solving	Transparency of personal data
Improved or assisted human decision making	Limited access to computing resources and human capital

[94]

Table 1. Opportunities and challenges of AI

Although it is seen that increasing the speed and quality of weapons systems in artificial intelligence may be an important factor; it is also a death machine and therefore

[93] KUDZKO Alena, Future Now: How AI Is Already Changing the Global and Military Landscape, https://www.globsec.org/2018/02/06/future-now-ai-already-changing-global-military-landscape/#DRsv8IaxcMxYu4Ak.99

[94] Artificial Intelligence:Emerging Opportunities, Challenges, and Implications for Policy and Research, June 16,2018, https://scipol.duke.edu/content/gao-report-artificial-intelligence-%E2%80%93-emerging-opportunities-challenges-and-implications

offers a threat. Secondly, the protection of the security of the countries and people who lives in, however, it has been observed that security provides some difficulties in storing and sharing information. It can also cause uncontrolled competition while creating an increase in production in the country. Another important factor is beneficial information and undirected information. It is possible to make a useful contribution to the economic, political and military initiatives of the states. However, undirected information is also a challenge during this process.

The most obvious consequences of creating a truly working quantum computer is the ability to almost instantly break into the military and infrastructure encryption systems of a potential enemy, which opens up huge opportunities in the field of both military intelligence and industrial espionage.

The use of AI for military purposes has sparked discussions under the UN Convention on the Prohibition of the use of artificial intelligence for military purposes. The use of specific conventional weapons that may be deemed to be excessively injurious or to have indiscriminate effects the action under the regulation which are subject to the anti-personnel mines and blinding lasers (Convention on inhumane weapons). In general, the haste and thoughtlessness of the AI's military developments could result in a new weapons race around the world, as well as a creeping disdain for international law's norms and values. According to some scholars, preserving strategic stability in the coming decades will necessitate a rethinking of the notion of deterrence in a multipolar world.[95]

5.4. The Impact of AI to the International System

Politics for the entire history of mankind is mainly guided by conscious human actions and collective actions and interactions of people in networks and organizations. Now improvements in artificial intelligence eliminate the possibility of fundamental changes in this arrangement: the idea of a non-human being with a certain agent can create radical changes at the broadest levels in our political understanding. Both in the global economy and in military rivalry, artificial intelligence has the potential to change the balance of power. AI has a lengthy history of being viewed as a promising field, yet its full potential has remained unrealized for much of that time. By expanding the availability of available processing power, AI has begun to provide results during the last decade, particularly in the

[95] Altmann J., Sauer F. Autonomous Weapon Systems and Strategic Stability // Survival. 2017. № 5 (59). С. 117–1042.

field of machine learning. This progress has sparked a lot of excitement, which is largely justified. However, it can also hide some of the more crucial realities concerning AI and its national security consequences.

Recognized leaders in this area for many years, the United States and China, have recently experienced growing competition from countries that have started the development of autonomous military systems and joined the technological race. These include UK, Russia, Israel, Iran, Turkey and a number of smaller states. All of them are active in research, which rely on the solution of problems of civil appointments in the sphere of high technologies, informatics, software, optics and in other areas.

In 2017, Russian President Vladimir Putin acknowledged the importance of combat robots, noting that the country needs its own effective developments in the field of robotics for the Russian armed forces. The emergence of new technologies makes the existing norms and military tactics irrelevant and it raises many questions about how the competition in the military sphere will unfold in the near future. The inevitable transformation of AI fundamentally intersects with traditional foreign policy issues. At the highest level, it has an impact on the global power balance. The potential for AI to enhance national economic and security goals has generated strong competition among governments for a strategic advantage. China's AI national strategy demonstrates how seriously governments regard this technology, betting heavily on its future. In a recent speech, Russian President Vladimir Putin said that "the country, which will gain the advantage of AI, will become the ruler of the world."[96]

AI development creates global challenges. Government strategies to promote the expansion of AI research within national boundaries can lead to deterioration of the world-wide governance landscape and a race that is under the strain of long-term regulation. Countries strive to attract the AI industry over national strategies and incentives to accelerate the development of AI in this scenario, but regulatory oversight is not strengthened to limit the social hazards connected with these occurrences. These dangers, which are linked to a lack of governmental control and increasing competition, can make it more likely that unbiased, socially damaging systems will endanger human life.[97]

[96]AP News, 2017. *Putin: Leader in artificial intelligence will rule world.* Associated Press.
[97] Peter Cihon , Standards for AI Governance:International Standards to Enable Global Coordination in AI Research & Development, Center for the Governance of AI Future of Humanity Institute, University of Oxford, 2019

Most of the discussions on how artificial intelligence affects geopolitics focus on the growing arms race between Washington and Beijing and the investment of major military forces, such as Russia. Surely, breakthroughs are occurring rapidly in the United States and China. While the weapons race between superpowers is thrilling, the development of AI outside of the big powers, even if there are fewer triumphs, can have a significant impact on our world. Small countries' decisions on how to use and invest in AI will have an impact on their strength and status in the international system.[98]

AI is increasingly being discussed in the international arena. Recently, Vladimir Putin said that the country that will become a leader in this area, “will be the ruler of the world”. In March 2017, Francois Hollande expressed the same idea: "who will possess AI, in the future will be the most powerful." Elevated to a strategic priority by Silicon Valley and industry 4.0, artificial intelligence is preparing to revolutionize international politics. One of the reasons lies in its dual nature. The use of AI, as well as other advanced technologies, is possible in the civil, military and security spheres, Nosetti notes. In recent years, China and the United States have simultaneously spent billions of dollars on the development of autonomous weapons systems (drones, missiles, etc.). This significantly expands the range of traditional war, to such an extent that American intelligence believes that AI can make a coup in armed conflicts in the same way as nuclear weapons did at the time, the scientist says. [99]

Breakthrough in AI weapons systems can create robust, asymmetric advantages for the leading military world. However, these benefits are likely to be short and these gaps can be closed quickly. The cost and complexity of AI-based weapons production can be relatively manageable compared to missile technology and nuclear technology or warplanes and aircraft ships. For example, most AI technology needed to arm a plane (air or land) will be available in civilian use products that can be modified for military purposes. Of course, the ease of spreading doesn't make this weapon less deadly. If this is our technological future, the task of arms control will become much more difficult. The most dangerous AI technology

[98] Artificial intelligence beyond the superpowers, 2018, https://thebulletin.org/2018/08/the-ai-arms-race-and-the-rest-of-the-world/
[99] Iskusstvenniy intellect gotovitsya proizvesti perevorot v mejdunarodnoy politike, https://www.inopressa.ru/article/25Oct2017/lemonde/intelligence

may not have a clear dual-purpose profile, but it may look like a digital code written for quite legitimate civil purposes.[100]

The consequences that access to autonomous weapons can lead to a global balance of hard power can be serious. First, AI weapons could serve authoritarian states as a new, relatively inexpensive option to achieve a strong deterrent capability. We can see problems with the balance of regional power when states begin to use AI technology to reverse historical shortcomings in relation to neighbors. The new advances may lie in the technology itself, but it could also be a country's perceived willingness to surrender deadly decisions to machines. In addition, there is a great danger that military systems with artificial intelligence and military decision-making will undermine existing approaches to conflict containment and de-escalation. The results for foreign policy leaders are serious. In the twentieth century, institutions and agreement instruments designed to prevent the proliferation of weapons and weapons were not created for the world order in the midst of the AI armament race. As the human and financial costs of the war dwindle, humanity should be prepared for more frequent and devastating outbreaks of violence in conflict zones, resulting in migration, economic instability, poverty, health crises and starvation. Governments should review the risk management system previously reserved exclusively for nuclear, chemical and biological weapons, also particularly those areas of disaster risk management that are of particular concern.[101]

The Pentagon is investing billions of dollars in artificial intelligence for military purposes.[102] Artificial intelligence experts are already being recruited into campaign headquarters. In China, modern technology is used to strengthen the authoritarian regime and censorship.[103] New Zealand is creating the world's first virtual politician[104], and Musk believes that artificial intelligence can become an immortal dictator and even unleash World War III[105].

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[100] Ben Scott, Stefan Heumann and Philippe Lorenz, Artificial Intelligence and Foreign Policy, January 2018, https://www.stiftung-nv.de/sites/default/files/ai_foreign_policy.pdf

[101] Ibid. pp.24-30

[102]Zachary Fryer-Biggs, The Pentagon plans to spend $2 billion to put more artificial intelligence into its weaponry, Center for Public Integrity,2018, https://www.theverge.com/2018/9/8/17833160/pentagon-darpa-artificial-intelligence-ai-investment

[103] Maya Wang, China's Techno-Authoritarianism Has Gone Global, Foreign Affairs, April 8 2021, https://www.hrw.org/news/2021/04/08/chinas-techno-authoritarianism-has-gone-global

[104] Harshajit Sarmah, World's First AI-powered Virtual Politician SAM Joins The Electoral Race In New Zealand, 2019, https://analyticsindiamag.com/worlds-first-ai-powered-virtual-politician-sam-joins-the-electoral-race-in-new-zealand/

[105] Ryan Browne, Elon Musk warns A.I. could create an 'immortal dictator from which we can never escape', 2018, https://www.cnbc.com/2018/04/06/elon-musk-warns-ai-could-create-immortal-dictator-in-documentary.html

Thanks to new technologies, colossal military potentials are emerging in the world, making full-fledged military conflicts almost impossible. The risk of irreparable damage is becoming global. Integration processes on the planet lead to deep interdependence of states in the economic, financial, informational, infrastructural and other spheres. The world is becoming transparent thanks to tracking satellites for various purposes, social networks, Internet resources that register the movement of ships and aircraft, programs for remote control and management of various equipment, and software update systems. Today, there are about two thousand satellites in orbit, of which several hundred belong to commercial companies. Every country is vulnerable to the critical infrastructure today. However, the magnitude of the vulnerability is difficult to assess or predict. Modern technologies make it possible to use the internet space for both peaceful and destructive purposes. It can be "mined", and so far not a single entity with access to the global network can be sure that he is insured against "cyber-mines". A cyberattack on Venezuela's power grid in March 2019 illustrates the vulnerability of the country's infrastructure.[106] Commercial systems can be used to deploy drones or autonomous vehicles to deliver explosives and create accidents. A series of major disasters can cause a stir in the international media and cause significant damage to information and psychological security.

New technologies need to be handled with caution, as we know from history that in the old days they could dictate behavior patterns to leaders and provoke conflicts. Some researchers believe that this is exactly what happened in the early 20th century, when new technologies - the telegraph, railways, general conscription and a mobilization plan - pushed the European powers into the abyss of the First World War.

Today we are witnessing similar processes in the military sphere, when the use of artificial intelligence for collecting and analyzing information, the use of programs for communication, control, automation of the processes of developing scenarios and decision-making, can cause a large-scale military conflict. Humanity has not forgotten the experience of "peaceful coexistence" under the conditions of the Cold War. We remember that it is possible to keep the peace in the alarming state of the outrageous weapons. For such a model of human society in the 20th century, civilization has developed mechanisms of relaxation that are still applicable today. The mechanisms can be listed in this way: measures of

[106] Martin Libicki, Cyberwar is What States Make of It, The Cyber Defense Review
Vol. 5, No. 2, Special Edition: Information Operations/Information Warfare (SUMMER 2020), pp. 77-88 (14 pages), https://www.jstor.org/stable/26923524?seq=1#metadata_info_tab_contents

confidence and transparency; hot lines of communication; meetings of experts, military, diplomats; cultural exchanges, student exchanges, etc.[107]

However, in the 21st century, humanity faces challenges that require common efforts and concerted action. Today, a new policy and new leaders are in demand, who could unite humanity to solve common problems based on common values and common goals.

By allowing governments to closely monitor, understand, and control the actions of their citizens, AI will transform authoritarianism into a viable alternative to liberal democracy for the first time since the end of the Cold War. This will trigger a new round of rivalry between social systems.

For decades, most political scientists believed that liberal democracy was the only path to sustainable economic success. Either governments will suppress their citizens and remain poor, or they will make them free and receive economic benefits. Some repressive regimes have managed to achieve economic growth for a certain period, but in the long term, authoritarianism has always meant stagnation. Artificial intelligence can reverse this dichotomy. It empowers the large, economically developed countries to make their citizens rich while maintaining control over them. Some countries have already started down this path. China began constructing a digital authoritarian state, employing monitoring and machine learning capabilities to keep disgruntled residents under control and establishing a "social credit" system. Some countries with similar interests are buying or replicating Chinese systems. The fight between liberal democracy and digital authoritarianism characterized the history of the twentieth century; now, the struggle between liberal democracy and digital authoritarianism may define the fate of the twenty-first century.[108]

At a modest cost, new technologies will provide a high level of social control. Authorities will be able to selectively control conversation subjects and conduct, ensuring the free flow of information about economically useful activity while avoiding politically damaging debates. The so-called "Great Firewall of China"[109] can be considered an example of this selective censoring.

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[107] Kontrol nad voorujeniyami v novih voenno-politicheskih I tehnologicheskih usloviyah, Moskva IMEMO RAN 2020

[108] The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation, 2018 https://img1.wsimg.com/blobby/go/3d82daa4-97fe-4096-9c6b-376b92c619de/downloads/MaliciousUseofAI.pdf?ver=1553030594217

[109] Douglas Heaven, China's great firewall and the war to control the internet, 12 March 2019, https://www.newscientist.com/article/mg24132210-400-chinas-great-firewall-and-the-war-to-control-the-internet/

In addition to retroactive censoring, AI and big data will help predict and control potential discontent. The system will be able to work by analogy with targeting Amazon or Google consumers, but it will be more effective because, unlike liberal democracies, the use of data in authoritarian states is not limited. Amazon and Google only have access to certain accounts and devices, the AI designed for social control will collect data from all the devices that a person uses on a daily basis. Moreover, authoritarian structures can easily correlate this data with information from the tax service, medical institutions, law enforcement agencies, banks, the results of genetic screening and physical parameters (location, biometrics, images from surveillance cameras using face recognition programs), as well as information received from relatives and friends. The effectiveness of AI will depend on wide access to data generally. Unfortunately, the amount and quality of data available to the authorities about each citizen will be enough to develop great AI systems.[110]

The artificial intelligence race between the world's three major military powers differs from past races in the areas of nuclear weapons and stealth technology in that a fair amount of AI technology can be used for both military and civilian needs. These circumstances will certainly result in a shift in state positions in the international arena, as well as a deepening of competition between new and existing "centers of power." In this regard, it is critical to pay attention to the advancement of artificial intelligence technologies as a factor that will have a considerable impact on future geopolitical processes, particularly military affairs prospects.

Artificial intelligence will have important effects on international and national security of the states. It will rebalance the balance of international power, empower individuals, and direct the global strategic balance to states with a strong AI industry base and heavy investments in AI research and development both in the public and private sectors. In terms of military and security outcomes, self-organizing collective decision-making in the herds of autonomous agents will be a defining characteristic of future battlefields.[111] The effects of the swarming strategies will appear in the stability in regional and global level and can break the power balance. Expanding AI's scope of threats, vulnerabilities and potential misconduct requires rethinking the global governance mechanisms of other emerging technologies, therefore they can cope better with dual-use technologies.

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[110] The Malicious Use of Artificial Intelligence: Forecasting, Prevention, and Mitigation, February 2018, https://img1.wsimg.com/blobby/go/3d82daa4-97fe-4096-9c6b-376b92c619de/downloads/MaliciousUseofAI.pdf?ver=1553030594217

[111] RICKLI Jean M., 2018. The Economic, Security and Military Implications of Artificial Intelligence for the Arab Gulf Countries, EDA INSIGHT, UAE, p.7-8

AI will change international security by restoring the international balance of power, empowering individuals and changing the global strategic balance. Two states, China and the United States currently dominate the AI and innovation market. In addition to fueling fierce competition, AI also potentially radiates power to transnational actors, such as multinational companies, as well as individuals and non-state actors.[112]

While AI has the potential to give a number of benefits in the military, it also poses a number of obstacles. Artificial intelligence (AI) has the potential to facilitate autonomous operations, lead to more conscious military decision-making, and even boost the speed and size of military action. It is, however, prone to unpredictable, one-of-a-kind types of manipulation and poses difficulties in human-machine interaction. Analysts have differing opinions on how successful artificial intelligence will be in future military operations. A tiny number of analysts feel that technology will have the least impact, while the majority of specialists believe that AI will have an evolutionary impact, even if it is not revolutionary. In the next chapter of the research, the national artificial intelligence strategies of the USA and Russia, which are the leading states in the field of artificial intelligence technologies worldwide, will be examined. Thus, in the international arena, artificial intelligence studies in the USA and Russia and their effects on different fields will be analyzed.

6. A COMPARATIVE ANALYSIS OF NATIONAL STRATEGIES ON AI OF RUSSIA AND THE USA

Nowadays, most of the countries of the world have already recognized the importance of AI for the national economy, social relations and security and adopted their strategies.

"National strategies have been created by 30 countries, with another 10 countries in the process. Not everyone understands what exactly needs to be created, but a strategic vision of this issue is necessary" said Head of Artificial Intelligence and Machine Learning, Butterfild Keyferd on his World Economic Forum's speech. "A national strategy is needed where it is necessary to set the rules of the game for the state, business and science. It is important how often this document is updated. Technologies become outdated very quickly,

[112] Nicholas Davis and Jean-Marc Rickli. "Submission to the Australian Council of Learned Academies and the Commonwealth Science Council on the Opportunities and Challenges Presented by the Deployment of Artificial Intelligence." Geneva, 25 July 2018.

so it is important to always be in trend" also mentioned Eremenko Maxim, Senior Managing Director, Director of Competence Development for Data Research, Sberbank.[113]

The goals of such countries as USA, Russia and China are similar: to achieve leadership positions. The US is looking to move away from China, which is making significant advances in AI development. The rapid development of artificial intelligence technologies is accompanied by a significant increase in both public and private investments in their development, as well as in the development of applied technological solutions based on artificial intelligence. According to international analysts, investments in artificial intelligence technology more than tripled from 2014 to 2017, totaling almost $40 billion. According to specialists, the global market for artificial intelligence-based technology solutions reached 21.5 billion dollars in 2018 and will reach about 140 billion dollars by 2024.[114]

"The Russian National Strategy for the development of artificial intelligence for the period up to 2030" consists of 6 main sections.[115] They are:

1. "General provisions
2. The development of artificial intelligence in Russia and in the world
3. Basic principles for the development and use of artificial intelligence technologies
4. Priority areas for the development and use of artificial intelligence technologies
5. Goals and main tasks of the development of artificial intelligence (has 6 sub-sections)
6. Mechanisms for the implementation of this Strategy."

The strategy of Russian Federation strongly emphasizes that the Russian Federation has significant potential to become one of the international leaders in the development and use of artificial intelligence technologies. This is made possible by a high level of fundamental physics and mathematics education, a strong natural science school, and the availability of modeling and programming skills. Russian teams consistently win first place in international school and student olympiads in mathematics, computer science, and programming. In terms

[113]Natsionalniye strategii razvitiya iskusstvennogo intellekta v Rossi i v mire, 22 January 2021 https://roscongress.org/sessions/rh-2020-natsionalnye-strategii-razvitiya-iskusstvennogo-intellekta-v-rossii-i-v-mire/discussion/

[114] Training and research laboratory of Artificial Intelligence and Machine Learning, https://www.istu.edu/eng/deyatelnost/obrazovanie/instituty/iit/uil_iskintellekta_mash_obucheniya/default

[115] Ukaz Prezidenta Rossiyskoy Federatsii "O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019 http://static.kremlin.ru/media/events/files/ru/AH4x6HgKWANwVtMOfPDhcbRpvd1HCCsv.pdf

of the number of scientific publications in physics, mathematics, and chemistry, Russia is among the top ten countries.[116] In addition, the Russian Federation has developed an active and increasing community of data processing experts who use artificial intelligence. According to the strategy, modern basic information and communication infrastructure (high internet access, development of a third and fourth generation radiotelephone network) and the availability of mobile data transmission are also favorable factors for the development of artificial intelligence technologies in Russia.

Although the Strategy[117] states that "the Russian Federation has significant potential to become one of the international leaders in the development and use of artificial intelligence technologies", achieving this goal in the short and medium term looks unlikely. Insufficient funding, especially against the backdrop of China and the United States, may become a key obstacle to Russia's becoming a world leader in the field of AI.

Initially, it was planned to allocate 125 billion rubles for the development of projects in the field of artificial intelligence, of which almost 90 billion from the budget. However, the coronavirus pandemic has made significant adjustments to the plans of the Russian government, as a result, the amount of federal funding for projects of AI has noticeably decreased. The federal project "Artificial Intelligence" provided with budget funding in the amount of 24.3 billion rubles and 6.9 billion rubles from extrabudgetary sources. The largest off-budget expenditures will be on software development, research support, and Community Outreach and Development.[118]

For the country's leadership, the high priority of AI development is determined by the significant funding of industry projects. Special mention deserves the use of AI in the military industry, an area where Russia's positions are traditionally strong.

On the international arena, Russia opposes the ban on lethal autonomous systems (LAS) and the military use of AI, but engages in dialogue with other countries and players and supports the development of clear universal rules and ethical standards. It is worth noting separately that the military objectives are indicated in the document exclusively within the framework of "ensuring national security". The Strategy itself has a clear bias towards the

[116] Ukaz Prezidenta Rossiyskoy Federatsii "O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019
[117] Ibid., pp.15-20
[118] Razvitiye iskusstvennogo intellekta, Ministerstvo ekonomicheskogo razvitiya Rossiyskoy Federatsii, https://www.economy.gov.ru/material/departments/d01/razvitie_iskusstvennogo_intellekta/

commercial use of AI. At the same time, the item ‘ensuring national security’ highlighted in main priorities of the strategy.

Russia is now investing in at least two directions: conventional forces and defense technologies where the Moscow believes it can still have a comparative edge over the West, and high-performance, low-cost asymmetric warfare to redress the conventional domain deficit. The first has gotten a lot of attention: Russia's development and employment of AI-controlled military technology and weapons.[119]

In part, the small number of AI startups is due to the fact that in Russia, this industry is dominated by established companies. This feature distinguishes it from most other advanced technological powers. According to the project "Map of artificial intelligence of Russia", there are 400 companies in Russia engaged in development in the field of AI.

Principles for the development of AI in Russia

The main points of the principles for the development of AI in Russia can be determined as follows:

- “protection of human rights and freedoms: ensuring the protection of human rights and freedoms guaranteed by Russian and international legislation, including the right to work, and providing citizens with the opportunity to gain knowledge and acquire skills for successful adaptation to the conditions of the digital economy;
- security: the inadmissibility of using artificial intelligence to purposefully injure persons and legal entities, as well as the prevention and mitigation of the risks of negative repercussions of employing artificial intelligence technologies;
- transparency: predictability of the results of the work of artificial intelligence, non-discriminatory access of users of products that are created using artificial intelligence technologies to information about the algorithms of artificial intelligence used in these products;
- technological sovereignty: assuring the Russian Federation's appropriate level of artificial intelligence independence, particularly through the majority usage of

[119] Michael Horowitz et al., “Strategic Competition in an Era of Artificial Intelligence,” (Washington, DC: Center for a New American Security, July 2018): 15-17, http://files.cnas.org.s3.amazonaws.com/documents/CNAS-Strategic-Competition-in-an-Era-of-AI-July-2018_v2.pdf;

domestic artificial intelligence technology and technological solutions based on artificial intelligence;

- innovation cycle integrity: guaranteeing tight collaboration between scientific research and development in the field of artificial intelligence and the actual economy;
- prudent thrift: prioritizing the implementation and adaption of existing measures aimed at implementing state policy in scientific, technical, and other domains."

At the same time, the Russian principles of AI development have obvious national specifics. It is driven by AI development goals set by the strategy.[120]

The goals of AI development in Russia and the tasks that need to be solved to achieve these goals[121]

The strategy declares the goals of the development of AI in Russia to be "ensuring the growth of the welfare and quality of life of its population, ensuring national security and law and order, achieving sustainable competitiveness of the Russian economy, including leading positions in the world in the field of AI."

To achieve the goals of AI development, the following main tasks should be solved:

- "support for scientific research in order to ensure the advanced development of AI;
- design and development of software that uses AI technologies;
- increasing the availability and quality of data necessary for the development of AI technologies;
- increasing the availability of hardware needed to solve problems in the field of AI;
- increasing the level of providing the Russian market of AI technologies with qualified personnel and the level of public awareness of the possible areas of use of such technologies;
- creation of an integrated system for regulating social relations arising in connection with the development and use of AI technologies.

To ensure these tasks, the strategy lists certain actions, in particular, "support for the export of Russian products (services) created (provided) using AI, and their promotion to

[120] Ukaz Prezidenta Rossiyskoy Federatsii "O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019
[121] Ibid., pp. 10-15

the global market", along with "ensuring growth in demand from Russian citizens, organizations and state bodies for products (services) created (provided) using AI."

The approach lays forth the groundwork for AI development in Russia. By 2024, "an infrastructure should be established to assist domestic firms involved in AI-related activities, including the establishment of high-performance data processing centers," according to the strategy. Furthermore, by 2024, "Russian microprocessors that are not inferior to foreign analogues in terms of speed and energy efficiency shall be produced."

"Fundamentally new sorts of computer system architectures have been developed and intellectual rights to them have been registered". Specialized data processing centers based on Russian microprocessors should be open by 2030.

"Adaptation of regulatory regulation in terms of human interaction with AI, as well as the establishment of suitable ethical norms," according to the plan." [122]

By 2030, software that use artificial intelligence technologies to tackle problems in a variety of fields should be available. Russian companies that build such software should be counted among the world's top performers.[123]

The aforementioned strategy foresees that over the next 10 years, Russia will increase research and development, invest in software and hardware, and improve the availability and quality of data for AI technologies. Furthermore, Russia aims to educate, retain, and attract highly skilled AI professionals, as well as create an enabling and flexible regulatory environment that will encourage investment, research, development, testing, and integration of AI-based technologies and solutions across various sectors of the Russian economy and society.

The strategy discussed above focuses on research and development of AI for applications in different areas, without direct mentioning AI applications for national security and defense. This is a noteworthy omission, given that the Russian defense establishment is working to create military robotics, unmanned systems, command and

[122] Ukaz Prezidenta Rossiyskoy Federatsii "O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019,
http://static.kremlin.ru/media/events/files/ru/AH4x6HgKWANwVtMOfPDhcbRpvd1HCCsv.pdf
[123] Ukaz Prezidenta Rossiyskoy Federatsii "O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019, pp.15,
http://static.kremlin.ru/media/events/files/ru/AH4x6HgKWANwVtMOfPDhcbRpvd1HCCsv.pdf

control, computers, communications, intelligence, surveillance, and reconnaissance, all of which can benefit from AI applications.

In mid of the October, President Putin signed a decree approving the strategy for the development of AI in the country until 2030. According to the document, Russia should take one of the leading positions in the world in the field of AI. [124]

The costs of investments of developed countries, especially the USA, China, as well as the European Union, on artificial intelligence technologies are growing at a rapid pace. Analysts predict that by 2024, artificial intelligence solutions will ensure the growth of the global economy by $1 trillion. According to the forecasts of the international research company IDC, the global volume of the artificial intelligence market will grow by 16% in 2021 and amount to 327.5 billion US dollars. In 2024, this figure will reach $500 billion.[125]

The global market for AI technologies used in weapons was estimated at more than $2.3 billion in 2020. It is expected that by 2026 its value will reach $16.4 billion, and the average annual growth rate will exceed 40%, according to the American Analytical Company Mordor Intelligence.[126]

The national strategy defines two key points for the development of AI in Russia - 2024 and 2030. It is assumed that by the first date the country will significantly improve its position in this area, and by 2030 it will close the gap with developed countries and achieve world leadership in certain areas related to AI. The Russian authorities are planning to introduce AI technologies, including through state national projects.

The United States views the development of AI as a means to maintain its technological superiority. The rapid increase in attention to artificial intelligence technologies from the top political leadership of the United States in recent years well reflects the change in the content of the annual memo on the budget priorities of the White House in the field of research and development.

In mid-September 2019, the US government allocated about $ 1 billion for research in the field of artificial intelligence, but this statement caused a mixed reaction from industry

[124] Ibid. pp.10-15
[125] https://www.idc.com/
[126] Evgeniya Chernisheva, Iskusstvenniy intellect na pole boya, https://plus-one.rbc.ru/society/iskusstvennyy-intellekt-na-pole-boya

leaders.[127] It is known that the US federal government for the first time calculated the requests of specific institutions for the costs of developing AI. Ministry of Defense spending in this area is classified. The 2020 AI Research Plan outlines the government's key programs and strategic priorities, including coordinating long-term federal investment in research, promoting safe and efficient human-AI interactions, and evaluating AI technologies with new criteria and standards.

President Trump signed an executive order in February 2019 reiterating the necessity of AI leadership in order to "protect the United States' economic and national security, as well as influencing the worldwide evolution of AI in line with national values, policies, and goals".[128]

This executive order launched the American AI Initiative, a concerted effort to promote and protect artificial intelligence technologies and innovations in the United States. The program follows a national strategy of collaboration and interaction with the commercial sector, academia, government, and like-minded foreign partners. The Initiative's key directives include requiring federal agencies to prioritize AI research and development, increase access to high-quality cyber infrastructure and data, ensure the United States leads the development of technical standards for AI, and provide training and education opportunities to prepare the American workforce for a new era of AI, among other things.
The document[129] speaks about the need to work directly on AI, for example in the field of machine learning, autonomous systems and applied solutions for complementary human-machine cooperation. Also, document indicates the importance of R&D in those areas of science and technology whose technologies are required for the development, production and implementation of AI in practice – quantum computer science, high-performance (strategic) computing, 5G communication networks, advanced microelectronics and cybersecurity.

The first National Strategic Plan was published in 2016. The update takes into account new research, technical innovations and other aspects that have emerged over the recent years. The document covers all areas of work, including R&D in the field of key technologies; development and testing of prototype systems with AI; practical application

[127] Artificial Intelligence in the United States, https://tadviser.com/index.php/Article:Artificial_Intelligence_in_the_United_States
[128] The White House, 'Executive Order on Maintaining American Leadership in Artificial Intelligence', 11 February 2019, https://www.whitehouse.gov/presidential-actions/executive-order-maintaining-american-leadership-artificial-intelligence/
[129] The National Artificial Intelligence Research And Development Strategic Plan: 2019 Update

and refinement of AI technologies; creation of the necessary infrastructure, data sets, technical and ethical standards for the creation and application of AI. Leadership in this area is seen as a prerequisite for maintaining the economy and national security of the country. The state assumes the role of a leading and guiding force and, together with the IT industry, the scientific community, and foreign partners, intends to ensure an increase in investment in research and development work.

The Executive Order signed by Trump establishes the American AI Initiative, guided by five principles:[130]

- "Create artificial intelligence technology breakthroughs in the federal government, industry, and academia to advance scientific discovery, economic competitiveness, and national security;
- Encourage the development of technical standards and lower barriers to safely testing and deploying AI technologies;
- Train American workers on the development and application of artificial intelligence technologies;
- Foster public trust and confidence in AI technologies and protect civil liberties, privacy and American values;
- To promote an international environment that supports American research and innovation in artificial intelligence and opens markets for American artificial intelligence industries, while protecting technological advantages in the field of artificial intelligence and protecting critical artificial intelligence technologies from acquisition by strategic competitors and hostile countries."[131]

In September 2019, the U.S. Chamber of Commerce's AI Principles were published, stating: "Policies that restrict data flows, such as data localization requirements, represent barriers to market access that will reduce AI-related investment and innovation and restrict access to to AI technologies. Governments must work relentlessly to ensure that data continues to flow across international borders." Two policy papers published in 2019, the Accelerating America's Leadership in Artificial Intelligence Plan signed by the President, and U.S. The Chamber of Commerce Principles of Artificial Intelligence does not mention

[130] Ibid.,
[131] The White House, 'Executive Order on Maintaining American Leadership in Artificial Intelligence', 11 February 2019, https://www.whitehouse.gov/presidentialactions/executive-order-maintaining-american-leadership-artificial-intelligence/.

the word "ethics" at all.[132] But a separate document containing ethical principles for the use of artificial intelligence in the field of weapons was adopted by the US Department of Defense. Ethical principles as formulated by the Pentagon are reminiscent of warranty obligations for a new weapons system. The Ministry of Defense stated that it will adhere to the implementation of five requirements: "responsibility", "objectivity", "controllability", "reliability" and "controllability" of AI.[133] Certainly, ethical rules underlie American democracy, and the US authorities will be ready to support them at the level of principles, but not to the detriment of American geopolitical interests.

The National Artificial Intelligence Research and Development Strategic Plan: 2019 Update sets out a set of goals for federally funded AI research and identifies the following eight strategic priorities:[134]

The first strategy emphasizes: Invest in AI research for the long future. Make next-generation AI investments a priority so that the US can continue to lead the world in AI discovery and comprehension.

The second strategy: Develop excellent human-AI collaboration methods. Improve your grasp of how to design artificial intelligence systems that complement and enhance human talents.

The third strategy : Understand and address the ethical, legal, and societal aspects of AI; investigate AI systems that use technical processes to handle ethical, legal, and social challenges.

The fourth strategy : Ensure AI system safety and security; advanced understanding of how to construct artificial intelligence systems that are resilient, reliable, secure, and trustworthy. Develop and give access to high-quality datasets and environments, as well as testing and learning resources.

The fifth strategy : Develop shared public datasets and environments for AI training and testing.

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[132] Ibid.,

[133] Dod Adopts Ethical Principles For Artificial Intelligence, February 24, 2020 Https://Www.Defense.Gov/Newsroom/Releases/Release/ Article/2091996/Dod-Adopts-Ethical-Principles-For-Artificialintelligence/

[134] The National Artificial Intelligence Research And Development Strategic Plan: 2019 Update, National Science & Technology Council, June 2019, pp.3-4, https://www.nitrd.gov/pubs/National-AI-RD-Strategy-2019.pdf

The sixth strategy: Standards and benchmarks are used to measure and assess AI systems. Develop a variety of AI evaluation techniques, including technical standards and benchmarks.

The seventh strategy : Gain a better understanding of the AI R&D labor requirements across the country. Expand R&D workforce development opportunities to incentivize strategically an AI-ready workforce.

The eighth strategy : Expand public-private partnerships to accelerate advances in AI. Promote opportunities for sustainable investment in AI research and development and for translating advances into practical opportunities in collaboration with academia, industry, international partners and other non-federal organizations.

The ability to comprehend and analyze AI system solutions, as well as to assess their correctness, dependability, and repeatability, is currently limited. First strategy of the document emphasizes continued investment in research and development is needed to increase confidence in artificial intelligence systems to ensure that they meet the needs of society and adequately meet the requirements of reliability, fairness, explainability and security. Investment in AI research is needed in areas with potential long-term returns. While additional research with predictable outcomes is an important component of long-term research, long-term sustainable investment in high-risk research can lead to high returns. Supporting the development of AI technological standards and related tools is emphasized in Strategy 6. To keep up with the quickly growing capabilities and expanding fields of AI applications, standards development must be hastened. Artificial intelligence solutions must perform mission-critical duties in terms of functionality and interoperability, as well as operate reliably and securely, according to standards.

The Table 2 below explains all main points of national strategies on AI of mentioned states and gives an opportunity to make a comparison between them.

States	**USA**	**RUSSIA**
The name of the document	THE NATIONAL ARTIFICIAL INTELLIGENCE RESEARCH AND DEVELOPMENT STRATEGIC PLAN: 2019 UPDATE	NATIONAL STRATEGY FOR THE DEVELOPMENT OF ARTIFICIAL INTELLIGENCE FOR THE PERIOD UP TO 2030.
Amount of pages	50 pages	25 pages
Contents of strategies	***Consists of 8 strategies***	***Consists of 6 sections***
	Strategy 1: Make long-term investments in AI research. **Strategy 2:** Develop effective methods for human-AI collaboration **Strategy 3:** Understand and address the ethical, legal, and societal implications of AI. **Strategy 4**: Ensure the safety and security of AI systems. **Strategy 5**: Develop shared public datasets and environments for AI training and testing. **Strategy 6**: Measure and evaluate AI technologies through standards and benchmarks.	**1.** General provisions **2.**The development of artificial intelligence in Russia and in the world **3.** Basic principles for the development and use of artificial intelligence technologies **4.** Priority areas for the development and use of artificial intelligence technologies **5.**Goals and main tasks of the development of artificial intelligence (has 6 sub-sections) **6.** Mechanisms for the implementation of this Strategy

	Strategy 7: Better understand the national AI R&D workforce needs. **Strategy 8**: Expand public-private partnerships to accelerate advances in AI.	
6.	**Main goals** given as a main sections and called ‘strategy’	**Main goals** 1.Ensuring the growth of well-being and the quality of life of its population 2. Ensuring national security 3. Achieving sustainable competitiveness of the Russian economy. 4. Support of scientific research/R&D to ensure the advanced development of artificial intelligence 5. Ensure the safety and security of AI systems.
7.	Document highlights that USA should maintain its’ leadership in AI sphere	Document highlights that Russia has the potential to be one of the leading countries in AI sphere
8.	The expenses of the Ministry of Defense in the field of artificial intelligence are classified.	The expenses of the Ministry of Defense in the field of artificial intelligence are classified.
9.	Strategy sees the rivalry between states as an arms race	Strategy sees the rivalry between states as an arms race
10.	Importance of human resources and qualified specialists	Importance of human resources and qualified specialists

Table 2. Comparison of AI National Strategies of the USA and Russia

The table gives a framework of how Russia and the US making their national policies on AI. The USA is mostly concentrated on the Research and Development and made updates based on that factor. Also, Russia emphasizes the importance of Research and Development on the AI field, basically on the document can be seen the commercial purpose, but it doesn't exclude the national security of the state even if it's outlined in a narrow range. Both of these countries focused on the position of being a leader in the sphere of artificial intelligence, USA says that the government should pace the development of new technologies to integrate it in different sectors to maintain its' leadership in the world. Russia also sees itself as a state that have a big potential to be one of the leading countries in the using artificial intelligence effectively and getting ahead of the arms race. In the documents of both countries are common points that are about safety, security of the AI systems and setting up certain standards in developing and using it. There is an another point about the ethical, legal, social implications of AI where aforementioned countries have mutual points, at the same time they are challenging some admitted rules on banning Lethal Autonomous Weapons. In Russia, most defense industries controlled by the government, however, the government of Russia and the Defense Ministry are willing to collaborate with private defense companies to accelerate the development of new technologies. In the USA, can be seen a model of private and state owned companies collaboration on the advancement of artificial intelligence technologies.

After comparing the national artificial intelligence strategies of Russia and the USA, it is necessary to describe in detail the breakthroughs made by Russia in the field of defense industry in order to determine the strong potential of the AI-integrated defense industry technologies.

6.1 AI in the Russian Military System

The stakes in the race for leadership in the field of artificial intelligence are high. Considering the scope of AI and its capability to affect diplomacy, defense, social stability intelligence, economic competitiveness, and the information environment, states should not lag behind the development and implementation of AI in order to achieve leadership in this area.

At the present time, defense exertions are concentrated on armed forces and its efficiency, some sustaining elements, entities of it serving as a maintenance. The layer "the

whole of government" is similar to national government that have the liability for national security and leans to be significant for many states and embody in various directions like security, cyberspace, counterterrorism and etc. Western thinking of defense analytics and politics last several decades concentrated on the enhancement of defense exertion that in the strategical meaning based on more complicated data technologies in political meaning enhancement of protection of frontline operators from the different reductions.

The advanced military powers of the world distinguish the importance of AI system its quality of replacing soldiers that face various issues as scope, difficulty, time, sustainability and advancement over the people's decision-making. AI's possibilities show the perspectives as high quality analysis, ability of decision-making, time speed up and other peculiarities in any situation. For this reason, why world's advanced military forces are investing in AI technologies and developments of them therefore, AI systems are adapted to the underpinning needs about the improvement of military doctrines, which has the ability of replacement the pattern of deterrence and hostilities following years.

Success in the military sphere largely depends on the accuracy and speed of decision-making by commanders at all levels, it is necessary to develop support systems for making such decisions, to introduce artificial intelligence technologies there, said Russian President Vladimir Putin.[135]

The Russian defense industry, which employs several million people and supports overseas arms sales, remains a vital domestic sector. Whether directly or through equity shares, the government owns nearly all of the defense industry. Russia initiated the GPV-2020 armament program in 2011 with the purpose of modernizing the military's armaments over a 10-year period.[136] Russia claims to have improved its ability to create upgraded systems in serial, boost manufacturing volumes, and develop new designs (such as hypersonic and cruise missiles, electronic warfare, and air defense systems). The Russian government sees defense as a crucial engine of scientific advancement and innovation.

The Russian Federation is operating in the field of the AI in sustainable way meanwhile is a little behind between leading states on AI. For the country's leadership, the high priority of AI development is determined by the significant financing of industry projects by Russian standards. The use of AI in the military industry, where Russia's

[135] Putin prizval razvivat sistemi iskusstvennogo intellekta v voennoy sfere, December 21, 2021 https://ria.ru/20211221/putin-1764712935.html
[136] Russian Arms Sales and Defense Industry, Congressional research Service, October 24,2021

positions are traditionally strong, deserves special mention. As previously stated, Russia is the second largest arms exporter in the world after the United States. Russia exports weapons to more than 45 countries, and since 2016 it accounts for about 20% of global arms sales.

President Putin gave a speech on national television in September 2017 in which he declared that “artificial intelligence is not only the future of Russia, it is the future of all mankind. The one who will become the leader in this field, will be the master of the world”. Russia has completed the establishment of a network of military-project-related entities. The MoD Commission for the Development of Robotic Systems for Military Purposes; The Main Department for Research and Technological Support of Advanced Technologies (GUNID); The Russian Ministry of Defense's Main Research and Testing Robotics Centre (MRTRC); The Advanced Research Foundation; The Military Innovative Technopolis "ERA" make up this network or structure.[137]

“In the shortest possible time, it is necessary to develop a progressive legal framework and eliminate all barriers to the development and widespread use of robotics, artificial intelligence, unmanned vehicles, e-Commerce, and big data processing technologies," Vladimir Putin said in a speech to the Federal Assembly in March 2018. Despite these aims, Russia's desire to develop and employ artificial intelligence is currently focused on its military. The national plan for AI research and development is a separate undertaking. Putin directed the government to prepare a National Strategy for Artificial Intelligence Research and Development in January 2019, according to state media. "Public, military, academic, and private resources will be pooled to speed the development of artificial intelligence in the country," according to the strategy.”[138] According to given reports, this roadmap would include a list of initiatives that will aid in identifying and removing roadblocks to the development of end-to-end technologies, as well as forecasting demand for artificial intelligence technology across industries. This road map will serve as the foundation for a broader national digital strategy.[139]

The draft national strategy on AI appeared in May 2019. It noted that the global AI market is growing rapidly (in 2018 it amounted to $ 2.5 billion, by 2024, according to forecasts, it will grow to $ 137.2 billion), the share of Russia in it is extremely small (0.2%

[137] Vadim Kozyulin, Militarization of AI, PIR Center (Russian Center for Policy Research) July 2019
[138] Samuel Bendett, Putin Orders Up a National AI Strategy, January 2019, https://www.defenseone.com/
[139] Ibid.

of world), the volume of investments, the number of patents and articles on AI are also less than 1%.[140]

In June 2019, the President signed five orders “on AI”, one of which ordered “to approve, within the framework of the national program “ Digital Economy of the Russian Federation”, a federal project aimed at implementing the national strategy for the development of technologies in the field of artificial intelligence of the Russian Federation and including 3-years action plan ”.

The AI development strategy was approved on October 10, 2019. The presidential decree instructed the government to make the necessary changes to the digital economy national program until December 15, 2019, and to develop a federal project for the development of artificial intelligence.

Up until the end of 2024, a total of 125 billion dollars was set up for the development of domestic artificial intelligence, with over $ 90 billion coming from the budget. The Russian government budget for national military spending in 2021 is expected to be 3.11 trillion rubles. Two-thirds of this cash will be spent on weapon acquisition and upgrading by the Ministry of Defense.[141]The Russian military is actively using AI technologies for its own purposes: several robotic systems are in service with the Russian Federation Armed Forces.

It should be noted separately that the military objectives are indicated in the document exclusively within the framework of "ensuring national security." The Strategy itself has a clear bias towards the commercial use of AI. Speaking about the level of AI development in Russia, it is necessary to make one important reservation: for obvious reasons, international ratings do not take into account military developments. Meanwhile, for many decades, it was military science and the defense industry that were the locomotives of Russian technological development. Some international experts also note the special role of the military in the development of Russian AI technologies. For example, Michael Horowitz, a professor of political science at the University of Pennsylvania, expressed the opinion that Russia and China are able to challenge the military superiority of the United States through the use of AI.[142]

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[140] Desyatiletiye II: Vladimir Putin predlagayet transformirovat stranu s pomoshyu iskusstvennogo intellekta, 29 June 2021, https://www.cnews.ru/reviews/ii_2021/articles/desyatiletie_ii_vladimir_putin_predlagaet

[141] Vasiliy Agapov, Istoriya razvitiya iskusstvennogo intellekta v Rossii, 30 August 2021, https://huawei.ru/insights/istoriya-razvitiya-iskusstvennogo-intellekta-v-rossii/

[142] Nikolay Markotkin, Elena Chernenko, Razvitiye tehnologiy iskusstvennogo intellekta v Rossii:tseli i realnost, Carnegie, 7 July 2020,07 июля 2020, Карнеги, https://carnegieendowment.org/2020/07/07/ru-pub-82173

Due to the closed nature of data on military developments, it is quite difficult to assess the level of use of AI technologies in them. Nevertheless, some conclusions can be drawn on the basis of public statements by Russian officials. Both representatives of the Ministry of Defense of the Russian Federation and the Russian leadership have repeatedly stressed that the arsenal of the Armed Forces of the Russian Federation has a whole range of weapons based on developments in the field of AI. This applies, for example, to drones, fighter jets, underwater robots.

It is difficult to assess Russia's investments in the development of AI for military use. But it is possible to make a rough overview of the structures associated with the Russian Ministry of Defense that deal with this topic. Large public and private companies are also involved in the development of AI in Russia. Representatives of the state corporation Rostec stated that a number of its subsidiaries are developing weapons using AI. Among them are the Kalashnikov and Techmash concerns, the High-Precision Complexes Non Governmental Organization, and Tsniitochmash JSC. In particular, AI elements have been used for several years in multiple launch rocket systems produced by Techmash.

Despite the fact that Russia's innovation ecosystem lacks the dynamics of America's and China's, the Russian defense industry's attempts to expand the military's use of artificial intelligence and robotics can have substantial effects on today's and future battlefields. In 2017, the Russian market of AI was estimated at $ 12 million, and in 2018, is rather low compared with the private sector and government spending in the United States, China, and even India. Although, according to forecasts, investments in the private sector will increase to 28 billion rubles (500 million dollars) by 2020 and the country ranked 20th in the world in terms of the number of AI startups. However, Russia is initiating plans to narrow the gap. As part of these efforts, Russia will continue to implement its defense modernization program for 2008 in order to robotize 30% of its military equipment by 2025.[143]

In the appeal of the President of the Russian Federation in 2017, distinguished the significance of the development unmanned robotic systems for the defense system that was charged in the Advanced Research Foundation.[144]

“In particular, Vladimir Putin stated in a message to the Russian Federation's Federal Assembly on March 1, 2018, that Russia had built a deep-sea unmanned vehicle capable of

[143] Artificial Intelligence and National Security, Congressional Research Service, November 2020, p.21.
[144] Era innovatsiy dllya gosudarstva I armii, VPK, 12 March 2018, https://vpk.name/news/208739_era_innovacii_dlya_gosudarstva_i_armii.html

traveling over long distances and delivering nuclear weapons.[145] Such autonomous devices, nicknamed "Poseidon," are expected to enter service with the Russian Navy until 2027."[146]

In March 2018, Sergei Shoigu, Russia's defense minister, called for military and civilian experts to join forces to create AI technologies, where he said that "essential to address possible threats to Russia's technological and economic security." These words were spoken at the first conference "Artificial Intelligence: Problems and Solutions," which was held on the site of the Russian Federation's Ministry of Defense on the initiative of the Russian Academy of Sciences and with the support of the Russian Federation's Ministry of Education and Science. Officials released a 10-point plan following the summit, which included ties to AI military simulations and AI ideas in domestic military forums.[147]

Rostec State Corporation is also engaged in the development of "smart" weapons in Russia. For example, in 2018, The Kalashnikov concern, which is a subsidiary of Rostec, developed a combat module that evaluates the scenario, recognizes dangers, and makes assault decisions. Its operation algorithm is similar to the algorithms found in the human brain, allowing it to self-learn. Rostec recently created software and an analysis complex for munitions that renders it immune to electronic warfare.[148]

General Director of National Center for the Development of Robotic Technologies and Basic Robotic Components', A.Grigoryev commented that research center will be able to incorporate new products of AI. That new products of AI based on afore accessible growth and progress for the creation world's best military application and special purpose robots from the best products, control systems, visual equipment complexes, special-sensors. He also stated Russia's domestic strides in the developed sections.[149] The Russian artificial intelligence market is expected to grow exponentially over the next few years, but the amounts involved still make up only part of the us market, or even what the us military is spending on it. But, AI is clearly a Russian priority. In the international arena, Russia opposes the ban on lethal autonomous systems and the military use of AI, but engages in

[145] O kakom novom superorujii Rossii rasskazal Putin, VPK, 2 March 2018, https://vpk.name/news/208137_o_kakom_novom_superoruzhii_rossii_rasskazal_putin.html
[146] VMF Rossii poluchit na voorujeniye podvodniye bespilotniki "Posedon" do 2027 goda, Poslaniye Vladimira Putina Federalnomu Sobraniyu, TASS, 12 March 2018, https://tass.ru/armiya-i-opk/5194368
[147] Shoigu prizval voennih i grajdanskih uchenih sovmestno razrabativat robotov i bespilotniki, TASS, 14 March 2018, https://tass.ru/armiya-i-opk/5028777
[148] Evgeniya Chernisheva, Iskusstvenniy intellect na pole boya, 1 March 2021, https://plus-one.rbc.ru/society/iskusstvennyy-intellekt-na-pole-boya
[149] Sergey Ptichkin, "Umnaya pulya vidit tsel," Rossiyskaya Gazeta, Sobitiya I kommentarii, Arsenal, July 19, 2016

dialogue with other countries and players and supports the development of clear universal rules and ethical norms.[150]

Russia is clearly working towards a more complete integration of AI. In Russia, a number of groups dedicated to military AI are being formed. The Russian government announced a 10-point AI agenda in March 2018, which includes the establishment of an AI and big data consortium, the Foundation of Analytical Algorithms and Programs, a state-funded AI training and education program, a specialized AI laboratory, and the National Center for Artificial Intelligence, among other initiatives.[151]

Speaking at the final board of the Russian Defense Ministry in December 2019, Vladimir Putin said that: "The previously existing models of weapons and equipment in the Aerospace Forces, Navy, and other types and branches of the armed forces are being consistently replaced with modern ones, including those based on digital technologies and artificial intelligence. Robotic complexes and unmanned vehicles are being actively introduced and mastered during combat training, which significantly increases the capabilities of units and subunits.[152]

There are many companies and organizations are working on AI systems in a defense system which make attempts to ameliorate the system which will automatically incorporate with various types of operations. The Russia's United Instrument Manufacturing Corporation created and improving the system for the protection of borders that will allow to work with a video cameras, infrared and seismic sensors, radars, drones to analyze and make observations on the borders. Moreover, the system which will be deployed on eastern and southern borders will allow collection of data of various types, also artificial intelligence technologies will be used to monitor and analyze and predict the situation and take any measures for the preclusion of any acts.[153]

While active commercial firms aided AI research in the United States and China, the Russian Defense Ministry, along with components of the defense sector, appears to play a major role. For example, Russia recently established the Advanced Research Foundation, a defense research institution similar to DARPA that deals with issues of autonomy and

[150] O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019, http://www.kremlin.ru/acts/bank/44731

[151] Allen Greg and Chan Taniel, Artificial Intelligence and National Security, July 2017, Belfer Center Study, 132 p.

[152] Zasedaniye kollegii Ministerstva oboroni, 24 Dcember 2019, http://www.kremlin.ru/events/president/transcripts/62401

[153] "Robots on Patrol: Russian Borders to Be Guarded by Artificial Intelligence," Sputnik, 2016, https://sputniknews.com/military/201606301042223143-russian-borders-guarded-robots/.

robotics, as well as the yearly conference "The Robotization of the Russian Federation's Armed Forces." The Advanced Research Foundation will lead a number of new projects using artificial intelligence systems, including image recognition and imitation of the human thinking process. Some Russian information technology companies, such as Yandex, the Mail.ru Group, and a number of AI start-ups, are also investing in commercial AI applications. According to reports, Russia is trailing the United States, China, and India in terms of the number of people using the Kaggle crowdsourcing platform for AI researchers.[154] In addition, some analysts point out that this is a recent proliferation of research institutions dedicated to AI, however, this can lead to duplication of duties and bureaucratic inertia, hampering the development of AI, rather than speeding it up. Many Russian Ministry of Defense projects to advance AI research and applications involve collaboration with universities and industry.

The Russian military investigated a number of artificial intelligence applications, with a particular focus on semi-autonomous and autonomous vehicles. Meanwhile, the Russian Corporation of Tactical Missiles is already working on missiles with artificial intelligence, capable of determining its own direction. Russian General Viktor Bondarev, who is the Commander-in-Chief of the Russian Air Force, confirmed the initial development of AI-guided missiles. In a November 1, 2017 formal declaration, he declared that "artificial intelligence will be able to replace the soldier on the battlefield and the pilot in the cockpit," and that "the day is approaching when artificial intelligence will be used." Bondarev made these remarks shortly after the successful testing of "Nerehta," a Russian unmanned ground vehicle that "outperformed existing unmanned combat vehicles," according to speech.

Russia intends to use "Nerehta" as a platform for AI research and development, with the possibility of using the system for combat, intelligence, or logistics in the future.[155] Russia is also reported to have developed a combat module for unmanned land vehicles capable of identifying and perhaps striking autonomous targets, as well as ambitions to construct a set of autonomous systems with AI support.

In an interview with the 'Rossiyskaya Gazeta' in August 2016, Grigoryev described a combat exercise held in Nizhniy Tagil in which an automatic helicopter revealed a hidden enemy, a terminator-robot armored vehicle called "Nerekhta" equipped with missiles and

[154] BERSHIDSKY Leonid, “Elon Musk Warns Battle for AI Supremacy Will Spark Third World War,”The Independent, September 6, 2017, https://www.independent.co.uk/life-style/gadgets-andtech/news/elon-musk-ai-artificial-intelligence-world-war-three-russia-china-robots-cyber-warfarereplicants-a7931981.html.
[155] ibid

guns made an automatic decision, and the task was successfully completed.[156] Meanwhile, UGVs are being improved and tested, while others, such as the Uran-6 demolition robot, have been deployed in Syria and Palmira.[157] Uran-9, according to Russian defense specialists, can be deployed in Syria to maintain Syria's or Russia's ground operations, but its capabilities have yet to be shown.[158] In addition, with the Russian Pacific, the intelligence system "Platforma-M" is currently unfolding. Another heavy UGV, the "Udar," was demonstrated in 2015, and it is based on the BMP-3 armored vehicle to reduce system technical maintenance. It is available in combat, engineering support, and transport versions.[159] Despite to these operations and UGVs the Russian defense settlement is still not fully automated yet. According to the allegations of the Russian newspaper "Komsomolskaya Pravda," the character of Russian weaponry and their application are based on the Russian Federation's government military doctrine.[160] There are propositions about that the electronic warfare is the one of the intensity of Russian military, but the situation in electronic warfare can be altered in the case of deployment of autonomous weapons by enemies which military forces of the Russia can encounter fully autonomous or systems of combats in a high level.

However, in addition to scientific research, Russia is developing weapons systems actively and openly that will include AI. The Russian Kalashnikov assault weapon, for example, is said to have a combat module with a machine gun that employs "neural network technologies to designate targets and make choices."[161] The powerful Russian development of military robotics and unmanned ground vehicles can be aimed at increasing their autonomy. There are also claims that the “Armata” T-14 “super-tank” has an autonomous

[156] Sergei Ptichkin, “Umnaya pulya vidit tsel,” Rossiyskaya Gazeta, Sobitiya i kommentarii
[157] Aleksey Zakvasin i Elizaveta Komarova, “Podorvat zaryad na rasstoyanii:kakim noveyshim voorujeniyem osnasheni Injenerniye Voyska Rossii, 8 February 2020, https://russian.rt.com/russia/article/716104-sapyory-miny-siriya-shoigu
[158] Primeneniye boevogo robota “Uran-9” v Sirii viyavilo ego nedostatki, 19 June 2018, https://ria.ru/20180619/1522957833.html
[159] Stephan De Spiegeleire, Matthijs Maas and Tim Sweijs, Artificial intelligence and the future of defense: strategic implications for small- and medium-sized force providers, Hague Centre for Strategic Studies, 2017, pp.82
[160] Mihail Timoshenko | Sayt Komsomolskoy Pravdi, “Voyna Pod Mikroskopom”, August 6, 2015, http://www.kp.ru/daily/26415/3289072/.
[161] TASS, ‘Kalashnikov gunmaker develops combat module based on artificial intelligence’, 5 July 2017, http://tass.com/defense/954894.

turret, and that further achievements may lead to the deployment of fully autonomous tanks.[162]

Moreover, the Russian military plans to include AI in uninhabited air, sea and underwater vehicles and are currently developing combat capabilities. It also explores the innovative use of AI for electronic warfare, including adaptive frequency hopping, waveforms and countermeasures. Finally, Russia widely used artificial intelligence technologies for internal propaganda and observation.

Although Russian swarm intelligence efforts appear to be behind those of the United States and China, the Russian Kronstadt group's general director claimed that "swarms of drones" would "undoubtedly" soar into the sky in future battles. At the same time, Russia may be working on the "Status-6" autonomous underwater vehicle, which may be used to deliver nuclear bombs.[163]

Additionally, in January 2019, there were reports that Russia is developing an Autonomous drone, apparently a heavy strike drone Sukhoi 'Okhotnik' ("Hunter"), which is being developed since 2011. It will be able to take off, complete its mission, and return to Earth without the need for human assistance. Weapons will only be used with the agreement of a'man in the loop,' who can critically examine the fighting scenario and, if necessary, interrupt the attack. According to the technical website, Okhotnik will be a pioneer in the creation of artificial intelligence battle systems.[164]

Looking ahead, the approach of the Russian government to the legal and ethical issues that will arise in the development of military applications of artificial intelligence and even deadly autonomous weapons remains questionable. For example, in a statement to the UN Group of Governmental Experts on Deadly Autonomous Weapon Systems: raised by these weapons systems. Today, according to analyst Samuel Bendett, there is a consensus that people will stay informed, at least in the near future. However, it is still unknown how the Russian approach can evolve with the development of basic technologies. For example, Viktor Bondarev, Chairman of the Federation Council Committee on Defense and Security,

[162] "Russia To Start Building Its Next Generation Flying Wing Stealth Bomber to Replace the Tu-22, Tu-95, and Tu-160 Aircraft," Aviationist, February 27, 2017,https://theaviationist.com/2017/02/27/russia-to-start-building-its-next-generation-flying-wingstealth-bomber-to-replace-the-tu-22-tu-95-and-tu-160-aircraft/.
[163] SLIJPER Frank, Beck Alice and Kayser Daan, State of AI, Artificial intelligence, the military and increasingly autonomous weapons, PAX, April 2019,
[164] SLIJPER Frank, Beck Alice and Kayser Daan, State of AI, Artificial intelligence, the military and increasingly autonomous weapons, PAX, April 2019,

stated that AI could one day "replace a soldier on the battlefield and a pilot in the cockpit."[165] According to his report, the Russian military is developing autonomous vehicles to protect ballistic missile bases and an autonomous submarines capable of carrying nuclear weapons. As robotics, Russia distributes remote human tanks such as "Uran-9" and "Vihr" to the battlefield.[166]

Last year, the Ministry of Defense of the Russian Federation began the formation of a specialized department for the development of artificial intelligence. Twelve tons of combat mass, Ataka anti-tank supersonic missiles, thermobaric ammunition of the Shmel flamethrower, a 30-millimeter cannon and a heavy machine gun - this is a portrait of the first Uran-9 robotic complex in the Russian army. In September, it was used for the first time in combat formations of combined arms units at the West-2021 strategic exercises joint with Belarus.[167]

As it mentioned above, national strategies play an important role to reach goals of states for the development of AI. In the Russia's National Strategy on AI was emphasized Russia's significant potential to become one of the international leaders in the development and use of artificial intelligence technologies. This is made possible by a strong basic physics and mathematics education, a strong natural science school, and the availability of modeling and programming skills. Russian teams consistently win first place in international school and student Olympiads in mathematics, computer science, and programming. In terms of the number of scientific publications in physics, mathematics, and chemistry, Russia is among the top ten countries. In addition, the Russian Federation has developed an active and increasing community of data processing experts who use artificial intelligence.[168]

The current basic information and communication infrastructure (high Internet access, construction of a third and fourth generation radiotelephone network) and the

[165] Horowitz M., Allen G., Kania E. and Scharre P., Strategic Competition in an Era of Artificial Intelligence, July 2018, Center for a New American Security, p.27 15-17

[166] BENDETT Samuel, 'Russia Racing to Complete National AI Strategy by June 15', Defense One, 14 March 2019, https://www.defenseone.com/threats/2019/03/russiaracing-complete-national-ai-strategy-june-15/155563/.

[167] Dmitriy Litovkin, "Oniks" i "Granit": kak umniye raketi vibirayut sebe tsel, https://www.gazeta.ru/army/2021/11/18/14218657.shtml

[168] Ukaz Prezidenta Rossiyskoy Federatsii "O razvitii iskusstvennogo intellekta v Rossiyskoy Federatsii, 10 October 2019, p.6
http://static.kremlin.ru/media/events/files/ru/AH4x6HgKWANwVtMOfPDhcbRpvd1HCCsv.pdf

availability of mobile data transmission are also positive elements for the development of artificial intelligence technologies in Russia.

The implementation of this strategy, which takes into account the current state of the global artificial intelligence market as well as medium-term projections for its growth, is a prerequisite for the Russian Federation's entry into the group of world leaders in the development and implementation of artificial intelligence technologies, and, as a result, for the country's technological independence and competitiveness.

By 2030, software that use artificial intelligence technologies to tackle problems in a variety of fields should be available. Organizations building such software in Russia should join the global market's leaders.

Despite Russia's ambitions, analysts believe that considerable progress in AI development will be tough for the country. In constant dollars, Russian military spending decreased by 20% in 2017.[169]. Spending then rose in 2019 but is expected to decline in constant dollars from 2020 to 2022.[170]

Many analysts also point out that Russian scientists have published a number of AI-related research papers, and that the Russian technology industry has yet to finish artificial intelligence applications comparable to those developed in the United States and China. Others contend that such reasons are immaterial, claiming that despite never being a leader in Internet technologies, Russia has managed to become a particularly harmful force in cyberspace. Roger McDermott of the Jamestown Foundation believes that in terms of decision-making speed, the new Russian combat control information systems based on artificial intelligence, the Russian military has a strategic advantage over NATO armed forces, as proved during the Center-2019 strategic exercises.[171] There are more than 150 military systems with artificial intelligence in Russia are currently in various stages of development. Key areas of interest include autonomous air, underwater, surface and ground

[169] Eksperti: Rossiya v 2017 godu vperviye za 19 let snizila rashyoti na oboronu, TASS, 2 May 2018, https://tass.ru/mezhdunarodnaya-panorama/5171808.
[170] "Military expenditure by country, in constant (2018) US$ m., 1988-2019," Stockholm International Peace Research Institute, https://www.sipri.org/sites/default/files/Data%20for%20all%20countries%20from%201988%E2%80%93201 9%20in%20constant%20%282018%29%20USD.pdf; and Siemon T. Wezeman, "Russia's military spending: Frequently asked questions," Stockholm International Peace Research Institute, April 27, 2020, https://www.sipri.org/commentary/topical-backgrounder/2020/russias-military-spending-frequently-asked-questions.
[171] Nikolai Markotkin and Elena Chernenko, Developing Artificial Intelligence in Russia: Objectives and Reality, August 5 2020

platforms. Moscow seeks to use AI for electronic warfare, intelligence, surveillance, reconnaissance, and even in strategic decision-making processes.[172]

Supporting defense relations and developing new weapons is important for Russia to demonstrate global military, diplomatic and political power, and such relations are part of Russia's foreign policy. Russia's investments in artificial intelligence fields in general are less than other leading countries such as the USA and China, but considering Russia's strong positions and its work in certain areas with existing potential, it further strengthens its pursuit and efforts to become a leader in the world. One of these areas is the defense industry. Except for the budget expenditures for the defense industry, investments in AI-integrated defense industry remain confidential. Many observers and military experts point out that Russian weapons could be cheaper and easier to operate and maintain than Western systems. The point is not the number of new weapons technologies developed, but the quality of development and the active use of weapons in certain cases, which is shown in practice by Russia in various battles in Syria, Ukraine and Naghorno-Karabah and etc. The effectiveness of new weapons equipped with artificial intelligence is recognized by many experts in this field in Russia and abroad.

[172] Jeffrey Edmonds, Samuel Bendett, Anya Fink, Artificial Intelligence and Autonomy in Russia, May 2021, Center for Naval Analyses, https://www.cna.org/CNA_files/centers/CNA/sppp/rsp/russia-ai/Russia-Artificial-Intelligence-Autonomy-Putin-Military.pdf

CONCLUSION

This research provides an overview of developments in politics and practice related to the military use of artificial intelligence in Russia. Russia and the USA are among the most involved in the development of AI, especially with regard to its military use. In general, the US is ahead of the development of AI and investment, but China is quickly catching up, and other states are eager to follow their example. Indeed, this research shows that all these states are striving to become leaders in the field of AI. The development of AI is becoming Russia's top priority, therefore, under favorable conditions, Russia is quite capable of becoming a serious player in international level and a local leader in some areas.

This research clearly demonstrates the start of the AI arms race. First and foremost, the study reveals that states create national policies and initiatives with the goal of expanding military AI use. The states mentioned in this report have specific research programs in place to investigate how AI may be used in the military, as well as programs that encourage collaboration with technical enterprises and universities to put their knowledge to good use. Second, it suggests that governments are increasing their investments in military artificial intelligence. Third, the rhetoric about the necessity to invest in military AI in order to keep up with adversaries is expanding. The artificial intelligence weapons race is typically framed as a zero-sum game, but it will almost certainly be a no-win situation.

Other countries have dedicated initiatives targeted at making the best use of these new technologies in conflict, in addition to the United States and Russia investing in military applications of AI.

When we talk about the level of artificial intelligence development of Russia, it is necessary to make one important mark. For some obvious reasons, international ratings do not take into account military developments. Meanwhile, for many decades, it was military science and the defense industry that were the locomotive powers of Russian technological development. Some international experts also note the special role of the military in the development of Russian AI technologies. Thus, the military sector is one of the strongest in terms of the development of Russian artificial intelligence technologies. As previously stated, Roger McDermott of the Jamestown Foundation believes that, in terms of speed of decision-making, the new Russian AI-based command and control information systems, The

Russian military has a strategic advantage over NATO military forces, as proved during the Center-2019 strategic exercise.

Russia’s positions on AI in the military and aspirations to get ahead in arms race in the development of new technologies analyzed in the neorealist approach in this research. According to the analysis, to ensure military security, Russia must keep its military capabilities at a level that will allow it to defend itself in the case of a crisis near the state border. Russia seeks to safeguard its security and territorial integrity in accordance with neorealism's defensive strategy. Furthermore, the aspect of strengthening its power supports Russia's objectives to preserve and strengthen its supremacy in regional and worldwide arenas by quickening technological breakthroughs and incorporating new technologies such as artificial intelligence into the defense sector.

The Russian government views innovation as one of the distinctive traits of a great power, and feels that military advances are essential for Russia's overall defensive stance in a changing threat environment. Russian artificial intelligence and the autonomous ecosystem aims are defined within the context of Russia's economic development and modernization efforts, and include programs aimed at enhancing the well-being of Russian population, the military, business, and entrepreneurial sectors.

According to high-profile political and military declarations, Russian security experts and lawmakers concur that AI research and application is critical to Russia's military's future success and military dominance. Despite several hurdles, such as the economic elements of AI, Russia is attempting to become one of the foremost thought leaders in the field.

The new global technology race will lead to the introduction of the most modern innovations in the military sphere in the near future. All the leading world powers will do this, because any lagging behind rivals increases vulnerability, which will be very difficult to cover up with conventional weapons. In addition, the emergence of new technologies can lead to significant changes in the strategies, planning and organization of the armed forces.

Therefore, in order to preserve sovereignty and defense capability, Russia must strive to gain certain advantages as soon as possible, or at least parity with potential adversaries in several critical areas, in order to partially compensate for the current weakness of the Russian economy and the technological backwardness of many industrial sectors.

In conclusion, it’s worthy to return to the concept of systems with artificial intelligence and responsibility of its’ creation. Giving the opportunity to any, even the most perfect system, the ability to independently plan and implement its behavior, change the algorithms of actions, the designer and all of humanity embark on a very risky path, which is fraught with consequences that are not yet fully realized.

Thus, the creation and development of artificial intelligence systems is currently becoming one of the most important areas of scientific and technological progress, the very fundamental technology that can radically change the nature of not only armed struggle, but the whole essence of the power confrontation of states, including economic, information and cyber warfare. This change will be characterized by the priority role of artificial intelligence systems during this confrontation.

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