DECODING THE TRANSFORMATION OF THREE DECADES OF AI RESEARCH: A SOCIAL SCIENCE PERSPECTIVE

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Abstract

This article discusses the dynamics of developing scientific publications related to artificial intelligence research. Based on the comparison of 20 research documents studied using the sigmoid analysis method, the paper determines the dynamics of publications and research methods related to artificial intelligence. The paper aims to study the nature of AI-related publications from the social and political science perspective and to determine the transformation of development dynamics.

Key words: *Artificial Intelligence; Social Sciences; Scientific Research; Transformation.*

INTRODUCTION

The view that the 21st century is the age of information technology has long been unquestionable [Tyner, 2014], although it is getting stronger yearly. The development of Internet technologies, which accelerated at the end of the twentieth century, is proceeding at an ever-increasing pace. Since the 1990s, when the Internet became available to the public [Curran, 2012], the technology has evolved and is much more flexible, intelligent, and scalable than its original version.

Even though the first connection between computers dates back to 1969 [Campbell-Kelly & Garcia-Swartz, 2013], it was not yet – "The Internet" as the world knows it today. It was just a network connecting computers until Sir Tim Berners-Lee introduced the world's concept of the World Wide Web (WWW). The first Internet server was launched in 1990, and this date can be considered the birth of the version of the network that humanity today knows as The Internet [McPherson, 2009].

Soon, it became clear that the WWW had a huge potential to become an object of mass consumption, and it did... By 2000, there were 360 million Internet users [DiMaggio et al., 2001]. In 2023, according to World Bank data, 5.3 billion people used it [Statista, 2023].

As the number of internet users grew, so did the nature of the Internet. In addition to the fact that it has become faster and more effective, its content has also changed. If the original WEB 1.0 allowed the user only one-way interaction, since 2004, with the integration of social networks, the Internet has evolved to a new stage in terms of the WEB 2.0 version [Nath et al., 2014]. The mentioned model allowed users to arrange virtual space according to their own opinions, and this new possibility led to a radical increase in the amount of data available online.

Personal information like text, video, photo, or audio material uploaded by citizens to the virtual space daily increases the amount of data available on the Internet. It was the growth of the amount of online data that contributed to the return of the issue of artificial intelligence to the agenda with a new interpretation...

The term: "Artificial intelligence" was first used in 1956 at Dartmouth College Summer School when a group of scientists developed a project to create a machine that could think like a human [McCarthy et al., 2006].

Although a lot of resources were invested in artificial intelligence research, in 1970-80, due to failed attempts to create a machine able to imitate human thinking patterns, there was a period of stagnation called "the first AI winter." The frustration with artificial intelligence, associated with the "second AI winter," covers 1980-90 [Floridi, 2020]. During the mentioned period, the interest in artificial intelligence continued to reduce, and the skepticism about creating a mechanism that could imitate human thinking increased.

Since the 90s, the world has been introduced to Internet technologies, which have changed all areas of human life, including artificial intelligence. Three main components made it possible to develop a new vision of artificial intelligence.

The development of **computing power** allowed modern computers to process larger volumes of **data**; on the other hand, the development of the fast Internet and the

increase in Internet users led to the accumulation of a large amount of digital data. This process led to the creation of appropriate **algorithms** that allow companies with big data to process raw material into valuable information. No company has enough human resources to process and sort millions of gigabytes of data daily [Allam & Dhunny, 2019].

Artificial intelligence is a technology that allows any data to be processed for various purposes. Therefore, the development of the mentioned technology has had an evolutionary and revolutionary impact on numerous areas of human life.

In the 21st century, most states are increasing the efficiency of the governance process by integrating modern technologies, including artificial intelligence, into the public administration process. Due to the digital evolution of governance forms, political science faces new challenges. New fields require developing and constantly adapting state-of-art research methodologies [Chen, 2009].

Due to the velocity of technological development, it is difficult for science to reflect modern trends in AI development. For example, it may take several years to prepare, edit, and publish a scientific article in a peer-reviewed journal, while assessing technological progress, two or three years may be crucial; in other words, current technological innovations at the time of starting working on the article and their impact on political processes may no longer be relevant at the time of publication of the article, which is why scientists may find themselves in a difficult situation. The academic sector lags behind the speed of technological progress.

A second issue makes AI more challenging to study from a political science perspective. Due to the novelty of the issue, scientists cannot agree on precisely what the field of AI includes. Therefore, academic research on artificial intelligence is complex because studying integrated AI is done with diverse perspectives.

This article addresses the above-mentioned issues and aims to identify the academic trends of research in the field based on the analysis of the existing scientific literature on artificial intelligence. It Demonstrates how the methodology and focus of study from a social science perspective change with the development of technology.

To assess the research dynamics of AI from a social science prism, the article reviews the papers published on AI over the last 3 decades from 1990 to 2020, including both scholarly articles and research reports.

The conducted research activities make it possible to analyze, structure, and categorize the existing studies on artificial intelligence. This will create a clear picture of the research design and applied methodology from the social science of AI technology, which will contribute to developing a scientific field.

Due to employing random sampling from the JSTOR database, a prominent repository of scientific literature, 20 documents were systematically chosen for analysis. This selection encompasses a variety of materials, including scientific articles, research reports, and book chapters wherein the term "artificial intellect" is featured in the title. Employing a content analysis methodology, particular emphasis was placed on the documents' substantive and structural aspects. Subsequently, the research materials were categorized based on their publication years, fields of study, and research methods.

The purpose of this paper is to reflect the differences between the scientific publications related to the AI topic and to reveal the research trends in the field from a social science perspective.

Nowadays, the main driving force of artificial intelligence is the private sector and its business interest, which is why the scientific research of the field is mainly focused on a narrow technological focus, leaving significant deficiencies in the exploration topics such as ethical, social, or other broader implications of AI.

Limitation of research – The number of selected documents was determined following the features of publishing a scientific article in social sciences. The review period of a scientific article may vary from 6 months to several years, while the preparation and editing of an article may take more than 6 months. Therefore, the paper's author considered that 20 papers were the number of documents that could be studied in depth in a reasonable period so that the work would continue to be adequate and relevant in the expected publication period of the article. The purpose of this paper is not to analyze the validity of the content of selected documents but to present how many different topics with different methods can be studied under the term Artificial intelligence.

ARTIFICIAL INTELLIGENCE RESEARCH 1990–2020

1 – An article published in 1990 in the journal "Behavior and Philosophy" entitled: "Natural Problems and Artificial Intelligence" is the oldest published work analyzed in this article. In this paper, author Tracy B. Henley discusses the different approaches to artificial intelligence. The article is particularly interesting because it was published in 1990 when the Internet was not widespread. Therefore, humanity is unfamiliar with the new vision of AI technology – AI as a big data processing algorithm.

The author discusses the philosophical and psychological aspects of artificial intelligence. He asks, "What would count as demonstrating that entity was

intelligent?" and tries to get an answer by reviewing the scientific literature surrounding this question [Henley, 1990].

The paper is a compilation of existing approaches to artificial intelligence that tried to define the concept of intelligence from an AI perspective and determine how feasible it was to create such a product.

In the first chapter: "Debunking And Other Philosophical Positions," Henley discusses the philosophical narrative about artificial intelligence developed by John Haugeland, according to which: "Nothing could be intelligent without X...; No [AI] system could ever have X; therefore; No [AI] system could ever be intelligent. Where X – can be feelings, creativity, personality, freedom, intuition, morality, and so on", which a machine will never have. In the same subsection, the author discusses Searle's position, according to which the main difference between a machine and intelligence is intentionality, which a machine does/can not have.

The next chapter – "The Perspective Of Psychology," discusses existing psychological models of intelligence and examples of attempts to measure this phenomenon with various tests, including artificial intelligence assessment models, including the Turing model.

The final chapter – "Ethical Considerations," begins with a discussion of the approach that intelligence tests such as the Turing Test are unacceptable because they are based solely on behavior. The author asks the critical question: "If observable behavior is insufficient to determine whether a creature has intelligence, then what is?"

This chapter also discusses Minsky's theory, which he developed in 1968: "AI is the science of making machines do things that would require intelligence if done by men".

Structure – Based on the article's content, the author relies on already existing philosophical approaches and, in the form of a compilation, tries to gather the existing philosophical and psychological approaches to intelligence. Using the method of quoting the phrases of the leading scientists tries to answer the main question - whether it is possible to create artificial intelligence.

2 – An article published in 2003 entitled: "Artificial Intelligence and Human Nature" discusses the philosophical perspectives of artificial intelligence. In contrast to Hanley, Charles T. Rubin tries to criticize the existing theoretical approaches by discussing several hypothetical examples of the development of artificial intelligence [Rubin, 2003].

The work consists of seven chapters, where Rubin criticizes the "Extinctionist approach" to the development of artificial intelligence, according to which AI technology will develop so much that in the end, humans will be replaced by

machines, which was not only inevitable but even necessary according to the supporters of the mentioned theory. He points out that this approach is pointless from an evolutionary and moral perspective.

In the chapter – "The Road to Extinction", – like the already discussed article, there is an attempt to define the essence of artificial intelligence; specifically, the author says that if the human brain is a mechanism that obeys the laws of physics and has consciousness, then it is possible to duplicate it. Therefore, if it is possible to create such a mechanism, it is possible to improve it and create a machine more powerful than the human brain.

The second chapter – "Wretched Body, Liberated Mind" – discusses theories of how, in a few decades, the human physical form could be replaced by machinery. This chapter asks when a mechanism can be considered conscious, and human perception of the world is compared to the brain's processing of the body's sensory inputs (Data).

The third chapter – "The Temptations of Artificial Life", discusses a model of a futuristic world where human consciousness can be copied by scanning the brain and creating an identical mechanism, so it will be possible to insert the human brain into a developed mechanism that will no longer have weaknesses.

In the fourth chapter – "Them and Us", – the opinion of extinctions – according to which robots will replace humans due to the evolutionary cycle – is criticized with two arguments: 1- it will not be acceptable for humans to be replaced by creatures developed over them, 2 – from an evolutionary perspective, it will be incomprehensible why humans will give up a dominant position in the world by their own will? The author asks an important question: "If the copied human mind continues functioning in a mechanism, will it retain its human identity?"

The fifth chapter – "Humanity's Last Stand" – raises the following issues: 1 – Will human desires be related to immortality, health, etc., would still be desirable if body-related deficiencies no longer existed? How will machines with robot bodies and human minds treat ordinary humans as parents or as victims?

In the sixth chapter – "Against Post-Biological Life", the author points out that although the extinctionists' views on the evolutionary process should not be taken seriously, their utopian approach raises questions that may become more and more relevant in modern technological progress. In the same subsection, the author responds to the discussed theory with the following phrase: "Nothing in evolutionary theory suggests that we have any obligation to commit suicide".

In the last chapter - "Finitude and Dignity" - Rubin discusses the moral aspects of the Extinctionists' vision. He asks questions that illustrate his position concerning

the mentioned theory: "There is no reason to assume that the post-human world will be morally superior to our own".

Structure – The paper mainly analyzes the existing philosophical issues about predicting the future; however, at the same time, it tries to answer the question necessary for studying artificial intelligence: When will a machine be considered a thinker?

3 – In an article published in "The Journal of Educational Technology & Society" in 2004, author Vladan Devedžić discusses essential aspects of Web Intelligence (WI) in the context of Artificial Intelligence in Education (AIED) research. This paper focuses on the possibilities of integrating artificial intelligence in the educational field [Devedžić, 2004].

Within the framework of the work, from a technical point of view, the author reviews semantic web, programming languages, WI-related work in AIED, Setting for WI-AIED systems, WI and Personalization of Learning, Ontological Engineering, Intelligent Web Services, intelligent Educational Servers and Portals; Web Mining and Social Networks.

The paper focuses on such features of web intelligence as web services, semantic markup, and web mining, as well as the possibilities of their application in AIED. The article, published in 2004, discusses the potential role of artificial intelligence in education, specifically by reviewing various technical solutions and web-based models.

Structure – in the article published in 2004, the author uses various research methods, including case studies, and strengthens arguments by quoting different authors. The author describes the chronology of the development of technologies, their characteristics, and their role in the education process, and, in conclusion, presents a forecast related to the growth of the role of mechanisms related to AI technology in the education process.

4 – The following document studied and analyzed within the article is a research report, – a work published in 2016, entitled - "India And The Artificial Intelligence Revolution".

The research report begins with analyzing the gaps and prospects in implementing artificial intelligence in India and a summary of the research findings. The author highlights the leading role of the private sector in AI-based application development focused on consumer goods and the educational system being outdated in today's economic environment, etc. Based on the mentioned findings, the author elaborates on five recommendations [Vempati, 2016].

In the introduction, the author discusses the growing relevance of AI and its impact on everyday human life. The author notes a considerable risk that India will fall behind China in AI development in the same chapter.

In the next chapter – "Moore's Law Spurs Recent Advances in AI" – the author discusses the reasons for the development of AI from the perspective of Moore's Law, according to which hardware becomes cheaper and more accessible over time.

In the next chapter – "Internet Boosts AI Proliferation in India, but Steep Barriers Persist" – the factors hindering and facilitating the implementation of AI in the country are determined, including existing Internet users; the abundance of data; improper infrastructure, in particular lack of databases, due to which Indian IT companies do business abroad.

In the next chapter, "AI Research–China Steals a March," the author discusses the successful model of Chinese AI, namely Baidu's language platform, as a successful implementation of AI technology by a non-Western nation. The author notes that India should focus not only on creating the Indian version of Google but also on the organizational structure, facilities, and customs required for these technological leviathans.

In the chapter "Funding AI Research–Global Lessons for India," the author considers the attraction of personnel employed in the academic sector by large companies as a potential hindering factor for state AI implementation. In the remaining part of the mentioned chapter, the author reviews in detail the chronology of artificial intelligence funding by years, using the example of different states or organizations.

In the next chapter – "Understanding AI's Impact on Indian Jobs – Encouraging Skill Development for Future Jobs," the author discusses the impact of artificial intelligence on the work environment in different countries and India. The document mentions that although India does not suffer from a brain drain of top-quality AI talent from university research labs to the industry, it must be wary to avoid this concentration of intellectual energy. Threats and challenges related to AI, such as criminals acquiring AI capabilities to mount sophisticated cyberattacks, public fear of modern technologies and the need to overcome this fear, and Outdated educational systems that cannot respond to the challenges of modern technologies, are also discussed in the section.

In the final part of the report, the author formulates a policy guide for developing artificial intelligence in India based on the findings. The "AI Policy Road Map for India" section discusses Short-Term, Medium-Term, and Long-Term state strategies for AI implementation.

Structure – Within the framework of the document, the author analyzes the gaps and prospects in the direction of AI implementation in India, using several research methods based on successful examples from around the world. The author relies on secondary sources, uses excerpts from various newspaper interviews, analyzes the international practice of implementing artificial intelligence, and, based on the summary, identifies the gaps that India is facing and accordingly formulates recommendations that are important to consider for the implementation of AI policies in the short, medium and long term.

5 – The following document discussed in this paper is one of the chapters of the collection of research reports entitled "Artificial Intelligence And The Future Of Defense" – subchapter: "What Is Artificial Intelligence?" [De Spiegeleire, Maas, & Sweijs, 2017]

In the first chapter, three subsections discuss such terms as Intelligence, Artificial Intelligence, Narrow, General, and Superintelligence. In the initial part of the paper, the literature regarding the development of definitions of intelligence and the existing literature on this term is discussed chronologically. This is followed by a chronology of the term "artificial intelligence" development and the definition of AI from different perspectives. The authors review the differences between ANI, AGI, and ASI in the next part of the paper.

The second chapter of the paper is devoted to the history of AI development. The winter and spring periods in the development of AI after the Second World War are chronologically discussed.

Specifically, the reasons for AI's two winters and three springs. Early Enthusiasm: The First AI Spring ('56-75'); The First AI Winter ('74-'80); The Second AI Spring ('80-'87); The Second AI Winter ('87-'93); A Third, Sustained AI Spring ('93-'11), Big Data, Deep Learning, and an Artificial Intelligence Revolution ('11-present). The authors review the differences between ANI, AGI, and ASI in the next part of the paper.

The following section of the second chapter is devoted to analyzing the reasons for the arrival of the third spring of AI, specifically big data and deep learning. This chapter discusses examples of the use of AI in the development of facial recognition systems and cyber security applications, as well as cases where the algorithm successfully passed the Turing test.

The third chapter – "AI: A Cookbook of Components, Approaches and Design Architectures", – discusses the components of AI and the working process of intelligence in both human and machine cases. In the next part of this chapter, special attention is focused on the machine learning method, explicitly discussing

the differences between machine learning approaches such as 1 – deep learning; 2 – Evolutionary programming; 3 – Bayesians (knowledge obtained with new information); 4 – Symbolists (creating hypotheses and verifying them based on data); 5 – Analogisers – decisions based on analogies.

Structure – In this research report, the author reviews the existing theoretical approaches to artificial intelligence and the chronological stages of the phenomenon's development. The paper also discusses concrete examples of how AI works in cases such as IBM's Deep Blue (Chess) and Watson ('Jeopardy!'), Google's AlphaGo (go), and others.

6 – In a collection of research reports entitled "Artificial Intelligence And The Future Of Defense," one of the chapters entitled "AI – Today And Tomorrow" examines the current state of development of artificial intelligence and potential ways forward. The paper begins by comparing AI and humans and analyzing the areas in which the computer is superior to the human mind [De Spiegeleire, Maas, & Sweijs, 2017]. In the subsection "Core Technologies and Applications," 3 main areas of AI use are discussed: 1 – information aggregation, integration, and analysis; 2 – Currently used AI systems; 3 – AI-enabled services used for targeted advertising and customer segmentation;

In the chapter – "Markets amidst the Artificial Intelligence 'Insights Revolution", – the author, based on secondary sources and quotes from stakeholders' phrases, discusses the impact of AI on the transformation process of various fields and the financial resources spent by multiple states in its development. Based on the reviewed materials, the author defines the trends in the development of AI in the private and public sectors.

In the third chapter, "The Timing of AI Development: Future Scenarios", – the author discusses two opposing hypotheses about the development of AI, according to which the current AI spring will end soon or vice versa. To illustrate this, the paper cites the results of a study, according to which there was a 90 % probability that by 2075, AI will be able to master the majority of human occupations.

In the fourth chapter – "Disruptors & Wild Cards", it is noted that although it is impossible to determine the exact details of the development of AI, the article still tries to define both likely hindering and facilitating factors of the development of AI, including growing difficulty of breakthroughs; possible hardware limitations; A breakthrough in cognitive neuroscience; human enhancement; Quantum computing; A 'Sputnik event' creating significant development incentives; Societal collapse – or existential catastrophe; Societal distrust and disinclination.

In the fifth chapter – "Caveats: Legal and Ethical Concerns over AI", – the author discusses legal and ethical concerns related to AI, focusing on such issues as unemployment, machine bias, legitimacy problems, driving public distrust of, and even societal backlash against AI.

In the sixth and summary chapter – "Summing up – The AI Tipping Point" – the author defines the differences that distinguish current AI spring from previous AI spring, among them: the level and diversity of funding, the mode of cumulative knowledge building; Big data and the abundance of visible success. In the next section, the author discusses how ANI can acquire elements of AGI using the example of Google search.

Structure – In this research report, the author uses several research methods, including a case study and a comparative analysis. Like the previous works, this document also includes elements of prediction.

7 – The following paper, which was discussed in the framework of this article, deals with the issue of artificial intelligence regulation. In the first part of the paper, authors Amitai Etzioni and Oren Etzioni discuss the factors, such as data and computer power, that have enabled AI to overcome decades of frustration and significantly benefit humanity. The article raises the ethical aspects of data processing and asks: "Who should process, for what purposes, and how!?"

The paper also discusses 2 main risks associated with artificial intelligence: 1 – risks related to using AI for military purposes and ethical issues; 2 – risks associated with introducing AI technology into the work process and its potential impact on job reduction. The article also discusses successful examples of AI usage and reviews the dangers of excessive regulation of AI research [Etzioni et al.; O., 2017].

The second part of the article details the integration of AI into the military field and employment market. A petition launched in 2015 against using AI in the military is discussed, and suggestions are made for regulating the field.

The last part discusses the possible scenario of the cyber revolution and the predictions of what may result from replacing the workforce with AI.

Structure – In this paper, the authors study the specific examples and define potential directions for future AI development.

8 – Although most articles and research reports discussed in this paper include elements of predictions regarding artificial intelligence, Matthew Price, Stephen Walker, and Will Wiley's research report – "Implications of Artificial Intelligence in Strategic Decision Making", is based mainly on a modeled future overview.

In the first section, "The Two Hour Road to War," the authors model the time frame between 04:35 and 6:24 on May 17, 2024, during which the so-called 'flash war emerges. According to this modeled future, a nuclear confrontation occurs between the United States of America and China" [Price, Walker, & Wiley, 2018].

In the next section, "Did AI Cause the Flash War of 2024?", the authors discuss potential scenarios of what could happen if the final decision-making in military matters depended on artificial intelligence, and they determine the potential threats of AI development;

In the section "When We Say AI, What Do We Mean?", the authors define the existing positions and main approaches to artificial intelligence between – Ani, Agi, and Asi. It is also specified that the article's purpose is not to predict the likely future but to review the extreme scenarios of the widespread use of AI technology in the military field.

In the following chapter, "Ambitions for Military Use of AI", based on a review of an analysis of policy documents such as The U.S. National Defense Strategy (NDS), the authors define the United States' position on artificial intelligence, according to which future defense spending will focus on AI. In the same chapter, the policies of China and Russia regarding the financing of artificial intelligence and the policy documents developed are reviewed.

The next chapter – "U.S. Military Guidance and Attempts to Establish International Norms," discusses the American Department of Defense (DOD) Directive 3000.09, "Autonomy in Weapon Systems," which serves as the governing document for AI technology in DOD. The authors note that the document's purpose is to minimize the shortcomings of autonomous systems and keep the "appropriate levels of human judgment over the use of force." The section discusses the experience of other countries and international organizations on the regulation of AI in defense.

In the next part – "How Autonomous is the U.S. Military Arsenal?" – examples of how the United States of America uses autonomous systems for specific weapons are discussed. In the chapter – "AI Evolution and Adaptation and the Changing Character of War," on the example of private companies like Uber, The Man Group, and others, the role of artificial intelligence in the decision-making process and the potential development areas are discussed. However, the authors believe that despite the technological progress of AI in military matters, the said technology will only be an additional tool in the decision-making process.

In the section – "Implications for Deterrence and Conflict Escalation", – the authors, based on historical examples, discuss the potential role of artificial intelligence in the issue of conflict escalation or containment.

The article concludes with the section "Recommendations and Conclusion", where the guidelines for integrating artificial intelligence in defense are presented.

Structure – The scientific article adopts an innovative model, focusing on modeling potential future scenarios to explore the integration of artificial intelligence in the military field. The authors utilize diverse research methods, incorporating citations from various authors, examining instances of AI technology implementation by state and private organizations, analyzing policy documents from state and international bodies, and conducting comparative analyses.

9 – The following document analyzed in the given paper is a 2018 research report titled "Adoption Of Artificial Intelligence", which examines the integration of artificial intelligence in both the private and public sectors [Hunter et al., 2018].

The introductory part of the paper discusses artificial intelligence and two different narratives regarding AI: AI as a dystopian futuristic phenomenon and AI as an already existing and integrated technology.

The authors highlight that none of the narratives focus enough on aspects such as algorithms, a supporting ecosystem, a skilled workforce, robust data management practices, proper computational and networking infrastructure, and a well-defined deployment strategy.

The authors note that the problem is a lack of "ready metrics and measures for assessing the "degree of AI" incorporated into a solution, which would be valuable for both public and private sectors". The authors conclude that it is necessary to implement AI tailored to needs, not the other way around.

In the second chapter – Adopters In Commercial Sectors, examples of AI use from the private sector are discussed. According to the authors, AI is best developed in data-rich sectors. In this section, the challenges of the private and public sectors in the process of integration of AI technology are also discussed; according to the authors, the state sector can benefit from the experience in the private sector; for example, the states may directly implement the accumulated experience in the management of unmanned vehicles in defense systems.

The next chapter – "Adopters In National Security", looks at potential ways to adapt AI to the military sector. Three cases where state institutions use private organizations' AI products for forecasting national security matters are discussed. The paper also discusses the JAIC (Joint AI Center) establishment in 2018 and its goals.

The following chapter, "Barriers and Enablers to AI Adoption in National Security", discusses such hindering factors of integration of artificial intelligence in defense

issues as lack of data, lack of training, the time factor, lack of competence of employed persons in relation to the issue of artificial intelligence. The authors also point out that, unlike some fields, data in the defense sector is not always in a processable format and often needs to be mined. Therefore, although data is the cornerstone of AI, some companies cannot collect the proper amount due to the strict legal environment (citizens' personal information).

In the chapter – "Public and Private Entities in the AI Ecosystem", – the authors define the main factors of integration into the AI ecosystem, including data administration, computing power, relevant digital competencies, etc.

The importance and potential of AI have led to the fact that the state and defense systems cannot monopolize the development of this technology. Due to the democratization of technology, small private companies have the opportunity to make essential contributions in responding to national security challenges.

In the chapter – "Workforce and Organization" – the authors discuss the issue of monitoring AI products. According to the document, there should be difficulties in tracking the machine learning process. The authors identify a problem – an insufficient workforce capable of measuring the effectiveness of AI. At the same time, many state structures are unsure about the effectiveness of AI, which is why many agencies refuse to implement AI technology. It is easier for private companies to accept the risks associated with AI because it will be possible to fix them. At the same time, the state tries to implement already well-tested technology.

Structure – the authors of the research report, based on the study of successful cases of the implementation of artificial intelligence in private and public structures, try to determine the potential ways of integrating artificial intelligence in the military field and related challenges and perspectives.

10 – Another research report studied within the framework of this paper entitled "Artificial Intelligence: What implications for EU security and defense?" focuses on the role of artificial intelligence in the EU security issue.

At the beginning of the article, the authors, Daniel Fiott and Gustav Lindstrom, review the potential positive impact of AI on various fields. The introductory part of the paper discusses the optimistic and pessimistic scenario of the development of artificial intelligence [Fiott & Lindstrom, 2018].

The next part discusses the actions of international organizations and states in relation to AI regulation. For example, on 12 September 2018, the European Parliament passed a resolution calling for "meaningful human control over the critical functions of weapon systems." The authors discuss examples of specific AI

projects of other countries, such as the US military to interpret satellite and drone surveillance data feeds (nicknamed 'Project Maven') or the 'Made in China 2025' strategy to harness hi-tech sectors for its economic development. The section discusses EU AI policy, specifically the strategies developed by the European Commission and the allocated budget regarding the AI R&D process, and the formation of a Commission-led European AI Alliance and High-Level Expert Group on AI dealing with pertinent ethical questions. The section also discusses examples of international cooperation related to artificial intelligence.

In the next chapter, "Understanding AI," artificial intelligence is discussed as a strategic enabler, highlighting the difference between different AI models. The section discusses the leading role of private companies, such as Amazon, Google, Apple, etc., in developing AI. The authors also emphasize the importance of data for developing artificial intelligence. According to the document, the main drivers of AI development are private companies such as Amazon, Google, and Apple, not a state. The authors note that it is difficult to determine exact data on how much money each country spends on AI R&D. However, some country-by-country data can be obtained from publications in the Scopus databases. The authors rely on a forecast that by 2025, the financial benefits of AI will be around 6.5–12 trillion.

The next chapter, "AI and Common Security and Defence Policy" (CSDP), discusses opportunities to use AI in security and defense policy and specifically discusses three directions: detection, preparation, and protection. Examples of these directions are broken down in detail. For example, the authors think that AI may be displayed in the logistics direction as well -AI-supported analysis could help identify safe locations for basing, suitable transport infrastructure, landing tracks, proper evacuation routes, and/or proximity to local and regional supply chains.

In the section "Deep learning and EU defense", 2 problems are discussed: 1: ethical issue: how independently AI should make decisions in military matters and to what extent humans should interfere. 2: Military AI may end up in the hands of a non-state actor. In conclusion, it is noted that the EU and NATO should harness the potential of AI.

Structure: Within the framework of the work, which discussed the possible influence of artificial intelligence on European security issues, the authors analyze successful cases and policy documents of different countries, on the basis of which they try to define the EU's Common Security and Defense Policy (the role of artificial intelligence in CSDP), current challenges, and identify potential development paths.

11 – The following document, analyzed within the scope of this work, is a scientific article entitled "Building Trust In Artificial Intelligence." In the introductory chapter

– "What is Artificial Intelligence?" two approaches to AI are compared: – I – codes and programs that always make accurate conclusions, and II – algorithms and data processing decisions, which always contain an error rate.

Within the framework of the work, the author – Francesca Rossi, highlights such aspects of AI functioning as – A Problem of Trust – companies process a large amount of data. Therefore, there is a need for transparency. Some questions must be addressed: "Who, how, and for what purposes process customer data?" [Rossi, 2018].

The author discusses the principles of 7 significant institutions working on the issue of AI in relation to the use of artificial intelligence and briefly reviews them. IBM, Google, The Asilomar, Partnership on AI, AI4PEOPLE, World Economic Forum, and The Institute of Electrical and Electronics Engineers represent these institutions.

In the next part of the article – "Practical Implementation of High-Level Principles," the author, from his point of view, defines the principles of AI, such as I – Explainability, II – Bias Awareness and Mitigation, III – Trusting AI Producers, IV – Driving and Facilitating Trusted AI. According to the authors, these principles must be fulfilled to gain society's trust in AI.

In the chapter "Driving and Facilitating Trusted AI", – the author discusses the policy of Europe and the United States of America for fostering the responsible development and deployment of AI.

In the concluding part, the author gives recommendations on how the potential of artificial intelligence can be used to the maximum extent and what should be done to build society's trust towards AI or How to define Issues of bias, explainability, data handling, transparency on data policies, and design choices.

Structure – In the discussed article, where the author reviews the phenomenon of artificial intelligence and the elements necessary for its functioning, with an emphasis on trust, the method of comparative analysis is used, according to which the author defines the best practices of the policies of different states and organizations and determines the recommendations as a conclusion.

12 – An article published in the spring of 2019 – "Artificial Intelligence: The Ambiguous Labor Market Impact of Automating Prediction" - aims to determine the potential impacts of automating predictions on the employment market. The authors Agrawal, Gans, and Goldfarb believe that artificial intelligence using the Deep learning method will be able to predict any issue based on the analysis of big data: "Take any old problem where you have to predict something, and you have a

lot of data, and deep learning is probably going to make it works better than the existing techniques." [Agrawal et al., 2019].

In the introductory part, the authors discuss the concept of prediction and define 4 direct effects that prediction can have on the employment market. However, the authors explain that since artificial intelligence applications have many dimensions that may both reduce and increase the demand for jobs, it is impossible to determine the net effect of artificial intelligence.

In the first chapter of the work – "Automating Prediction Tasks", the authors discuss the potential scenarios of replacing human power with artificial intelligence and its possible effects in automating or increasing the demand for labor in the decision task. In the first chapter, the authors use the example of Kira Systems and Blue J Legal's AI to discuss how integrating this technology in legal matters can automate specific legal processes.

In the next part of the chapter, based on the various examples, it is discussed how the AI prediction model helps drivers in the decision-making process. According to the authors, it is unclear what effect this will have on the general labor market, and although it may hurt the income of taxi drivers, in the end, it may have a positive effect overall. In the same part, "Predictions in Email Responses", the authors discuss the effect of the automation of the email system on the example of Google Mail and what impact it can have on the employment market.

In the second chapter of the paper, "Automating Decision Tasks", authors discuss examples where automation of prediction through artificial intelligence can improve human decision-making and, thus, labor productivity; in addition, the role of automation in forensic and medical decision-making is discussed.

In the following subsection – "Indirect Effects: Augmenting Labor on Other Tasks", the authors, from the perspective of drug discovery and language translation, discuss cases where an automated decision-making system might produce better results. In the paper, The Case of Radiology is discussed as a separate example, according to which, in the case of proper integration of AI, automation of the mentioned field may occur to some extent. The same chapter lists 29 radiology-related activities that can/cannot be replaced by artificial intelligence.

The next chapter, "New Tasks through New Decisions," discusses how different companies use the automation of decision-making by machine learning and what impact the development of this technology has on the direction of scientific research.

In the summary section, the authors discuss cases where artificial intelligence makes the prediction process much easier based on the processing of existing data

and provides an opportunity to replace human labor. This, in turn, makes the decision-making process more efficient.

Structure – Based on the analysis of various cases and author citations, the authors in the study discuss the potential consequences of the impact of artificial intelligence on the employment market of decision process automation.

13 – A research report published in 2019 titled "Wars Of None: Artificial Intelligence And The Future Of Conflict" deals with predicting the role of artificial intelligence in future conflicts. The report is divided into 5 chapters, summarized in the concluding section.

In the first chapter of the paper, authors Can Kasapoğlu and Barış Kırdemir review the evolution and importance of AI in military affairs; the authors use excerpts from interviews with famous scientists, such as Yoval Noah Harari's 2018 speech, according to which the upcoming dominant species will be more different from us than we were different from the Neanderthals [Kasapoğlu, 2019].

The second chapter deals with the impact of AI in the short term, where the authors review the role of AI technology in medicine and other social fields. The following section is devoted to AI geopolitics, where the authors compare American, Chinese, and Russian AI policies and explore the AI Race between them.

The fourth chapter is devoted to defining the role of AI in future physical, information, and cognitive warfare operations. The authors detail the prospects for using AI in land, sea, and air spaces. For this purpose, the functioning of combat devices of different countries is discussed based on specific examples, such as: "Uran 9", a remotely controlled Russian military vehicle tested in Syria in 2018.

The last chapter of the paper deals with the discussion of NATO's AI policy and the development of recommendations.

Structure – In the framework of the study, the authors used combined research methods, including the case study model. The paper reviewed the phrases of various authors about the technological future of humanity, as well as passages from state documents of multiple countries, such as the US Joint Operating Environment 2035 Report.

14 – In the introductory part of the research report published by Ulrike Franke as part of the European Council's research in 2019, the author reviews the phenomenon of artificial intelligence and the main reasons for its development. In the following subsection - "Why AI Matters," artificial intelligence is discussed as one of the tools for determining interstate politics. For example, the paper quotes the former president of Google China, Kai-Fu Lee Remar, according to which

AlphaGo is compared to the Sputnik moment, which is Typical of the US and China AI Race [Franke, 2019].

The author considers AI technology as a phenomenon that may become of cultural and historical importance for society and provides an example of 280 million people in China watching Alphabet win at Go against one of the world's best human players.

In the paper, artificial intelligence is considered a tool of geopolitical importance. Therefore, the official documents of the states where the development of the mentioned technology is defined as a strategic interest of the state are discussed; for example, Executive Order on Maintaining American Leadership in Artificial Intelligence (13859) states that: "Continued American Leadership in AI is of paramount importance to maintaining the economic and national security of the United States and to shaping the global evolution of AI in a manner consistent with our Nation's values, policies, and priorities."

In the next part of the document, "Elements of AI – and how the main players fare", the three main components of AI technology such as human resources, data, and computer power, are defined. According to the mentioned components, the authors compare the examples of the USA, China, and the European Union.

In the following subsection – "AI in Europe: Key issues" – the author identifies the key issues of European AI, including a high level of dependence on external actors (in the case of chips or applications) and a low rate of citizens' trust in AI technology.

The mentioned chapter ends with 5 recommendations; according to the author, it will be possible to promote the development of AI in the EU with the following components: a unified data collection system; Increased and smart investing; regulations; integration into military affairs for non-literary purposes; Education;

In the conclusion, the author discusses the aspects needed to achieve sovereignty in AI, including access to talent, data, and hardware – the three critical elements of successful AI. At the same time, the author believes that Europe, along with the development of the mentioned components, should adopt the relevant regulations; thus, it will have a chance to go beyond mere sovereignty and become a norm-setter, embedding its ethics and values into AI governance and development.

Structure: The research report's purpose was to study the international practice of implementing artificial intelligence and to discuss the European perspective of the AI race; different research methods, including the case study, citations, comparative, and document analysis methods, were used.

15 – The following document discussed within the scope of the paper is a part of the research paper – "New Tech, New Threats, and New Governance Challenges" entitled

"Artificial Intelligence". In the document, author – Camino Kavanagh discusses the current policy and regulatory landscape around artificial intelligence.

In the introductory part of the paper, the author reviews definitions of AI. In this part, the author also discusses the field of artificial intelligence that can bring significant benefits. However, in the same part, Kavanagh also reviews the risks associated with increased cyber threats [Kavanagh, 2019].

The second chapter, "The Current Policy and Normative Landscape," discusses such actors and their AI policies as Nonprofits and multi-stakeholder initiatives, Commercial actors, Governments, and Multilateral Forums. In the mentioned chapter, the author analyzes the AI-related policies of the mentioned actors based on the case studies and document analysis method.

The next chapter, titled: "What Lies Ahead?" includes a prediction for the future and 5 recommendations identified by the author on what relevant stakeholders should do to make the integration of AI as effective as possible and bear the least risk.

Structure – Within the given research report, the author uses such research methods as a case study, document analysis, and citation of existing literature. The author discusses the practice of administering the policy of artificial intelligence on the example of private, NGO, state, and international organizations, and, as in most of the examples discussed so far, he also uses elements of prediction.

16 – In another scientific article entitled: "Near-Term Applications Of Artificial Intelligence," author Christian H. Heller, based on the review of dozens of examples, analyzes how successful examples of AI in the private sector can be integrated into the systems of the DON (Department of the Navy) [Heller, 2019].

In the first chapter of the paper – "Definitions Of Artificial Intelligence", based on a review of the literature related to AI, the author discusses the different approaches, structures, and types of AI.

In the same chapter, the current progress and perspectives of AGI development are discussed, along with concrete examples of how Narrow AI applications are used in practice. For example, Amazon's Alexa and Apple's Siri are both examples of narrow AI beginning to make regular, continuous changes to people's lives; however, regardless of the level of development of AI technology, the HITL (Human-in-the-loop) system is still a priority.

The following chapter – "Public Use Leads to DoN Application", discusses examples of private AI initiatives that can be adapted into DoN systems. In the author's opinion, the best applications have been successfully operating for years, including Google Maps – AI to program the most efficient routes; Chatbots such as Siri, Alexa, and Microsoft's Cortana output to support the personalized needs of their users

even better; Uber-dynamic pricing – accurately pricing a commodity or service between supply and demand; Etc.

Continuing with the section "The Department of Defense and Artificial Intelligence", the author explores the DOD's stance on integrating artificial intelligence. This perspective is based on a 2016 Defense Science Board (DSB) report. The report emphasizes six crucial mission parameters that warrant consideration: the speed of decision-making, the heterogeneity and volume of data, the quality of data links, the complexity of the action, the danger associated with the mission, and the required persistence and endurance.

This chapter also discusses the costs of specific DOD AI projects. However, the last paragraph emphasizes that despite research and integration of new systems, DoD policy mandates strict human oversight of autonomous or semiautonomous weapons systems.

In the next chapter – "Near-Term AI Applications For The Navy And Marine Corp", the author delves into the potential repercussions of incorporating AI applications into the military in the short term. The exploration spans nine key aspects: Administration, Personal Productivity, Planning, Logistics, Crisis Response, Training, Intelligence, Force Protection, and Force Structure. The author discusses successful examples of existing AI applications for each aspect and analyzes how they can be implemented in Navy and Marine Corps operations.

In the following section, the author discusses the aspects needed for the successful implementation of AI, including: - when the right people are paired with the right data; – Necessity of military specialists with knowledge of AI; – human-AI collaboration; – AI-database interworking; – AI ethics and policy;

Along with this, the chapter discusses the AI policies of such tech giants as Amazon, Google, Microsoft, etc. In the last chapter – "Costs And Trade-Offs", the author discusses the costs incurred for integrating AI applications in the defense sector of the United States of America. In the same chapter, the author compares the costs incurred in China's and Russia's AI projects and, based on secondary sources, makes predictions about the economic benefits related to AI.

In the concluding remarks, the author highlights that the ultimate cost of AI development may not solely be quantifiable in terms of dollars spent or the cancellation of other projects by the Department of the Navy. Instead, the profound impact lies in how AI has the potential to reshape the operational landscape of the Navy and Marine Corps.

Structure – In the reviewed article, the author uses such research methods as document analysis, comparative analysis, and case study, and at the same time,

strengthens his positions by quoting the opinions of famous authors or experts in the field.

In addition, it reviews the policy AI implementation of various states based on secondary statistical data. The article also included an element of prediction: "If these nations achieve usable AI integration for economies and militaries, the rest of the world may be left behind for decades".

17 – The following document, "Humane Artificial Intelligence: The Fragility of Human Rights Facing AI", is a research report dealing with the threat of violation of fundamental human rights from the perspective of AI. Human Rights such as equality and anti-discrimination towards everyone may be at risk due to algorithmic prejudice. Therefore, the author discusses the need to create "data ethics".

According to the author, Human Rights is a top priority; in response, the EU is working on a draft document (adopted in 2023) that will outline the issue of human rights protection concerning AI. The author also discusses the importance of a 2018 Council of Europe document highlighting AI's threats to human rights [Cataleta, 2020].

In the next part of the document, the author discusses specific cases of human rights violations, for example, in the field of facial recognition systems and employment or the issue concerning crime prevention (Compas; PSA; HARM).

The chapter titled "AI and Protection of Human Rights in Europe" revolves around the imperative for regulations. It is observed that the implementation of such regulations is often delayed by several years, reflecting the experience with GDPR. The challenge lies in the struggle to keep pace with the rapid advancements in technology, highlighting the inherent difficulty in synchronizing regulatory frameworks with the swift evolution of technology.

In the next chapter – "AI and Digital Security: the Protection of Personal Data Online" – the author discusses the ways in which the rights of Internet users regarding the protection of personal data can be violated; the chapter discusses some criticisms concerning personal data protection from the perspectives of principles and provisions of GDPR.

The following chapter discusses the "declaration on the manipulative capabilities of algorithmic processes adopted" on 13 February 2019, where the Committee of Ministers of the European Union affirms that: "attention must be paid to the capacity of digital technologies to use both personal data and non-personal data to identify individual vulnerabilities, and it thus encourages member states to take appropriate measures". The same chapter discusses the OECD's five basic principles for regulating AI and critics' opinions on the mentioned document. This

general agreement aimed at setting standards has been signed by 36 Member States, including the world's major economies, but excluding China.

In the last part of the article – "The Chinese Threat: The Enjoyment of Human Rights in the Face of Invasive AI", – the American and Chinese policies for the development of artificial intelligence were compared. The author believes that due to the specificity of China, the country can overtake the United States in the "AI race" because the state has access to a much more considerable amount of big data, which in turn contributes to the creation of better AI products. The author also cites that by 2080, humanity may be fighting to save itself from AI.

Structure – The paper's framework reviews the general threats associated with integrating AI technology in terms of personal data protection and the policies of different countries or international organizations to solve the mentioned issue. The author studies concrete examples, cites various stakeholders, analyzes policy documents and regulations, and, based on comparative analysis, identifies the peculiarities of different countries or organizations' policies regarding AI regulation.

18 - The introduction of the research paper "Constructivism and its risks in artificial intelligence" discusses the concerns of famous people and experts about the high risks associated with the transformation of artificial intelligence (AI). This part of the paper focuses on the constructive role of human choices and theories in developing artificial intelligence and its associated risks; the need for technical research and assessing socio-economic impact are emphasized.

In the chapter – "The history and development of AI", – the author chronologically discusses the stages of the development of artificial intelligence in the last decades and the existing opinions about the transition from ANI to AGI. The mentioned chapter ends – with a discussion of three general foundational approaches to building AI – Symbolic-computational, connectional, and neuromimetic [Lea, 2020].

In the next part – "Translating philosophies of mind into AI: assumption underlying approaches " – the author compares artificial intelligence from the perspective of well-known social and economic theories. In the work, the author discusses different fundamental approaches to intelligence, including acting humanly (Turing test approach), thinking humanly, thinking rationally, and acting rationally. The author relies on the opinion of Norvig and Russell, according to which, although signs of all four components are visible in AI research, the dominant approach is still the rational agent – acting rationally. In the same chapter, the theories of authors such as Becker, Hayek, Simon, and Kahneman are discussed and compared.

In the next part of the paper – "the chess problem or the problem with chess? Models and measurement" – the author discussed an example of the integration of

artificial intelligence in a chess game and the main factors in developing chess skills among players. The paper criticizes the approach that a machine beating a human in a chess game can be seen as a superiority of the machine over the human mind because it is still a narrow AI (ANI); therefore, its comparison with human thinking is not justified.

In the next chapter of the paper – "AI in Social and Economic Races", – the author discusses practical examples of AI development based on comparing various state policies. Specifically, the budget spent on AI R&D, followed by examples of how AI is used in everyday life. In the same part, the author discusses examples from the private and academic sectors.

In the next part – "The Risk of AI Reconsidered" – the author reviews the risks related to AI, such as the eventual destruction of humanity, reduction of jobs, engineering, and algorithmic bias, as well as loss of identity, cyber vulnerability, espionage by government or private corporations, and weaponization of AI.

Structure – In the paper author reviews both the philosophical approaches to AI, the practical manifestation of the mentioned technology, and the issues of its financing, using both public and private sector examples. In the last part of the work, based on prediction, the author determines the probable threats that may threaten humanity in the worst scenario of the development of artificial intelligence. Within the framework of the work, the author uses quotes, studies the cases of different companies and states, and makes a comparative analysis; the author also describes in detail the chronology of the development of artificial intelligence and discusses the predictions of threats related to AI.

19 – The article "Artificial Intelligence: A Threat to Strategic Stability" by James S. Johnson aims to determine the potential consequences of integrating artificial intelligence in the military field. This article addresses how and why AI could affect strategic stability between nuclear-armed great powers (especially China and the United States) and the multifaceted possible intersections of this disruptive technology with advanced conventional capabilities [Johnson, 2020].

Chapter one, "Conceptualizing Military Artificial Intelligence," outlines four essential components of AI integration in the armed forces: 1 – The incorporation of AI will speed up operations without changing the core laws of strategy; 2 – AI has an impact on decision-makers that goes beyond technology since it depends on human viewpoints and shapes their perceptions; 3 – The integration puts major military forces under more strain and raises the possibility of standards and safety concessions brought on by technical competitiveness; 4 – The most significant risk

is the integration of AI with nuclear weapons without sufficient testing, which could lead to a catastrophic outcome.

The same chapter discusses the threat of how the proliferation of AI in the military field can make modern warfare more difficult in the given competitive political environment. The paper discusses the three cases of how integrating AI into a non-nuclear weaponry system can escalate warfare. It has been suggested that the military would be reluctant to hand over too much control to the machines, but the AI Race may outweigh those concerns.

The next chapter, "Autonomous Weapons, swarming, and Instability" (AWS), discusses how AI-augmented drones can be used in conventional combat situations, giving one side a massive advantage. A nuclear state with a weak defense may find itself in a "Use them or lose them" situation. The paper suggests that states may turn a blind eye to the risks of AWS development. This section discusses specific examples of AI integration with AWS (the 2011 case of MQ1 drones being infected with malware). According to the forecast, the capabilities of UAVs (Unmanned aerial vehicles) will be further improved using artificial intelligence, making drones more effective in counter-offensive operations. This section of the work discusses the importance of the human factor in the process of nuclear deterrence. The paper also discusses the case of DARPA, which is working on ASV (autonomous surface vehicle) development, and the opinion of experts on the mentioned topics.

The author reviews four scenarios for the use of drones in the future. As a summary of the chapter, it discusses how important AWS can play in shaping future conflict. The examples of China and the United States of America are discussed as a comparison.

The chapter – "Hypersonic Boost-Glide Technology and Missile Defense" – discusses how AI can adapt to these combat techniques, solve the gaps that have existed so far, and have a general impact on the conflict process.

The paper concludes with the assumption that new-generation AI capabilities will inadvertently increase the risk of nuclear confrontation. The conclusion is based on an analysis of the potential impact of AI on the strategic stability between the major nuclear powers – the US and China. It is noted that, regardless of technical capabilities, AI's conclusions will be based on a human-made algorithm, which can be subjective and biased.

Structure – By analyzing a specific military technology as an example, the article identifies how future threats may arise from integrating artificial intelligence into military affairs. The author uses a case study method while developing pictures of

various potential futures of how integrating AI into military affairs could change the warfare model.

20 – Research Report – "Humane Artificial Intelligence Inequality, Social Cohesion And The Post-Pandemic Acceleration Of Intelligent Technology" – Author Peter D. Hershock – analyzes the pandemic's impact on artificial intelligence's development process. In the introductory part - the author explains that such cataclysms as pandemics and wars have often become one of the factors in reducing social inequality. Therefore, COVID-19 can play a similar role against the existing inequality in the world, and modern technologies can become one of the main factors [Hershock, 2020].

In the first chapter of the work – "The First Pandemic in the New Era of Intelligent Technology", – the author emphasizes how the combination of such aspects as big data, machine learning, and artificial intelligence can intensify the risks to human privacy and social cohesion, examples of which are already seen in the modern technological world. The author explains that the Covid pandemic is the first global pandemic in the age of smartphones and discusses examples of how it has contributed to the acceleration of technological progress.

In the next chapter – "Trajectories Forward: A Range of Possibilities" – based on articles by various authors and examples of specific organizations, several technology development scenarios are predicted. The author deals with such an issue as citizens' loss of data privacy versus a swifter end of the pandemic, and based on China's example, it discusses a case when the government has a legal right to all data produced within the country's borders.

In the next part of the chapter, the author discusses the impact of accelerated digital connectivity and online education on the normalization of digital socialization, the potential risks of social learning, and the growing role of educational technology (EdTech) in reshaping formal education.

In the same chapter, the author discusses new opportunities in education and socialization using examples of specific companies and their technologies. However, it is noted that – "Not every public good that can be privatized and marketized should be" – and notes the danger that may follow.

In the next chapter – "Digital Socialization and the Potential for Social Learning Deficits", the risks associated with remote learning are discussed, including – online education, which would place biosocial developments at risk that is foundational for ethical deliberation.

The paper's last chapter – "Social Cohesion and Social Resilience after COVID-19" – discusses the impact digital connections can have on post-Covid social relations.

The author notes that digital communication has created more opportunities for disinformation campaigns, fake news, and deep fakes. The text explores how the COVID-19 pandemic has exposed social insecurities and value conflicts at various scales and highlights the importance of addressing these issues.

Structure – Within the framework of the work, the author uses several different methods, including quoting the statements of famous authors and experts, conducting case studies, providing a chronological description of events, and presenting statistical information based on secondary data.

CONCLUSION

The rapid development of artificial intelligence has had a significant impact on all areas of the modern world. It is difficult to find a field where AI technologies do not play an essential role. Therefore, science needed to adapt to technological evolution. Social and political sciences are no exception. Today, it is impossible to analyze political systems without considering the influence of modern technologies because digital technologies have become the primary tool of current political processes.

Scientific research and analysis of artificial intelligence have shortcomings; the field is developing so quickly that a document might lose its relevance after the time spent preparing and publishing a scientific article.

In addition to the mentioned problem, other aspects make the scientific study of AI even harder. Artificial intelligence covers many fields, and the problem is that it is usually considered from one perspective; for example, for representatives of the information technology field, it is associated with algorithms, data, and computer power; for economists, AI is an alternative to human labor, for political scientists, it is a tool for political mobilization and public management, for public administration specialists it is a simplified and effective means of providing state services, etc. Accordingly, representatives of all directions have their scientific interest in the mentioned phenomenon, which makes the ambivalent concept of artificial intelligence even more vague.

This article aimed to determine the main trends in AI research methods and directions based on the study of dozens of papers on AI published in the social sciences over the past 30 years. Within the framework of the article, based on the analysis of the content and research methods, 20 documents were studied. It was determined that the interpretations of artificial intelligence in scientific research papers have changed over the years.

The chronology of published articles on artificial intelligence clearly shows the moment of arrival of the fourth spring of AI, as the most significant time interval

among the 20 documents studied within the scope of the work is fixed from 2004 to 2016. This is the period when the WEB 3.0 Semantic Web was being developed, and artificial intelligence finally gained the understanding that the world knows it today – the application of algorithms that use data and computing power to enable machines to model human-like intelligence and perform complex tasks autonomously.

The subject matter also differs between the documents published before 2004 and those published after 2016. If in the older papers, the authors mainly studied the philosophical nature of AI, in the works of the modern period, they are already discussing various AI applications and their practical importance. For example, how can it change the human workforce, current military activities, or medicine? What economic impact will it have on a particular country, organization, etc?

Over the years, articles on artificial intelligence have consistently raised growing concerns about the technology's development. Whether addressing specific topics or not, these concerns include the security of citizens' personal data, job displacement, economic repercussions, military risks, and more. Almost every analyzed document published after 2004 contains concerns regarding AI implementation.

It is also worth noting that the prediction component plays a significant role in most studied papers. Since AI is new to the modern world, including science, many analyzed documents have contained predictions about the potential effects of artificial intelligence on various fields.

It is worth noting that a large part of the studied documents discussed the integration of artificial intelligence in the military field from different angles; the papers also covered such issues as AI policy and regulations, AI and human rights, etc. (see Table N1).

Table I

Distribution of topics
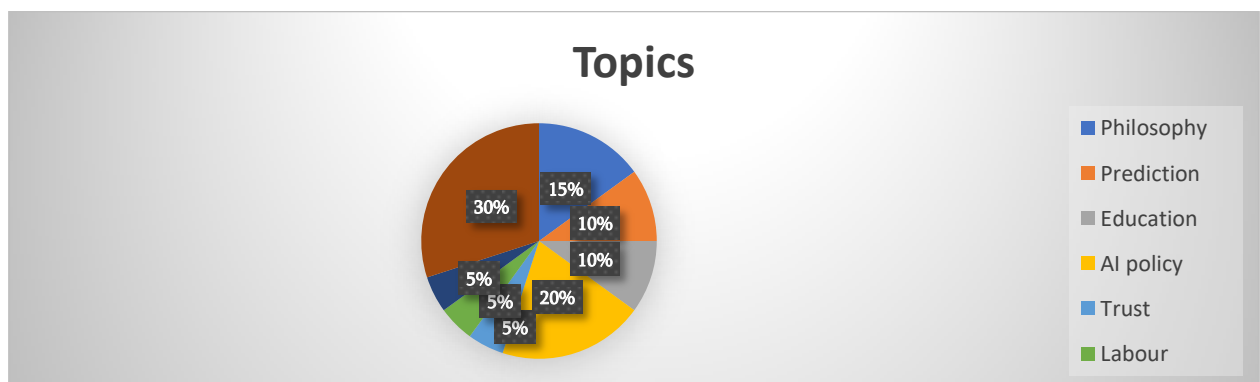
Due to the multidisciplinary nature of artificial intelligence, in all the reviewed works, the authors use several research methods, both quantitative and qualitative, such as Case studies, comparative analyses, chronological description, document analyses, secondary statistical data, etc. (see Table N2).

Table II

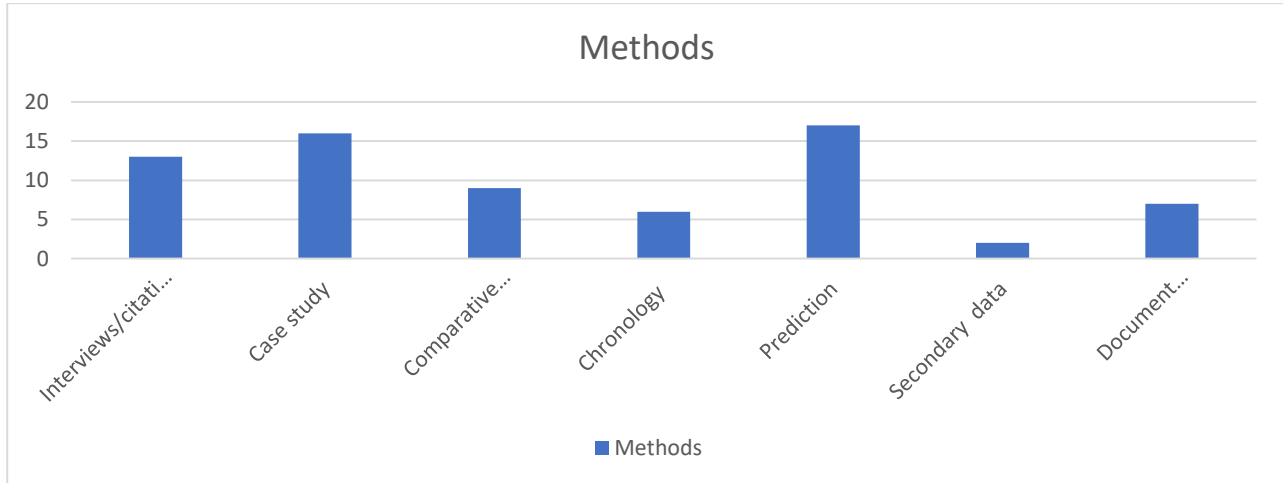**Research Methods Utilized in Artificial Intelligence Studies**

Table III

An overview of Analyzed documents by year, content, and methodology

a.	Topic	Year	Citation from interviews	Case study	Comparative analyses	Chronology	Prediction	Secondary statistical data	Document Analyses
1.	Philosophy	1990	V			V			
2.	Prediction	2003	V				V		
3.	Education	2004		V		V	V		
4.	AI policy	2016	V	V	V	V	V		
5.	Philosophy	2017		V	V	V			
6.	Prediction	2017	V	V	V		v		
7.	AI Policy	2017		V			V		
8.	Military	2018	V	V	V		V	V	V
9.	Military	2018		V			V		
10.	Military	2018		V			V		V
11.	Trust	2018			V		V		
12.	Labour	2019	V	V			V		
13.	Military	2019		V			V		V
14.	AI Policy	2019	V	V	V				V
15.	AI Policy	2019	V	V			V		V
16.	Military	2019	V	V	V		V	V	V
17.	Human Rights	2020	V	V	V		V		V
18.	Philosophy	2020	V	V	V	V	V		
19.	Military	2020	V	V			V		
20.	Education	2020	V	V		V	V	V	

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