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### ASHIMOVA AITOLKYN BERIKKYZY

### Artificial Intelligence as an Instrument of Political Communication: Application and Global Forecasting

8D03202 – Media and Communications

A dissertation submitted for the degree of Doctor of Philosophy (PhD)

> Scientific advisors G. Sultanbayeva, Doctor of Political Science, Professor

Foreign scientific supervisor Steve Zhongshi Guo, PhD, Professor

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The following documents are referenced in this dissertation research:

The Resolution of the Government of the Republic of Kazakhstan "Concept of Development of Artificial Intelligence for 2024-2029" dated July 24, 2024, No. 592.

The Law of the Republic of Kazakhstan "On Online Platforms and Online Advertising" dated July 10, 2023, No. 18-VIII.

Law of the Republic of Kazakhstan "On Informatization" dated November 24, 2015, No. No 347-VI.

Resolution of the Government of the Republic of Kazakhstan. On the approval of the State Program "Digital Kazakhstan": approved on December 12, 2017, No. 827. It was repealed by the Resolution of the Government of the Republic of Kazakhstan No. 311 on May 17, 2022.

Resolution of the Government of the Republic of Kazakhstan. On approval of the national project in the field of communications "Accessible Internet": approved. October 27, 2023, No. 949.

#### **DEFINITIONS**

The following documents are referenced in this dissertation research:

**Artificial Intelligence** – the capability of computer systems to simulate tasks typically associated with human intelligence, such as learning, reasoning, problemsolving, language understanding, and others.

**Political Communication** – a process of information exchange between different political actors, occurring through both formal and informal interactions.

**Machine Learning** – a subset of artificial intelligence models that can gain knowledge from the presented data by training algorithms to recognize patterns and make predictions or decisions and improve their performances over time.

**Computational Propaganda** – propaganda practices that use automated tools, algorithms, automated content generation, and other artificial intelligence systems to spread information in digital environment.

## NOTATIONS AND ABBREVIATIONS

AI	Artificial intelligence		
AGI	Artificial general intelligence		
AISB	Society for the Study of Artificial Intelligence and the		
	Simulation of Behaviour		
CEO	Chief executive Officer		
EU	European Union		
GAN	Generative Adversarial Networks		
GRECO	Group of States against Corruption		
GPT	Generative Pre-Trained Transformer		
ICT	Information and communication technology		
IT	Information technology		
LDB	Literature-based discovery		
LLM	Large language models		
NGO	Non-governmental organization		
NLP	Natural language processing		
NLG	Natural language generation		
NLU	Natural language understanding		
OECD	Organization for Economic Co-operation and		
	Development		
PEST	Political, economic, social, technological		
R&D	Research and development		
RLHF	Reinforcement Learning from Human Feedback		
SWOT	Strengths, weaknesses, opportunities, threats		
UAE	United Arab Emirates		
UK	United Kingdom		
UN	United Nations		
US	United States		

#### INTRODUCTION

**Relevance of the research topic.** In the light of ubiquitous global digitalization and the introduction of artificial intelligence (AI) in virtually all areas of socio-economic life, these technological breakthroughs have led to the transformation of communication processes and the political sphere. AI has not only changed traditional mass communication but also forms new ways of interaction between political actors and society.

Kazakhstan, following international trends, pursues an active policy of introducing and mastering the latest technological achievements through various national development projects that emphasizes the significance of AI. The proposal outlined in the "Concept for the development of artificial intelligence for 2024-2029," developed by the Ministry of Digital Development, Innovation and Aerospace Industry of Kazakhstan, highlights many milestone targets, such as increasing the number of products utilizing AI on National Artificial Intelligence Platform and patent innovations by 2029. In addition, the state also worked on substantiating the legal basis for AI-driven innovation. Significant amendments and additions were made to the Law of the Republic of Kazakhstan, "On Informatization," regulating digital technologies. The new changes introduced important concepts such as "intelligent robot," "national artificial intelligence platform," and "operator of the national artificial intelligence platform" to the legislature. The need to amend the legislation stems from the fact that various governmental organizations and NGOs in Kazakhstan are already integrating AI-based technologies into decision-making and public communication strategies. Early adoption of AI systems is essential for both government and commercial organizations, as these technologies significantly reduce operational costs and have higher long-term performance due to advanced learning algorithms.

The integration of AI in the political sphere is not limited to government operations but also significantly transformed political communications. In academic literature, political communications are defined as a public space where the interaction occurs between the state, political parties, various institutions, media and citizens. It was characterized by specific behaviors, such as the primacy of the state in agenda setting, limited participation of actors as full participants in political debates, coalitions between parties and analog media, and limited citizen participation. The limited nature of citizen participation facilitated linear models of communication with the state's dominant role in agenda-setting. However, with the unprecedented development of digital technologies, political communication is transforming from purely linear to interactive and transactional models, where all participants of the communicative process can create, share, and influence political discourse on equal grounds. AI started to play a significant role in this transformation, with novel technologies, such as large language models and generative AI systems, being able to create content indistinguishable from those written by humans. However, AI's impact is not restricted to the creation of textual content, as images and videos (deepfakes) of a political nature created with the help of intelligent tools are now also standard tools to influence political opinions. Unlike many other technological innovations, these models have almost immediately become mainstream, among businesses and ordinary users.

In recent years, technological breakthroughs in the field of AI have led to the emergence of new concepts, such as digital political communication and computational propaganda. It explores the use of AI in political campaigns, microsegmentation, and automatic content distribution. The collective monograph "Computational Propaganda," edited by S. Woolley and F. Howard, explored how AI influences political manipulation on social media platforms. Despite the broad international interest in this area, the experience of Central Asia, and Kazakhstan in particular, has not been the focus of academic research sufficiently. This makes Kazakhstan of particular research interest for conceptualizing the processes of influence of AI in political communications in the region.

Changing news consumption patterns in modern society and the widespread introduction of AI-based technologies led to a shift in media practices and journalistic culture. Social media platforms have become important spaces of political communication that compete in importance with classical media. The rapid emergence of various actors in the political and communication spheres is mainly due to the availability of information communication technologies and the simplified procedure of aggregating disparate interests on a global scale. AI has also become a widely discussed topic in international political and expert discussions. In international relations, AI is discussed, on the one hand, as a key technology that can affect the redistribution of power in the international system; on the other hand, as a topic for conducting the negotiation process and international cooperation. This is reflected in the national strategies of the leading world powers in the technology field, as well as in UN documents and resolutions on various areas of AI application. At the supranational level, AI acts as a topic and context for negotiations within the multi-level negotiations in global political frameworks.

Despite the considerable academic interest in AI and its use in the field of political communications, to date, there is a lack of methodology for assessing the level of implementation of AI-based tools and their impact on the political sphere. Analyzing the methods of AI application in political communication and forecasting the prospects of its development is important for the policy of our state, since the solution of such a problem as building a competitive national economy must be integrated with the latest achievements of information technology.

Finally, it is important to note that since the topic of this dissertation work was chosen, there have been numerous significant breakthroughs in the field of AI, which only highlights the dynamism of modern technological development and their unprecedented influence on political communication. The constant expansion of AI capabilities only further emphasizes the relevance of the research topic and necessitates understanding and forecasting trends in this area.

The degree of the scientific development of the topic. The development and establishment of AI as an independent discipline encompasses both philosophical and theoretical works. The contemporary concept of artificial intelligence was first proposed by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon in a research proposal for Dartmouth Conference in 1956. It was based on

the notion that the ability of a machine to perform various intellectual operations and types of intellectual activity. This approach was consistent with the proposition presented by English mathematician and computer scientist Alan Turing in the 1950 article "Computing Machinery and Intelligence". In the article, Turing theorized that if the detached observer cannot tell the difference between human and machine in imitation game thought experiment, then the original problem of whether a machine is able to think would become too insignificant to merit a discussion. Later, John Haugeland proposed a reconstruction of the philosophical tradition of identifying thinking with calculation and understanding intellectual activity as a rational manipulation of mental symbols. In the Soviet Union, Victor Finn carried out a machine-oriented formalization of plausible reasoning, a method for automatically generating hypotheses was created. In the 1980s, Dmitry Pospelov characterized the theory of artificial intelligence as a science of knowledge that studies its extraction and representation in artificial systems. During the same period, one of the founding fathers of modern artificial intelligence, Marvin Minsky, studied the influence of the computational approach to human intelligence. To date there is not one unified fundamental work that was able to encompass the whole complexity of the topic of artificial intelligence. Nevertheless, it is important to note "Artificial Intelligence: A Modern Approach" by Russell Stuart and Peter Norvig, which is based on agentbased concept of working algorithms in artificial intelligence.

Academic interest in the influence of information technologies on society and societal communications is a relatively novel phenomenon with just over a century old history behind it. Prominent scholars such as Arnold J. Toynbee, Oswald Spengler, Nikolai Berdyaev, and José Ortega y Gasset set the stage for modern discourse as early as the beginning of the 20<sup>th</sup> century. And in the middle the century, Daniel Bell, Manuel Castells, Willard Martin, Marshall McLuhan, and Alvin Toffler studied the notion of "information society," a term that describes society which is based on telecommunications infrastructure and communication. The notion which in the modern digital political space evolved into the theory of communicative capitalism proposed by Slavoj Zizek and Jodi Dean. Information society theory also evolved in the idea of the next industrial revolution characterized by its speed and spectacular scope and involves current breakthroughs such as artificial intelligence and improvements in robotics proposed by Klaus Schwab.

Correspondingly, theoretical basis of modern mass communication political communication was founded in the works of Edward Bernays, Harold Lasswell, and Marshall McLuhan. Harold Lasswell proposed fundamental communication model based on the following questions: "Who" – "Says What" – "In Which Channel" – "To Whom" – "With What Effect?", that later was extended by Richard Braddock. Later, breakthroughs in the field of information and communication technology led to the emergence of other communication models, such interactive and transactional models. In the 1950s, Wilbur Schramm proposed an interactive model that featured feedback loop along with message encoding, decoding, and interpretation. Around the same period, Bruce Westley and Malcolm S. Maclean Jr presented also included a feedback feature with a greater focus on environmental

factors and an additional component of the channel that plays a gatekeeping role that usually occurs in mass communication. Later, in the mid-1960s, Frank Dance developed a transactional model of communication, that showed communication model as an upward-expanding spiral of increasing complexity. In the early 1970s, Dean Barnlund also designed a transactional model of communication that featured multi-layered feedback system.

Modern methods of political communication that involve AI instruments of called computational propaganda were conceptualized in a collective monograph "Computational Propaganda: Political Parties, Politicians, and Political Manipulation on Social Media" by Samuel C. Woolley and Philip N. Howard. Published in Oxford, the study brings together studies by 12 researchers from 9 countries (UK, USA, China, Russia, Poland, Brazil, Taiwan, Germany and Ukraine) describing the experience and practice of this phenomenon. Contemporary actors and models of interaction of political communications in the network landscape were investigated in the study by Yulia Lektorova.

In Kazakhstani political science, problems and features of formation of foreign and Kazakhstani political communication in the mass media was outlined in the works of Gulmira Sultanbayeva.

The object of the study involves political communication in the context of digitalization and introduction of artificial intelligence.

The subject of the study encompasses the use of artificial intelligence technologies in modern political communication, their impact on the communication between political actors and the audience and forecasting transformation of political communication processes under the artificial intelligence influence.

**The aim of the study** is to analyze the impact of AI technologies on political communication in the context of digitalization process, with special emphasis on Kazakhstan, and to forecast trends in political communication processes driven by AI.

To achieve the aim of the study, the following **tasks** were set:

- to analyze the theoretical and methodological foundations of AI in the context of its historical development;
- to study the practice of the application of AI-based technologies in the modern media and their impact on the process of creating and distributing content in relation to political communication;
- to study theoretical approaches to AI in international relations and analyze its impact on global political processes;
- to analyze the theoretical basis and modern methods of political communications that use AI tools;
- to explore the influence of digital platforms and AI on political propaganda, including the use of algorithms for public opinion manipulation;
- to analyze perspectives for the introduction and further integration into the political process in Kazakhstan, including social, economic and technological aspects;

- to develop a model for forecasting the development of political communication with the integration of AI and to identify key trends in the application of AI in political sphere;
- to conduct an expert survey on perception of AI in political communication to substantiate a proposed model for forecasting the development of political communication with the integration of AI and assess its impact on political interaction.

The research hypothesis is the thesis that the advent of AI and the changes that these systems have already introduced to the different communication mediums suggest that with further development, they can transform the communication platforms completely. Therefore, the information in the political communication process is undergoing a change from a linear model to interactive and transactional in the future as artificial intelligence will be applied to every step of the communicative technologies based on AI transform process. New digital mass political communication to individually tailored political conversation as more people consume artificial intelligence-generated content. The author also hypothesizes that as more people utilize AI instruments and engage with AI-generated content, they view positively the practice of its application in political decision-making processes.

**Research methods applied in the dissertation work.** The author used historical and philosophical analysis of the problems of artificial intelligence in the first part of the dissertation work to reveal the main trends in the development of the field as a separate branch of science. The main research methods also consist of structural-functional and comparative analyses to identify issues of digitalization of political communication and the emergence of computational propaganda, as well as content analysis and systematization to highlight application practices of artificial intelligence in mass communication and international politics.

To analyze the current state and prospects for the development of artificial intelligence in Kazakhstan, the author used the combination of SWOT and PEST analysis methods as an analytical framework to re-contextualize current changes in a technological and social environment. SWOT analysis is an instrument to examine internal factors (strengths, weaknesses, potential opportunities, and potential threats) of the given conditions. PEST analysis represents a framework of external macro-economic factor analysis of the chosen subject: its political, economic, social, and technological aspects. These two analytical tools, in conjunction, can describe a more nuanced and holistic picture of the digital development in the country.

To substantiate the proposed models of interactive and transactional models in political communication, the author conducted an anonymous expert survey on the practice of using AI and its influence on political communication among media experts, journalists, political and data scientists. This method helps to identify the main trends in the development of political communications with AI integration based on Kazakhstan's experience based on expert opinions that ensure objectivity and high levels of competence in the study results. The survey conducted was a voluntary, anonymous online survey using closed-ended questions and a purposive non-probability sampling with the addition of snowball sampling as respondents recommended other experts to participate in the study. It involved 84 experts, with a response rate of 76.4%. The obtained data was processed using descriptive and analytical statistics in the IBM SPSS Statistics (version 23). Spearman's rank correlation coefficient was used to assess the relationship between variables measured on an ordinal scale, with statistical significance determined by  $p \le 0.05$ . The results showed a significant positive correlation between the frequency of AI use, interest in AI-generated content and support for AI in the political decision-making process.

#### Main provisions submitted for defense

- 1. AI-based instruments are commonly used in modern political campaigns in the form of automated bots and algorithms for information dissemination. The general direction of the development of AI models shows that they have the potential to transcend its function as a mere intermediary and start playing a major role in all information and communication spheres.
- 2. The recent surge in generative artificial intelligence models for creating different types of content shows that the relationship between audience and AI-generated content will become more nuanced. Models such as text-to-video, text-to-music, text-to-image will evolve even further, but together with it different artificial intelligence assistants will also emerge, that will help people to navigate ever so complex media landscape.
- 3. Results of combined SWOT and PEST analysis show that for Kazakhstan to use the full potential of artificial intelligence technologies will require a joint effort on the part of the state, private businesses, and residents of the country. The state is responsible for creating the necessary infrastructure and environment to promote technological innovation. Private businesses can make a significant difference by structuring and labeling available data for use in artificial intelligence implementation and advanced analytics technologies. At the population level, it is important to develop technological habits to develop digital ways of working.
- 4. Digitalization led to the convergence of traditional forms of journalism and the proliferation of different communication platforms such as Internet forums and social network websites. Under such circumstances, the direction of the informational flow started to change, becoming a more important factor in communication. With regard to the advent of artificial intelligence and the changes that these systems already have been introducing to the different communication mediums, it is suggested that with further development, they can transform the communication platforms completely.
- 5. The stages of artificial intelligence development as a content medium described above applied to political communication settings are more aligned with the political marketing approach. During the current era of social media platforms and content proliferation that leads to unprecedented audience segregation, non-marketing approaches to political communication, such as agitation, are becoming increasingly ineffective.

New digital technologies based on generative artificial intelligence can help overcome these obstacles and elevate mass political communication to individually tailored political conversation.

6. Different models of communication flow in political communication of different platforms correspond with different periods of mass media development: linear – political communication during the period when traditional mass media were the main public communication medium; interactive – political communication of the modern period, when mass media transitioned to the Internet and now is competing with social media platforms for audience attention; transactional – political communication with the inclusion of AI systems to the main communication platforms.

The scientific novelty of the dissertation work is that it considers for the first time the influence of artificial intelligence on political communications in the field of media research in Kazakhstan. As a result of the research conducted, the following findings were made:

- theoretical and philosophical prerequisites for the emergence of artificial intelligence were outlined;
- categories of artificial intelligence and their application were systemized;
- features of novel digital information space and the advent of new political actors were studied;
- the characteristics of the fundamental aspects of digitalization of political propaganda have been identified;
- novel practices of political communication and social risks associated with the digitalization of public policy are described;
- an analysis of the application of artificial intelligence tools in modern international politics, diplomacy and the media was carried out;
- a model for forecasting the development of artificial intelligence in content creation is presented based on the historical periodization;
- the current state and prospects for the development of artificial intelligence in various socio-economic spheres of Kazakhstan have been determined;
- a global forecasting model for the development of political communications with the integration of artificial intelligence has been developed based on the experience of Kazakhstan.

**Theoretical and practical significance of the dissertation work.** The conducted study allows to conceptualize the influence of artificial intelligence on political communication. Analysis of computational propaganda practices and cases in modern elections revealed the latest trends in political communications and their influence on modern political processes. The proposed forecasting model of artificial intelligence development in content creation can be applied as a conceptual development model for other digital technologies in the field of mass communication. The results of a combined SWOT and PEST analysis of the various aspects of the development of artificial intelligence in Kazakhstan can be used in the work of political scientists and journalists. The results of the dissertation work can be used for

research into the problems of transformation of communication processes under the influence of technology in mass communication and political science.

#### Publication and approval of research work.

The main provisions and conclusions submitted for defense were reflected in 6 scientific papers, 2 of which were published in journals with a non-zero impact factor and included in the international Scopus database, 3 in scientific publications recommended by the Committee for Quality Assurance in the Sphere of Education of the Ministry of Education of the Republic of Kazakhstan, and 1 report in the proceedings of international scientific and practical conferences abroad (Spain, India).

- Ashimova A., Sultanbayeva G., Kendirbai G., Kertayev R., Lozhnikova O. Gender Division and Television Consumption in Kazakhstan // Journal of Applied Journalism & Media Studies. – 2023. – № 3(12). – P. 355-373.
- Ashimova A.B., Sultanbayeva E.S., Steve G., Belgarayeva A.T. SWOT analysis of the current state and prospects for the development of artificial intelligence in Kazakhstan's media industry // Herald of Journalism. 2022. № 4(66). P. 51–58.
- 3. Alimzhanova A., Popova B., Nurpeis Л., Ashimova A. New horizons of visualization: the role of AI in modern journalism in Kazakhstan // Herald of Journalism. 2024. № 74 (4). Р. 109–124.
- Ashimova A., Sultanbaeva G.S., Kendirbay G., Kertaev R., Lozhnikova O.P. Digital media preferences in the focus of social research // Herald of Journalism. – 2020. – № 2(56). – P. 92–101.
- Ashimova A.T., Alzhanova A.K. SWOT and PEST analysis of artificial intelligence in Kazakhstan: current state and development prospects // Proceedings of the International Conference on Innovative Computing & Communication (ICICC 2022). – 2023.
- 6. Sultanbayeva, G., Akynbekova, A., Belgarayeva, A., Buyenbayeva, Z., Ashimova, A. (2024). Digital literacy as a tool for identifying fake news: A comparative analysis using the example of European and Kazakh media // Journal of Information Policy. 2024. № 15.

**Structure of the dissertation work.** The work consists of introduction, three chapters, conclusion, list of used literature and appendices. The volume of the dissertation work is 152 pages, including 7 tables, 23 figures, and 1 formula. The list of references contains 236 titles.

#### 1 OVERVIEW OF THE IMPACT OF ARTIFICIAL INTELLIGENCE ON POLITICAL COMMUNICATION, MEDIA, AND GLOBAL GOVERNANCE

# **1.1** The History of Development of Artificial Intelligence in The Context of Political Communications

Political communication has existed since antiquity as a process of exchanging messages between the state and citizens. However, till the emergence of mass communication technologies such as the printing press, it was primarily based on symbolic communication. Those included royal insignia and monuments to communicate the message of authority and power. Throughout human history, emerging technology has symbolized imperial and national prowess. In many cases, this was related to the military field where inventions and the importation of combating technology had the most visible effects. However, any new technological advance could strengthen the nation's image both locally and internationally, which was, in turn, the most basic form of political communication.

In academic literature, political communication is usually defined as a public space where the interaction between the state, institutions, media, and citizens takes place [1]. This public space usually took the form of mass media, whose evolution was always closely related and dependent on the development of technology. Mass societies that were born with the industrial revolutions, when machinery made it possible for the mass production of goods, also needed mass-produced news and information. The advancement of the First Industrial Revolution gave rise to the emergence of modern journalism, revolutionizing printing technologies and speeding up the process of communication. The development of communication and the expansion of electricity during the Second Industrial Revolution allowed news and media to cross international boundaries.

The period of the First Industrial Revolution is also significant because concepts of the first computers emerged. Charles Babbage's first programmable computer, described in 1837, was named the Analytical Engine and cited as a distant ancestor of artificial intelligence (AI) and computing devices in general [2]. The steam-powered calculating machine conceived to implement the principle of programmable control is rightfully considered the forerunner of modern electronic computers. Similar to computer designs of the mid-20th century, the input of the data into the engine's system was carried out by punch cards that enabled it to change its program.

Another lesser-known concept of prototype for computing devices was proposed by Semyon Korsakov in 1832. He conceived the first machine project designed to perform intellectual operations, the results of which should not be numbers but indications of the connection of "ideas" or concepts. The proposal to the St. Petersburg Academy of Sciences included several functional mechanical devices that also operated based on perforated tables and were designed for information retrieval and classification tasks [3]. Examples of theoretical applications of the device, given by the inventor, who trained himself in homeopathy, were mainly related to medicine. Korsakov's proposed "linear homeoscope" performed the function of pairing drugs that would have been most suitable for treating diseases manifested in specific symptoms. Nevertheless, the "intelligent machines" functionality was not exclusively tied to the medical field. The inventor assumed that the machines would work with tables, to be compiled by notable experts from various fields. Even though both Babbage's and Korsakov's prototype machines were groundbreaking for their time, they did not enter everyday use they remained important symbols of scientific achievement.

Political communication, consistent with modern understanding, came to existence only with the emergence of more sophisticated communicative technologies: telegraph, radio, and later television and internet. It might be particularly noteworthy that prominent scholars in the field of political communication outlined the mid-1950s as the beginning of this cross-disciplinary field. In the introduction to the *Handbook of Political Communication*, Dan Nimmo and Keith Sanders specifically indicate 1956 as the year "to designate something called "political communication" as one of three "intervening processes" (political leadership and group structures being the other two) "by means of which political influences are mobilized and transmitted" between "formal governmental institutions, on the one hand, and citizens voting behavior, on the other hand" [4]. Russian political scientist Grachev is also of the opinion that the concept of political communication," which was previously applied mainly to technical fields, became widespread in interdisciplinary research.

The same year of 1956 was marked by introducing the theoretical concept of artificial intelligence (AI) at the Dartmouth Conference [6]. In the conference statement, the authors of the idea – John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon – wrote that the basis of the planned research is the proposal that all characteristics of intelligence, including the ability to learn, can be described so precisely that they can be reproduced a machine. Ten leading American researchers participated in its work, including Minsky, Newell, Simon, Moore, Solomonov, and Selfridge. At the time, the idea of artificial intelligence was formed as the ability of a machine to perform various intellectual operations and types of intellectual activity, which hitherto were carried out only by humans.

The researchers, the original attendees of the 1956 Dartmouth conference, at the time, were very positive in their outlook on solving the problem of cognitive machines. The conference proposal stated: "We propose that a 2 month, 10 man study of artificial intelligence be carried out during the summer of 1956 at Dartmouth College in Hanover, New Hampshire. The study is to proceed based on the conjecture that every aspect of learning or any other feature of intelligence can, in principle, be so precisely described that a machine can be made to simulate it. An attempt will be made to find how to make machines use language, form abstractions and concepts, solve kinds of problems now reserved for humans, and improve themselves. We think that a significant advance can be made in one or more of these problems if a carefully selected group of scientists work on it together for a summer" [7].

The concept presented by McCarthy and his colleagues was consistent with the approach proposed by English mathematician and computer scientist Alan Turing. In

the 1950 article titled "Computing Machinery and Intelligence," Turing changed the fundamental approach to understanding thinking machines by operationalizing the question itself in a proposed imaginary game [8]. He described a hypothetical game of imitation, where a person and a machine, invisible to the researcher, send replies to different questions through an intermediary. The researcher then tries to determine from the answers which of the respondents is human and which is a machine. In these circumstances, the focus shifts whether a machine can think like a person to whether a computer can take part in a game at such a level as to deceive a person. Turing believed that real computers capable of imitating humans in this way would be feasible just a couple of decades later, at the beginning of the 21<sup>st</sup> century. When it happens, the original problem of whether a machine can think would become too insignificant to merit a discussion. This imaginary game became the basis for the "Turing Test" and was the first serious proposal in the philosophy of artificial intelligence. In the same breakthrough article, Turing also proposed the Child machine idea, explaining, "instead of trying to produce a programme to simulate the adult mind, why not rather try to produce one which simulated the child's?" [8]. His idea was that the machine would eventually develop an "adult" brain if such a program was subjected to appropriate education.

Even though the Dartmouth workshop did not lead to immediate breakthroughs, it laid all the theoretical foundations for future research in the field. The participants of the conference concluded that cognitive devices need to possess the following capabilities, which are to this day relevant to the field and being actively developed:

• natural language processing – the ability of computing systems to communicate using conventional language;

knowledge representation – the ability to store the received information;

• automated reasoning – the ability to use the stored information to answer questions and to draw novel conclusions;

• machine learning – the ability to adapt to new circumstances and to detect and extrapolate patterns.

One of the aspects of computer application that became especially popular after World War II was machine translation. At the time, military successes in cryptography and encoding prompted an interest in the peaceful use of computers. In the early 1950s, first in the United States and then in other countries, there were several projects on machine translation of texts from one language into another. In 1954, the Georgetown-IBM experiment made the first demonstration of a device for translating from Russian into English with a vocabulary consisting of 250 words [9]. During the same period, in the Institute of Applied Mathematics of the USSR Academy of Sciences, a group was organized that brought together leading mathematicians and linguists, who by 1956 had created the first working algorithm for translating mathematical texts from French into Russian [10]. The translation was done under clearly limited linguistic conditions but with a larger vocabulary of 1,900 to 2,000 words. For this project, the researchers chose technical texts for translation and avoided combinations with figurative meanings and idioms. Both governments were particularly interested in a machine that could decipher and translate spoken language and high-processing input.

By this period, all the prerequisites for the emergence of a new field in computation were created. Moreover, the Dartmouth conference was not the only attempt at creating cognitive computation. Although the taxonomy may have differed, many research centers were involved in one direction or another in automated cognitive research, which later gave rise to modern research in the field of AI. At the time, extensive development and research in the direction of cognitive computation were also carried out on the territory of the former Soviet Union. In the early 1960s, Russian mathematician and cyberneticist Dmitry Pospelov, together with psychologist Veniamin Pushkin, conducted practice-oriented research in this field. Their work aimed to create methods for managing large systems through automated means [11]. However, the researchers themselves did not consider this new direction as one of the areas of AI and used different terms to refer to it. The reason behind this was ideological differences between the two superpowers, which had already led to the prolonged conditions of the Cold War. In the territory of the former USSR, the concept of "artificial intelligence" was seen as an ideologically Western phenomenon. Initially, Pospelov and Pushkin labeled their research direction as "psychonics" - in analogy with the highly popular at that time field of bionics at that time. Psychonics, in fact, was the subsection of bionics where the results of psychophysiological research were used in the construction of control systems. Applying this original cognitive concept as a form of modeling demonstrates essential aspects of modern problems of managing the intellectual sphere of society, primarily science and education [11].

One of the more challenging intellectual tasks for the emerging field was studying the definition of images and situations. Researchers representing various research fields – physiologists, psychologists, mathematicians, and engineers – were working on and continue to deal with its solution. In 1957, the American physiologist Frank Rosenblatt proposed to create a model of visual perception and recognition that he titled "perceptron" [12]. The emergence of a machine capable of learning concepts and recognizing presented objects turned out to be highly fascinating and intriguing not only to physiologists but also to experts in other fields of knowledge. It gave rise to a substantial influx of theoretical and experimental research in the following decades. As for the modeling of logical thinking, a good model task here can be the automation of proving various theorems. Since 1960, a number of programs have been developed that could find proof of theorems. These programs had, according to John McCarthy, "common sense," that is, the ability to create deductive solutions.

In the period from the 1950s to the 1970s, studies in the field of AI flourished. Computers that previously were mainly used for military purposes became more accessible for researchers and were able to store bigger amounts of information and compute at higher speeds. Machine learning algorithms had also improved, and there was a better understanding of which algorithms to apply to particular problems. In 1963, a research laboratory at MIT received a \$2.2 million grant from the newly formed Advanced Research Projects Agency, later known as DARPA (Defense Advanced Research Projects Agency). The finance funded the MAC project, which included the AI Group founded by Minsky and McCarthy five years earlier [13]. One of the aims of the projects was the creation of a "computer utility", which would be as reliable source of computational power as the electric utility was a source of electrical power. The project's goal was to create a functional time-sharing system that would allow a large number of users to access programs on one computer remotely. This research became the foundation of modern computer networks and the Internet.

In the 1970s, further research in the field owes its development to the works of John Hopfield, later renowned for the proposal of associative neural networks. Because of the developments of Newell and Simon, an approach based on heuristic search has taken shape. Difficulties in this direction gave rise to a new solution called knowledge-based models. The novel approach was developed in the works of a group of scientists at Stanford University (Edward Feigenbaum, James Buchanan, Joshua Lederberg), who developed the first expert system in the field of identification of organic compounds using the analysis of mass spectrograms named DENDRAL. In addition to the symbolic and connectionist directions in modern artificial intelligence, it is customary to single out agent-oriented and hybrid approaches [14]. The current trend is usually classified as a logical paradigm in the field of AI research.

However, it became gradually apparent that commercial developers and researchers had grossly underestimated the complexity of AI research and its application. In 1973, the journal Artificial Intelligence published a report titled "Artificial Intelligence: A General Survey," commonly referred to as the Lighthill report, after its author, James Lighthill, who compiled data for the British Science Research Council. Lighthill presented an assessment of the progress of academic research in the field and came to unfavorable conclusions regarding core aspects of AI development. He stated that "in no part of the field have the discoveries made so far produced the major impact that was then promised" [15]. According to modern estimates, this document "formed the basis for the decision by the British government to end support for AI research in most British universities" [6]. The chain reaction to the report continued, and the following year, in 1974, in response to criticism from academic circles and continued pressure from the United States Congress, the United States and Great Britain governments ceased substantial funding of non-targeted research in AI [2]. The following decades of reduced interest in the field would be commonly referred to as "AI winter." The term first appeared in 1984 as one of the topics of public debate at the annual meeting of the American Association for Artificial Intelligence (AAAI) [13]. This discussion was a natural reaction to the general pessimism in the AI community and the media.

One of the last efforts to revive interest in the field in that decade was an initiative by the Japanese government to invest in AI as part of its Fifth Generation Computer Project (FGCP). Between 1982 and 1990, they invested \$400 million in the revolution of computer processing, the introduction of logic programming, and AI improvement. Combined with the expansion of algorithmic tools, this helped maintain persistent academic interest in AI. John Hopfield and David Rumelhart advanced "deep learning" and "backpropagation" techniques that allowed computers to learn from experience. This technological breakthrough was accompanied by the

introduction of expert systems by Edward Feigenbaum that emulated the human decision-making process [6]. Solving complex problems was achieved by program reasoning through "if-then" rules based on the information from experts in various fields. These systems were among the first AI software programs with practical applications and were used in different industries, such as computer-aided diagnostics. Nevertheless, by the mid-1990s, many investors became disillusioned by the feasibility of the projects, and the funding trickled once more. The AI field lost its prestige to the level that researchers started using other terms for their projects, such as machine learning, informatics, and cognitive computation, deliberately avoiding the original title of artificial intelligence.

The end of the 20<sup>th</sup> century was characterized by the rapid expansion of ICT technologies. There was particular interest in the capabilities of Web 2.0 in the field of political communication when concepts of "e-democracy" and "e-government" were first theorized. This created more opportunities for citizen engagement in government decision-making processes. As a result, governments and political parties started to explore new ways to integrate digital platforms into their activities.

The renewed interest in AI has skyrocketed in recent decades as machine learning techniques have begun to be successfully applied to many problems in academia and industry. This was due to the use of powerful computer equipment and the collection of large datasets. By this time, research funding in the field of AI methods has shifted from government grants to major technology corporations. In the early 2000s, there was a breakthrough in deep learning technologies, and AI systems moved to a new stage of development [16]. This was possible because of the remarkable increase in the speed and capacity of computer powers by the end of the 1990s. The increase in computing capabilities is usually measured by empirical observation referred to as Moore's law. The law forecasts that computers' speed and memory capacity double every two years because metal-oxide-semiconductor (MOS) transistor counts also double in the same period [17]. Moore's law is, strictly speaking, a projection of a historical trend posited in 1965; however, it remains a relevant predictive tool even after half a century since its introduction.

When discussing questions of history, it should be borne in mind that even a few decades ago, the term "Artificial Intelligence" itself was not used to characterize many of the research fields that can rightfully be attributed to this area nowadays. The field has grown to the level that it has turned from one narrow area of mathematics and logical reasoning into one of the fundamental areas of cognitive science. The task of defining the term can be quite a challenging undertaking since the range of issues related to it is quite extensive in modern scientific research. Currently, AI combines many sections, which include both the general theory of perception or feeling, and special practical methods, such as proving mathematical theorems, diagnosing diseases, recognizing faces and objects, and even interacting with people. AI researchers apply its methods in a wide variety of fields, and scientists whose specialty lies in different areas find in it the basis for systematizing and solving intellectual problems. Therefore, in the beginning of the 2000s, AI became one of the more universal areas of knowledge [18].

It is important to note that modern researchers in the field have not yet come to a common understanding of the meaning of the term "Artificial Intelligence". It is most often used in the following three meanings:

1) a scientific direction that aims to model the processes of human cognition and thinking and, at the same time, to use human methods of solving problems to increase the productivity of computer technology;

2) various devices, mechanisms, and computer programs that, according to one or more criteria, can be identified as "intelligent" at least on the basic level;

3) a set of ideas about cognition, mind, and man, making it possible to raise the question of modeling general intelligence [19].

As we can see, AI can operate both as a fundamental scientific discipline, as well as an applied field of study. It can be a part of various devices capable of reflection and simulating some aspects of human cognitive capabilities. This dualistic nature of AI enables it to connect theoretical research and practical solutions in numerous areas.

Over the years since the idea was proposed as an independent field of study, there have been several different approaches to defining artificial intelligence. Historically, there have been four main approaches that have divided automated cognitive functions into separate behaviors and reasoning. The table below shows a traditional approach to illustrate these approaches through various AI definitions by numerous field researchers (Table 1): thinking and acting humanly vs. thinking and acting rationally. It is important to note that the division between human and rational behavior presented below does not imply that, in comparison to rational reasoning, humans are necessarily "irrational".

Thinking Humanly	Thinking Rationally
Haugeland: "The exciting new effort to mal computers think machines with minds, the full and literal sense." [20]	Charniak and McDermott: "The study of ment faculties through the use of computational models [22]
Bellman: "[The automation of] activities th we associate with human thinking, activiti such as decision-making, problem solvin learning" [21]	Winston: "The study of the computations that mal it possible to perceive, reason, and act." [23]
Acting Humanly	Acting Rationally
g;	Acting Katonany
Kurzweil: "The art of creating machines the perform functions that require intelligent when performed by people." [24]	Poole: "Computational Intelligence is the study the design of intelligent agents." [26]
Kurzweil: "The art of creating machines the perform functions that require intelligent when performed by people." [24] Rich and Knight: "The study of how to mal computers do things at which, at the momen people are better." [25]	Poole: "Computational Intelligence is the study the design of intelligent agents." [26] Nilsson: "AI is concerned with intellige behavior in artifacts." [27]

Table 1 – Four Main Categories of Artificial Intelligence Definitions

Historically, all four approaches to AI have been applied by different researchers with distinct scientific methods. The human-centered approach was partly an empirical science that involved observations and hypotheses about human behavior. The rationalist approach involves a combination of mathematics and technology. Given this dissertation work focuses on AI applications in political communication and media, it is worth considering AI from a rationalistic approach, which correlates with the second definition of AI, which regards it as devices with various cognitive functionalities.

It should be pointed out that initially, AI was presented to the general public not as intangible computer algorithms, but as physical devices and applications that were on the same level with human intelligence in their cognitive capabilities. For instance, in the 1979 Soviet Encyclopedic Dictionary, the term is defined as "a conventional designation for cybernetic systems that model some aspects of intellectual activity" [28]. In comparison, in the 1990s AI was already understood as "a branch of informatics, in which methods and means of modeling and reproduction using computers of individual intellectual human actions are being developed" [29].

The rationalist approach postulates that a device is intelligent if the task it performs requires an intellectual effort from a human if he is in the place of the machine. Already in the middle of the 20<sup>th</sup> century, computer scientists worked on programs that could find proof of theorems, so-called programs with "common sense" [30]. An example of such an intellectual effort can be the solution of various arithmetic problems from simple to complex. However, according to this logic, even the most primitive electronic calculator would have an intelligence that eliminates the previous position. The solution to this problem was proposed by Alan Turing in the early 1950s. As mentioned previously, the Turing Test was aimed to determine whether a machine could be deemed "intelligent". Turing's idea proposed to test a machine for intelligence through communication or negotiation. Suppose the examiner was unable to determine whether his interlocutor is a person or a machine. In that case, it must be assumed that this mechanical device has intelligence or appears to be intelligent [8]. But, with this approach, it is logical to assert that computer programs such as simple chatbots satisfy the Turing test completely. The earliest notable example was ELIZA, a natural language processing program created in 1964 by the American cyberneticist Joseph Weizenbaum. The program was designed to mimic a psychiatrist's behavior and imitate "the responses of a nondirectional psychotherapist in an initial psychiatric interview" [31]. Patients with whom this program interacted in most cases did not doubt that they were communicating with an actual human. To this day, human emotions and feelings that people project toward computer programs and applications with textual interfaces are called the ELIZA effect in computer science.

However, despite the program's success at the time, researchers did not consider it as artificial intelligence because the impression that ELIZA could actually understand its interlocutors was largely illusory. The program design was to recognize certain keywords and their combinations in text typed on the keyboard. When the computer found a combination that matched one of the samples, it responded with simple phrases in which the preprogrammed formulations were included. For instance, if the patient mentioned a family member, ELIZA would respond with a question about familial relationships. Another method was to transform the patient's statement into a question which was very similar to the behavior of a human psychotherapist. This exact principle underlies the modern chatbots that are used for commercial purposes. The program's realism was achieved because when the program did not detect familiar phrases, it did not remain speechless; rather, it responded with neutral remarks.

The idea proposed in the Turing test is still applied to assess the performance of AI applications based on natural language processing. The Loebner Prize competition, held annually since 1991 and organized by AISB (Society for the Study of Artificial Intelligence and the Simulation of Behaviour), is the longest-running Turing Test-like contest. With technological development and ubiquitous employment of chatbots in numerous commercial fields, the new updated version of the Turing test appeared. The upgraded version of the "total Turing Test" includes an assessment of both linguistic and robotic behaviors [32]. A video signal helps the examinator assess the subject's perceptual abilities and provides an opportunity for the interrogator to manipulate physical objects. The requirements of the total Turing Test include:

- computer vision to perceive objects;
- robotic system to handle objects and move about.

However, even the advanced versions of the Turing test cannot fully satisfy the rationalist approach to AI perception because of the gap of understanding between experts and non-experts assessing different AI-based systems. For a person who understands the underlying mechanisms behind the work of the most sophisticated computer programs their ability to skillfully imitate human intellectual activity loses all visibility of "intelligence". Therefore, despite the Turing test remaining relevant more than seven decades later, most AI researchers have devoted little effort to passing it. It is generally believed that studying basic principles of intelligence is more important than trying to duplicate an exemplar [6].

To date, no AI close to human intelligence, that is, one that could perform such cognitive functions as thinking, reflection, and creativity on its own accord. However, recent technological breakthroughs such as neural networks and deep learning techniques are advancing the field and making possible new, more capable models such as generative AI. The two main classes of AI models are based on their capabilities of learning algorithms and their functionality. The first category includes such types of AI as Narrow AI and Strong AI, sometimes called General AI. The latter type is also sometimes designated as general artificial intelligence (AGI), the ability of the systems to learn and perform any intellectual task that requires human intelligence. In theory, developing both strong and weak AI should lead to the eventual development of AGI.

The definition of weak AI postulates that it is based on a particular model of algorithms where they outperform humans on some very narrowly defined tasks. Unlike strong AI, narrow AI focuses on one or several subsets of cognitive abilities and develops along this spectrum; however, these systems are unable to extrapolate

the gained knowledge to perform other tasks. Narrow AI illustrates that intelligent behavior can be modeled, and applications based on it have passed the Turing Test several times. Researchers in this AI subfield aim at building machines or module programs that act intelligently without taking a position on whether or not they possess any cognitive abilities. Currently, applications based on these algorithms are the most widespread application of AI technologies utilized both in commercial and direct consumer sectors. The most prominent examples include a range of digital voice assistants such as Siri, Alexa, or Alisa, which are embedded in smart devices; they are able to follow voice commands in natural language and perform simplified tasks. At the same time, narrow AI applications are not limited to communicative systems that are modeled after human interaction. One of the early successful cases of weak AI programs was IBM's Deep Blue, the first supercomputer expert system to defeat world chess champion Garry Kasparov in 1996 under regular time controls. In an exhibition match, the program beat the world champion with a score of 3.5 against 2.5. In addition to demonstrating the technological advances, the highly publicized chess facilitated IBM to raise the company share price by \$18 billion. Nevertheless, Deep Blue's victory over the grandmaster does not entail its superiority in mastering the game humanly; instead, its success was determined by the sheer computing power that contained 16 chess chips, which could search for 2 to 2.5 million chester positions per second. A massively parallel search of the supercomputer enabled it to reach the maximum sustained speed observed during the game of 330 million chess positions per second [33].

The scope of narrow AI utilization is expanding every year. These include sophisticated computer models like image and facial recognition, autonomous selfdriving vehicles, predictive maintenance systems, and comparatively simple algorithms for text autocorrection, recommendation systems, and email spam filters. Some experts believe that instead of using the terms weak AI and narrow AI interchangeably, the latter should be considered as the subcategory of the former. Hypothesis testing about minds or parts of minds is typically not part of narrow AI but rather the implementation of some superficial lookalike feature. Many currently existing systems that claim to use "artificial intelligence" are likely operating as a narrow AI focused on a specific problem and are not weak AI in the traditional sense. Digital assistants like Siri, Cortana, and Google Assistant are all examples of narrow AI, but they are not good examples of weak AI, as they operate within a limited range of functions. They do not implement parts of minds but rather implement natural language processing together with predefined rules. In addition to the limited scope of the application, weak AI systems are also characterized by high data dependence. The machine learning techniques employed for developing these applications, such as supervised, unsupervised, and reinforcement learning, require vast amounts of highquality datasets.

In contrast, strong AI (also sometimes referred to as Artificial General Intelligence or AGI) deals with the issue of consciousness and mind. The theory of AGI suggests that computers can acquire the ability to think and be aware of themselves as a separate entity, in particular, to understand their thoughts. However, it would not be necessary for their thought process to be similar to that of a human. It is a construct that has mental capabilities and functions that can mimic the human brain. According to the philosophy of strong AI, there is no essential difference between the piece of software, which is AI, precisely emulating the actions of the human brain, and the actions of a human being, including its power of understanding and even its consciousness.

The current stage of AI development led to the emergence of numerous branches within the field. These include Machine Learning, Neural Networks, Evolutionary Computation, Computer Vision, Robotics, Expert Systems, Speech Processing, and Natural Language Processing. In this dissertation, the author mainly focuses on machine learning and its rapidly developing subfield, deep learning. The figure below illustrates the current relationships between the bigger field of AI and its various domains (Figure 1). The figure illustrates how AI includes machine learning, and at the same time, any necessary algorithm or knowledge that is hand-coded or built by traditional programming techniques rather than learned by machines. As evident from its name, machine learning process includes any technique that allows a system to gain knowledge from the presented data. Deep learning, algorithmic process based on artificial neural networks, is the best known of those techniques, but it is not the only one [34].



Figure 1 – Artificial Intelligence and Its Main Subfields

Note – Source: [34]

Based on advanced statistical methods, machine learning became a field of its own and began to expand in the 1990s. It is an AI subfield that does not rely on preprogrammed instructions in its system and can learn from the input data. In machine learning, the data is used to determine which algorithm is best to generate results based on the amount, quality, and nature of data. This data is then used for data mining in a variety of ways, such as recommendation systems for similar products in online stores, personalized content on video streaming services, online advertisement and friend suggestions on social networks like Facebook. After the "AI Winter," the general line of development of the field has changed its goal to achieve AI while trying to solve problems of a more practical nature. The field then shifted its focus away from the symbolic methodologies it had inherited from AI. Instead, it shifted to methods and models drawn from the fields of probability and statistics [35]. Machine learning applications can be optimized for purposes such as spam filtering, optimal character and facial recognition, and web search algorithms. One of the most common uses of machine learning is for smart searches on Google and Yandex websites.

At the current stage of development, deep learning is seen as an all-purpose technology, with its practical applications as varied as natural language processing, image-speech recognition and reconstruction, natural language text-to-image creation, and generative AI. Even though the first academic paper describing deep learning algorithms for supervised feedforward dates all the way back to 1967 [36], it took almost fifty years for computer technology capability to level with the theory. The reason it required such a long time is that deep learning needs large amounts of data and computing power for training the artificial neural networks. A simplified analogy can be if computing power can be seen as the engine of AI, data would be a fuel. Only in the last couple of decades has computing become sufficiently fast and machine-readable data amply plentiful. Currently, a typical smartphone holds millions of times more processing power than the computers used in the NASA Apollo program in 1969. Similarly, the Internet of 2020 is almost one trillion times larger than the Internet of 1995.

While deep learning was inspired by the human brain, it works very differently. It requires enormous amounts of data compared to humans, but once trained on big data, the learning models can decidedly outperform humans for a given task. This is especially true in dealing with quantitative optimization, such as picking a particular advertisement content to maximize the likelihood of purchase or recognizing one out of a million possible faces. In addition, deep learning can improve systems' predictive power by tapping into massive heterogeneous data that is not feasible even for trained professionals. While the human brain is limited in the number of things it can focus on at a time, a deep-learning algorithm trained on millions of data points is capable of discovering correlations between obscure features that are too subtle or complex to comprehend and which may even be undetectable for humans.

Given the strengths and weaknesses of deep learning, it is no wonder that the first beneficiaries of this technology were the biggest Internet companies. Corporations such as Meta Platforms (formerly Facebook Company) and Amazon possess access to massive amounts of data that are also often automatically labeled via user action. Data of this kind aligns with deep-learning techniques that are best applied to unstructured data (data without a predefined organization or without a predefined data model) such as text, audio, image, and video files. Prevailing application purposes for deep learning include image classification, predictive analytics, sentiment analysis, and so forth, where the technology achieved "state of the art" (best results to date) in benchmark after benchmark. For example, deep learning has radically improved Google Translate. Until 2016, Google Translate used classical machine-learning techniques, using enormous tables of matching patterns in

the two languages labeled with probabilities. A newer neural-network-based approach, leveraging deep learning, yielded markedly better translations. Deep learning has also significantly improved machines' ability to transcribe speech and label photographs [34].

At the same time, deep learning presents great opportunities in applied sciences. Some publications on the topic parallel the development of AI in modern research with the introduction of telescopes and microscopes to natural sciences that paved the way for numerous ground-breaking discoveries. Interestingly, in 1665, English natural scientist Robert Hooke referred to the practice of using telescopes as "adding of artificial organs to the natural" [37]. These instruments also helped scientists of the time to start relying on their own observations rather than blindly following treaties of antiquity. Introducing AI into sciences may accelerate the pace of scientific discovery and begin the new age of enlightenment.

One of the most promising areas of AI application in scientific research is literature-based discovery (LDB). It is a type of research process that involves extraction of knowledge from analyzing and uncovering new connections in an already published and verified body of academic work, using automated or semiautomated methods. This approach is far from novel, being pioneered in the 1980s by Don R. Swanson of Chicago University, who had a simple hypothesis that if there is a relationship between discoveries A and B and a relationship between discoveries B and C, then there should be a connection between discoveries A and C. The hypothesis proved correct when his program titled Arrowsmith found two separate observations: Raynaud's disease is a pathology related to blood viscosity; dietary fish oil intake could ameliorate blood viscosity. Hence, Swanson only used 34 reports on Raynaud's pathology and 25 publications on the relation between fish oil and the amelioration of blood viscosity.

In comparison, modern generative AI models are trained on the amount of data that a single person is not able to read in the course of one's life – ChatGPT, the most common consumer chatbot, was reportedly trained on approximately 570 GB of datasets. Therefore the most suitable type of models of this kind of assignments are generative AI systems because they can be trained on the natural language data. Moreover, since theoretically, there is no limit on the amount of data it can analyze, AI models can find connections across fields that have little to none in common at first glance. One of the possible disadvantages of AI LBD systems can be that generative models currently are mostly trained in English and a handful of other European languages. Hence, they perform better in these languages. Developing specialized models in other languages, such as Irbis GPT, a Kazakh language LLM announced in February of 2024, can bolster literature-based research in developing countries as well.

This ability of AI systems to analyze unfathomable amounts of data can also be used as a predictive mechanism. In 2021, Google DeepMind developed a program called AlphaFold for predicting protein structure based on its amino-acid sequence. In order to understand how proteins function, it is necessary to determine their threedimensional structure because misfolded proteins can lead to various pathologies. To date, AlphaFold has compiled a database of over 200 million 3D protein structure predictions, which was already the foundation for 1.2 million studies. The deep learning model can be applied, among other purposes, for studies of molecular mechanisms of viral infection to facilitate several activities, including drug design and many more [39]. Thus, AI models will allow researchers in various social science fields to expand their range of research instruments in innovative ways that can improve traditional research methods.

At the moment, the scientific community is on the verge of a period when AI programs will be able to come up with new theorems and their practical solutions on their own. The field of AI has proved its practical significance in a relatively short period of existence. Here are only a handful of examples of practical areas where researchers have made significant progress:

- 1) Mind games. In 2016, Google DeepMind Challenge Match went down in Korea, it was a five-game Go match between top Go player Lee Sedol and AlphaGo, a computer Go program developed by Google DeepMind, played in Seoul, South Korea. The program won all games by resignation except for the fourth one. This match was chosen by Science magazine as one of the Breakthrough of the Year [40].
- 2) Natural language processing (NLP). Generative Pre-trained Transformer 3 (GPT-3) is the third generation of the natural language processing algorithm from OpenAI. According to the developers, the program can be used to solve "any problem in English" [41].
- 3) Automated planning and scheduling. It is an area of artificial intelligence that concerns the execution of a strategy or sequence of actions, typically for intelligent agents, autonomous robots, and unmanned vehicles. A notable example of AI planning deployment is Hubble Space Telescope uses a short-term system called SPSS and a long-term planning system called Spike [42].
- 4) Medical diagnostics. There are many different AI techniques available, which are capable of solving a variety of clinical problems. There is compelling evidence that medical AI can play a vital role in assisting the clinician to deliver health care efficiently in the 21st century [43]. In 2016, IBM claimed that Watson, the AI system that previously was known for winning a popular television intellectual game Jeopardy!, would "revolutionize healthcare". IBM aimed to address problems ranging from pharmacology to radiology to cancer diagnosis and treatment, using Watson to read the medical literature and make recommendations that human doctors would miss [44].
- 5) Autonomous control. An Alvinn computer vision system trained to drive a car was used to pilot a NavLab computer-controlled minibus and was used to drive across the US (with a human taking control only 2% of the time).
- 6) Robotics. Boston Dynamics is an American engineering and robotics design company is best known for the development of a series of dynamic highlymobile robots, including BigDog, Spot, Atlas, and Handle. Since 2019, Spot

has been made commercially available, making it the first commercially available robot from Boston Dynamics, while the company has stated its intent to commercialize other robots as well, including Handle [45].

Among the largest scientific communities dealing with the problems of creating artificial intelligence are the American Association for Artificial Intelligence (AAAI), European Coordinating Committee for Artificial Intelligence (ECCAI), Society for Artificial Intelligence and Simulation of Behavior (AISB), ACM Special Interest Group in Artificial Intelligence (SIGART). In the CIS countries, the largest AI research society is the Russian Association of Artificial Intelligence (RAAI).

In Kazakhstan, there the proposal was made to create a national AI cluster based on Nazarbayev University. In addition, according to the Ministry of Science and Higher Education, currently, 24 universities and research centers are engaged in research or development of artificial intelligence, with Nazarbayev University being the leading institution in the field. Nazarbayev University Institute of Smart Systems and Artificial Intelligence (ISSAI) to date implemented several projects on the use of the Kazakh language, such as open-source Kazakh Speech Corpus 2 (KSC2) and KazNERD, a dataset for recognition of registered organizations in Kazakhstan.

Currently, the type of AI models that gained the most widespread use are generative programs that can create endless amounts of text and visual content. Introduced in many fields, GPT programs have had a particularly strong impact on the media industry, which in turn is inextricably linked to the dissemination of political communications.

## **1.2** Application of Artificial Intelligence in Media and the Evolution of Automated Journalism

Academic literature defines political communications as a public space where the interaction between the state, political parties, various institutions, groups, and individuals takes place [46]. Traditionally, this space can be identified by specific markers such as the primacy of the state in agenda setting and framing of the main political and social issues; restricted power of non-state actors in political discussion; and limited citizen participation [47]. In the past, especially before the advent of technologies, digital communication government supremacy in political communication ensured the linear, unidirectional flow of information from top to bottom. In this chain of relations, mass media, especially during the reign of its analogue forms, functioned as a bridge between the state and the public with the power of selecting and framing messages and events. Two classical related theories that stand out among others and showcase the role of media as the main instrument of political communications are *gatekeeping* and *agenda-setting*. Interestingly, both theories emerged in the middle of the 20<sup>th</sup> century, during the Cold War, when international news flows were restricted.

Even though gatekeeping originated in social psychology, in the 1950s researchers started to apply the theory in news making to describe the process of information filtration in mass communication. According to this approach, the newsmakers, mostly journalists and editors, are compared to the "gatekeepers" who control figurative information gates in a highly subjective decision-making process

[48]. Usually, editors in charge decide which news was worthy of public attention and, therefore, would go into print based on their personal experience or whether there was another publication about the same event. Over the decades gatekeeping theory in its original form remained remarkably resilient in mass communication only with some additional reframing. Namely, five concepts of the process that predict and shape the published media content include: personal values, media routines, organizational influences, extra-media influences, and ideology. Meanwhile, the agenda-setting core concept explores the ability of the news media to influence and shape the salience of the topics on the public agenda. The theoretical model suggests how the media can be a successful tool to set specific issues in the public mind and to frame how the said public thinks about them [49]. This is achieved by highlighting distinctive attributes of the issues reported by the news media, called "frames", that affect the audience's perception.

With the unprecedented development of digital technologies and the advent of AI, when applied to modern media, the robustness of both theories might be challenged or even completely transformed. At the turn of the century, Maxwell McCombs himself critically reconsidered the conventional agenda-setting theory framework by indicating that variability of media content available to audiences through the Internet would lead to a "situation that would spell the demise of agendasetting as we have known it" [50]. Digitalization is forcing mass media and political communication to shift from purely linear to more transactional models. Individual actors have increasing influence, and each social media user is not restricted to only passive consumption, but also can create and disseminate any information, including political content, on their own. The following decades only showed that audience fragmentation across different mediums and their selectivity due to the personalized character of content feed further threatens the power of mass media to shape public agenda as efficiently as before. Similarly, researchers also proposed that the traditional media gatekeeping model needs updating and even reconceptualization. For instance, the modernized version of the gatekeeping theory should acknowledge that media professionals no longer possess authority in selecting topics to present to the public, and more often than not are reduced to 'playing catch up' with the audience and anticipating new social media trends and topics. Because of that the emergence of generative AI models can lead to not a mere reconceptualization of media theories but creating completely new ones that will match new media environments. However, to understand the transformative nature of new AI models the application of earlier systems in journalism should be also explored.

Even before the concept of AI became mainstream, terms such as *robot journalism, automated journalism, algorithmic journalism* gained popularity in the growing body of academic research. Despite the futuristic implications that the titles suggested, these terms stand for programs that can automatically gather information, interpret, and present it in readable formats [51]. Examples of such technology were the first-generation software programs referred to as natural language generation (NLG). Even before the advent of machine learning technologies, natural language processing was viewed as an independent subfield of AI and computational linguistics that aims to produce outputs in natural languages by algorithmic means

[52]. However, before the advancement of machine learning systems in the early 2010s, NLGs were mostly viewed as theoretical concepts. The development of sophisticated semiconductors and subsequent leaps in computing power enabled NLGs to be designed to automatically create a written narrative from structured data using deep learning technologies. These programs found their use in a variety of content creation spheres, from business data reports to personalized email and messaging communication, but their most compelling application was in journalism.

NLG software was useful for various media organizations for a range of automation needs throughout the chain process of creation and delivering information from content generation to personalized recommendations to automated marketing. Early adopters of data-to-text and text-to-text technologies included major media outlets, such as the Associated Press, Forbes, ProPublica, and the Los Angeles Times, which wanted to bolster their news reporting [53]. But the very first example of automated news publishing originated in sports journalism on the online platform StatSheet founded in 2007. StatSheet was the network comprised of smaller websites that originally reported on college basketball and later started to cover news on other types of sporting events popular in the US including American football, NBA, and NASCAR [54]. The origin of automated reporting in sports is understandable because game results are mainly represented in numerical values, and this statistical data easily lends itself to be rendered in short reports in data-to-text format. Moreover, sports reporting usually does not require complicated literary forms and can rely on common phrases and conventional templates. At the time, the platform published 20 different types of reports on games, including season previews and recaps. StatSheet content algorithms could analyze up to 10,000 data points and store 4000 suitable generic phrases and sport terms to generate coherent text. In 2011, the company underwent rebranding as Automated Insights and expanded its scope beyond sports reporting.

The field of sports news has proven to be so fruitful that around the same time, in 2010, another similar company, Narrative Science, was founded. The company originated from a university student project, StatsMonkey, and the founders of the company presented it as "a model for data-driven storytelling" to generate reports on numerical outcomes of baseball matches [55]. In the publication about the project, authors claimed that their techniques could be applied to a wide range of data reach spheres, such as finance, crime rates, or state census information. After grounding the company, the founders launched the NLG platform Quill for analysis and textual content generation for business users and started to focus their specialization on data research. The success of the company led to some premature predictions about the direction of automated journalism: in 2012, Christian Hammond, co-founder of Narrative Science, declared that within 5 years, AI writers would be able to win the Pulitzer Prize, and in 15 years more than 90% of the news stories would be generated by algorithms [56]. As of the writing of this work, no AI system has yet to be nominated for any renowned literary prizes.

Both companies started providing their services and collaborating with major news agencies. In 2014, the Associated Press announced its partnership with Automated Insights to produce reports on financial news like periodical corporate earnings. According to the agency, automation of data-rich but repetitive tasks – that the bulk of financial reporting belongs to – enabled editorial staff to focus more on higher-impact journalistic genres. A year prior, a nonprofit organization for investigative journalism ProPublica applied the Narrative Science algorithm to their news application Opportunity Gap, that lets readers to track equal access to education across states in the US [57].

At the same time, a decrease in programming costs and higher expertise in data science made it possible for major media agencies to develop their own proprietary NLG systems. One of the early adopters was the Los Angeles Times; in 2014, the newspaper started to publish reports on earthquakes - common in the region generated by the in-house system Quakebot. It analyzed incoming messages from the US Geological Survey and determined their newsworthiness depending on the magnitude of the accidents. Reports on earthquakes measuring less than 6.0 points were automatically sent to the copy edit desk, where editors decided if the post should be published. Another case includes The Washington Post's NLG system Heliograf, which generated reports on the results of the Summer Olympics in Rio de Janeiro in 2016. The agency then started to apply the program to publish short stories about other sports events and congressional and gubernatorial elections in the US. They also launched an application for automatic comment moderation, ModBot, in 2017. The newspaper's proprietary algorithm was trained on the data of humanmoderated comments to filter them automatically according to the editorial policies and determine whether human intervention was necessary.

As the examples show, the earlier versions of NLG systems were suitable for formulaic journalistic reporting that did not require high levels of creativity or stylistic refinement. Unlike character or event-driven stories, short reports on sports matches or financial spreadsheet information followed straightforward templates and generic descriptions, i.e., the programs needed highly structured data available for input and further analysis. Highly structured data means that similarly structured information is available for each category on specific data collection tools and requires the same analytic steps. An additional advantage of those systems was that computers could mine big amounts of homogeneous data to generate reports on events – a task almost impossible and tedious to be performed by people. The writing algorithms help editorial boards to streamline basic reporting and cut costs without sacrificing staff members. Since machine learning algorithms can only present and mimic standard variants of text, such models leave no room for an individual stylistic approach when creating texts. Therefore, such programs can only be used while correcting simple texts, such as instruction manuals for devices or a description of the pharmacological properties of drugs, but they are unacceptable when processing fiction. Even in scientific, academic writing, individual style can vary greatly from author to author and is not uniform. Because of this, at the time, all agencies that employed NLG programs actively confirmed that technological addition to content creation did not lead to any job losses. Additionally, machine learning techniques were inapplicable for the analysis of unstructured data, where data points can be few and far between and often cannot be presented in one uniform format. Analysis of unstructured data requires abstract thinking and knowledge of scalable data

integration. Writing stories using unorganized data demands high levels of creativity and practical expertise.

In some cases, instead of entirely relying on content automation, media outlets combine journalistic output with NLG technology, such as the UK-based news agency Press Association that partnered with news automation specialists Urbs Media in the project named RADAR, abbreviation for Reporters and Data and Robots. The agency uses open data from government and local authority websites that can be broken down into local contexts, and under human supervision, their in-house NLG program Arria generates regional news reports. The journalists involved in the project create semi-unique story templates for each set of data, and the information is automatically inserted into it, resulting in reporting that also allows the production of the agency to be scaled up [58]. This approach enhances productivity and provides accurate reporting with minimal cost, an important factor for smaller local media outlets.

During such rapid technological developments, media discourse actively revolves around topics of "robotic" or "algorithmic" journalism and whether robots could deprive of work not only journalists but also representatives of other creative fields, despite assurances to the contrary. Certainly, such discussions are facilitated by the overly simplistic and sensational way media presented topics on AI to the public. For instance, the account about the first case of the Los Angeles Times involving writing algorithms to report on earthquakes was published under the headline: "While LA Journalists Hid Under Desks, a Robot Wrote a Story About the Earthquake" [59]. However, despite receiving wide media attention, before the advent of generative AI models, automated journalism occupied only insignificant market share in comparison to the traditional "human" journalism. Machine-created examples of journalistic articles were viewed more as interesting case studies rather than actual threats that can disrupt the media industry. As a matter of fact, the problem that faced news outlets and technology companies in general was the inability to integrate NLGs into more complex processes because these programs were limited in their understanding of natural language. NLGs could not even understand the texts they themselves generated. Titled natural language understanding or NLU, it is the ability of machines to comprehend data in the form of texts. NLU is a subset of a broader concept of natural language processing and uses syntactic and semantic analysis to understand the meaning and the sentiment behind the text. These systems can find wide applications in areas such as machine translation, topic classification, voice activation, and, in relation to media, one of the most impactful application areas was content editing.

Editing is a crucial stage in any creative process; it is especially important for creative writing and publication. Editorial responsibilities include not only correcting spelling, grammar, and punctuation, which can be done by simple algorithmic means, but also ensuring that the content is consistent with internal style guidelines and appears to be coherent and relevant. Even with the decline in periodical publications over the past decades, which has transformed the publishing industry, editorial functions have undergone few changes. Another significant editorial responsibility that is becoming increasingly in demand is fact-checking. The modern avalanche of digital content led to the worrying widespread phenomena of mis- and disinformation, which in some cases is also used as a tool of information wars, and editorial boards are facing the duty to combat the proliferation of fake news. And regardless of the format of the publications (electronic or paper), the texts must still be read to make changes.

The case illustrating the difficulty of computer systems comprehending written material was a Talk to Books search feature released by Google in 2018. Data scientists indexed sentences from 100,000 books in the Google Books database and developed an efficient method for encoding their meaning as sets of numbers known as vectors. When entering an appropriate question, these vectors were used to find twenty sentences with the most similar vectors in the database [34]. Thus, Talk to Books could successfully answer questions about when or where a described event took place, or whether its name, date and place occur in the same sentence. However, if information in need is split into different sentences or even different paragraphs, the system could show only sentences with approximately similar meanings. The search program also showed different results if one paraphrased the same question. Such problems stem from the fact that the algorithms that Talk to Books are based on do not read texts or understand their meaning in a similar way to what people do. They can only identify specific sets of phrases that were programmed into their systems. This creates a paradox of AI at the time being able to write or translate texts but completely unable to understand them.

It is difficult to convey how transformational the emergence of a new generation of NLG systems based on generative AI turned out to be. The term "generative AI" refers to the combination of computational methods that can generate unique and, for the most part, coherent content [60]. Also sometimes referred to as "foundation models", these models can create novel data instances from the learned patterns and relationships present in the training data. The main characteristic of generative AI models is their flexibility – the systems can be trained to perform a wide range of tasks, from software writing to image and video generation. The training includes supervised, semi-supervised, unsupervised, and reinforcement learning.

The foundation of generative AI systems is called large language models or LLMs; they are trained on vast amounts of unlabeled data in self-supervised mode. In supervised machine learning, the systems receive training on the large quantities of labeled data, such as labeled images, to improve image recognition systems. However, this can be a difficult and costly process since the data should be prepared beforehand by people; in these cases, the more optimal method is semi-supervised learning that combines both labeled and unlabeled data that can be used for classification and regression tasks. In unsupervised learning, the machine algorithms train themselves on a cluster of unlabeled data to discover patterns and insights without human input. Reinforcement learning uses a very different approach based on behavioral psychology with a trial-and-error approach where systems are trained to achieve optimal results according to a "reward model" [61]. However, the technique that can truly align intelligent systems with human preferences is called reinforcement learning from human feedback (RLHF), which is largely used in

training modern LLM models. Here users determine which responses to their prompts were better aligned with the request and this data is also used to calibrate the language systems [62]. The factor that unites all these machine-learning techniques is that AI systems need vast amounts of user-generated data for training. Therefore, even though generative AI programs can create seemingly unique images from user requests, their styles and elements, in any case, are based on existing works. These systems can be criticized as not being truly generative and rather derivative because they do not possess creativity that can create unique ideas. In the IT industry, generative AI lends itself for the computer code generation, especially when it comes to the basic programming. Modern services based on generative models include Codex and Copilot that help programmers generate code under their supervision. Compared to the software text generation, because of their impressive natural language performance, the use of algorithms that can deliver tailored news content for the users is a more promising area of AI application in journalism.

Highly specialized AI areas, such as autoregressive language models, differ from traditional programs in that they do not require direct programming. This process sometimes involves thousands of lines of human-written code but has the ability to independently learn from the available data. This method includes a whole class of different techniques for working with digital data, such as mathematical statistics or optimization methods [63]. After statistical analysis of millions of text units, machine learning allowed language models to create sentences by predicting the next word in a sequence of text. The simplest example would be, when writing personal emails, the probability that the word "dear" will be followed by the word "friend" is statistically higher than the word "enemy". The solution to such problems does not require the program to understand words separately or even in context, and the text generation process happens automatically. In this dissertation work, the author does not use term "writing" for the process of creating textual content automatically, because writing unique text requires highly cognitive skills such as creativity and reasoning, which at the moment are out of reach for current AI models. Therefore, the author prefers the term "generation" for this process which correlates with the name of generative AI (also abbreviated as GenAI) models.

As stated above, NLG programs of the previous generation were utilized only for specific purposes such as news report generation on sports events or stock market fluctuations. In other words, those programs were applicable for the highly structured homogeneous content that would not demand specialized expertise in the subject or intricate writing techniques. However, this content creation equilibrium changed with the introduction of GenAI models such as ChatGPT, Bard, LLaMA, and Copilot in the early 2020s. According to a Goldman Sachs report, generative AI will increase global GDP by 7% and replace 300 million jobs in the knowledge industry by 2030 [64].

In 2018, AI research organization OpenAI introduced Generative Pre-trained Transformer 1 or GPT-1, the first language model based on the transformer architecture. Trained on the 4.5 GB of text or approximately 7000 unpublished works from the BookCorpus dataset (a textual repository), the model had 117 million parameters [65]. The distinctive feature of these programs is that the model is pretrained first during the initial stage, when it learns to predict the next word in the text and obtains the foundation for the successful completion of further tasks. Because of that, GPT systems do not need to rely on templates and are more versatile in their application. The next model, GPT-2, was introduced the following year, in 2019, and it was trained on a much larger dataset of 8 million web pages for a total of 40 GB of text material and had 1.5 billion parameters. The power of neural networks is conditionally measured in terms of the number of learning parameters. "Parameter" stands for the number of factors that the neural network can use in the course of its work. This allowed the GPT-2 model to generate whole pages of coherent passages, which was not feasible before [65].

GenAI models can be based on different machine learning architectures, but they are primarily build on deep neural networks, which are suited to model different types of content. For instance, they can be trained on sequential data to model natural language (GPT-4) or use spatial data for image generation (Dall-E) [66]. To demonstrate the capability of GPT models, the author of this dissertation work asked ChatGPT 3.5 (a chatbot developed by OpenAI) to give its own definition of the generative AI concept presented in the figure below (Figure 2).

🛞 New chat	ChatGPT 3.5 ~		
Today	۲	You Give definition of generative AI	
Generative Al Definition			
	0	ChatGPT	
		Generative AI refers to a class of artificial intelligence systems that have the capability	
		to generate new content or data that is similar to, but not an exact copy of, existing	
		examples. Unlike traditional AI systems that are designed for specific tasks and follow	
		predefined rules, generative AI models, particularly those based on deep learning	
	1	techniques like Generative Adversarial Networks (GANs) or recurrent neural networks,	
		can learn patterns and structures from large datasets and use that knowledge to	
		create new, novel outputs.	
		In the context of language, generative AI models can be trained on vast amounts of	
		text data and then generate human-like text based on the patterns and styles they've	
		learned. Similarly, in the realm of image generation, GANs, for instance, can produce	
		realistic images by learning from a diverse set of training images.	
Upgrade		Generative AI has applications in various domains, including image synthesis, text	
Get GPT-4, DALLE, and more	Mes	sage ChatGPT	
474 Altolkyn Ashimova		ChatGPT can make mistakes. Consider checking important information.	

Figure 2 – ChatGPT 3.5 Definition of The Term "Generative AI"

Note - Compiled by the author

In January 2020, OpenAI proposed the scaling law of language models: one can improve the performance of any neural language model by adding more training data, model parameters, and computing power [67]. Since then, the technological race to train even larger neural networks for natural language processing was launched. If GPT-3 had 175 billion parameters and was trained on 17 GB of data, GPT-4, released in 2023, can boast, according to some accounts, a staggering 1.76 trillion parameters

based on 45 GB of data points. Other AI research companies and countries also followed suit on LLM development. A handful of such examples include:

- Hangzhou DeepSeek Artificial Intelligence Basic Technology Research Co. Ltd., a Chinese technological company, released its namesake R1 model chatbot in January of 2025. Trained on the fracture of the cost of other contemporary LLM models (under \$6 million compared to GPT-4's \$100 million), it also requires significantly lower levels of computing power. With 671 billion parameters, DeepSeek gives comparable responses to other more costly models, such as solving logical problems and writing computer code. The release of the chatbot marked a breakthrough in reducing expenses and simultaneously increasing efficiency in creating new AI models, making them more accessible for developers.
- Technology Innovation Institute (TII) of the United Arab Emirates introduced Falcon with 180, 40, 7.5, and 1.3 billion parameter AI models in 2023. They work well with Arabic, English, number of European languages, and when prompted can generate simple texts in Kazakh.
- French AI research company, Mistral AI launched open-source LLM Mistral 7B in 2023. Despite being smaller in size than its competitors (7 billion parameters), the model exceeds OpenAI's GPT-3.5 on specific benchmarks and showed good performance in French, Spanish, Italian, English and German languages.

Most of the natural language processing networks show better results in English because of the overrepresentation of material in this language in the training data. However, as the examples listed above indicate, there is a general trend towards localization of LLM models to other languages. At the time of writing this dissertation work, there are plans to develop a Kazakh language LLM. At the VI Forum Digital Almaty 2024 "Industry X: Digital evolution of the future" Minister of Digital Development, Innovation and Aerospace Industry, Bagdat Musin announced that the ministry is working on the Kazakh analogue of ChatGPT and future implementation of AI solutions in digital government services [68]. Not longer after that, in February 2024, a local IT research company MOST Holding announced launching Kazakh language model named Irbis GPT, that is in development by the partner of holding, company Gen2B [69].

In terms of its broader impact, the project may be seen as a powerful incentive for the growth of the IT sector and digital economy in the country. Additionally, by prioritizing the local language, it contributes to its development and preservation. Unfortunately, during the initial stage of computerization and expansion of Web 2.0 technologies, not enough attention was paid to the integration of the Kazakh language. To this day, Kazakh language is not readable by all computer fonts, which is a sign of a low prioritization. Moreover, even though the first country code toplevel domain '.kz' was created in 1994, Kazakhstani Internet space was always dominated by foreign, mostly Russian, websites, which in turn later translated into the dominance of foreign social media platforms. The development of localized generative AI models will change this disbalance and pave the way for Kazakhstani platforms. Advanced Kazakh-language AI models may also significantly influence
creative industries such as journalism by providing innovative digital tools such as automated content creation and new forms of audience interaction.

The topic of AI has already been extensively covered in Kazakhstani media. Many television channels broadcast stand-alone programs that cover news in the field of technological advancement. A good example is IT news programs such as "Atameken Business" and "24-hour Hi-Tech" on the channel Khabar 24. The content offered by the two programs is similar; they not only cover industry news but also analyze the latest technologies in the world and in our country. In addition to IT news, Khabar 24 broadcasts the "Digital Kazakhstan" and "Gylym" programs in two languages. Gylym program analyzes and explores innovation in the areas of science and technology. Each issue of the program is devoted to a separate topic, such as "Face ID. The system of facial recognition", "Intelligent transportation system", "3D printer technology", "Electric cars". The main feature of the program is that it is dedicated to getting the audience acquainted with the level of science in the country and to present the discoveries made in Kazakhstan. Another program on the channel, "Digital Kazakhstan" is devoted to increasing the level of digital literacy among its average viewers. In addition to presenting and explaining digital programs developed by Kazakh programmers, it contains instructions on how to get services on government platforms that every citizen should know. For example, the episode dedicated to the electronic IDs details how one can use it if a person does not have the physical one in the airport, and at which airports the service is available. The episode "Relevance of Modern Technologies" focuses on new digital technologies developed by Kazakh scientists in the fight against the global pandemic, such as various equipment for viral diagnostics. The device, developed by Kazakhstani researchers, utilizes special sensors that transmit the data to the server powered by AI when a person takes an air sample. After that, the processed data helps to detect the presence of the virus in under 2 minutes.

However, the development of new technologies initially raised apprehension among industry experts about its impact on traditional media roles. In 2018, attendees of educational MediaHub in Almaty announced that the profession of journalism is on the line for "a quick death" and AI will completely change the local media field in the upcoming years [70]. Despite these natural concerns, there is also a broader trend in Kazakhstani media outlets towards AI implementation in their daily content creation process [70]. For example, since 2020, the Atameken Business TV channel has featured a virtual presenter, marking the first use of AI programs in a news broadcast in Kazakh television history. The 'i-Sanj' machine learning anchor modeled after actor Sanjar Madi hosts a daily economic news block on the channel. And in 2023, the channel presented the first Kazakh language virtual presenter 'i-Sana' modeled after journalist and TV presenter Saniya Temirkhan. For these programs, the developers must implement a wide array of AI models, such as expert models, an audio image generator, and a discriminator for visual image quality. The goal behind the AI anchors is their efficiency and cost-effectiveness – they provide a consistent viewing experience and can be adapted to different platforms and all news formats. Moreover, the use of a virtual presenter signals to the viewers TV channel's commitment to the adoption of cutting-edge technologies. The first virtual television anchor appeared in 2018 on the XinHua TV channel in China. Two AI news anchors were able to read news in English as well as in Mandarin, which were revealed at the fifth World Internet Conference in China's Zhejiang province. The proliferation of virtual presenters on television indicates that the use of AI resonates with the modern audience. In addition to AI anchors, other specialized channels feature the efficient use of novel digital technology. Namely, the Khabar 24 news channel is fully automated and equipped with a robotic studio that includes automated cameras and presenter tracking systems [70]. Another example of common AI use includes the widespread application of image generation tool on news portals to create illustrations for news articles. Kazakhstani media portals, such as Orda.kz and Zakon.kz, widely feature AI-generated images when illustrating news content on abstract topics, illustrating the shift from traditional methods to innovative approaches in journalism [71].

The examples above show that AI models, despite initially being viewed as disruptive technologies, are, at the moment, performing mostly assistive functions. For instance, the Reuters news agency utilizes AI's data mining abilities to find patterns in large datasets. Associated Press uses similar techniques to scan social media feeds for detecting trending news and events. However, when it comes to longer journalistic genres such as investigative or opinion journalism, generative AI abilities still fall short. Even though the GPT-4 model can perform in 26 languages and generate seemingly fluid texts, this technology has not yet demonstrated its suitability for producing long analytical news articles without human supervision. To date, the use of automated journalism outside of simple overview reports is impossible not because of software shortcomings but because of the lack of the appropriate amount of data required to generate more complex journalistic work, such as event-driven storytelling. Yet, the pace of emergence of all new models shows that these issues can be overcome in a very short time.

Generative AI applications such as ChatGPT, GitHub Copilot, Midjourney, and, recently, Sora AI have captured media and public attention more than any previous AI programs because of their accessibility and ease of use. These programs do not require extensive training in computer science or specialized equipment. Most of them can perform routine tasks on common personal computers or smartphones. However, text generation is, in fact, the most straightforward application of generative technology, and the emergence of other more niche products listed below demonstrates their great potential in the consumer sector. Application areas and examples of these programs include:

- **Text-to-image:** DALL-E / Midjourney generative applications for image creation from text prompts; these programs can generate images in different styles and quality depending on the description;
- **Text-to-code:** GitHub Copilot an automated code completion tool that can generate solution code based on programming problem in natural language. It is a joint development of OpenAI and GitHub (owned by Microsoft) and is powered by the GPT-4 model;
- Text-to-video: Sora AI / Gen 2 / Make-A-Video application designed to generate videos from text-image data in natural languages. Among those

applications, to date, Sora by OpenAI has demonstrated the highest quality video generation in the promotional materials;

• **Text-to-music:** Adobe Music GenAI / MusicGen – programs for customizing the generated sound "based on the reference melody" and increasing its length using text prompts in natural language.

Combined, these AI systems can create whole synthetic media ecosystems in the near future, where every production process step can be achieved through generative technology means. Considering that mass communication shifted to the digital space and social media became the main public platform, generative technology enables individual content creators to compete with major media outlets. For example, in film production, scripts, videos and scores can all be generated by various AI programs with just a few or even a single person behind the process. This potentially opens up countless possibilities for content creators and new ways for artistic self-expression.

Yet, emerging technologies are not the only factor that is reshaping the journalism of tomorrow. This process has been on its way ever since the introduction of the Internet when the audience obtained autonomy in content creation. Currently, traditional media outlets have lost their gatekeeping privileges, no longer being the main platform for public discussion and content sharing. Internet media websites also cease to occupy a leading position in the information flow for many users and, accordingly, lose their main traffic, giving way to social networks and individual blogging space. Therefore, the most popular resources for the implementation of AI algorithms are social media platforms, where AI algorithms most often decide what content is most likely to catch user attention. Social media algorithms take into account user age and gender, preferred activities across the platforms, and analyze their interests based on the subscriptions and following creators. In addition, machine learning models constantly analyze the number of views, likes, and comments. All these factors have contributed to the situation when traditional journalism can no longer set the main agenda and direct public attention towards chosen topics. Nowadays, media outlets rely on AI technologies as a crutch to follow their audience's interests. Even television channels and news agencies depend on usergenerated footage and photographs during breaking news events, in some cases making professional video reporting from the place of events obsolete.

The concept of automated journalism has interested media outlets and academics in the field ever since the introduction of computer programs that could create short summaries of longer documents and generate texts based on templates. Now, generative AI models are theoretically capable of writing news stories and other unique content. Editorial boards that successfully integrate AI technologies can also delegate various tasks between algorithms and human journalists: the former could be responsible for routine and pattern-based reporting such as financial reports, earthquake forecasts, results of sports competitions, weather and traffic jams, crime chronicles; whereas the latter would focus on narrative-driven stories and in-depth investigation. This, in turn, could radically change the concept of traditional journalism – when algorithms will churn out news reports and tailor them to each individual user at the pace no human editorial board can, the role of journalism will

shift from news making to its interpretation and analysis. However, even in this scenario, journalists would not be able to be gatekeepers for the event analysis or investigative reporting since digital communication opened the way for the increased impact of citizen journalism. In a situation where media have no power of agenda setting, many media theories are increasingly becoming obsolete, creating a need for new paradigms in the new age where AI coexists with newsmakers and the audience in the communicative space.

The evolution of mass media has always been closely related and dependent on the development of technology. Mass societies that were born with the Industrial Revolution, when machinery made it possible for the mass production of goods, started to need mass-produced news and information. The technology of the first industrial revolution gave rise to the emergence of modern journalism, revolutionizing printing technologies and speeding up the process of communication. The development of communication and the expansion of electricity during the Second Industrial Revolution allowed news and media to cross international boundaries. The Third Industrial Revolution, or Digital Revolution, brought yet a bigger transformation in media production and consumption. It led to a decrease in physical newspaper circulation locally and unstable demand nationally, instead making the Internet and other novel digital technologies, such as video streaming platforms, become the consumers' preferred way of consuming news [72]. This shift reshaped both traditional forms of journalism and pushed forward algorithm-driven content distribution usually produced by individual creators.

Numerous experts believe that the rise of AI can bring the next transformational technological change and lead to the fourth industrial revolution or Industry 4.0. The fourth industrial revolution will entail the disappearance of old professions and the emergence of new ones since the ongoing process can surpass traditional manufacturing and industrial practices and transform the number of creative industries such as journalism.

## **1.3 Theoretical Frameworks of Artificial Intelligence in International Relations and Global Politics**

The advent of digital technology and AI has pushed the digitalization of international relations, including the digital transformation of diplomatic offices and traditional practices. Use of social media led to the emergence of "Twitter diplomacy," when social media assisted individuals to coordinate their actions during the political protests. On the other hand, the use of big data and AI-based algorithms in digital diplomacy has led to the emergence of data diplomacy [73]. In data diplomacy, machine learning is used directly to predict the digital and physical behavior of social media users based on the analysis of voiced opinions, preferences, and digital footprints. There are three main aspects of the use of AI in diplomacy:

1) AI as a topic for negotiations;

2) AI as a diplomatic tool;

3) AI as a factor in changing the negotiation context [74].

AI is a tool of diplomacy (in particular, digital diplomacy), a topic for negotiations, and a factor in shaping the negotiation environment. The use of AI in

this area raises important issues of information security in diplomacy, protecting personal data in social networks, and the mitigation of the effects of algorithm bias. The impact of AI on the international system and world politics has yet to be assessed and comprehended, separating misconceptions and widespread rumors from the facts of reality regarding this innovation and its role in social development.

Over the past two decades, AI has become a prominent topic in international political and expert discussions. These discussions touch on the issues of data wars, AI sovereignty, technological competition, the use of intelligent systems for decision-making, the problem of agency in the AI world and many others. In international relations, AI is discussed both as a key technology that can affect the balance of power in global systems and as a topic for conducting the negotiation process and international cooperation. This is reflected in the national strategies of the leading world powers in technology, as well as in UN documents and resolutions on various areas of AI application. At the supranational level, AI acts as a topic and context for negotiations within the multi-level negotiation process on Internet governance, international security, sustainable development, ethics, and human rights. In terms of political communication as a public space for the exchange of political discourse [1], AI can have far-reaching implications. The topic of AI in politics is very nuanced because technology's influence on political communications occurs on multiple levels at once:

- AI as a part of national politics;
- AI as a tool for individual opinion expression.

This dichotomy of AI application on macro and micro levels of public space creates a cycle where gains in one sphere drive progress in the other and vice versa. In this way, AI has a simultaneous transformative effect on society on both levels. On the one hand, digitalization and AI development are increasingly becoming the aim of national development programs, as AI is viewed as a form of political leverage in international politics. Similar to nuclear energy, AI can be used in both benevolent and malevolent ways and bring a competitive advantage to the governments that are able to develop it first. On the other hand, compared to other complex transformative technologies, AI is simultaneously being developed as various applications for the general public. In combination with other digital advancements, AI can immensely empower individuals to challenge political discourse and gain greater prominence in public discussions.

Because the emergence of AI systems is relatively recent, their impact on the international system and world politics has yet to be assessed and comprehended. It is important to separate idealized visions and common misconceptions from the facts regarding this innovation and its role in social development. Use of AI raises issues of information security in diplomacy, protection of personal data in social networks, and mitigation of the effects of algorithm bias. These challenges necessitate an examination of different approaches to AI in relations to established paradigms to understand how it can reinforce or disrupt traditional balance of power. The following section outlines how AI could, and already is shaping international relations theories. In this work, the author will examine AI from the

perspective of classical theories: realism / neorealism, liberalism, and social constructivism, and discuss their paradigmatic differences in relation to the novel technological breakthrough.

As a dominant international relations theory, realism – sometimes also referred to as political realism – sets the state firmly at the center of its analysis framework. It postulates that international actors exist in a constant state of competition and vying for power in an anarchic global system. Rooted in the works of the classical thinkers like Thucydides and Morgenthau, realism dominated the academic field of international relations since the end of World War II, because it claims to offer the most accurate portrait of state behavior on the global stage. From the realist point of view, AI is viewed as a weapon for enhancing state power, and therefore, it is more concerned with military use of these technologies, which can include intelligence streams, drone wars, military robotics, etc. Given realism's straightforward and pragmatic views of international matters, the influence of AI in the political realm can be simplified to a theoretical formula that emphasizes its military applications. Political scholars Ndzendze and Marwala, in their book *Artificial Intelligence and International Relations Theories*, present such formula for evaluation of the "AI balance of power" below as [75]:

### $BoP_{AI} = (\mu_{innovation(Y1-Y2)} + P_{AI} + X_{Tech(Y1-Y2)} - R$

In this formula:

- $\mu$ innovation (Y1 Y2) indicates median score for innovation in general, comparing one year to another.
- P<sub>AI</sub> indicates the total amount of AI patents in a country that have industrial and military applications. In addition, the patents must be exclusive to that state and have been applied for within the previous 10 years.
- $X_{tech}$  (Y1 Y2) relates to the change in the total share of a given country's technology exports from one year to another.
- R relates to the same indicators in a competing country.

If the calculations result in a positive score, it indicates that the state is currently ahead of the competitor in the development and application of AI within the military sphere. A negative score, on the other hand, indicates the advantages of the rival state. In this case, if R (rival state AI indicators) equals 100, and the compared state's indicators add to 50, it indicates that a rival state is twice as advanced in the use of AI for military purposes. Nevertheless, the authors of the formula admit that it is debatable whether the deployment of AI technology can have notable effects on the outcomes of the possible war. The formula could be used as a simple indicator of which states have leverage in militant technology in relation to another [75]. Moreover, analytical programs based on AI can be used to calculate and make more precise assessments of the military power and resources of the adversary countries. If they judge against the state's favor, AI can actually act as a deterrent in pre-conflict situations.

In contrast to classical realism, which places excessive emphasis on the competitive and confrontational nature of relations between nation-states, neorealism offers a slightly more nuanced approach to understanding the transfer of power in the global community. This theory considers not only state actions but also various institutions of the international system. Neorealism views cooperation between nations as limited in its natures and constant competition among them as its enduring feature [76]. Consequently, from a neorealist perspective, AI is considered a disruptive force in the potential change in the balance of power in the international system. The integration of AI into global affairs on a larger scale can empower and even weaponize minor actors, bringing them on the same level as traditional great powers. Under these circumstances, a neorealist approach is concerned with digital wars, data wars, information security, cyber conflicts, and AI-driven arms races. These new challenges for international security may lead to the creation of sovereign AI systems that, in turn, raise the issues of techno-nationalism. The term refers to the situation when states prioritize fostering domestic AI innovation instead of cooperating on research to reduce technological dependence on other countries.

Both realist and neorealist approaches to world politics attracted criticism for being state-centric and failing to factor in the agency of non-state global actors. This criticism is especially relevant today since non-state actors, namely global tech corporations, hold the majority of patents and research capabilities in the field of AI. In this regard, liberalism opposes the basic thesis of the realistic school of thought and postulates that even though the state's role is undeniable, states are not the only important actors on the international stage [77]. Furthermore, since democracy plays a central role in this theory, liberalism postulates that state actions are subject not only to nationalist self-interest but also to universal values shared with other democratic states. The neorealist theory that emerged later in the 20<sup>th</sup> century rejects more idealist proposals of liberalism and emphasizes the concepts of the free market and competition as means of achieving progress and stability. From both liberal and neoliberal standpoints, AI is considered as a technology for the collective societal advantage, yet it carries potential risks as well as opportunities. For example, by providing diverse groups with generative technologies, AI can promote democratized innovation. At the same time, AI raises legal and ethical concerns, and the protection of human rights and freedoms is becoming increasingly important. One particular instance of algorithmic bias includes a case when a machine learning program trained on texts found that names associated with being European American were significantly more likely to be correlated with pleasant terminology than African American names. For AI-models that are responsible for making consequential decisions, such as hiring job candidates or predicting recidivism, there should be a screening process before being adopted into commercial or regulatory systems. Regulatory agencies will have to decide if an AI makes fair decisions by analyzing training data for the presence of stereotypes [78]. Another concern is that non-state actors like IT corporations are also playing a more important role in key decisions. They do it by leveraging their technologies in international decision making.

Regarding the legal and ethical aspects of AI, the protection of human rights and freedoms is becoming increasingly important, especially in areas where AI

systems compete with humans for jobs. There are already concerns that companies will favor programs like ChatGPT over hiring human employees. At the same time, non-state actors like IT corporations also play a more important role in key decisions. Those corporations possess vast amounts of funds and power over global digital infrastructure that enable them to stand on similar grounds as the traditional political actors such as sovereign states and international organizations. The ideals of free market regulations fall short when it comes to the tech industry because they enjoy virtual monopoly in this market. In this regard, states have made attempts to bring big technological corporations in line through legal actions. For instance, in 2020, the US Justice Department filed a civil antitrust suit against Alphabet, the parent company of Google, for dominating online search and search advertising [79]; the litigation took place in 2023. Before that, the company received fines from the EU for breaching its antitrust rules in 2017 and 2018 and separately was found by the state of France for breaching the EU General Data Protection Regulation. The Alphabet Inc. case is just one example of a state attempt for stricter regulation of the digital market, other major technological companies were also brought under legal scrutiny for various unethical practices related to data handling and business practices. Liberalism highlights the importance of decentralizing power both in political and economic spheres, and the importance of freedom of expression in achieving it. However, developing and deploying AI systems require vast amounts of investment and sophisticated expertise that can be obtained only by corporations and state agencies. This prevents less powerful actors, such as developing states or activist groups, having similar technological leverage. Moreover, contemporary manipulative practices such as computational propaganda that relies on AI programs put basic liberal values such as freedom of speech under threat.

In comparison to established theories of realism and liberalism, constructivism is a relatively new approach in international relations, emerging around the end of the Cold War in the 1980s. It focuses on the importance of social structures, norms, and state identities and postulates that international relations are shaped not only by material factors but also by socio-cultural influences [77] that include public opinion, social movements, and cultural values. Whereas realistic or liberal approaches emphasize rational behavior in the anarchic system, constructivism proposes that state interests constantly evolve through ongoing interactions in society. As a result, constructivist paradigms offer a more conceptual view of the role of AI in a nationstate system. Through this lens, we can analyze technology not as a means of military empowerment or source of threat but a tool that can propel states to develop both economically and culturally. Generative AI and deep learning tools may level the field for developing countries in sectors such as education and academic research. The basic example includes natural language translation programs based on machine learning methods, which help to disseminate new knowledge faster than ever before, especially among those who only communicate in local languages without the help of interpreters. Textbooks and research papers that are open access can reach a wider audience in developing countries. At the same time, as was pointed out by the scholars, the constructivist theory demonstrates how technologies that augment data acquisition and communication are also responsible for the information noise, which

in turn sometimes leads to miscommunication and potential conflicts [75]. This applies to the systems based on neural networks since it is impossible to parse out how the programs come to a particular decision due to their opaqueness. In some cases, the social issues stem not only from the design of AI systems, but also from their application. AI generated synthetic media called "deepfakes", explored in more details, in the later parts of this dissertation work, are applied to promote certain political actors or communities. Deepfakes can be used to create provocative content to push people to react in accordance with disinformation campaigns. The manipulation tactics involve using fabricated content to influence the audience and political actors.

The table below summarizes and compares the approaches to AI among three main international relations theories, highlighting the key differences in their perspectives on the role AI plays in global politics (Table 2).

Table 2 – Artificial Intelligence through the	e Lens of Major International Relations
Theories	

IR theory	Perspective on AI	Positive Deployment	Negative Deployment
Realism/ Neoralism	AI as a weapon in military and virtual conflicts	Can give the state "the upper hand", given that it has more sophisticated technology	Can become threat if the competitors possess more sophisticated military technology, change drastically the status quo
Liberalism/ Neorealism	AI as a leverage for non-state political actors	Can be used for societal good, give voice to minority actors on domestic and international political stage	Can be used to manipulate and divide people into different political fractions, suppress freedom of speech and other liberal values
Constructivism	AI as a tool for development that can influence state identity	Can be used in various fields such as education, scientific research, communication, art, and elevate less developed states	Can be a possible reason for miscommunication due to the erroneous use of technology
Note – Compiled by the author			

There are other important paradigms in international relations through which the issue of AI can be analyzed. Examples include novel critical theories such as the feminist approach, postcolonialism, critical theory, and green theory. All of them offer a unique angle for analysis of technological transformations and their impact on shaping modern society on various levels. However, since these theories have admittedly less prominence in global political discourse, they will not be the subject of this dissertation.

As the discussion of theoretical approaches to AI shows, there are different levels of analysis that every paradigm employs: individual, national, and supranational. Since the methods by which states and major political actors engage with individuals through the modes of various digital platforms and automated algorithms are covered in the next chapter dedicated to computational propaganda, this part of the work focuses on case studies of AI usage on national and supranational levels.

At the national level, major powers are developing various adoptive strategies to strengthen their economies through AI advancement and as a response to technological development in other states. In 2017, China's State Council released a strategic document titled 2030 New Generation of Artificial Intelligence Development Plan that outlined a decade long roadmap to global technological dominance. The document showcases China's course for global AI leadership and consists of several significant steps. The initial step towards technological leadership was the task of reaching a similar competitive level with the leading countries by 2020, with semiconductor manufacturing identified a priority sector. Despite developed manufacturing facilities in numerous areas, semiconductor fabrication is where the country has historically lagged. The second step is to ensure a key theoretical breakthrough in the field of AI by 2025, reaching the core AI industry scale of 400 billion yuan and related industries to more than 5 trillion yuan. Lastly, the third step will be to become an AI global innovation center and ensure the country's entry into the front end of innovative and economic powers. In addition, according to the plan, by 2030, the core AI industry scale should reach 1 trillion yuan, accelerating related industries to more than 10 trillion yuan (Notice). It is projected that the total volume of investments by the Chinese government in promising industries including IT will amount to \$150 billion, and in related industries - \$1.5 trillion [81]. The strategic document demonstrates that even before the global semiconductor shortage due to the COVID-19 pandemic and US sanctions related to advanced computing, the Chinese government had anticipated the need for reinforcement of the domestic chip supply chain. According to the Worldwide Semiconductor Equipment Market Statistics Report, by region, in the second quarter of 2022, China ranked first in semiconductor equipment shipments with \$7.55 billion [82]. However, its main manufacturing and political competitor, Taiwan, produces over 60% of the world's semiconductors and over 90% of the most advanced ones, which account for 15% of the overall Taiwanese GDP. It is also noteworthy that, while the development plan does not specify global innovative powers the country is seeking competitive advantage, it explicitly underlines the aim to "expand widely and deeply" AI systems in production, daily life, and social governance. This includes measures for the construction of public safety intelligent monitoring and early warning and control systems.

On the other side of the Pacific, the United States currently holds the technological leadership in the field of AI. Historically, the country has enjoyed technological advantages since the post-World War II economic expansion and has

made early investments in key industries, including computer science and information systems. However, even without direct funding, the state still pursues ways to secure its dominance in the field. Since 2022, the US Bureau of Industry and Security has issued comprehensive export control rules aimed at China's military AI development by controlling their access to advanced AI semiconductors manufacturers with US inputs that also include license requirements for chips used in supercomputers [83]. The set of regulations not only control the sale of cutting-edge AI technology to competing nations but also prevents US companies from sharing their expertise with other countries, which in turn has a spill-over effect on many non-military areas. The US also creates a geopolitical divide among third countries by requiring them to secure licenses for procurement of advanced semiconductors from leading firms such as Nvidia, thus being able to reject companies with ties to China. As we can see, the conviction is that the development of AI will lead to a new industrial revolution, becoming the catalyst for the technological race between the US and China. Therefore, having a strategic advantage in this area offers global economic leadership and the power to influence the world order.

The US also has a very distinctive stand on the use of AI for national security aims. In addition to continuing DARPA programs, in 2018, the US Department of Defense reorganized the Joint Center for Artificial Intelligence. This body functions as Pentagon's coordinator for AI integration across various military projects and applications. In 2019, Trump's administration signed an Executive Order to launch of the American AI Initiative and institutionalize to its AI strategy [84]. Next year, the 2020 National Strategy for Critical and Emerging Technologies established the principles of US technology leadership, global collaboration on priority technologies, and the importance of robust risk management protocols [85]. The strategy specifically designated 20 key areas that include advanced computing, data science and storage, high-performance computing, and human-machine interfaces, along with other strategic innovation areas. The US Congress has authorized over \$100 billion in funding to develop critical technology fields indicated in the strategy. Thus, it is evident that US seeks to to remain the global leader and innovator in the field of AI through a dual approach: accelerating domestic innovation and containing competitor nations such as China as well as other countries with strong digital sectors. In 2023, the Joe Biden and Camala Harris Administration issued Executive Order outlining requirements for AI companies in the country to report security test results and other information to government agencies during AI systems training that could pose a threat to national security or critical infrastructure based on the Defense Production Act. The Executive Order also pledged "to support safe, secure, and trustworthy deployment and use of AI worldwide", extending its scope beyond US borders. It will likely recognize the majority of US-based AI companies operate globally and, thus, have tremendous impact on an international scale.

Other nations are also competing to secure their positions in the global AI race, aiming to obtain technological and economic leverage. The examples include the UAE launching a generative AI company, AI71, in 2023. Its open-source Arabic language model, Falcon LLM, has 180 billion parameters and was trained on 3.5 trillion tokens. By investing in its state-backed AI companies and models, the Abu

Dhabi government aims to diversify its economy, which traditionally has been heavily dependent on natural resources, while also avoiding technological dependence on other nations. UAE media also highlights that the startup will launch decentralized data control for companies and other countries, keeping their models open-sourced [86]. Another nation with AI aspirations is India: along with developing its own semiconductor supply chain, the state supports local AI companies such as Krutrim with its namesake language model, which can generate text in 10 local dialects. It is the first Indian startup to obtain the status of a "unicorn" (a common business term for privately owned and not listed on a share market startup company valued at over \$1 billion) receiving \$1 billion valuation after raising \$50 million from investors in a funding round in 2023. Concurrently, Sarvam AI raised \$41 million leveraging its Hindi language model OpenHathi, while the AI4Bharat AI research laboratory announced the release of Airavata, an instruction-tuned LLM for Hindi in 2024. Among the developed nations, France made notable strides toward building its own competitive AI model without reliance on technological imports. Mistral AI, a French startup that also offers open-source AI models, was founded in April of 2023 and gained a \$2 billion valuation by the end of the same year. These countries were specifically exemplified in this work because each demonstrates different advantages in developing potentially transformative technologies. On a global scale, the UAE enjoys financial advantages due to its rich oil resources, while India, with over 1.4 billion population, can reap benefits from its immense human capital. France, on the other hand, can lean on advanced digital logistics and technological expertise from other EU member states. Moreover, different countries have different attitudes towards public data, which is used in training generative AI models and other deep learning systems. Some more proactive nations are willing to share public data with local startups. The strive of the countries to build their own local AI systems also reflects the emerging trend of AI nationalism, where instead of interdependence in technological development, they increasingly seek sovereignty and strive to change the traditional balance of power through high-tech tools.

Kazakhstan also maintains its development in line with international trends and pursues an active policy of introducing and mastering the latest technological breakthroughs through various national development projects. Following the global trends, the country allocated 2.2 trillion tenges for the period of 2021-2025 for the state project "Technological breakthrough through digitalization, science and innovation," with one of the expected economic effects to reach 79 billion tenges in taxes annually from the crypto industry [87]. The goals of the project include the integration of AI elements with Big Data technology in various socio-economical spheres. Another state project, "Accessible Internet" anticipates expenditures of 1.4 billion tenges for the period 2023-2027 with the aim of increasing the transit potential of the country and creating a regional data hub [88]. But the most important program in this area in Kazakhstan is "Concept for the development of artificial intelligence for 2024-2029," which was developed by the Ministry of Digital Development, Innovation and Aerospace Industry of Kazakhstan [89]. Expected results of the program include launching of a Kazakhstani supercomputer by 2025 and completion of a public training course on AI by at least 80,000 people by 2029. The prioritization

of AI as the main development direction in the country was emphasized in a speech by President Kassym-Jomart Tokayev at the plenary session of the Digital Bridge forum in October 2023. During his address, he noted that the state would have to adopt a strategic document to identify areas of application, tasks and tools for advancing AI. The head of state stated: "Artificial intelligence is no longer science fiction, but a reality that has come. A new era is unfolding before our eyes. Artificial intelligence technology is as revolutionary as electricity and the Internet were in their day. It has the potential to fundamentally change the way people live, automate many work processes and create significant economic value. Experts estimate that the potential contribution of artificial intelligence to the world economy is comparable to a quarter of global GDP. The widespread use of this technology could become the most important factor in the progressive development of Kazakhstan" [90]. Tokayev identified the following priority as ensuring normative regulation of the use and implementation of AI. The President noted that more than 120 countries at the time had already adopted various legislative acts to address these issues.

Governments are willing to invest in digital technologies and AI in anticipation of the next industrial revolution that experts profess AI will bring to society. One of the most widely cited 2023 McKinsey reports states that by 2030, generative AI applications could automate up to 70% of all business activities across almost every current profession [91]. Interestingly, an increasing number of reports on the prediction of AI's impact on the global economy and society have a tendency to exaggerate the percentage of occupations that AI might replace and the amount of billions in value it can add to the global economy. Nonetheless, almost all agree that AI will bring unforeseen changes to the social and natural environment. This growing consensus indicated the importance for policymakers to develop new strategies that will cope with transformations that go along with the emergence of new technologies. In addition, the favorable environment for digital development that governments create encourage technological companies to invest in AI research and its application in consumer products.

At the supranational level, AI is often intertwined in discussions on the prospects of international security, sustainable development, ethics, and human rights. Since 2013, there have been informal expert discussions on regulation of lethal autonomous weapon systems (LAWS) under the framework of the 1980 United Nations Convention on Certain Conventional Weapons. The influence of AI is driving the emergence of new negotiation topics that affect LAWS, as well as a shift in focus in ongoing negotiations. In terms of AI as a driver of change, this involves the emergence of new types of conflicts related to biases in AI algorithms and data usage, as well as its use in conflict situations. In 2017, intergovernmental expert groups were formed to continue working in this area. The same year, the UN decided to create the Center for AI and Robotics (UNICRI Center for Artificial Intelligence and Robotics) participation of such expert organizations as the with the International Telecommunication Union (ITU), the Centre for Future Intelligence (CFI), and the Foundation for Responsible Robotics. As part of the debate on sustainable development issues in 2017, the Second Committee of the General Assembly held a joint meeting, "The Future of Everything - Sustainable Development in the Age of Rapid Technological Change". The meeting aimed to address the rise of ethical concerns around the potential of technological advancements to outpace state policies and regulations, possibly undermining societal norms. In relation to that, in 2019-2021, a UNESCO group of experts prepared recommendations on the ethical aspects of AI [92]. Another international organization taking a stance in this area is ITU; since 2017, the organization has made a significant contribution to promoting an AI agenda dominated by a globalist view of technology development.

The annual World Economic Forum in Davos, which brought global attention to the topics of digital transformation and the Fourth Industrial Revolution in the prior decade, in 2024, made "Artificial Intelligence as a Driving Force for the Economy and Society" one of its four key themes. Although, as an international institution, the World Economic Forum lacks independent decision-making power, the agendas chosen for the annual events serve as an important indicator of the global political outlook. This is because the event attracts global political and economic leaders and is closely followed by media and academics. Another important factor is not just the topics chosen for the international forum but also the way they are discussed. The rapid rise of generative AI in 2023 led to discussions around related risk mitigation, such as concerns about unemployment and change in regulations and governance in this field. However, the forum's primary focus was on the possibilities of enhancing productivity and creative application of the technology, under the topic "Generative AI: Steam Engine of the Fourth Industrial Revolution?". The common consensus among speakers and attendees on the issue was that digital transformation is required across all industries, with the rise of generative AI much like the steam engine in the 19<sup>th</sup> century. Although it went unacknowledged during the debates, the choice of the metaphor for AI carried symbolic meaning. Despite steam engines being the cornerstone of industrial development in the past, their required immense amounts of fuel and manpower, which is not unlike the relationships between all forms of modern AI that depends both on the big data generated by people and their assistance in sorting and refining it for its training. In contrast, the steam technology of the past was considerably easier for states and companies to control and protect from competitors, giving them technological leverage that spurred a wave of colonial expansion among nations that were less industrialized. The current nature of digital technology transcends such physical and geographical boundaries being easily adaptable and replicable across different environments. Therefore, modern states can only attempt to apply a thin veil of regulations to protect intellectual properties from competitors.

The regulation of AI technology and its potential risks were the focal points of another, comparatively more impactful, international platform – AI Safety Summit 2023. Convened by British Prime Minister Rishi Sunak, the first global summit on AI safety and regulation brought together global political and business leaders to address the extreme risks posed by emerging AI models. Its main outcome was the "Bletchley Declaration on AI Safety" signed by 28 countries worldwide, including the host nation, the US, China, six EU member states, Saudi Arabia, and the Kingdom of Saudi Arabia. The document identified two focal points of international cooperation on the issue: 1) identification and construction of common scientific and evidence-

based understanding of AI risks of shared concern; 2) building risk-based policies across the countries that signed the declaration to ensure safety. The wording of the second agenda also included the following remark: "collaborating as appropriate while recognizing our approaches may differ based on national circumstances and applicable legal frameworks" [93]. The statement is particularly significant given the political and structural differences across the states that joined on the declaration, giving each of them leeway in constructing the AI safety policies aligned with their own agendas while simultaneously committing to common security and ethical standards. Despite the event's practical focus, AI Safety Summit had a prominent historical symbolist component: its venue, the mansion of Bletchley Park, was the center of cryptography during World War II for the Allied powers, and it was where one of the founders of AI, Alan Turing, worked on deciphering intercepted Nazi Enigma code.

It can be predicted that the Bletchley Declaration is one of the first among the series of multilateral and bilateral agreements on AI risk mitigation. Like nuclear technology, which has a dual purpose as a source of clean energy and as a source for nuclear missiles, general-purpose AI models can also be used both in peaceful and military situations. However, unlike nuclear power, adapting generative AI for different purposes does not require much expertise. Whereas AlphaGo, the program that defeated world champion Lee Sedol in 2016, could only play the game of Go, ChatGPT can be prompted to generate both educational and disinformation content by any user who has access to the Internet. Generative language models can write software for cyber-attacks and, at the same time, write software for cybersecurity purposes.

#### **Conclusions to chapter I**

- 1. Political communication developed alongside technology, gaining significance with the industrial revolution and the evolution of mass media. However, it became a separate discipline only in the middle of the 20<sup>th</sup> century after World War II. The development of AI began with early computing concepts in the 19<sup>th</sup> century, and it also gained ground during the after-war period. The term was officially presented at the 1956 Dartmouth Conference, and the research in this field originally focused on language processing and machine reasoning. The Cold War stimulated AI funding, resulting in MIT's Mac projects and psychonics in the Soviet Union. The 1970s saw great leaps in expert systems and neural networks, however, overestimation of the available technology led to a period called AI Winter characterized by reduced funding and academic interest. Despite these setbacks, advancements in deep learning and data processing have ignited AI resurgence, integrating it into the media, process automation, and scientific discovery. Modern AI evolved from theoretical concepts to an independent field that shapes political communication and other various industries.
- 2. Traditionally, political communication involved a linear flow of information, from the state to the general public, and the media acted as a gatekeeper. This was emphasized in theories, such as gatekeeping and agenda-setting. However, ubiquitous digitalization and advancement in AI disrupted these communication

models, first, by fragmenting media audience, and second, by enabling all individuals to create and share their own content. Automated journalism streamlined news reposting in areas like sports and finance. At the moment, news agencies increasingly integrate semi-automation, such as natural language generation (NLG) in their daily process.

- 3. Generative AI, and large language models (LLMs) such as GPT in particular, transformed content creation. Those systems can generate unique and coherent content for various areas, from software coding to media and with training on vast amounts of data, can generate texts, images, video, and even musical compositions. In Kazakhstan, the development of Kazakh LLMs such as Irbis GPT lays the foundations for local IT growth. However, automatic news reporting still requires human oversight for more complex tasks. These changes indicate a new area in media and communication both on a global scale and in Kazakhstan.
- 4. There are two levels at which AI plays an important role in international relations and diplomacy: supranational and national. At the supranational level, AI is becoming the principal part of negotiations on Internet governance, security, sustainability, ethics, and human rights. Classical international relation theories including realism, liberalism, and constructivism offer different perspectives on the role of AI in this area. Realism and neorealism view AI primarily as a weapon in military and virtual conflicts. Liberalism and neoliberalism regard it as leverage for various non-state actors, while constructivism focuses on AI's impact in shaping state identity.
- 5. At the national level, countries across the globe are competing in AI development to secure political and economic leverage. For example, China's 2030 New Generation AI development plan outlines the course for global leadership through semiconductor production and technological breakthroughs, while the United States strives to maintain AI dominance through export-control policies and defense strategies. Other countries including UAE, India, and France are also building their independent AI models. At the same time, there is growing international cooperation on AI safety as evidenced by the Bletchley Declaration signed by 28 countries worldwide on AI Safety Summit 2023.

### 2 ARTIFICIAL INTELLIGENCE IN MODERN POLITICAL COMMUNICATION: DIGITALIZATION OF POLITICAL SPHERE AND COMPUTATIONAL PROPAGANDA

### 2.1 Political Communication in Novel Information Space and Emerging Power Dynamics

To comprehend the transformational impact that the introduction of AI systems has on this space, it is essential to discuss the recent revolutionary developments due to the digitalization of communicative channels and the emergence of new political actors. The transformation of communication at the turn of the 20<sup>th</sup> and 21<sup>st</sup> centuries not only contributed to the dissemination of socially significant information but also became a basis for a digital space. The academic interest in the influence of information technologies on society and societal communications also began during the same period. Pioneering scholars such as Arnold J. Toynbee [94], Oswald Spengler [95], Nikolai Berdyaev [96], and José Ortega y Gasset [97] set the stage for modern discourse in the first decades of the 20th century. The breakthroughs in communication technologies like radio and television and their proliferation became the foundation for the systematic study of how information and technological development affect individuals, historical processes, and civilization. The 1960s and 1970s were characterized by the proliferation of theories regarding post-industrial society. During this period, a whole body of research appeared dedicated to the to the developed countries into a qualitatively new stage of social development termed as "information society". The most prominent scholars who focused on this topic include Daniel Bell [98], Manuel Castells [99], Willard Martin [100], Marshall McLuhan [101], and Alvin Toffler [102]. As the term suggests, in an information society, the economy is based on the creation, dissemination, integration, and other information-related activities, with the development of communication technologies as the driving force behind it. Toffler also used the term "super-industrial society" to describe this process. At the same time, Daniel Bell and Willard Martin analyzed the widespread use of information technology in all spheres of life, including communications. Modern telecommunications infrastructure forms the basis of understanding information society. This dissertation work proposes that "information society" describes transition period of postindustrial era between the advent of the Internet and beginning of conversion to the digital society. However, due to the uneven distribution of telecommunication and digital advancement across geographical regions, many states are still stranded on this level of development.

The transformation of political communication algorithms entails a modification of the interaction channels and strategies set against the backdrop of the growing intensity of information exchange. It is notable that the rapid growth of information exchange began in the 1980s before the media shifted to digitalization with the advent of 24-hour news television channels that intensified the need for constant content delivery. The advent of Web 2.0 technologies and social media platforms only hastened this process. Additionally, there was a significant increase in the number of political message communicators who gained equal access to information flows through various Internet platforms. This shift disrupted the previous balance between communicators and recipients. With the increasing number of communicators, the competition for the audience's attention became fiercer. As a result, individual internet users have become independent actors in virtual political and communicative interaction.

As one of the most generally recognized trends in the transformation of modern politics, digitalization stands in stark contrast to other communicative technologies preceding it. In the past, every new form of communication was complementary to the ones before it, as radio was complementary to print, and television was complementary to both but did not replace other media. However, digitalization incorporated traditional mass media outlets, reducing the audience of their analog counterparts and introducing new forms of media and communication. It became one of the key "megatrends" of societal development, affecting and reshaping various areas of its life [103].

The term "digitalization" was first coined in 1995 by Nicholas Negroponte. In his book Being Digital, Negroponte compares bits to atoms as the smallest particles of the material and digital world, respectively [104]. To convey the importance of digital technologies in the following decades, the author also proposed the concept of "Daily Me", a daily newspaper tailored according to every individual's taste and preference. The active use of the term in economic, political, and administrative circles began in the mid-2010s. The concept's popularity was further fueled by the 2015 article in the journal Foreign Affairs by Klaus Schwab, founder and president of the Davos Economic Forum. Titled "The Fourth Industrial Revolution: what it means, how to respond", the article argues that humanity is on the verge of the next industrial revolution, driven by the convergence of technology and the "blurring of the boundaries of the physical, digital and biological" [105]. This revolution should lead to the transformation of production systems, public administration and administration on an unprecedented scale. Taking roots from the Third Industrial Revolution that introduced the wide use of electronics in communication, it is characterized by its spectacular speed and scope and involves current breakthroughs in AI and robotics. Despite its later impact, the short article did not introduce groundbreaking concepts. Instead, it reiterated the processes repeatedly described by researchers and retold the forecasts and predictions contained in the vast body of scientific and futurological literature. In fact, the concept of the fourth industrial revolution was first introduced in the German Federal Government's Research Union project for the comprehensive digitalization of industrial production in 2011 [106].

In 2016, Schwab made the topic of the Fourth Industrial the central theme of the World Economic Forum in Davos, drawing the attention of world leaders and experts. The same year, the World Bank published a world development report titled Digital Dividends, which discussed the advantages and risks of the global digital revolution. In 2017, the Ministry of Digital Development, Innovation and Aerospace Industry of the Republic of Kazakhstan approved the State Program "Digital Kazakhstan". It proposed the progressive development of the digital ecosystem to achieve sustainable economic growth, increase the competitiveness of the economy and the nation, and improve the quality of life of the population with digital technologies [107]. Digitalization being the focus of global discussion platforms, reports on the topic by international financial organizations, and state programs aimed at using it as a developmental tool is difficult to imagine as a mere coincidence. It rather indicates attitudes that are formed by global financial and economic structures and then implemented by nation-states. To date, numerous documents have been published on digitalization programs in different countries and interstate associations, such as the Digital Europe Programme (2021-2027) or the 50-in-5 Campaign, a program aimed at developing digital public infrastructure in 50 countries in 5 years by 2028. The need for complex digital solutions became even more apparent in the post-pandemic world.

Currently, the term is used to rebrand a complex set of processes and problems that have long been discussed in the areas of computerization and informatization, the development of telecommunication technologies, the computer revolution, and the information and knowledge society. Analyzing the evolution of terminology in the public and academic consciousness allows us to see these changes from a new angle and understand the emergence of the concepts of "digital society" and "digital world" [108]. The adoption of information technologies and digital services in recent decades has led to innovative changes in the field of political communications. They further strengthened the connection between political actors' intentions and the instruments that they use to convey power decisions. There are three main aspects of these changes, which include the following:

- transformation of political communication algorithms;
- changes in an optimal ratio of communicators and recipients;
- information flow content [109].

The rapid development of telecommunications infrastructure and the introduction of information technologies into various areas of society formed a new information space. The digital landscape associated with the emergence of specialized virtual resources, such as blogs, social networks, expert websites, etc., is an ongoing, dynamically developing process in which every active user can participate. Unlike physical spaces, where social structures are determined hierarchically and are based on vertical communications, digital space offers opportunities for the horizontal integration of users and the creation of communication rules that differ from the ones that emerged in off-line environments [110]. The horizontal nature of digital communications can lead to the disruption of traditional forms of information exchange and the rise of new issues. For example, one of the decisive factors that changed the flow of information was the emergence of fake news and alternative facts and plurality of information sources. The term "alternative facts" refers to the intentional misinterpretation of factual material, which, along with "fake news," becomes one of the tools of information warfare [111]. Moreover, in many developing countries there are limited number of independent fact-checking platforms because of the lack of the infrastructure that protects freedom of the press and verified information. For example, in Kazakhstan the Legal Media Center serves a critical exception, playing an important role in protecting journalists' rights and providing verifiable information. The center is a nongovernmental organization that was funded by the United States Agency for International Development' (USAID) regional initiative the Central Asia Media Program [112].

The increased trust of the audience in new digital sources, as opposed to traditional ones, shows the shift from the virtual environment to everyday practice that leads to the appearance of new aspects of political communications. These issues are reshaping the field of political communication studies, which has evolved into a sub-discipline within its framework. In addition, a new range of research questions are emerging, including the virtual dimension of politics on the Internet and social media in particular. These also include the idea of digital platforms as a separate media sector that differs from traditional media and the relationship issues between information technology and new democratic institutions.

To conceptualize the content aspects of political communications in digital space, researchers use such criteria as the construction of information agendas, the symbolism of information flows, and the mechanisms of public practices [109]. While political communication always relied on the creation of symbols in the audience's consciousness, in recent years, the symbolic image formed by online users has gained additional emblematic markers. But symbols gained even greater significance between actors of political-communicative interaction, where semantic content gave way to visual content and served as the basis for identifying circulating information flows. The power of symbols and visual information is well known since the first televised presidential debate between John F. Kennedy and Richard Nixon. This debate is often regarded as evidence of the impact of television images on the audience. Because visual information offers cognitive shortcuts, its significance is even more prominent in the era of ubiquitous digital content. In addition to gravitating towards visual media, which is proven by the immense popularity of such social media platforms based on photo and video content sharing as Instagram and TikTok, people also communicate through visual images that include the usage of emojis in instant messaging. Humorous visual memes also became cultural artifacts, replacing political caricature in modern times.

The liberal nature of digital communication commences an interactive climate on each platform that puts a different spin on the nature of the discussion of political matters. This, in turn, changes the traditional hierarchy of news prevalence within the boundaries of agenda-setting theory. Agenda-setting is one of the more influential media and political communication theories of the past century, proposed by Walter Lippmann in the 1920s and later refined by Maxwell McCombs and Donald Shaw. Salience is the basis of agenda-setting, where topics discussed the most in news sources are perceived by the audience as the most important, regardless of the reality of the situation. Originally, the theory proposed that audiences had only one primary source of information on political issues - the official news media. However, with the proliferation of digital media platforms, this predicament is undergoing significant changes. As a result, the prominence of official sources in the information supply chain is declining. An increasing number of surveys indicate that the global audience is progressively turning to social media for news and commentary. For instance, according to a 2023 Pew Research Center survey, a third of US adults view Facebook feed as a source of news, while 26% turn to YouTube for information on current events [113]. This corresponds with trends in the UK, were 41% of people aged 18-24 cite social media as primary news source; this number was only 18% in 2015 [114]. In developing countries, particularly in Central Asia, these figures are even higher; according to one statistics, 92% of Internet users in Kyrgyzstan prefer social media as primary news source [115]. At the turn of the century, Maxwell McCombs himself critically reconsidered the conventional agenda-setting theory framework, suggesting that variability of media content available to audiences through the Internet would lead to a "situation that would spell the demise of agenda-setting as we have known it" [50]. This perspective highlighted the concerns about audience fragmentation that would potentially challenge the dominance of traditional media.

However, the diversity of informational sources is not the only distinctive feature of digital media; it also includes personalization of content delivery for each individual social media user. Currently, digital customization tools let the audience not only choose content creators and issues that align with their interests but they also can disregard certain topics or media outlets entirely. Moreover, this process can happen without conscious effort from the users, driven by content optimization algorithms built into every digital media platform and trained on user-generated content and preference data. This, in turn, leads to two simultaneous processes: audience fragmentation and the emergence of media "echo chambers". Audience fragmentation describes the extent to which the audience is dispersed across the range of digital platforms because of their increased selectivity. This change in the audience, which started early on with the advent of cable television, became more prominent in recent years and is considered one of the main factors contributing to the weakening of the traditional mass media influence [116]. Personalized content consumption also leads to the phenomenon when certain ideas and beliefs are reinforced by the transmission and repetition of messages within a closed system, akin to how sounds repeat in actual echo chambers.

All these developments lead us back to the fact that, in the digital space, there is a radical change in the traditional linear and unidirectional flow of informational transmission from one participant to another. It modifies the classic communication model in the direction of the increased number of independent actors and a diversity of strategies for political interaction. New forms of communication, supported by Internet resources, level out the geographical and structural limitations of political space, offering new formats for the aggregation of interests and their articulation. Moreover, advances in communication channels are modernizing communication technologies while simultaneously enriching the ways information is disseminated, including creating new platforms that integrate multimedia formats. By combining all possible levels of information flows, digital political communications turn into endless information traffic without internal structure and a single main agenda [117]. Digitalization has dramatically lowered the access barrier for virtually all contributors to become more publicly visible and has reorganized the predominantly vertical flows of information into interactive communication networks. The characteristic feature of modern interactive communications is that the flow of political information in the digital landscape forms spontaneously and independently. The reason lies in the multiplicity of digital resources and fierce competition for information capital of

numerous participants. Placing political communications within digital space allows for tracing the transformation of communication mechanisms. They are used for obtaining power, evaluating strategies for maintaining political contacts and forming new political agendas.

Applying this approach to the Kazakhstani context, the author considers it appropriate to highlight that the domestic example is characterized by the simultaneous unprecedented development of digital technologies and fragmentation of the telecommunications landscape. This results in the disconnection of remote regions from virtual communication. At the official state level, there is a drive for the widespread introduction of digital public services and the modernization of management based on information technologies. The successful examples of those attempts include the introduction of the electronic government (egov.kz) system, launched in 2006, and the implementation of the state program "Digital Kazakhstan" with the main goal of improving citizen standards of living through digital technologies.

The main characteristic of Kazakhstan's digital landscape is the predominance of mobile platforms, with a 90.9% Internet penetration rate and 60.8% of social media users (11.85 million) among the total population in 2023 [118]. Due to the low costs of mobile Internet, the country largely bypassed the earlier stage of desktop computer-based digital media and transitioned directly to the mobile and social media platforms. As a result, the political stage has also moved to digital space, where the interactive model of communication prevails, and the retention of political power occurs through virtual influence. The increasing importance of internet communications in the country led to the introduction of the law "On Online Platforms and Online Advertising," dated July 10, 2023, which is discussed in more detail in the later parts of this dissertation.

Kazakhstan's example is emblematic of the globalized nature of the intensive digitalization process, which generates technological turbulence in the socio-political spheres. Digitalization creates possibilities for the transformation of political regimes by actively using digital resources in the processes of distribution and implementation of power. Moreover, in the context of global technological turbulence, there are new socio-political attractors that include bifurcation points of risks and opportunities for traditional political regimes.

There are several notable aspects of the changes in the information space. On one hand, the introduction of new types of digital platforms blurs the line between various traditional political actors. On the other hand, the deepening of relations between digital corporations and governmental institutes leads to the algorithmization of political power. The algorithmization of political power means that political institutions are borrowing corporate IT methods of predictive analytics, ranking and information filtering. These methods are used to study target audiences, manage the political agenda and even adjust public sentiment. As a result, there are new hybrid political actors that have the power potential to shape modern politics according to their agendas on digital platforms.

In fact, the modern digital political space is characterized by a wide spectrum of political actors of a new type. Their emergence has also been a subject of research

interest among political scientists for a considerable period. One of the more comprehensive proposed models is Donald Axelrod's concept of emergent organizations through "bottom-up" processes, where powerful political actors are formed from an aggregation of smaller ones [119]. The model compares this process to the organization of individual neurons into meaningful structures similar to propositions in the works of Marvin Minsky [120]. In the modern digital space, new participants go through similar "bottom-up" processes, albeit with a sifter pace. In addition, digital platforms themselves can become viable political participants with the ability to compete with traditional political actors such as the states and institutions. Historically, media corporations (e.g., Rupert Murdoch's News Corporation in the US) were always among political actors; they reached this status through consolidation and acquisition of smaller outlets. However, whereas the traditional space of socio-political communications entailed state dominance and, in some cases, monopolization of the public space, digital politics allows for a competitive relationship between traditional and new actors.

One of the most significant emerging types of political actors is global information technological corporations. In comparison to multinational corporations of the past, IT companies are in control of their own digital infrastructure in the information space. In addition to controlling communication flows within their platforms, these corporations can also influence the meaningful parameters of modern digital politics. In the era of communicative capitalism analyzed in the framework of political theory by Slavoj Zizek and Jodi Dean [121] [122] where the concept of added value is extended to such areas of life as social interactions and content consumption, global technological corporations have their political agendas and abilities to implement them in the digital political space of nation-states. They accumulate various technological advantages and use them to influence political processes. This influence comes from the ability to allow or deny access to digital opportunities or resources. Moreover, compared to IT corporations, nation-states lack the technological expertise to build their own digital infrastructures that could compete with social media and similar platforms in popularity. It is important to bear in mind that the audience sees various governmental platforms purely as utilitarian tools and rarely turns to them in their spare time.

Another form of capitalism emerging in the current circumstances is so-called "platform capitalism," where technological corporations use their software and hardware resources to become foundations for other businesses, essentially gaining control over them [123]. Platform capitalism is best aligned with developing digital media outlets by increasing user engagement; nowadays, IT companies constantly strive to add new features to improve old media outlets and create new ones. The digitalization of the media and the increased role of audience participation, where users receive an endless content feed tailored for each individual, gradually changes the notion of the public sphere, making digital platforms its central hub. Notably, this process makes Marshall McLuhan's observations on the relations between people and media from the mid-20th century applicable to contemporary digital environments. In his book *Understanding Media*, he wrote, "physiologically, man in the normal use of technology (or his variously extended body) is perpetually modified by it and in turn

finds new ways of modifying his technology. Man becomes, as it were, the sex organs of the machine world, as the bee of the plant world, enabling it to fecundate and evolve ever new forms" [124].

Digital platforms are becoming new key institutional foundations of sociopolitical interaction. They hold natural monopolies over public and private social communications, enabling them to act as channels for promoting new concepts and ideas to the mass consciousness. With their growing political, economic, cultural, and social influence and self-promotion tactics, technological companies have become primary socio-political actors in the digital space. Corporations such as Amazon, Google, Microsoft, and Meta Platforms already shared their visions of humanity's future, and their projects include issues such as universal income or the application of AI technologies virtually for every aspect of life. On the other hand, they actively censor social media content and collect user personal data for analysis and use in their financial interests. This situation suggests that digital democracy is enhanced not so much by the producers of relevant content but by platforms and algorithms, within which they can be reproduced by an unlimited circle of actors' users [125].

Researchers believe that digital platforms are developing into a new "valuenormative" and "institutional" framework that integrates various areas of social interaction [126]. The digital social paradigm that results from this is not only a convenient mobile platform for interactions but also a new socio-technological global environment with its own virtual ecosystem. This environment already encompasses a value-normative system, symbols, and forms of digital identification. The increased importance of digital platforms is gradually replacing social and cultural reality and personal self-identification. Currently, nation-states are still determining the legal boundaries of technological corporations and their relationships with users. One prominent example includes several legal issues that Meta Platforms faced regarding using user data for unsolicited advertisement targeting and antitrust issues in 2020 and 2016 when user data was exploited to influence the outcome of the US presidential elections.

This raises an important question about the role of digital platforms in shaping public discourse, with different approaches to their regulation in different countries. Notable in the field of the socio-political environment digitalization is the German experience. It is significant to highlight that the country has legal regulations governing the use of the media both in the framework of their traditional functions and for the purposes of targeted disinformation and disorientation of the opposing side during conflicts. The regulation includes misleading and exerting informational pressure on target groups before digitalization. German military experts consider the media to be a key tool for information operations. It allows, on the one hand, to effectively inform Germany's population and the country's allies and, on the other hand, to shape the desired behavior among target groups of influence abroad [127]. As it was stated by Klaus Naumann, the former Inspector General of the Bundeswehr and Chairman of the NATO Military Committee, in 1999, after the alliance's military operation against Yugoslavia: "We can fulfill Sun Tzu's dream and paralyze this or that country without firing a shot" [128]. The Federal Government of Germany has a specialized branch, the Federal Ministry for Digital Transport and

(Bundesministerium für Digitales und Verkehr). The "White Paper of German Security Policy and the Future of the Bundeswehr", the country's main doctrinal document in the field of security, published in the summer of 2016, firmly establishes widespread digitalization of all social spheres and highlights it as the intricate part in the domestic and international politics [129]. At the same time, the document also deals with the advantages and disadvantages of digital communication.

However, at the moment, it is impossible to determine whether the modern digitalization processes have an unambiguous positive or negative impact. Instead, we are facing a complex combination of effects, which can lead to unclear consequences. As Edward Bernays, the founder of modern propaganda, wrote in 1928, "There are invisible rulers who control the destinies of millions" [130]. This statement is even more relevant nowadays that the "invisible" rulers have started applying "invisible" algorithms to guide and shape public opinion.

From the first political caricatures in pamphlets and newspapers and propaganda posters in the streets to televised debates and speeches. Visual content has always played an essential role in political communications. In the digital age, visual content has become a significant part of not only political party advocacy but also individual participation. Social media enabled users to present their opinions and reactions in video formats, which further changed the mode of personal and mass communication from semantic in the past to visual in the current times. However, the constant sophistication of the generative AI tools made photography and video unreliable mediums. In the past, photographs and especially video footage had a presumption of veracity in the public eye because fabricating them was extremely difficult. In comparison to the verbal reports, they affected the audience on deeper emotional levels and shaped the visual perception of historical events. In Kazakhstani history, video footage of the 1986 December events later became the symbol of the national strive for independence. Photo and video footage was irrefutable evidence that were believed to capture reality, the status quo challenged in recent years by numerous examples of deepfakes used to deceive the public.

Deepfakes are intertwined with social media culture: the term first appeared on Reddit in 2018, a forum social network, as a username account that created deep learning software to produce fake pornographic and mainly included celebrity images [131]. Soon, other message board communities appeared on the platform that shared software scripts to produce such content automatically. The website administration took down the community; however, the practice became widespread in other online communities, and the technology has found application in other areas. One of the emerging areas of deep learning application that is particularly relevant to the field of political communication is called "deepfakes." The term is derived from combining of the words "deep learning" and "fake." It is an AI-based image and sound synthesis technique that combines and overlays existing images and videos with generated images or videos [132]. They are based on generative adversarial networks (GAN) technology, which consists of a pair of "adversarial" deep learning neural networks. In the multi-step process, the first network generates unique content based on other similar data, such as an image of a public persona based on their numerous real images. The second network compares the synthesized image to the real-life

prototype and attempts to determine whether the output meets the standards. Based on the second network's feedback, the former aims to minimize the "loss function," or the difference between its generated and authentic images [133]. After the generation of a better version of the image, this process can be repeated countless times until an equilibrium is reached between two networks. This is how the generated images and videos can reach levels of realism, making them difficult to distinguish from genuine images at first glance.

An important feature of these generative techniques is that they can create unique analogs based on the key features of texts, speeches, and images of real objects while maintaining the features of prototypes. This means deepfakes can be generated in auditory, visual, and audiovisual formats. The variety of forms of generating deepfakes makes them a universal and very effective tool for influencing people's minds. One of the earliest general public applications for creating deepfakes was a Chinese mobile application Zao developed in 2019. It could take user images from their photographs and place them as the main character in a popular film for a few moments. The program keeps the original movie soundtrack, which lowers the technology requirements. In 2021, a mobile application called Avatarify appeared on the Apple App Store that can turn photo images into short video format, making a person in the photo sing or laugh. These application examples also show the level of proliferation of deepfake technology that can be, though amateurish and detectable, generated on common smartphones. According to the latest fraud research, one of the most common fraud types in 2023 was AI-related [131], and this practice has not escaped the realm of politics. Also in 2023, a video message from President Kassym-Jomart Tokayev appeared on social media platforms, in which he called on fellow citizens to invest in entrepreneur Elon Musk's investment platform [134]. Even though the video was quickly labeled as deepfake, it had an attached website link with a fill-in form for user data. It also remains unclear how many people believed the fraudulent content.

Depending on the computer processing power currently, it is possible to create highly authentic audio and video files where any political or public figures allegedly express a particular position or even perform specific actions that are contrary to their character. One recent notable example to date includes a political action committee that supports a candidate in the 2024 United States presidential election and exgovernor of Florida state, Ron DeSantis, in the summer of 2023, created a political television advertisement video that used the AI-generated voice of the former president Donald Trump presenting him in an unfavorable light.<sup>1</sup> Even though experts attested that the audio did not sound completely natural, the content was based on the part that Donald Trump himself published on his privately owned social media platform Truth Social, therefore sounding probable for the audience [135]. As a response, at the beginning of 2024, another deepfake video now depicting Ron DeSantis appeared on social media platforms, where he announced dropping out of

<sup>&</sup>lt;sup>1</sup> YouTube. Trump Attacks Iowa // [Video]. – 2024. – https://www.youtube.com/watch?v=LKQiTpiPN7I

primary elections.<sup>2</sup> The high-quality video showcases the full range of generative AI technology, with DeSantis's voice and movement appearing natural and life-like. Moreover, even though comments on the YouTube platform indicate that the majority of the audience was aware of the video being synthetically generated, they shared it in support of DeSantis resigning from the electoral campaign. These two cases demonstrate possible development paths for political campaigns in the future, where even though the audience may not be deceived by the AI-generated content, it still can influence public discourse, distracting from other serious issues.

The proliferation of deepfakes created by individuals and groups has reached such proportions that global organizations are taking proactive measures to combat their use. For instance, in anticipation of the 2024 European Parliament elections, all the participating parties must commit to a voluntary Code of Conduct facilitated by the International Institute for Democracy and Electoral Assistance and the European Commission. The code outlines that the signatories should abstain from producing and dissemination, among others, "any type of deceptive content using audio, images or video and generated with or without artificial intelligence to falsely or deceptively alter or fake candidates, officials or any electoral stakeholder" [136]. In the future, such non-binding documents may enter into the general practice of ensuring fair and transparent elections on a global scale.

The problem with unreliable information in the new digital era is its quality and the speed with which it can be disseminated. Disinformation erodes trust in society in both official and unofficial sources, and the audience does not have the tools or methods to reliably verify presented information. In this situation, governments have no other choice but to step up and take measures at the legislative level. For example, the term "false information" is defined in the Law of the Republic of Kazakhstan, "On Online Platforms and Online Advertising," which regulates public relations related to online platforms operating in the country. The law defines false information as "information that does not correspond to reality or contains material misrepresentations of facts" documented in any form in the digital sphere but does not specify its nature or methods of creation [137]. To date, in Kazakhstan, there is still a lack of legislative basis to directly regulate the use of AI in terms of data protection or content generation.

However, it must be understood that the impact of AI on politics is dynamic in nature and is not limited to the creation of disinformation content. There are also many malevolent ways that generative AI tools can be used in various positive ways in politics, such as crafting more persuasive messages during political campaigns and sentiment analysis of the target audience. Psychology researcher Igor Grossman of Waterloo University proposed that the versatility of LLMs makes it possible for them to be trained with real personal stories so the models can accurately mimic human reactions and answer different questions. This allows such programs to be used during focus group surveys in sociological studies or to simulate agents in economic research [138]. In addition, LLMs can be trained to mimic political audiences to test

<sup>&</sup>lt;sup>2</sup> YouTube. What Ron DeSantis should say but won't // Political Analysis Channel. - 2023. - https://www.youtube.com/watch?v=jYTsZHd49Jo

possible reactions to electoral campaigns and programs. However, more notorious uses of this technology revolve around disinformation campaign practices. These practices usually include the creation of deepfakes in various formats and the spreading of fake news.

In conclusion, artificial intelligence's influence on politics can be detected on macro and micro levels, creating a perpetual cycle of affecting one another. Governments and international organizations create favorable conditions for AI development on national and supranational levels. This, in turn, leads to AI technology proliferation into the consumer sector, and because applications based on these systems do not have high technological or expert requirements, they were quickly adopted by individual users. The proliferation of AI-generated content indicates increased public interest in this technology and encourages governments to further development.

# 2.2 Emergence of New Political Communication Tools: Theoretical Foundations and Key Methods of Computational Propaganda

The rapid emergence of new actors in the political and communicative spheres in recent years is primarily explained by the availability of information technologies and the simplified procedure for aggregating and articulating disparate interests on a global scale. Through blogs, forums, political websites, and other platforms, communities, separate interest groups, and networks are formed, acting as actors who aim at the implementation of information influence in the digital space and beyond [109].

Modern digital technologies are developing in a post-cultural environment [139], characterized by the collision of multidirectional cultural programs. Progress in information technologies expands the horizon of possibilities for access to information resources, allowing people - individually and collectively - to make informed decisions. Conversely, the lack of systematic control over the flow of information also enables various political actors to use increasingly sophisticated manipulative tools to influence public opinions and actions. These tools are aimed at weakening the audience's rational decision-making process. The fundamental difference between manipulative and argumentative practices is determined by the normative framework in which the subject of argumentation "considers the addressee as a rational person who is able and willing to understand and critically evaluate all elements of argumentative speech" [140]. The emergence of new types of vulnerabilities, ensuring information and psychological security, and building one's own communication strategy requires specific knowledge and skills from an individual in the digital age. People are required to be able to distinguish actions from argumentative ones, to recognize manipulative and analyze argumentative structures in communication, and logically evaluate their pragmatic and ethical aspects. It is important to note that the term "manipulation" has a negative meaning only when applied to personal and group interactions. The term is mainly used in the context of psychological influence and power over individual decisionmaking. Manipulative practices belong to the category of negative informative actions because they encourage people to take actions without connection to their real

needs and interests and in the interests of the subjects of manipulation. At the same time, the objects of manipulative actions do not realize that they are under someone else's influence even after they are informed about it. The audience perceives information that contradicts the prevailing stereotypes as unreliable, biased, or simply false. Accordingly, they prefer content that is precise and from sources that confirm their existing ideas [141]. And since the present audiences receive most information through digital channels, new forms of political manipulation, such as digital or computational propaganda, have emerged.

The topic of digital propaganda did not come to scholarly attention till the mid-2010s. This is because propaganda as an academic subject was somewhat pushed to the periphery of socio-political analysis in connection with the end of the era of totalitarian regimes and the weakening of the Cold War confrontations period. In the 1990s, there was a prevalence of cyber-optimism regarding new technological perspectives, namely the proliferation of Web 2.0 and online social networks. According to Chomsky, the spread of new technologies was seen as a way to expand democracy and novel opportunities to strengthen freedom of speech [142]. However, recently, academic interest began to grow in topics related to the challenges, risks, and dangers of communication in digital society, such as cybersecurity breaches, social control, Internet addiction, and cyberbullying. In the field of political communication, the most prominent topics are the problem of manipulating public opinion online and disinformation [143]. These practices are usually referred to as computational or computer propaganda. The term appeared only several years ago and was formed at the intersection of such fields as computer science, political science, sociology, linguistics, and social psychology.

An attempt at primary conceptualization of this growing global phenomena was presented in a collective monograph titled Computational Propaganda Political Parties, Politicians, and Political Manipulation on Social Media edited by S. Woolley and F. Howard. Published in 2018, the work combined the studies of 12 researchers from 9 countries (Great Britain, USA, China, Russia, Canada, Poland, Taiwan, Brazil, and Germany), describing the experience and practices of this phenomenon during events that vary from local and national elections to international security crisis [144]. According to the authors, computer propaganda is "part of a package of dubious political practices" where new automated digital actors such as social bots are being used to support specific political positions. They effectively suppress dissenting voices and create the illusion of overwhelming superiority. In this regard, they concluded that "as a communicative practice, computer propaganda describes the use of automation algorithms to fully control and disseminate misleading information on social networks" [144]. Ultimately, the work describes and analyzes new practices of manipulating information on the Internet, especially on social media platforms, to influence audience opinions and behavior and disrupt traditional political communication practices.

When conceptualizing the theoretical basis of computational propaganda, the authors identified the social and technological aspects of this phenomenon. As a social phenomenon, computational propaganda is related to the traditional forms of propaganda, namely, a form of specific communication that selectively distorts

symbols and meanings to achieve the specific goals of political actors, referring mainly to the emotional and unconscious sphere of the human brain. It often involves such cognitive manipulation processes as impression management and the halo effect. As a technological phenomenon, it leans on new technological foundations that include social media platforms, big data, algorithmic agents, and generative AI. Computational propaganda also skillfully utilizes novel digital instruments, for instance, social bots, to distribute content automatically, such as fake news and sensational information on popular social networks or even distributed denial of service (DDoS) to disable opposing actors.

In contrast to traditional propaganda that uses analog media platforms, which are aimed at the broad public, computational propaganda makes it possible to conduct highly targeted campaigns using personalized content for a selected group of people. Because of this, computational propaganda campaigns are often more effective since they are received by the audience that is already identified as more receptive, frequently reinforcing their existing confirmation biases. However, even though the objects of this type of propaganda are primarily social media users, in the understanding of the researchers they have the same characteristics and vulnerabilities as the pre-digital era audience: anonymity, increased emotionality, weakening of critical and rational control, and social conformity.

In terms of identification of the subjects of computer propaganda, it is often an unfeasible task. The problem with developing an identification methodology is that even though the tools for detecting automated programs have greatly expanded, it is still problematic to find the principals behind the computational propaganda campaigns. As many scholars in the field indicate, "binding" automated bots to a particular social network actor is one of the most controversial yet promising topics in the study of social bots. The dominant players in the field of computer propaganda are those actors who have global access to network information, communication infrastructure, and sufficient resources to utilize large-scale computer technologies in implementing information impact. They include large corporations, political parties, government agencies, media outlets, and other organized entities and institutions. Figure 3 below illustrates major political actors participating in computational propaganda practices, both on the receiving and sending ends. They are presented in descending order of importance and level of influence on the mass audience.

The uneven distribution of influence from "clickbaiters" (a derogatory term for those producing and publishing misleading content specifically designed to entice audience attention) to individual politicians to states does not entail their autonomy from one another. Often, the hierarchical structure in the diagram above also illustrates their interdependent nature. At the same time, there is a growing opinion that new groups of elites are emerging – individuals who hold significant influence over public opinion in the digital environment.



Figure 3 – Major Actors of Computational Propaganda

Note – Compiled by the author

Lev Manovich, a prominent researcher in the areas of digital culture and new media, identified the following categories in the hierarchical structure of digital environment:

- direct users people who generate data but do not have the competence to work with big data and are the object of information impact from other data classes;
- 2) actors with the capabilities and competencies to collect digital data (holders of digital assets);
- 3) actors with competencies in big data analysis, owners of algorithms for processing, analyzing, and interpreting data, and capable of constructing persuasive communication and propaganda programs on this basis [145].

In addition, there is a suggestion for the inclusion of a fourth class in the system of "datacracy" – an elite group of actors who have the power to control the rest of the data classes to serve their interests [146]. This group usually compromises major corporations and state agencies that can influence information flows and control access to information. The term also suggests that datacrats achieve their hierarchical status using control over data and technological expertise. Thus, computer propaganda emphasizes two levels of subjectivity – expert-professionals and social elites' representatives who tend to merge traditional political and business elites with technological elites.

The nature of Internet communication, especially on social media platforms, is predispositioned to amplify the effect of propaganda campaigns. Those platforms allow for rapid dissemination of information when messages spread across different social networks. Many researchers associate these features with the echo chamber effect, where individuals become increasingly reliant on the influence of a social group with similar views to theirs. In these groups, certain popular ideas and beliefs are repeated in the closed system, drowning out alternative opinions. Because of this, a person tends to believe and accept information that is consistent with the ideas they have already formed, especially when it comes from people whom they perceive as similar to themselves. The echo chamber effect was studied long before the proliferation of Internet communications. In the 1970s, scholars at Villanova University and Temple University demonstrated that the frequency of transmitted messages is a key attribute of memory in distinguishing recollections and attributing referential validity to plausible statements [147]. The study discovered the illusory truth effect, according to which messages that a person has already heard are perceived as more credible than new information. This effect is more prominent nowadays since the audience is more exposed to the constant flow of engaging content across various channels and devices than at any point in human history. However, the nature of Internet content remains, for the large part, unverified and unreliable. Furthermore, popular trends become viral through multiplication, such as the option to "share" links on the websites, by social media users. Consequently, no matter how outrageous or harmful the information might be (e.g., vaccine and climate change conspiracies or slanderous political scandals), being repeatedly exposed to it, the audience starts trusting and spreading it further. This phenomenon inevitably leads to negative consequences. New forms of computational propaganda are mainly linked to fake news or unreliable information on social media. They refer to deliberately false information that cannot be verified or easily detected. This type of content is created with the intent of dishonestly misleading the audience. The main tools for spreading disinformation online include social bots, trolling, and algorithmically targeted content.

The transformation of the political sphere, driven by digitalization, enabled many political actors to implement technological solutions to support their own public interests [148]. Social media has become one of the main platforms for interacting with the electorate and also allow for targeted communication and efficient mobilization for different causes. There were shocking revelations that automated messages played a significant role in shaping the political discourse during the recent election cycles in the US. Research by Bessi and Ferrara showed that in 2016, nearly 19% of all tweets related to the election were generated by automated bots [149]. The study also found that at the time, extrapolating from the entire population, 400 thousand social bots were active on Twitter, which was roughly 15% of all platform users. As a result, the public became aware of the power of modern algorithmic information dissemination. Social bots can have a substantial effect on democratic political discussions and even influence people's choices during elections. They usually target specific groups and spread misinformation aimed at certain political agendas.

Social bots are one of the main channels of computational propaganda. Derived from the word "robot," they are algorithmic programs designed to automatically generate content and interact with human users [150]. Their primary function is to engage with other users to promote selected messages by amplifying political narratives. The main categories of the bots include news, PR, advertising, and political bots. Moreover, their use is not limited to social media platforms and is increasingly used on instant messaging applications. In this dissertation, the author defines the latter category not only as automated information disseminators but also as artificial political communicators because they act as agents that can communicate with human users on social media platforms with a degree of autonomy without direct human intervention. Figure 4 illustrates how social bots operate on political, social, and economic levels.



Figure 4 – The role of artificial political communicators

Note – Compiled by the author

Depending on the context, the messages transmitted by political bots can range from simple to complicated. For example, bots can simply retweet positive messages or call for action, or they can engage in discussions about conspiracy theories. Political bots can be especially effective when used in combination with so-called "trolls" and "sock puppet" accounts. Sock puppets are fake identities created to interact on political topics and ignite or escalate ongoing social and political debates. In contrast, trolls are social media users who deliberately post inflammatory messages to provoke other users into emotional responses. Social media platforms, initially aimed at connecting people across different geographical points by sharing their personal content, gradually became the primary news sources for the general audience. This shift led political bots to gain a heightened level of influence in mass information campaigns. For instance, the 2016 study on news usage found that the majority of US citizens used social media before considering traditional mass media outlets [151]. This could be viewed as problematic because the creators of social media platforms such as Meta (Facebook) and X (formerly known as Twitter) did not initially design them as news sources for the users. Their mission statements show that these platforms were envisioned as communication forums. X's original mission statement reads, "To give everyone the power to create and share ideas and information instantly, without barriers" [152]. Meta's original mission statement declared, "Facebook's mission is to give people the power to share and make the

world more open and connected". In 2017, the platform updated its mission statement to "Give people the power to build community and bring the world closer together" [153]. The semantic emphasis of the statements is on individual creativity and connectedness, not on official news distribution. In later years, Meta continued to develop its message of creating communities over information dissemination. This, in turn, removes responsibility from platforms to verify or fact-check information that individual users share.

The approach of social media platforms to information creation and dissemination is vastly different from traditional media outlets' practices, such as print media or broadcasting stations. Compared to traditional media, which has structured editorial processes to verify information, social media platforms focus on real-time user-generated content that emphasizes instantaneous information dissemination. Even though many users may rely on social media as verifiable news sources, these platforms are not granted official licenses to obtain and share news. Additionally, they often do not have any mechanisms to control its flow. Moreover, the functions built into the systems to 'like' and 'share' user posts lead to information dissemination in an uncontrollable manner. There are a number of moderation tools that social media platforms apply to the user content, which can include both pre- and post-moderation. However, they lack the robust mechanism of information verification and fact-checking that traditional media outlets consistently use for these purposes. The unregulated and often uncontrollable flow of content creates opportunities for information manipulation, with automated bots being one of the most cost-effective solutions.

There are many cases where social bots can be used for different purposes that are not related to public opinion manipulation, such as customer support and advertising. However, their primary uses in the context of computational propaganda include:

- 1) Promoting selected topics and opinions by imposing as real accounts and bolstering the number of followers or likes;
- 2) Suppressing undesirable opinions by deluding and burying the content, thereby limiting free speech;
- 3) Generating numerous variables of the same messages that only differ in phrasing for disinformation campaigns [154].

There is another category of social bots, whose purpose is to cheat baselines on third-party sites, within groups on social networks, and even on third-party voting services. Accounts for these bots are easy to procure through specialized online stores of accounts and redirects such as BuyAccs or on anonymous forums like Antichat. Consequently, there is a strong negative perception of political bots by the public, including both general audiences and the academic community. Nevertheless, it is important to recognize that automated bots do not have their own agenda or goals. Because of that, they can be used in many ways that will positively contribute to society. For example, bots can automatically disseminate critical information on public health, such as disease outbreak alerts and vaccine updates. They can ensure that verified information reaches a wide audience in a timely manner. Proved to be highly effective, social bots can also be used to promote positive messages like fostering healthy lifestyle behaviors or raising awareness on social issues. Therefore, it is advisable to consider innovative ways in which those bots can be applied. New information strategies that integrate those simple AI tools can harness their potential for positive impact.

Although social bots are actively used in various fields, such as marketing, advertising, and human resources, most research on social bots is devoted to "malicious political bots with a high level of imitation of human behavior". This is due to the aggressive nature of their application, the high degree of distribution, and the lack of effective control of these bots by the public [155]. Notable examples of the most resonant consequence include the use of malicious political bots in electoral practices at various levels in countries such as the United States, Japan, Venezuela, Brazil, and Germany. These technologies are used in everyday political propaganda practices including astroturfing, which is the process of creating and maintaining artificial public opinion by "flooding" the information space with messages of a specific nature. Computational propaganda practices also include the manipulation of public opinion, spreading information about the impact of foreign influence, efforts to undermine opposition, and the suppression of dissident opinion [156]. It is important to emphasize that the use of social bots also significantly increases the degree of anonymity of the propaganda campaigns. These technologies hide campaign subjects behind false accounts and troll attacks, making it difficult to trace the originators. Automation also expands the scale of the impact on the audience by increasing the speed and scope of information dissemination, resulting in a significantly larger number of people online being exposed to computational propaganda practices than ever before.

Similar tactics can also be used for marketing and PR purposes, giving way to promote so-called corporate computational propaganda. One of the prominent examples of social bots utilized for corporate purposes was promoting Tesla, the electronic automobile manufacturer, on Twitter. The researchers found that in the period of 7 years, from 2013 to 2020, eight suspicious accounts posted around 25,000 tweets with the tag \$TSLA and over 5000 with the tag #TSLA. These tweets portrayed the company in a favorable way, highlighting its achievements [157]. According to the study, the content of the posts was not likely written by human users, and the frequent intervals (every 3 hours) identified the automated accounts termed "Fanbots". Appearing at the time when a counternarrative doubted Tesla's expertise in automobile battery technology, bot-generated content supported and proliferated the company's entrepreneurial narratives throughout subsequent years.

Automated accounts are not the only tool used in digital propaganda. Targeting digital advertisements based on data mining is also a common method of shaping political agendas. The vast amount of user data collected by social media platforms is analyzed by predictive models to create tailored political messages. This type of content is especially efficient because users find very engaging the information that provokes emotional reactions and confirms their preexisting biases, which, in turn, leads to further political polarization. The most notorious case of successful micro-targeting is the Cambridge Analytica scandal in the mid-2010s, when data on 87 million users, confirmed by Meta (at the time Facebook), was used to build individual

psychographic profiles. The confirmed cases include 2016 Ted Cruz and Donald Trump's presidential election campaigns that used tailored political ads to mobilize voters. In the same year, Cambridge Analytica was also suspected of aiding the UK Independence Party and the political group Leave.EU into persuading voters to support the Brexit referendum [158]. The reason behind the success of the company is attributed to its methods, which are based on profiling systems using digital footprints such as Facebook likes. The system relied on an algorithm that automatically attributed individuals' personality traits according to the OCEAN model. The model is also called "the Five-Factor model of personality" and includes such attributes as Openness (to experiences), Conscientiousness, Extroversion, Agreeableness, and Neuroticism. The algorithm could also accurately predict other personal traits like ethnicity, sexual orientation, religious and political leaning, and more [159]. Cambridge Analytica could not only create highly personalized political messages but also predict how people will react to them. The case revealed to the public the extent of how personal data and digital footprints can be used to manipulate the audience. As a result, the US Federal Trade Commission levied a \$5 billion civil penalty against Meta for failing to secure users' privacy from deceptive harvesting [159].

Trolling is also deployed as a tool in digital propaganda, although it is a less cost-effective solution that requires high levels of expertise and organization. The definition of trolling is a singular or systematic provocative action aimed at discrediting concepts, programs, and views, as well as individuals and social groups. As a form of social aggression, it involves such verbal tactics as provocation, deception, slander, aggression, bullying, and insult. While individuals may use trolling as a form of virtual communication and self-expression, it is increasingly being used as a PR technique in commercial and political fields. In these spheres, trolling is a part of astroturfing practices, a term that refers to the practice of using modern software to manage and create artificial public opinion on the Internet [160]. A proven case of using trolling for political gains involves the Russia-based Internet Research Agency (IRA). Referred to in media as "troll farms", the agency employed hundreds of people who created thousands of sock puppet accounts on major social media platforms, forums, and comment sections of online publications to instigate political polarization according to the given agenda. The advantage of troll accounts compared to automated bot accounts is the greater difficulty of detection and distinction from ordinary users who participate in such behavior since they do not display distinctively programmed temporal and behavioral patterns. The scale of the operations could be deduced from the report by X (formerly Twitter) after an investigation, which indicated that during the 2016 US elections, 36,746 Russian accounts produced approximately 1.4 million tweets [161]. In 2018, criminal charges were brought against the agency in absentia in the US court, and IRA and associated individuals were placed on the sanctions list.

We can see that, except for trolling, computational propaganda heavily relies on AI tools. Both social bots and predictive models are based on machine learning algorithms and can be managed by a handful of people, which makes computational propaganda accessible to a wide range of actors. Moreover, further development of
generative AI tools will make digital propaganda even more effective and sophisticated. For example, ease of access to new machine learning technologies endows previously limited social actors, such as online communities, with political power and a high potential for civil activity [156]. Current LLMs such as GPT-4 and DeepSeek and image generation models like Midjourney and Stable Diffusion make it possible to create fully automatic troll accounts capable of generating personalized content, communicating with target groups, and further disseminating chosen political messages. Because of their autonomous nature, they are very difficult to be detected. However, it is also important to note that the public is becoming more alert to the risks of digital propaganda techniques. At the moment, new groups are appearing in the online space to counteract various forms of psychological manipulation and disinformation campaigns. Moreover, they are using similar computational methods to address these issues. These online activist communities oppose the following issues:

- covert corruption schemes [162];
- concealment of information that discredit government power structures [163];
- purposeful informational distortions in editing open-source information depositories (i.e., Wikipedia or other virtual encyclopedias) in the interests of individual political actors [164];
- and fake news and disinformation campaigns on social media [165].

Computational propaganda is still a new concept that is based on interdisciplinary research approaches and is being studied both from the technological and social aspects. Researchers associate the features of computational propaganda objects with new characteristics of the target Internet audience. Virtual communities have segmented structures with members consuming uncritically "convenient and familiar" content [156]. A new form of digital propaganda is purposefully constructed and circulating disinformation in social networks. Automation of content personalization and dissemination became the cornerstone of computational propaganda. This includes social bots, data mining, and algorithmic programs for data analysis – all factors that have immensely increased the speed and scale of modern political campaigns.

As is evident from various cases discussed in this part of the dissertation, the most influential subjects of computational propaganda consist of political and business elites who have joined forces with representatives of the technological elites who have the necessary competencies to create and disseminate propaganda content. Moreover, despite the bright prospects that digitalization is supposed to bring to society, envisioned by numerous programs and projects, there are also concerns regarding it.

Firstly, any technological or social change inevitably entails a certain level of public concern about its negative consequences. Namely, one of the earlier concerns was that the rapid expansion of the digital economy could be a threat to the development of the real economy, even though experts, on the contrary, emphasize that the digitalization of transactional processes can strengthen it. At the same time, such fears can be fueled by redistributing financial and other resources for the development of certain areas. The prospects for digitalization are sometimes perceived as a "digital concentration camp," "chipization," and even in a metaphorical sense as a "conspiracy of numbers" [166]. Admittedly, these concerns were heightened by the measures that various authorities have taken in the emergency conditions of epidemiological restrictions. They included the requirement to check QR codes to access public places during the COVID-19 pandemic. For example, in Kazakhstan, to enter public places, people had to use Ashyq mobile application. The application allowed, with a QR code and integration with the general database of the Ministry of Health of the Republic of Kazakhstan, to determine the status of a visitor: whether he was currently a carrier of the virus or not. However, due to its limiting nature and combined with hesitations around vaccination, this particular digital solution was negatively accepted by some people.

One of the biggest risks associated with the digitalization of all spheres of life is the insufficient security of personal data in cyberspace. The previous part of the dissertation describes cases where user data was used for manipulative purposes in political campaigns, such as Cambridge Analytica meddling in elections in different countries. However, Meta, the platform from which user data for exploitation by Cambridge Analytica originated, was involved in other cases of data breaches of various scales even after the company received substantial penalties from FTC for failing to adhere to privacy compliance. One of the latest instances of data leak involves the 2021 case when 530 million points of user data scraped from Meta was publicly revealed in an online hacking forum [167]. There were other multiple instances of breaches on the platform in 2019 when at one point, data from over 300 million accounts that included names, user IDs, phone numbers were found on dark web servers (the hidden network that uses non-standard protocols and ports, in many cases used for illegal online activities) [168]. In these two instances data leaks were performed by the malicious third-party entities, however, there was a case when the platform itself gathered user data without their direct consent. It was discovered that from 2016 to 2019, Meta gathered user email passwords for verification purposes but later used the data for targeting advertisements and recommendations [169].

Digitalization also brings many ambiguous consequences for international political communication. One example is the problem of ensuring the confidentiality of foreign policy information: sensitive documents may be stored on poorly secured resources and obtained illegally. Such information can be used for destructive purposes like discrediting or manipulating certain political figures. Occasionally, compromising information appears on resources such as WikiLeaks, an international non-profit organization platform that publishes leaked news and classified media materials provided by anonymous sources. However, in some cases classified military information can end up even of social media platforms. In 2023, a Massachusetts Air National Guard military officer posted photographs of paper printouts with security stamps against the background of foreign objects on the instant messaging platform Discord. As a result, they gained wide circulation on Telegram, Twitter, 4chan, and Reddit. Highly classified documents contained information related to Ukrainian military forces and US intelligence about other countries that include, among others, Iran, South Korea, Israel [170]. What is remarkable about the case is not the content

of the classified documents but the circumstances of their publication. A 21-year-old military member originally leaked them to a public Discord server dedicated to the popular computer game Minecraft. The online group where the documents were leaked consisted mainly of teenagers and young people, who played games and discussed popular politics, among other things. When the first posts with classified information started to appear in October of 2022, many chatroom members did not even understand the contents of the documents and doubted their authenticity. After the highly publicized arrest, the culprit was charged with two counts for violating the US Espionage Act: unauthorized retention and transmission of national defense information and unauthorized removal and retention of classified documents or materials. It is unclear whether the accused had truly malicious intentions; however, in many cases, documents were posted during casual conversations and online arguments. The casual nature of the case is an indication that in the digital age, information security and cybersecurity can be breached and disseminated with an unprecedented level of ease. This example clearly demonstrates that digitalization raises demands on politicians and decision-makers, requiring them to have communicative competence and navigate a complex digital environment. In response to these challenges, political actors are working to protect critical infrastructures. They are limiting access to relevant data, ensuring cybersecurity, and addressing other concerns, as reflected in security documents and legal acts. Nevertheless, no number of protocols and other protective measures can negate the human factor. It is becoming increasingly important because any individual can yield significant power with various digital tools. Digitalization and generative AI capabilities can also facilitate the selection and deliberate falsification of information intended for the mass audience. This, in turn, can lead to further direct or indirect impacts on individuals and groups.

Another feature of the phenomena of digitalization and AI in society is the socalled concept of "vision," which rarely receives attention in academic literature but has a great influence on public opinion [171]. As it was described in the previous part of this work, the concept of an information society and the role of digitalization that will shape it has a serious theoretical and research base, both in philosophical and socio-technical fields. In some cases, conceptual outlines on informatization, digitalization, and especially AI contain references to futurist works and even predictions by visionaries and thought leaders. These concepts become the basis for various state and international development programs for the information society that aim for tangible outcomes and entail substantial social changes. In this sense, "visionarism" currently has considerable and even consequential influence over social and academic discourse on technological development. For instance, the MIT Initiative on the Digital Economy presents itself as "a team of visionary, internationally recognized thought leaders and researchers examining how people and businesses work, interact, and will ultimately prosper in a time of rapid digital transformation" [172]. Many prominent experts and researchers in the field of AI, including technology entrepreneur and Coursera self-learning platform co-founder Andrew Ng, venture capitalist and writer Kai-fu Lee, computer scientist and podcaster Lex Fridman, etc., position themselves as AI thought leaders and

visionaries. Even though most experts have deep expertise in their respective fields, there is a noticeable tendency to make broader predictions about the future of humanity and AI evolution in the popular media. Former Google chief technological officer and futurist writer Raymond Kurzweil has particular media prominence because of his views on transcending human nature and possibilities for immortality [173]. Transhumanism has long been a topic of heated debates between philosophers, sociologists and experts in other fields; however, no one was so bold as to declare that the technological singularity and the rise of artificial superintelligence might happen in the foreseeable future.

In this vein, another prominent author who is responsible for the popularization of the concept of AGI and its risks is the Swedish philosopher Nick Bostrom. In his books, Anthropic Bias: Observation Selection Effects in Science and Philosophy (2002) and Superintelligence: Paths, Dangers, Strategies (2014), Bostrom raises the topic of theoretical existential risk from AGI. Notably, the latter book, which became a New York Times bestseller, describes speculative theoretical scenarios of AI systems evolving to the point of taking over the world and posing existential risk to humanity. It was praised and recommended by well-known entrepreneurs Elon Musk and Bill Gates, among others, who helped to popularize the term "superintelligence" [174]. In response, Professor Emeritus at the University of Washington, Oren Etzioni, wrote in an MIT Review article, "predictions that superintelligence is on the foreseeable horizon are not supported by the available data" [175]. The problematic aspect of these popular science books is that they do not educate the lay audience but create misconceptions about the level of technological development in the field of AI. Moreover, the negative portrayal of theoretical technology often creates prejudice and biases. For example, any existing AI solution or technology resembling it might be harmful to people using it. On the other hand, a part of the audience may be under the illusion of technological breakthroughs and that AI is an omnipotent tool for solving all existing socio-economic problems. These oversimplified views may have serious consequences, such as fear-driven government policies or, contrarily, overconfidence in unproven and untested AI technology.

At present, the economic sector is the most promising environment for the application of digital technologies, and AI in particular. Even before the emergence of more sophisticated AI models, the digital economy ceased to be an abstract concept as electronic payment systems, online commerce and banking, and cryptocurrency began to replace traditional forms of production, exchange and consumption of various forms of goods. Much of the banking system, especially in the United States, depends on the availability of consumer credit. Credit card applications, charge approvals, and fraud detection are now done by machine learning-based programs. There is an argument that thousands of workers have been displaced by the AI models; however, in fact, if one took away the AI programs, these jobs would cease to exist because human labor would add an unacceptable cost to the transactions. So far, automation through information technology in general and AI in particular has created more jobs than has eliminated and has created more intellectually challenging, higher-paying jobs. At the same time, AI tools, namely large language models, jumped from an emerging technology to a mature one between 2021 and

2023. According to the AI Index program, a part of the Stanford Institute for Human-Centered Artificial Intelligence, in 2022, global AI private investment amounted to \$91.9 billion [176]. However, as in any fast-growing field, there is a "hype" effect around AI, meaning promotion strategies that use extreme publicity tactics. Numerous startups use the concepts of AI and digitalization to gather investment and venture capital without adequately researching and applying their technology.

As various cases of computational propaganda have demonstrated, participants of political communication exploit the opportunities provided by the new technologies for their own agendas. One of the current trends is the gradual abandonment of hierarchical interaction in the public sphere that used to establish a balance between the collective and the individual. It is analogous to the market economy and Adam Smith's "invisible hand" metaphor. Much like free-market capitalism, self-regulatory systems emerge, where the government, as well as other regulatory institutions, become redundant as a connecting and managing link to the general audiences [177]. This leads to the absolute optimization of algorithmic processes when people begin to base their decisions on the system recommendations. In some cases, as in the choice of entertainment and educational content, the audience does not even make a conscious, active choice. Instead, recommendation algorithms began to control people's tastes and further behavior. The fact that machine learning systems are based on data about users past preferences and behavioral patterns can create the illusion of impartiality. However, since the structure of these algorithms is the intellectual property of technology corporations, they are often not publicly accessible. As a result, their use is by no means a guarantee of general well-being. In fact, it can lead to fundamentally new forms of dependence - on big data and its operators, or rather, on the interests behind them [177].

A final issue is the explanation and justification behind the AI-based decisionmaking process. Unlike AI models, people can always give a reason for why they made a decision because human decision-making is based on highly selective experience and rules. However, machine learning and deep learning decisions are based on complex equations with thousands of features and millions of parameters. Machine learning "reason" is essentially a thousand-dimensional equation trained from large quantities of data. Thus, a "reason" for producing a given output is too complex to explain fully to a human. Despite that, many key AI decisions are required, by law or by user expectation, to be accompanied by an explanation. A great deal of research is currently underway that attempts to make AI systems more transparent, either by summarizing their complex logic or by introducing new AI algorithms that are fundamentally more interpretable. These downsides of machine learning have caused significant public distrust of AI.

Nevertheless, it should be pointed out that the majority of novel technologies presented such downsides. History suggests that, with time, many of the early errors of new technology will be fixed and improved upon. Examples include the advent of the circuit breaker to avoid electrocution and anti-virus software to stave off computer viruses. There is confidence that in the future, there will be technology and policy solutions to address the challenges of AI influence, bias, and opaque operations. To put it in technical terms, the core of the issue is the simplicity of the objective function and the danger of single-mindedly optimizing a single objective function, which can lead to harmful externalities. Current AI systems are currently optimized for a singular goal and usually do not involve considerations of ethics or audience well-being during the programming stage.

There are many unknowns in the progress of AI, and concerns should be addressed with due caution. However, the fear of the unknown should not stop the advancement of responsible AI development. Rather than ignoring researchers' concerns until the technology is mature, as with nuclear weapons, governments should open dialogue with AI researchers to design regulations that balance practicality with security. AI is already making our lives easier, and its progress will continue to produce practical applications.

Fairness and bias issues with AI will require substantial efforts from all stakeholders to address them. This process includes the following steps:

- First, companies using AI should disclose where AI systems are used and for what purpose.
- Second, AI engineers should be trained with a set of standard principles—like an adapted physician's Hippocratic oath; engineers need to understand that their profession embeds ethical choices into products that make life-changing decisions and thus promise to protect users' rights.
- Third, rigorous testing should be required and embedded in AI-training tools to provide warnings or disallow the use of models trained on data with unfair demographic coverage.
- Fourth, new laws requiring AI audits could be passed. If a company receives enough complaints, it could be AI audited (for fairness, disclosure, and privacy protection), the same way it might face a tax audit if its books look fishy.

## **2.3** The Digital Transformation of Political Communication and the Role of Artificial Intelligence in Shaping International Discourse

As the preceding parts of this dissertation have established – technological development entails the constant transformation of social and political life at the national and global levels. Currently, digital codes are intensively replacing linguistic constructions and narratives in public communication and messages aimed at mass audiences. This makes digitalization one of the imperative factors that shape modern communication and further ascertains Marshall McLuhan's postulate that "the medium is the message". In it, the message becomes a change in the scale, pace, or pattern that an invention or innovation "introduces into human affairs" [178]. While numerous examples of AI usage have demonstrated a strong push for the implementation of digital technologies in all spheres of life, even at their nascent stages, there is also an urgent necessity for their analysis and comprehension. This necessity arises from the need to form theories that can accurately assess the current state of political communication, anticipate the prospects for its future development, and offer effective strategies for swift response to the constantly changing political landscape. The evolving role of communication processes predetermined scientific interest in political communication. This led to the emergence of various approaches to its study, which took shape in a separate scientific direction. In some of them,

political communication is studied as a defining element of the political system, while in other cases, it is analyzed through the prism of the actor interaction.

The new role of communication processes predetermined scientific interest in political communication. It led to the emergence of various approaches to its study, which took shape in a separate scientific direction. In some of them, political communication is studied as a defining element of the political system of society. In contrast, in other cases, it is studied through the prism of the interaction of its actors. At the moment, political communication is the subject of study in political sciences, which includes political theory, sociology, psychology, history, linguistics, and many other areas of social and humanitarian knowledge. There is a vast body of research on the very concept of traditional political communication that indicates it as one of the fairly developed academic areas.

In the most general terms, political communication can be characterized as a process of information exchange between different political actors, carried out during formal and informal interactions. Certainly, there are numerous other definitions of the concept of political communication. For instance, within the framework of political theory, its key conceptual aspects serve as the foundation for building models that explain communication processes in politics, particularly in relation to power distribution, political decision-making, political behavior, and more. However, in this work the author considers political communication primarily to be a form of mass communication.

There are three main theoretical categories that handle the mass communication approach [179]:

1) pre-war theories, exemplified by the works of Walter Lippmann, who argued the ability of the media to manipulate public opinion with virtually unlimited influence;

2) post-war theories of political party support and persuasion;

3) modern theories that focus on methods of information influence during election campaigns, content resources, and technologies, media, and party strategies to engage the audience.

In the section "Application of Artificial Intelligence in the Media" of this work, the author illustrates how traditional media lost its privileges of agenda setting and gatekeeping of public opinion. The mass media aspect of political communication is also undergoing changes, and the first two categories are gradually losing their relevance in the current environment.

The pre- and post-war theories consider non-marketing approaches to political communication. Non-marketing ways of organizing information flows and political communication rarely consider such factors as the audience's demand for particular information. Activities such as propaganda or political campaigning take place based on the communicator's interests (e.g., positions, resources, intentions) and at the time and place they deem necessary. This is partly because the initiator of such political communications considers the audience unaware of the desired agenda and, therefore, unaware of their own information needs. In principle, non-marketing communications have been quite successful in the past when audiences had a limited choice of content and media resources. In some cases, the audience was exposed to the information,

even when they were unwilling to receive it. This is the reason why radio transmission and agitational banners have been popular propaganda tools in public places, such as city squares and streets, in the past century.

The last theoretical category considers marketing approaches to organizing political discourse. Scholars see political marketing as strategies to follow and public opinion during election campaigns to tailor candidates' examine communicative strategies [180]. Marketing methods also revolve around the concept of supply and demand for the favored information by the general public. They are designed to persuade a person to make an independent assessment of facts and a conscious choice about their behavior. In addition, political marketing is a set of activities that form a positive image of political institutions, leaders, ideas, programs, and concepts in the public mind. One of the most suitable definitions of marketing methods of organizing political information was formulated by Grachev, who stated that: "the scope of the concept of "political communication" in its most general form should include the entire set of phenomena of information impact and interaction in the sphere of politics associated with the specific historical activity of political actors regarding power and power-managerial relations in society" [5]. There is a connection between political consciousness and behavior, which can be viewed as a psychological search examining the mechanisms for implementing values and principles [181, p. 135].

As communicative technology progresses further and erodes the boundaries between media and the audience, they become the main vehicles of political communication and participation. Digital technology brought the proverbial "town square" to the people's personal space, into the screens of the devices they carry virtually everywhere. Conversely, with low barriers to entry into public discourse, any individual can turn into a political actor and attract their own digital audience. And machine learning-based recommendation algorithms embedded in social media platforms can personalize this public space, tailoring media content to the characteristics and preferences of each individual user. This practice has become widespread in modern marketing and political messaging. However. if personalization of the political content through recommendation algorithms is the process to some extent invisible, the symbolization of information flows, mentioned in the earlier chapter of this work, is the factor that draws increased attention to the role of AI in politics.

Political communication is a multidimensional and dynamically developing phenomenon, and the academic community reacts very quickly to its realities. In ongoing research, various manifestations of this phenomenon of current changes are referred to. But at the same time, they do not remain purely speculative concepts; educational institutions of higher education have been studying relevant academic disciplines for several years and preparing educational publications on political communication for various areas of training. Concurrently, it should be noted that information of a public nature, coming from political leaders of the leading subjects of international relations, usually turns out to be in great demand and attracts great public interest that is usually reserved for the messages of popular entertainment nature. This effect is enhanced in the case, for example, by the appearance of policy statements and detailed articles by politicians of world importance in the transnational media due to significant informational occasion or prepared on acute issues on the political agenda.

Nowadays, the development of digital technologies has allowed the exchange of information in society and its political system to develop both linear and interactive models. However, interactive communication models are beginning to prevail as modern communication concepts increasingly acknowledge the limitations of the approach that relies on a direct, linear impact on the audience because they do not account for the complexity of current communication technologies. As a result, modern political discourse is oriented towards a dialogical mode, where interaction between subjects and objects of politics occurs on equal terms. For instance, many individual content creators on social media platforms have a bigger following than politicians or political parties. There is also a rise in citizen journalism that can also illustrate this phenomenon. Nowadays, individuals can report and comment on the latest news and gain more attention than traditional media outlets.

Notably, the development of digital platforms, especially social media, has also allowed the founders of technology corporations to become authoritative figures in the eyes of the public. This is because social media has become a new platform for information flow between government representatives and mass audiences and, in many respects, has replaced traditional media. Historically, owners or executives of traditional media outlets usually did not seek the spotlight of public attention, which starkly contrasts with modern days. For instance, Mark Zuckerberg is a co-founder of Facebook and CEO of its parent company, Meta Platforms, which also controls Instagram and WhatsApp instant messaging services. He is in the constant media spotlight because of his control over one of the largest social media platforms and instant messaging services in the world. Interestingly, tech magnates from different sectors of the economy try to have influence over the social media industry, such as Elon Musk, founder and CEO of Tesla Inc. and SpaceX. Musk underwent a highly publicized buyout deal over the Twitter social media platform and later renamed it to X. Another example is the attempt by US President Donald Trump to create a new successful social media platform, Truth Social, launched on February 21, 2022 [182]. Created by Trump Media & Technology Group, it was modeled after Twitter, where Trump enjoyed a massive audience following previously. However, Truth Social did not become successful platform. It has a limited audience and is under strict legal scrutiny.

In the era of instantaneous and group communication, one can see an increase in networking practices, where people join with others with similar principles and views. At the same time, there is an increase in protest movements since antiestablishment attitudes can quickly spill over from digital environment into the physical one. Modern protest movements most often originate online and, despite lower coordination, are quicker in call for action. An example is the protest movements of the previous decade, when, with the help of new media, waves of revolutionary attempts and civil society activism emerged in developing countries in a relatively short period called "Twitter revolutions". The term, which replaced the earlier concept of "color revolutions" in the post-Soviet region, was chosen to demonstrate the role of social media platforms as the main communication tool in the activist movements. The development of social networks and the affordability of mobile technologies widened the geography of democratic protest activities. The movement that first started in 2009 in Moldova also began in authoritarian Middle Eastern countries that included Tunis (2010-2011), Iran (2009-2010), Egypt (2011), and later Turkey (2013) and Ukraine (2013). Generally called the "Arab Spring," the movement engulfed almost a dozen countries and resulted in not so much the fall of individual national regimes as the formation of a new type of threat to the traditional notion of the state as such. These political changes were reflected in the mass media. For instance, in 2011, Time magazine recognized the abstract protester as the Person of the Year, illustrating the empowerment of individuals to challenge the governing establishment with the help of digital technologies [183].

However, the practices of spontaneous bottom-up protest movements formed during the Twitter revolutions are gradually becoming another tool for traditional political actors. For example, the mobilization through digital platforms was the main strategy during the January 6, 2021, storming of the United States Capitol. At the time, US President Donald Trump attempted to overturn the 2020 election and used his online presence for support gathering. As a result, shutting down the Internet and limiting access to social networks is the primary reaction to non-peaceful protest movements in many countries, as was the case during the January unrest in 2022 in Kazakhstan.

The significance of digital communication in modern politics is also underlined by the emergence of the reverse trend to Twitter revolutions called "Twitter diplomacy" or, in some cases, "Hashtag diplomacy". Political actors, such as heads of state and prominent politicians, actively participate in current trends and public discussions on social media platforms, foregoing traditional media outlets. This allows direct communication with the audience and the ability to shape informational narratives without the involvement of the mass media. Official social media pages of government representatives often reflect the main goals of the country's foreign policy and become good indicators of the political involvement of various public figures in current events. At the time of writing this work, the official Instagram page of the President of Kazakhstan, Kassym-Jomart Tokayev, has 2.6 million subscribers and 416.5 thousand subscribers on X, substantial in the country with a population of 20 million. During the aforementioned US Capitol events, Donald Trump's Twitter page amassed over 88 million subscribers [184]. The main downside of digital diplomacy practices could be the involvement of the social media platforms themselves in different political events instead of being impartial tribune for the political communication participants. The incident of January 2019 is noteworthy when, after proclaiming himself the interim president of Venezuela, Juan Guaido [185], Facebook and Instagram removed special "chips" of authenticity that should verify the accounts of a public person from the official pages of President Nicolas Maduro but spared the authentication marking on the Guaido's pages. In another case, Facebook, Instagram, and Twitter suspended Donald Trump's accounts as a response to the US Capitol Storm. These instances can be a starting point for the

conceptualization of a possible new source of legitimacy of power, which in the future can be called digital or network power.

The complication of communication processes in the modern world and the emergence and development of new forms of public policy and diplomacy lead to an objective need for new means of production, storage, and processing of information, the physical volume of which is growing exponentially. Comprehensive computerization and automation, which have remained significant since the last third of the 20th century, have created a strong paradigm dependence on the hardware and software of participants in public relations. The network approach to these technologies has, in turn, predetermined a new dimension of interdisciplinary discourse in the field of digital technologies. This change has influenced both methods of communication and reshaped the roles and strategies in public relations simultaneously.

Digital technologies have provided audiences with tools to express their preferences in a way that is accessible to everyone, with the lowest material and transactional costs of all kinds. At the same time, they have also become the leading platform for social engagement and political participation. In modern conditions, the fastest response to these developments has been from the side of the highly competitive market environment. However, political and, more broadly, social preferences have a wider context of interest: the articulation of a political position is an example of a need that requires an individual to fulfill it, and knowledge of people's opinions, in turn, is an absolute need for any political force. Until recently, the Internet and other similar network technologies were seen as the main tools that enable these communication interests to be realized. Nevertheless, technological breakthroughs in the field of machine learning and generative AI are becoming a new influential factor in all forms of digital interactions. At the same time, the importance of these emerging technologies in the context of the transformation of political relations is recognized both by those researchers who are convinced about its positive role, those who consider it as a kind of inevitability and new reality, and those who are critical of its effects and consequences.

Digitalization has touched upon virtually every aspect of modern life: on an individual level, they involve everything from leisure time to work and education, and on national and international levels, they changed many communicative practices. Experts seek to assess and predict its consequences for foreign policy and international relations. With the rapid advent of AI, numerous active studies have been conducted on their impact on the economy at all levels of analysis. For example, Boston Consulting Group performed extensive field experiments on AI's effects on knowledge worker productivity and quality. The study revealed that AI, particularly the GPT-4 model, significantly increased participants' productivity and performance quality, with two patterns of AI usage emerging: those who delegate tasks and those who integrate AI into their work fully [186]. In comparison, there are relatively fewer studies on the consequences of digitalization and the impact of AI on political communication, including those related to international relations. This circumstance of new communication tools. As a result, the information flows rapidly switch from

one to another without leaving time to analyze their effects. Nonetheless, there are deep-dive explorations on digital diplomacy, shedding light on its complexity and the impact of technologies on international relations. In this regard, the scholars reflect on the upcoming information warfare technologies and information management. They also examine the presence of government departments in social networks in the context of public diplomacy targeting foreign audiences. At the same time, as a form of public diplomacy, digital diplomacy serves as a mechanism for influencing a broader audience through the following methods:

- Online broadcasting of political radio and TV shows;
- Distribution of publicly accessible digital literature;
- Monitoring social media discussions;
- Information sharing through instant messaging;
- Government members' and political parties' social media accounts [187].

The potential of digitalizing international political communication can extend beyond the abovementioned methods. Certainly, it is necessary to consider the ambivalent nature of digitalization in international communication. Digitalization can cause positive and negative consequences depending on specific conditions. Its manifestations can also be highly ambiguous and complex. For example, digital tools allow diplomats to release up-to-date data quickly, digitize it, and share it on various information platforms. This ensures unrestricted and broad access to information, making it truly public. Thus, digitalization can act as a deterrent aimed at limiting or preventing secret diplomacy, discrimination, manipulation, and other negative phenomena in international politics.

As digitalization is accelerating at its pace and generative AI is paving the way for new technologies and their application, the main challenge facing the academic community is to analyze and predict what role new AI-based tools will take in public communication. One of the frameworks that is particularly suitable for this task is the model of historical periodization. It was previously used to analyze the development of radio and the Internet as public communication tools, from their first appearance at the beginning of the 20<sup>th</sup> century to modern days [188]. The author divided technological development periods into four phases:

- **Phase I: Technology** a period when novel technology is only being developed, and its limits are being tested. At this phase, only a small circle of people with expertise in the field understand the science behind it and are more focused on testing and improving the instruments rather than applying them for practical economic purposes. For radio this period was roughly between 1899 and 1923, and 1990 and 1995 for the Internet.
- Phase II: Content experts and enthusiasts continue improving the technology, making it easier to use and more affordable. This leads to the appearance of a new class of users consumers, who are more numerous and demand content to consume using new mediums. Demand for content establishes content producers for the medium as another class of users. Phase II usually overlaps with the developmental phase: 1912-1925 for radio and 1993-1998 for the Internet.

- Phase III: Advertising after suitable content comes into mass production, the number of non-professional consumers increases enough to attract advertisers. Experts and content producers do not always welcome advertising as a revenue model but usually view it as the only viable option for monetization and further technological development. For radio, this period lasted between 1922 and 1929, and for the Internet between 1994 and 2001.
- Phase IV: Advertising becomes content during this period, advertising is firmly established as part of the medium; however, consumers and content producers continue to seek ways to avoid it. This pushes marketers to develop new attractive forms of advertising, sometimes embedding them into content, blurring the distinctions between content and marketing. This last developmental phase was between 1930-1949 for radio and 2001-2008 for the Internet.

This periodization model can be applied to other communicative technologies as well, such as television or periodical press, albeit the period durations would vary greatly. For instance, the initial technological period for the periodical press lasted for a couple of centuries between the development of the first printing press by Gutenberg and the appearance of the first regularly published newspaper. The model described above is used both for analog (radio) and digital (Internet) media. It can also be applied to social media platforms and partially to AI-based technology to outline their developmental path in the future. The analysis of communicative technologies through this model can provide a clearer understanding of their evolution, impact on communication as a whole, and even outline potential future trends.

The first social media platforms, such as GeoCities (later Yahoo!GeoCities) or Classmates.com, were used only by a close circle of Internet enthusiasts in the mid-1990s. With further development of Web 2.0 technologies in the early 2000s, more well-known platforms such as MySpace and Mail.ru Agent appeared, attracting a wider audience of users. Advertisers started placing rudimentary Internet ads on those websites, usually in the form of banners. Later, this technology was perfected by much larger platforms such as Facebook and YouTube, which used advertisement revenue for further expansion. Subsequent development phases are characterized by the appearance of amateur and professional creators who made content specifically for those platforms. Currently, marketers and advertisers cooperate closely with professional bloggers or influencers to promote products and services on different social media platforms, which created a new field known as "influence marketing". In many cases, advertising is embedded within the content that the audience willingly seeks out, such as beauty product reviews and various unboxing content, showing that social media has already reached the last developmental phase.

Applying the periodization model to the development stages of artificial intelligence technology can be a more difficult task because AI instruments with practical application appeared less than a decade ago. AI-based tools, especially generative AI systems, are also not an independent medium of communication but rather being applied as serviceable tools. At the same time, social media websites also are not independent from the Internet. Nevertheless, with the significant increase in

the number of users, they started playing the role of a separate communication medium that was autonomous from other Internet websites. A similar process can happen to AI technologies: it is possible that they will evolve from service tools into independent mediums on their own. The analysis of the technology and its application can help create a blueprint for further AI development as a part of mass media. One of the ways to do that can be the application of the historical periodization model but projected forward using the same sequence of phases, thus creating a model for forecasting the prospective role of AI in mass media (table 3).

Period	Description		
Phase I: Technology	Currently, the majority of generative AI tools are still being improved, and their application limits are being studied by the developers. Despite the ease of use, these applications still demand some sort of training, and the best usage results are delivered by specialized prompt engineers, as in cases of using text-to-code programs (GitHub Copilot) or systems used in scientific research.		
Phase II:	At the beginning of the current decade, general consumer applications		
Content	based on generative AI, such as ChatGPT and Dall-E, appeared, they		
	are attracting the lay audience to try them out for entertainment		
	models for converting purposes or generating images to illustrate the		
	content		
<b>Phase III:</b> Advertising	Developing and training AI models for different tasks is very costly.		
8	According to the CEO of OpenAI, Sam Altman, the cost of training the		
	latest GPT-4 model amounted to more than \$100 million [189].		
	Training custom models can also be relatively costly for individual		
	firms or users. Therefore, developers may welcome advertisers as a		
	source of additional revenue. Various companies may use AI tools to		
	create advertisement campaigns for their products and services,		
Phase IV.	The nature of AI technologies is suitable for unlimited content creation		
Advertising become	for each individual user AI theoretically can customize any type of		
content	content, including commercial content, into the form attractive for all		
	types of users. Technology will also be able to deliver these new forms		
	of advertising content through various means using different smart		
	devices: smart glasses, smart home systems, personal AI assistants, and		
	others.		
Note – Compiled by the	e author		

Table 3 – Forecasting Model of AI Development in Content Creation

The stages of AI-based technology development as a content medium described above, when applied to political communication settings, are more aligned with the political marketing approach. If we look at political marketing as an exchange model where the act of casting votes can be viewed as a transaction [180], then it is especially important to target the audience with suitable content. During the current era of social media platforms and content proliferation that led to unprecedented audience segregation, non-marketing approaches to political communication, such as agitation, are becoming increasingly ineffective. New digital technologies based on generative AI can help overcome these obstacles and elevate mass political communication to individually tailored political conversation.

Under the current conditions, the task of theoretical study of the consequences of digitalization for international political communication and ways to respond to what is happening is being updated. The situation is further complicated by the fact that this communication segment, being both a real-life and actively developing phenomenon, has not yet become a full-fledged independent subject of scientific research.

The foregoing allows us to draw some conclusions. The transition of the development of the world to the digital age has become a reality, which inevitably entails the transformation of the life of societies and international relations. Under the new conditions, political communication is also undergoing changes, including its international segment. At the same time, the changes themselves have not yet been diagnosed and fully comprehended. Judging by the assessments of digitalization and its consequences for international relations in general and international communication contained in the doctrinal documents of developed countries, political actors are at the stage of declaring their intentions. The transition to responding to digitalization, including in the field of international political communication, has not yet systematically taken place.

#### **Conclusions to chapter II**

1. The digitalization of political communication has drastically changed the interaction between various political actors and the public. Shifting to interactive, visually driven platforms like social media disrupted traditional media hierarchy elevating individuals to key participants in politics. However, digital platforms exacerbated issues such as fake news, audience fragmentation, and the emergence of "echo chambers". The ongoing decentralization of news sources by social media challenged traditional media theories that emphasize media dominance over public discourse. In addition, digital corporations started to influence information flow shaping public opinions and political agendas through the algorithms. Therefore, the impact of social media and other digital platforms on socio-political interaction remains complex and uncertain.

2. There are several notable things about new technological transformations. On the one hand, introducing new types of digital advances can blur the line between various traditional political regimes. On the other hand, the deepening relations between digital corporations and governmental institutes leads to the algorithmization of political powers. Algorithmization of powers signifies political institutions borrowing corporate techniques of predictive analytics, ranking, filtering information to study target audiences, manage the political agenda and correct public sentiment. As a result, there are new hybrid actors that have both the power potential and the ability to shape modern politics in their own agendas.

3. Digital technologies gave rise to a new form of digital propaganda – computational propaganda, a practice of manipulating public opinion online through disinformation. In this process, political actors leverage tools such as social bots, fake

news, and content algorithmization to shape public discourse. In comparison to traditional propaganda, computational propaganda facilitates highly targeted and personalized political campaigns that exploit existing biases among the audience. Even though social media platforms were originally designed for social interaction, these latest developments raise concerns about misinformation and automated manipulation in political communication.

4. The influence on political agendas in digital propaganda is achieved by micro-targeted political advertising, data mining, and trolling. Micro-targeting was exemplified by the Cambridge Analytical scandals, when users' personal data was used to tailor political messages. Moreover, digital propaganda became even more accessible with the advent of AI tools by automating content creation and user profiling. AI's increasing role in digital propaganda and diplomacy only highlights its influence on political communication and shaping public opinion.

5. As the pace of digitalization accelerates, it is important to analyze and predict the role AI will take in public communication. Historical periodization model can be used in this task, forecasting development of AI through four main phases: technology, content, advertisement, advertisement as content. At the moment, AI systems are in the technology and content phases of development, attracting both a lay audience and developers. As technology proliferates further, advertising will become an important revenue source, which in turn will lead to AI-based personalized content. In political communication, AI can strengthen political campaigns by tailoring messages to segmented audiences. Therefore, under AI influence mass political communication will transform into individually tailored political conversation.

#### **3** THE INTERSECTION OF ARTIFICIAL INTELLIGENCE AND POLITICAL COMMUNICATION: A COMPREHENSIVE ANALYSIS OF TRENDS, MODELS, AND PUBLIC PERCEPTION

### **3.1** Assessing the Development and Future Potential of Artificial Intelligence in Kazakhstan

As a geographically vast country with sparsely populated regions, developing robust communication and informational infrastructure systems has always been of utmost priority for Kazakhstan. Consequently, there is an urge to introduce digital public services and the modernization of IT-based management across the board. The author of this work views widespread digitization as the cornerstone towards successfully integrating AI into all spheres of politics and economy.

On June 25, 2020, there was an amendment and supplementation on the Law of the Republic of Kazakhstan "On Informatization" dated November 24, 2015, on the regulation of digital technologies [190]. The amendment introduced novel concepts to the legislative body that included "intelligent robot," "national artificial intelligence platform," "blockchain," and "digital asset," among others. Since one of the main goals of this law is stated as "formation and ensuring the development of information and communication infrastructure," the new concepts indicate what the state perceives as the further developmental path of communicative infrastructure. In this case, the amendment shows that new digital technologies, including AI and robotics, are recognized as essential parts of the state informatization initiatives. According to the Law, an "intelligent robot" is "an automated device that performs a certain action or is inactive, taking into account the perceived and recognized external environment." Although there is no separate definition for the concept of artificial intelligence, the definition of the term "national artificial intelligence platform" is a "technological platform designed to collect, process, store and distribute data sets and provide services in the field of artificial intelligence."

The need to amend the legislation arises from the fact that various governmental organizations and NGOs in Kazakhstan are already actively developing various projects to integrate AI technologies in different socio-economic aspects. Early adoption of AI systems is important for both government and commercial organizations, as these technologies significantly reduce operational costs and have higher long-term performance due to advanced learning algorithms. As of the time of writing this work, the platform aimed at facilitating OECD AI principles lists seven projects related to AI and/or digitalization in Kazakhstan. The ongoing projects that address AI directly are: "Artificial Intelligence Research and Development Support Fund," launched in 2019 to promote partnerships among research institutes and universities various educational projects; "Pilot Project on AI for Cancer Research", launched in 2017 and aimed to procure programs for AI R&D and innovation in the medical sphere; "Smart Data Ukimet", initiated in 2018 [191]. Among already implemented projects, the website lists "Digital Kazakhstan" (2018-2022), "Project on Fostering Productive Innovation" (2016-2020), and "Road Map, Focused on The Development of Competencies" (2016-2018). The most successful program that included electronic government implementation and gradual digitalization of the

public space was "Digital Kazakhstan". The program was carried out in the following four key areas:

- 1. "Digital Silk Road" the development of reliable, affordable, high-speed, and secure digital infrastructure and high-quality mobile coverage;
- 2. Development of a creative society enhancing competencies and skills for the digital economy, improving population digital literacy, training ICT specialists for different industries;
- 3. Digital transformations in leading sectors of the economy the widespread introduction of digital technologies to increase the competitiveness of economic sectors;
- 4. Transition to a proactive state improving electronic and mobile government systems and optimizing digital public services.

Kassym-Jomart Tokayev summarized the preliminary results of the program at the international forum "Digital Almaty 2021 – Digital Reset: a leap into a new reality". He noted that over 90% of public services in the country were already digitalized, and they will not only increase the coverage and availability of services but also focus on proactivity and compositeness. Moreover, the market sector for software solutions aimed at the development of AI, wireless networks, and contact computing systems increased by 35% compared to the previous year (approximately \$12 billion). Tokayev also emphasized that the world has already entered the era of AI, machine learning, and neural networks. These developments have great influence over various spheres, including economics, security, medicine, and politics [192]. Table 4 below presents other results of the Digital Kazakhstan program implementation by the end of 2021 [193].

N⁰	Criteria	Outcomes		
1	The share of Internet users in the country	81%		
2	The population digital literacy level	81.5%		
3	Labor productivity growth in ICT	5.9%		
4	Labor productivity growth in "Mining and quarrying"	6.3%		
5	Labor productivity growth in "Transport and warehousing	4.8%		
6	The number of people employed in the ICT industry	110 thousand people		
7	The share of public services accessed electronically out o	80%		
	the total volume of public services			
Note – Source: [193]				

Table 4 – Results of the Program "Digital Kazakhstan"

To analyze the current state and prospects of AI development in Kazakhstan, rather than simply enlisting various developments in this field taking place in the country, it would be advisable to put them in the context of comparative analysis. The author utilizes the combination of SWOT and PEST analysis methods for these purposes [194]. Even though these tools are usually used for strategic planning and management, they can be valuable analytical frameworks to recontextualize changes in technological and social environments. SWOT analysis is an instrument to

examine the internal factors (strengths, weaknesses, potential opportunities, and potential threats) of a given situation or organization. In this particular case, it examines broad conditions for the introduction of digital technologies, including AI, into various spheres in the country. PEST analysis represents a framework of external macro-economic factor analysis of the chosen subject: its political, economic, social, and technological aspects. These two analytical tools, in conjunction, can describe a more nuanced and holistic picture of the digital development state.

#### **Political aspects**

**Strengths.** The political environment for introducing technological changes in the country can be evaluated as generally favorable. The state actively promotes widespread digitalization through national programs such as "Digital Kazakhstan" for 2018-2022, aimed at technological modernization of the country's flagship industries such as mining, metallurgical, processing, and agricultural industries. Target indicators also included creating jobs through digitalization and increasing the population's general level of digital literacy. Even though the Covid-19 pandemic took place during the implementation of this program, according to the progress report at the end of 2019, 32.8 billion tenge was attracted to the innovation ecosystem and over 50,000 jobs were created. At the time, the economic effect amounted to 714.3 billion tenge [195].

Another major state project approved at the time of writing of this work is "Concept of Artificial Intelligence Development for 2024-2029". The rationale behind this concept is to transition digital data management towards real-time collection and updating by eliminating the human factor. The main results of the program include the launch of the Kazakhstani supercomputer by 2025 and no less than 25 AI-enabled solutions developed on the corresponding platform by 2029. In addition, the Concept is not the only state program explicitly addressing issues of AI. A number of strategic documents, such as the "National Development Plan until 2025" and the "Concept of digital transformation, development of the information and communication technology industry and cyber security for 2023-2029," also defines number of tasks and activities in the field of artificial intelligence. These commitments show the country's ambitions to become a leader in the region in the field of AI innovation and digitalization.

Weaknesses. One of the main disadvantages of the political environment in Kazakhstan is corruption. It is a serious hindrance not only to implementing various national projects but also to the socio-economic development of the country in general. Although corruptive practices are particularly difficult to detect and measure, according to the Group of States against Corruption (GRECO) 2022 report, Kazakhstan ranks 102 out of 180 countries. The World Economic Forum survey conducted for the report showed that 80% of young respondents in the country view corruption as the main social problem [196]. Furthermore, reports from various organizations have indicated significant financial losses related to corruption-related offences in the country. For instance, an earlier report by Civic Foundation Transparency Kazakhstan uncovered that corruption-related offenses in Kazakhstan amounted to a staggering 1 billion tenge in 2014 [197]. It is important to note that in relation to corruption, it is possible to report only disclosed amounts. Consequently,

many white-collar crimes remain unsolved, making actual financial losses incomparably larger.

There is also the issue of so-called "anticipatory institutionalization". The term stands for the phenomenon when institutions are being created and financed from the state budget for various developmental purposes in anticipation of the national programs but do not yield any tangible results [194, p. 3]. Usually, anticipatory institutionalization is directly related to corruption when officials allocate the budget with malicious intentions. One such example can be the establishment of a countrywide electronic learning system, "E-learning," in 2012. According to the program, all schools in the country had to be connected to a broadband Internet network, as well as receive the necessary platform for automating the educational process. However, even though the state allocated 35 billion tenge for the program [198], the project failed because of the lack of quality broadband Internet infrastructure at the time and poor management. Problems with the technical equipment of schools came to light again a few years later during the Covid-19 pandemic, when schooling was forced to switch to a distance learning format. Many schools in remote regions reported issues with internet connection and imperfections of distance learning platforms. This case highlights the influence that oversight can have on large-scale projects.

**Opportunities.** Despite serious consequences, the challenges presented by the global Covid-19 pandemic have also accelerated the digitalization process. Most of the bureaucratic services, such as applying for welfare benefits or university applications, are now accessible remotely. This, in turn, leads to more people using these services online and simultaneously providing their data during the process. Increasing availability of real-time data combined with the abilities of machine intelligence can radically change the decision-making process at the state level. It is especially important in forecasting based on incomplete or implicit information. Therefore, it is safe to predict that further demand for digitalization will be required for the foreseeable future at all government levels.

At the beginning of 2024, at an extended meeting of the new government, the Kassym-Jomart Tokayev ordered digital reforms aimed at the acceleration of the country's development. Prior to that, the President identified AI technology integration to the economy and big data analysis as the main priorities for the future sustainable development. This direction was emphasized during the international digital forum "Digital Almaty 2021 – Digital Reloaded: The Leap to a New Reality." [191]

**Threats.** From a political standpoint, one of the biggest threats to the development and integration of AI systems in the country is the looming threat to national cybersecurity. According to the National Cyber Security Index (NCSI), Kazakhstan ranked 78th out of 176 countries on national security and 31<sup>st</sup> out of 182 on global cyber security in 2022 [199]. This international index measures the commitment of countries to prevent cyber threats and manage related incidents. However, the disadvantage of such global ranking systems is that they are rarely able to reflect various nuances of the issues on the national level. One of the weak aspects of cybersecurity in Kazakhstan is personal data protection. In 2019, personal data on

11 million people – including ID numbers, dates of birth, and places of residence – were leaked from the servers of the Central Election Commission. Contrary to expectations, the internal investigation showed the reason for the leak was not unauthorized access to the servers of the Commission, but the banal negligence on the part of the employees. The database was transferred to a third-party contractor without proper precautions, that led to a data leak [200]. This case proves that national digitalization projects might be overly focused on the introduction of digital technologies, neglecting soft aspects, such as the promotion of digital literacy and cybersecurity hygiene among the general audience. In addition, the country lagged in developing its own information systems, borrowing digital technologies and cybersecurity systems from third parties [201]. This, combined with relatively lax regulation regarding cybercrime in the country, are the main potential threats to the implementation of future AI programs.



Figure 5 – SWOT Analysis of The Political Aspects of AI Development in Kazakhstan

Note - Compiled by the author

#### **Economic aspects**

**Strengths.** The IT market in Kazakhstan is one of the most dynamically developing economic areas. Between 2018 and 2022, it showed an upward trend with an annual rate of 9.8%, which amounted to 2.5 billion tenge by the end of the period [202]. In line with global trends, the growth is due to the heightened demand for remote work formats and the proliferation of digital educational and entertainment services. Moreover, the IT sector receives great state support, which provides ample

opportunities for the digital development of the government and commerce. According to International Data Corporation (IDC), the ICT market in Kazakhstan will continue to grow at an average annual rate of 6.48% from 2023 through 2027. The fastest growing sectors are anticipated to be cloud services, IT services, and software, with an average annual growth rate of 21%, 14.8%, and 13%, respectively. This projection depends on the successful implementation of the national program "Accessible Internet" which should cover the period from 2024 to 2027. The program aims to provide the general population and business entities with high-speed Internet access [88]. The World Bank also forecasts that Kazakhstan's economy will grow by 2-4% annually in the next 5-year period, which will also have a positive spillover to the IT sector.

**Weaknesses.** The continuous lack of qualified human capital is one of the main bottlenecks for developing virtually every economic sector in any country. The studies indicate an ongoing shortage of qualified human capital to meet the needs of the labor market in Kazakhstan in conditions of a rapidly changing market structure [203]. This issue is especially pronounced in the IT industry, where there is a significant shortage despite substantial government efforts to cultivate and retain qualified personnel. The latest IDC estimation showed that by the end of 2024 the additional demand for skilled staff will exceed 30 thousand people. In addition, there is also considerable uneven human capital distribution in different regions of the country that exacerbates the digital divide. The IDC report shows that in regional terms, the majority of IT personnel are concentrated in two major cities: 38% in Almaty and 33% in Astana. In western regions, this percentage amounts to 8%, in the north - 7%, and 5% in central regions. Southern and eastern regions show a concentration of IT human capital of 4%. [202, p. 117].

Another serious obstacle faced by the local IT sector is the relatively high concentration of public and quasi-public sectors in economics. According to various estimates, the government's share in the annual GDP can be as high as 50%. For comparison, OECD standards recommend that the state's share should not exceed 15% for sustainable economic development. Not only does this situation negatively affect the competitiveness of the local companies, but it also forces the Kazakhstani IT market to form around government procurement. At the same time, there is a lack of IT specialists needed to digitalize government services, and the problem is only exacerbated since the government sector jobs have historically lower wages in comparison to private IT companies.

**Opportunities.** Kazakhstani financial technology (usually referred as fintech) is experiencing an unprecedented development in recent years. The active use of digital banking services and so-called banking "super apps" by the general population pushed local fintech market to become one of the fastest growing in Asia. Local banks are actively integrating financial and non-financial digital services on their platforms, thus creating digital ecosystems for personalized experiences. Another expeditiously growing service type is the so-called govtech (government technologies) embedded into banking applications. According to the official report on the international forum Digital Bridge 2022, during the first 8 months of that year, more than 8.5 million users visited the "Government Services" section on the

Kaspi.kz banking application [204]. In addition, fintech companies are also actively introducing AI-based instruments into their platforms. These include visual facial recognition systems used by banks like Jusan and Kaspi for user identification or issuing instant cash loans. In 2022, the National Bank of Kazakhstan announced plans to launch its own national Open API platform that will reduce the costs of integration with other fintech services [205]. Other unique conditions for the development of the IT and fintech industry by the government include various tax benefits. For instance, in the Astana Hub technology park, there is a zero-tax rate for IT companies in addition to the preferential conditions for their placement and various acceleration programs.

**Threats.** In developing countries, high taxes can negatively affect certain sectors' development. From January 1, 2022, the state introduced a value-added tax (VAT) in the amount of 12 percent for foreign Internet companies that sell their goods and services in Kazakhstan. This tax is commonly referred to as digital tax, and Kazakhstan became one of the first countries in Central Asia to introduce it. It yielded 10.4 billion tenge in 2022 [206]. In 2023, the tax revenue amounted to 24.3 billion tenge. As of 2024, more than 80 international companies are among the list of taxpayers, which include corporations such as Google, Amazon, and Temu. Changes to the Tax Code, which provide for the obligations of foreign companies, are intended to equalize the competitive conditions for residents and foreign companies.

However, the introduction of digital taxes has also its disadvantages in the form of harming local start-ups at the initial stage of their expansion [207]. This contradiction lies in the fact that as the most technologically intensive and complex industries, the IT sector is also the most import-dependent industry in the country. On the other hand, modern economic globalization trends enable multinational technological companies to exploit gaps and differences in various national tax rules. This, in turn, creates tensions against traditional tax concepts and pushes smaller foreign technological companies to relocate to other areas or increase the price of the imported products and services for local companies, impeding the digitalization process in the region overall.

#### **Social aspects**

**Strengths.** Social mobility is one of the key indicators of public welfare. This indicator includes many criteria, such as access to education, social protection, quality healthcare, fair employment opportunities, and lifelong learning, among others. The first Global Social Mobility Index, presented by the World Economic Forum in 2020, ranked Kazakhstan 38<sup>th</sup> among 82 countries in the study [208]. According to the report, the country also ranked 32<sup>nd</sup> in access to education and 33<sup>rd</sup> in education quality and equity. As a major contributor to social mobility, education is also responsible for the scientific and technological foundations for future developments in all areas, including digitalization and AI integration. There are many initiatives aimed at fostering research in higher education.



Figure 6 – SWOT Analysis of The Economic Aspects of AI Development in Kazakhstan

Note – Compiled by the author

According to the Ministry of Science and Higher Education, 24 universities and research centers are currently engaged in research or development of AI, with Nazarbayev University being the leading institution in the field. Nazarbayev University Institute of Smart Systems and Artificial Intelligence (ISSAI) to date implemented several projects on the use of the Kazakh language such as open-source Kazakh Speech Corpus 2 (KSC2) and KazNERD, a dataset for recognition of registered organizations in Kazakhstan.

Another noteworthy initiative is the Atlas of New Professions and Competencies. Commissioned by the Ministry of Labor and Social Protection in 2021, it presents major changes in occupations for the next decade [209]. The Atlas uses the Foresight methodology to make predictions about occupations and competencies that may be already in demand or will appear in the labor market. Currently, leading universities update their curricula in emerging areas such as machine learning, data science, cybernetics, AI, robotics, and data journalism in accordance with the Atlas.

Weaknesses. One of the acute problems of social development, in relation to technological development, in the Central Asian region is the issue of digital inequality. This issue is usually centered around access, or lack of access, to be more precise, to ICTs. 2020 UN E-Government Survey indicated that Kyrgyzstan, Tajikistan, and Turkmenistan showed significantly lower levels than the global average (54%) of the population internet connection (38%, 22%, and 21%,

respectively) [210]. Compared to its neighbors, in Kazakhstan, even rural areas have higher levels of Internet access – 76% of rural settlements are provided with mobile broadband access. However, the vast territories of the country increase the cost of building and maintaining telecommunication infrastructure. Combined with the fact that Kazakhstan has one of the lowest population densities in the world (less than seven people per square kilometer), there is always a risk of increasing the digital divide between urban and rural areas. Digital inequality between regions creates potential for informational and knowledge asymmetry and may lead to the distortion of technological innovation. In 2021, the average level of digital literacy among Kazakhstanis aged between 6 and 74 was 79.6%, with the lowest level at 68.9% (Akmola region) and the highest at 87.2% (Almaty city) [211].

**Opportunities.** The path towards technological modernization and digitalization that is already showing significant advances in fintech and government service should ultimately lead to innovation in other social spheres. One of the most promising areas in Kazakhstan in this regard is medical technologies or medtech. Recent advancements in this field include projects aimed at remote medical services, robotics and AI in healthcare. World Bank-funded project "Kazakhstan: Fostering Productive Innovation" contributed to the implementation of the PneumoNet program, AI diagnostic solutions to accurately identify seventeen of the most pathogenic lung diseases, including tuberculosis, pneumonia, lung cancer, and Covid-19 with high speed [212]. Currently, Almaty A.I. Lab is developing the project Cerebra, based on the machine learning methods, the program for diagnosing early signs of stroke of the patients. Both these projects not only contribute to the healthcare system in general but also improve access to quality diagnostics in remote areas. Thus, potentially decreasing existing digital divide in the country.

Another fertile social sphere for fostering innovations is the concept of "smart cities". For instance, in 2020, the Kazakh Ministry of Digital Development, Innovations, and Aerospace Industry, with the support of the World Bank, initiated the Smart Cities and Artificial Intelligence (SCAI) program. The objective is to improve the quality and accessibility of private and public services based on the collection of local data, targeting certain cities in the country [213]. In 2023 a pilot project for the system of public and road safety "Sergek" (can be translated from Kazakh as vigilant or watchful) launched in Almaty. The system can detect when vehicles do not stop for pedestrians at the crossroads, or when they are in the same intersection zone. These efforts contribute greatly to the introduction of AI-based technologies and provide for the improvement of the well-being of the population.

**Threats.** The biggest threat that automation and AI can present to modern society is the likelihood of mass elimination of jobs. Contemporary research related to government transformation consistently identifies digitalization as the most relevant direction of the civil service in the future. According to a report by the International Labor Organization [214], Citi, Deloitte, together with the Oxford Martin School [215], held a debate on the prospects for future automation of public service and business. The conducted studies and assessments led to the conclusion that the risks of computerization are moderately high because about 40-56% of all jobs in the subsequent 10-20 years will undergo automation. The Citi report stated

that in two decades, 47% of all US jobs will be replaced by robots. In the next 10 years Deloitte predicts a similar transformation of 35% of the UK labor market; according to the International Labor Organization in the countries of the Association of Southeast Asian Nations this figure will reach 56%. Recent developments in the field of generative AI are believed to further upend the labor pool. According to the McKinsey 2023 report, up to 30% of all hours currently worked in the US economy could be automated by 2030, which can lead to 12 million occupational transitions, with more than 84% accounting for food and customer services, sales, and production work [216].

Despite the active implementation of AI technologies in various socioeconomic spheres, there is no legislative regulation for AI systems in Kazakhstan. As was already mentioned above, Kazakhstani legislation introduced the concepts of "intelligent robot" and "national artificial intelligence platform", but there is no clear definition for the concept of "artificial intelligence" itself. Capabilities of generative AI show that it can greatly affect knowledge workers and streamline white-collar tasks, thus driving down wages. While the process of automation in manufacturing and changes in the workplace is incremental, even a potential reduction in jobs can have large negative effects in society in terms of the perception of AI in general [194, p. 4].





Note - Compiled by the author

### **Technological aspects**

**Strengths.** Modern digital infrastructure and sufficient computing power are the foundation of AI development, and in the beginning of 2024, the state announced its plans on a project for building a supercomputer and the construction of a corresponding data processing center by 2025. The Ministry of Digital Development, Innovation and Aerospace and the largest investment holding Samruk-Kazyna signed an agreement with UAE-based Presight AI Ltd on creating the supercomputer [217]. It is projected not only cover the computing demand for the local IT market but also export computing power to the neighboring countries that lack such equipment. The supercomputer will create necessary provisions for the development of national AI platforms. The project will be part of Smart Data Ukimet, a platform designed to collect, store and analyze data from government agencies' information systems. This should lead to a 20% increase in public services that use AI by 2029.

Another positive development in the national AI field is the recent announcement of launching Kazakh language LLM – Irbis GPT – that will be an additional stimulus for the growth of the IT sector and the digital economy in the country. Advanced infrastructure in combination with developed AI systems will become an impetus for attracting investment in the high-tech sector and the development of the startup ecosystem.

Weaknesses. R&D expenditures are one of the most important conditions for the sustainable economic development of a country. However, compared to developed countries where this indicator can reach up to 3-5%, Kazakhstan's R&D expenditure level remains relatively low. The country's strategic development plan specified increasing the share of GDP spending on science and research to 1% by 2025. Despite these plans, the National Bureau of Statistics indicated that the share of domestic R&D expenditures in the ratio to GDP was only 0.12% in 2022. It did not exceed 0.13% in the period between 2017 and 2023 [218], more than seven times lower than the target amount. The low share of GDP allocation can negatively impact the structure and quality of technological innovation.

Furthermore, the main burden of subsidizing domestic expenditures on R&D fell on the national budget – in 2020, almost half of all the projects in the field were state-funded (48%). This share was 13.7% higher than a year before. This indicates that the national R&D industry is not attractive enough for the private sector to invest in it. One of the main reasons for the low business investment is dependency on foreign technological supplies. This is especially relevant for the local IT companies, which, in theory, should be more engaged in developing local research capabilities.

**Opportunities.** One of the main advantages in Kazakhstan for future AI system development and integration is a high level of digitalization. According to the 2022 UN E-Government Survey, the country has the highest e-government development index among landlocked developing states and already successfully digitalized significant industrial sectors, such as logistics and transportation [219]. The development of 5G and fiber optic networks also facilitates the spread of innovative technologies across a wide range of sectors. In addition to the government sector, another important field for the integration of digital technologies is traditional industries dominating the structure of the economy such as oil and gas, mining and

metallurgy. For instance, already involved in some industries, there are remote systems for real-time visual processing of large flows of information from field facilities and their subsequent analysis to quickly respond and improve the production process in the fields. There is a trend towards automated deposits that can be controlled and managed by remote expert teams located in different countries [220].

**Threats.** The AI development concept for 2024-2029 indicates the absence of technical standards for the products with AI components as a serious impediment to further advancement in the field, especially in their practical application. This is because the lack of corresponding standards creates difficulties for the expert examination of AI systems. One of the given examples in the document involves an examination of recommendation systems with predictive analytics – the systems planned to be implemented in the automation of state decision-making processes. Without clear technical standards, it might be problematic to determine what level of prediction accuracy is sufficient for use in government services. The experts should also decide when and how often predictive AI models should be retrained on these systems' incoming data and level of transparency. Moreover, other legislative documents in addition to the law "On Informatization" should regulate AI-based programs and their use in different sectors because the lack of proper control led to the proliferation of substandard AI programs in commercial and public spheres.



Figure 8 – SWOT Analysis of The Technological Aspects of AI Development in Kazakhstan

Note - Compiled by the author

The overview summary of the analysis of the current changes in various socioeconomical programs aimed at supporting the development of advanced AI systems in the country are present in the combined SWOT and PEST analysis table below (Table 5). It highlights opportunities and challenges that form current AI landscape in Kazakhstan.

SWOT / PEST	Strengths	Weaknesses	Opportunities	Threats	
Political	Strong state	Public	AI and digital	Danger to	
aspects	support	corruption	acceleration	cybersecurity	
Economic	Fast-growing IT	Low human	Developing	Adverse digital	
aspects	market	capital	fintech and govtech	taxes	
Social aspects	High social	Digital divide	Openness in	Possibility for	
	mobility and	between	other social	job losses	
	access to	regions	spheres, such as		
	education		healthcare and		
			smart cities		
Technological	Cutting-edge AI	Insufficient	Advanced	Lacking unified	
aspects	technology	GDP spending	digitalization	technical	
	development	on R&D		standards	
Note – Compiled by the author					

Table 5 – Combined SWOT and PEST Analysis of AI Landscape in Kazakhstan

For Kazakhstan to advantageously utilize the full potential of AI technologies and related technological boosts, there is a need in joint efforts on the part of the state, various organizations, private businesses, and residents of the country. The government should bear the responsibility to build and maintain the necessary infrastructure and environment to promote technological innovation. In addition, its role in fostering the development of local AI models and in-depth analytics, as a major customer of such technologies, in the private sector is also crucial. At the same time, private businesses can make significant contribution by organizing and labeling available data for use in AI implementation and advanced analytics technologies. The widespread adoption of digital technology to increase the pace of innovation will also contribute to implementing technology use cases in business. At the population level, there is an ongoing process of adopting AI and other digital technologies to facilitate everyday life that still require cultivation of digital work methods.

# 3.2 Global Forecasting Model for The Evolution of Political Communications with Artificial Intelligence Integration

AI and modern political communications are both actively developing research fields where the body of academic publications has grown exponentially in recent years. At the same time, these two concepts in combination create a brand-new field, with many of its areas only being at the theoretical stage. It is also important to note that compared to other social fields, media and communication studies, that political communications are part of, are in a constant state of permanent change. The theories that scholarly work uses to explain this state of permanent turbulence play the role of a prism that can highlight some of its aspects while downplaying other aspects depending on the theoretical framework being used. However, because the emerging field is in constant need of research and data collection, there is also a demand for models that can function as a road map for further exploration and theory construction.

The introduction of AI can be compared to the invention of a telescope and microscope in the 17<sup>th</sup> century because they accelerated empirical research to an unforeseen pace. Likewise, AI-based programs can also ignite the already fast-paced nature of modern political communication. It can offer solutions for both content creation, duplicating its variety without substantial changes to the meaning and distribution through personalized communication channels. At the same time, like Web 2.0 and social media platforms, AI can empower unconventional actors and level the playing field for all participants of the political discourse. The combination of these factors changes the nature of communication, requiring new models to adapt to the novel dynamics of this process.

As a verbal or diagrammatic representation of mass communication processes, communication models are usually divided into three categories: linear, interactive, and transactional [221]. Linear communication models present communication in a sequential, one-directional way. In linear communication, the information flows in one direction from the communicator to the audience. The earliest communication models were linear, including Lasswell's, Shannon-Weaver's, and Berlo's S-M-C-R (Source – Message – Channel – Receiver) communication models. Among those, Lasswell's communication model can be seen as a foundational model that focuses on the key elements of the process.

In 1948, Harold Lasswell, one of the founders of modern political science, proposed the now fundamental communication model based on the following questions: "Who" – "Says What" – "In Which Channel" – "To Whom" – "With What Effect?" [222]. Lasswell believed that instead of dividing the subjects of these questions into different research areas, this model instead allows one to focus on the act of communication in relation to the social process as a whole and examine its "structure and function". As with any simplified model, it was later criticized for the absence of nuances such as the context in which communication happens and not reflecting an extensive range of communicative aspects. Moreover, since the model presented a straightforward linear information transmission mode, in the later decades, researchers suggested including a "feedback loop" in the model. A decade later, Richard Braddock presented his extension to Lasswell's communication formula that included additional questions such as "Under What Circumstances?" and "For What Purpose?" [223], giving the model some interactive characteristics.

Despite its unidirectional presentation, Lasswell's model to these days does not lose relevancy due to its adaptability to constantly changing mediums and communication technology. It is particularly noteworthy that when the model was first envisioned, television was just entering into mainstream mass media, and radio and periodical press were the predominant public mediums. The main criticism of the model for being one-directional communication can be rebuffed with the argument that public communication at the time did not have the inbuilt feature of receiving feedback from the audience. When discussing traditional forms of public communication, where the role of the tribune ("In Which Channel") is assigned to the conventional mass media, specifying the direction of information flow was negligible. Since traditional mass media is characterized by limited audience participation, the direction of communication can go only in linear form from the communicator to the recipient. Moreover, such communication would be vertical in nature because the communicator would have more control over the transmitted message.

However, accompanying the technological development in the later decades of the 20<sup>th</sup> century, there was a surge in the emergence of new media and commutation forms. This led to the emergence of interactive models that are currently based on internet-based communication, but they also involve communication through telephone or letter exchange. To this category belong Schramm's and Westley and Maclean's communication models. These models emphasize dynamic nature of communication and highlight the importance of interaction between senders and receivers of the messages.

Schramm's model was proposed around the same period as Lasswell's model in 1954 and offered an alternative perspective on the process of communication. It is circular in nature, consisting of the source and destination of the message and the feedback loop. If Lasswell's model focused on the direction and participants of the communication, Osgood-Schramm's model's focal point is the actions of message senders and receivers. They consist of encoding, interpreting, and decoding there hierarchical differentiation information. Moreover, is between no communication participants in this model; the initial message and the feedback are equally important [224]. Westley and Maclean's model also features a feedback feature, but it focuses on environmental factors. Those factors, usually depicted as X1, X2, X3, and Xn, are "objects of orientation" or socio-cultural influence that form the message of the sender to the receiver. This model also features an additional component of the channel that plays a gatekeeping role that usually occurs in mass communication [225]. It is noteworthy that in the linear communication models, channel represents how or the way the messages are conveyed. In both Schramm's and Westley and Maclean's models, feedback plays a crucial role that not only equalizes parties of the communication but also can modify the initial sender's message. Moreover, the importance feedback during communication became even more prominent with the emergence of Web 2.0 technologies, when Internet users got the opportunity to participate in mass communication. However, the models were too simplified and could not reflect the more nuanced aspects of communication.

One of those nuances is that during communication, the message does not simply go back and forth but allows communicators to create shared meaning, often during dynamic interaction. This is the central notion that transactional communication models are based on. For example, Dance's Helical model, published in 1967, presents the communication process as an upward-expanding spiral and it can move both forward and backward along it. This non-linear nature of communication of the model shows it as complex process, where both parties contribute to it. Usually applied to interpersonal communication, the spiral that depicts conversation is at its most narrow point at the base because, in the beginning, interactions usually start very simply. As the conversation progresses and becomes more complicated, the spiral uncoils and expands. The author of the model, communication professor Frank Dance, believed that communication does not make a complete circle through a feedback loop as in interactive models, but rather previous messages influence the content of the following messages [221]. Thus, learning from existing data and adjusting communication accordingly is the main concept of this model.

Another significant model that belongs to this category is Barnlund's transactional communication model. Barnlund presented a multi-layered circular system where the main focus of communication shifts from simple message exchange to creating a shared meaning from internal and external cues. Those cues include public or environmental, private, and behavioral [226]. First published in 1970, like Dance's model, it is also applied to interpersonal communication. Both Dance and Barnlund believed that other factors, in addition to the sender's initial intention, shaped the meaning created during the interactions between two people. This is a distinctive feature of the two models, and the reason for that may be that in the late 1960s and 1970s, when they were first proposed, dynamic, active interaction was possible only during interpersonal communication.

Digitalization led to the convergence of traditional forms of journalism and the proliferation of different communication platforms such as Internet forums and social network websites. Under such circumstances, the direction of the informational flow started to change, becoming a more important factor in communication. Currently, a linear communication model cannot explain the roles of communicators and recipients or explain the effects of the transmitted messages. The influence of digitalization and the proliferation of social media led the linear mode of communication to "rotate" and transform into the interactive mode. Moreover, since the communicator ("Who") and the recipient ("To Whom") of the communicative process remain largely unchanged, the most impactful factor in this shift of information flow is the channels that they use. The models of communicative process depend on the characteristics of the mediums and their functional possibilities. Regarding the advent of AI and the changes that these systems have been introducing to the different communication mediums, it suggests that with further development they can transform the communication platforms completely. These changes in the communication mode as AI-based systems evolved are partially described in the "Forecasting model of AI development in content creation" in the earlier chapter.

To explore this concept of how communication changes further, the author of this work proposes different models of communication in political communication of different platforms that correspond with different periods of mass media development as below:

- Linear model political communication during the period when traditional mass media were the main public communication medium.
- **Interactive model** political communication of the modern period, when mass media transitioned to the Internet and now is competing with social media platforms for audience attention.
- **Interactive model** political communication with the integration of AI systems in the main communication platforms.

Each of the models is based on classical communication models, expanding on it, taking into account different periods of technological development. Therefore, the three models illustrate how political communications are evolving along with different technological advances in mass communication. The progression from one model to another shows how political communication adapts to emerging technologies and communication platforms.

#### Linear communication model in political communication

Technological breakthroughs and the emergence of new forms of media turned the 20<sup>th</sup> century into the era of mass communication. Taking their roots in the prior century, the invention of telegraph and radio eliminated physical communication barriers, bringing the main political actors closer to the general audience. In contrast to the past, one could not only read about historical events and government decisions on the pages of the periodical press but also hear about those events and later see them with one's own eyes. At the same time, even the very notion of the term "audience" changed during this time, from the spectacular witnessing of events such as public speeches to a more abstract and distant concept of people receiving messages through different communicative channels in removed locations. The audience, no longer confined to space and time, e.g. physical presence during the events, became infinitely larger and more passive, receiving content through radio and television broadcasts, and, later, various digital platforms. As a result, political communication became.

In some ways, the limited interactive character of the traditional media obliged their audience to be more passive. This characteristic remains unchanged till nowadays, the audience on the Internet is comparatively more engaged and active because they can leave comments and easily share content. In contrast, traditional media viewers show little initiative in giving feedback to the outlets. For instance, a cross-sectional study conducted across 14 regions (urban and rural areas) and two major cities in Kazakhstan a sample size not less than 2500 in 2016 showed that among regular television audience, only about 6% would call live in a broadcast, vote on a particular subject, or ask a question directly during interactive programs such as talk shows [227]. Moreover, a tenth of all viewers believe those programs were staged to appear interactive and spontaneous, thus making audience participation redundant. The profiles of those who willingly participate in such programs are largely female, from urban areas, aged between 25-34 and over 65 years old (Figure 9).



Figure 9 – Replies to the survey question: "How do you relate to television programs that provide the opportunity to call live, vote, ask a question, and apply for participation?"

Note - Compiled by the author

The increase in the scope of mass media led, firstly, to the expansion of its distribution space, and secondly, defined it as a new structure that organizes and implements information and communication processes [181, p. 71]. Therefore, the medium of communication that plays the role of the main communicative platform determines the structure of the information process in public communication. Until the very end of the 20<sup>th</sup> century, conventional mass media such as periodic press, radio, and television (in particular, 24-hour-news television channels) were the primary vehicles of political communication. This status quo did not change till the emergence of smartphone devices and the proliferation of mobile Internet in the mid-2000s, becoming dominant platforms for public discourse.

Despite offering content in different formats, as a medium of public communication traditional mass media outlets share the following characteristics:

1) Standardized nature of information intended for mass audiences;

2) Centralized content production;

3) Feedback from the audience could be received only in limited ways and in a time-delayed fashion.

Before the advent of recommendation algorithms, personalizing information content for every individual user was impossible. During the era of analogue media, the only method of content differentiation was through the distinction of the media outlet itself for different audiences. In the past, the target audience was distinguished by dividing them into arbitrary groups based usually on demographic characteristics that were ascribed to different interests. However, at the time, there were only limited ways to know the real audience preferences, such as press circulation amount or television channel ratings. There were other practices as well to get direct feedback from the audience, usually through face-to-face or mail surveys by media agencies or receiving direct mail from the most active members of the audience.

As shown in the earlier chapters, as the main public communication platform, traditional media also played a crucial role in gatekeeping, being able to choose the public agenda and political actors (communicators) that they put into the spotlight. This power over the agenda-setting, along with the process of information commodification, led to the fact that traditional media actors' preference tended to skew towards political parties, public figures, representatives of the larger organizations, and, of course, the state. The more they were in the media spotlight, the more familiar they were to the audience, making them credible sources of the news and opinions on the daily events. Therefore, these actors of political communications had a more significant influence on the discourse of public issues and, together with journalists, were able to create narratives favorable to their own agendas. In some cases, this may lead to information asymmetry between political narrative creators and the audience, creating a power imbalance over the political discourse. Thus, making the public communication process one-directional and vertical from top to bottom as it is illustrated in figure 10.

The figure above shows a linear model of political communication when mass communication was predominated by traditional media outlets (Figure 10). This model is based on Lasswell's communication model because it features unidirectional information flow. However, the model also includes limited characteristics of interactive communication models typical to Westley and Maclean's model, such as gatekeeping in the form of media outlets and a very limited feedback loop. Here, the senders of the message in the mass communication process that include state, political parties and organizations, and individual politicians and other public figures, are divided from the receiver by traditional media outlets. Media plays the double role of communication channel and gatekeeping in public agenda. The audience can send limited feedback but only to the media outlets and not directly to the senders of the message. Because of this the audience remains for the most part passive.

The digital transformation brought along low entry barriers and created unique challenges and opportunities for the marketplace. It increased competition among businesses in the media and communications industry. This has led to the need for new ways of organizing information exchange, which entailed the birth of new mediums. Along with well-known traditional media, new media have emerged: mobile communication, the Internet, digital television, video games, podcasts, etc. [228]. Exemplified by the fact that, by the end of 2022, the proportion of Internet users almost across all ages (6 to 74 years old) in the country reached 94% according to the Bureau of National Statistics of the Agency for Strategic Planning and Reforms of the Republic of Kazakhstan. Moreover, the share of households with Internet access reached 96% [88], digital space became the primary medium for interpersonal and mass communication.



Figure 10 – Linear Communication Model in Political Communication

Note - Compiled by the author

#### Interactive communication model in political communication

It is generally accepted that the biggest impact that transformed traditional media in recent decades was the emergence of Web 2.0 technologies. However, this process was not instantaneous, and the early development of the Internet as a part of the media sphere is illustrated in the model of historical periodization in the earlier chapter. Traditional media was highly competitive when the Internet was still PC-based, and the audience had to physically restrict themselves to access it, similar to watching television. Nevertheless, with the emergence of smartphones and the proliferation of mobile Internet, the equilibrium started to change quickly. This can be illustrated by the fact that by the end of 2007, there were approximately 50 million active Facebook users. Just in two years, this number increased sevenfold, and reached 350 million active users by the end of 2009 [229]. Although the direct causation cannot be proven, this surge in the number of users correlated with the introduction of the first generation of iPhone devices that also supported 3G technology in 2007 and 2008 and other similar smartphones that enjoyed big consumer success.

One of the main factors that overthrew the status of traditional media as the main discussion platform in mass communication was the emergence of social media. They changed the information power equilibrium between the audience and content makers, allowing every user to create and share their personal content. Whereas before, media spotlight was very limited to public personals and professional journalists, now any user can go online and share their thoughts. Social media platforms also have relatively low barriers to entry for aspiring content makers, both
technologically and professionally, in comparison to traditional media outlets. If television programs require complicated equipment and a crew of professionals, video bloggers rarely need more than a single camera to record content for the social media of their choice. The new term for these new types of content creators is "influencers". According to one of the definitions, an influencer is someone who attracts many followers on social media and becomes a source of advice for them (Leung). In addition to that, users are also encouraged to be more interactive on other internet websites in general, such as leaving their review on consumer products and entertaining content, participating in online surveys and actively share content among each other. If, in the past, the success of individual content makers was measured in the number of followers, the increased number of automated bots on various platforms made this measurement counterproductive. Therefore, nowadays the new criteria is so-called "user engagement", a term that stands for individual's response to digital content which is usually expressed in time and digital activities. The term predates the online platforms, and were defined as customers willingness to invest their resources that also include cognitive resources into the interactions with the brands [231].

At the same time, along with the unprecedented development of digital technologies, political communication transformed from purely linear to more interactive models. Individual actors have increasing influence, and each social media user can not only passively consume but also create and disseminate any information content, including political content, on their own [46]. This independence and relatively low entry barriers created an unforeseen avalanche of content, which is competing with traditional media for the audience's attention in all spheres. In some instances, as in the case of news journalism, people get the latest updates on the events more quickly from the social media posts of bystanders or citizen journalists. This process can be illustrated by the so-called "Twitter revolutions" during the Arab Spring events in the early 2010s described in the previous chapters. During those events, news agencies gathered information from social media posts that people were directly participating in the protests and recording them. This ability to experience firsthand events and report them to others directly, bypassing traditional media, encourages the commonly passive audience to become more actively involved in mass communication.

Traditional media is forced to follow events through social networks and constantly show an active presence. In addition, many political actors communicate with their audience directly and, in some cases, have a bigger digital presence than the media outlets themselves. This can be illustrated by the comparative example that the official account of the current president of Kazakhstan, Kassym-Jomart Tokayev, had the following of 2.7 million on Instagram at the time of the writing this work. In contrast, the state newspaper with the largest circulation in the country, Egemen Qazaqstan, has the following of 18,500. Tokayev's digital presence is more prominent even in comparison to the physical and online circulation of the newspaper, which amounts to 80,000 daily circulation, 400,000 weekly circulation, 40,000-50,000 daily views of the Internet version, and 300,000 weekly views [232]. Senate of the Parliament of the Republic of Kazakhstan has 52,800 followers on the platform, and

Press Service of the Government of the Republic of Kazakhstan has 220,000 followers. A similar example can be drawn from other countries: whereas former US president Joe Biden's official account had 17,1 million followers, the Washington Post newspaper's Instagram following is only one-third, with 6,8 million followers. The trend is also consistent across the platforms: on X (formerly called Twitter), Kassym-Jomart Tokayev has a following of 412,400, while Egemen Qazaqstan has only 9,900 followers. These examples show that political figures and traditional media outlets compete for the audience's attention in the same informational landscape.

Political communication, following the properties of online communication, changed from linear and one-directional to multi-directional and interactive as illustrated in Figure 11.



Figure 11 – Interactive Communication Model in Political Communication

Note - Compiled by the author

The first model presents a clear division between communicators and the audience because traditional media as a communication space also functions as an entry barrier to mass communication; in the second model, all the communicators, including the audience, are on the same digital plane without communication barriers. The absence of gatekeeping and equality of all communication participants makes this model similar to Schramm's communication model. However, the major difference is that whereas Schramm considered only two participants engaged in active communication, figure 13 presents a version where we have multiple actors simultaneously involved in the communication process. Digital media platforms have made it possible to communicate synchronously on several platforms with almost instantaneous feedback. Moreover, the absence of hierarchy between actors also

eliminates points of message initiation ranking. If, in the past, messages were initiated by the major political actors and received by the audience, currently, any communication participant can start the information campaign at any point in time. As Schramm wrote: "It is misleading to think of the communication process as starting somewhere and ending somewhere. It is really endless" [233].

#### Transactional communication model in political communication

As chapter two of this dissertation has established, although AI-based instruments are commonly used in modern political campaigns in the forms of automated bots and algorithms on information delivery, they are not the main methods or actors of the communicative process yet. However, the general direction of the development of AI models shows that they have the potential to transcend its function as mere intermediaries and start playing a major role in all information and communication spheres. The recent surge in various generative AI models for creating different types of content shows that the relationship between audience and AI-generated content will become more nuanced. Models such as text-to-video, text-to-music, and text-toimage will evolve even further, but together with it, different AI assistants will also emerge that will help people navigate ever so complex media landscapes. Despite the seeming sophistication of some of the functions, as in the case of recommendation algorithms in social media platforms, AI systems are only in their initial developing stage.

Currently, AI programs perform following functions in the communicative process:

- As recommendation algorithms;
- As automated communicators;
- As content enhancers;
- As content generators;
- As personal information organizers.

Even though this work focuses mainly on content recommendation algorithms, these systems encompass many dimensions that shape the concepts of personalizing system behavior, such as personalized information retrieval, information filtering, and web personalization [234]. All these systems are based on machine learning algorithms that are programmed for decision-making based on explicit and implicit feedback. The first feedback category includes information from the user community, such as ratings and recommendations, and the latter category consists of recorded user interaction including purchase history and viewing habits. The goal is to build prediction models based on audience information and data analytics that can be applied to a number of fields like marketing and sales. Already these days, not one single social media user receives social media recommendations stream similar to anybody else. One of the more interesting examples was the company AudienceAI, which runs through specialized AI models that capture audience reactions to different video content for better optimization.

One of the most basic forms of automated communicators includes chatbots used on various websites and instant messaging applications. They are also based on

the predictive models that are trained to give answers depending on the script. Because of their interactivity, they aroused public interest from early on, as ELIZA created in the early 1960s, when the concept of AI was only being introduced to the lay audience [31]. The emergence of GPT language models solved the problem of preparing scripts for every possible user interaction scenario and can generate responses automatically and appropriately to the given situation. Currently, there are attempts to use the technology not only for practical purposes but also tools for human companionship and other related interactions. One of the commercial examples was Replika, a generative AI chatbot that trains its neural networks based on interaction with the user to create a virtual companion and offer interpersonal relationships. The application was particularly popular during the Covid-19 pandemic when many people had to self-isolate for prolonged periods of time [235]. Chatbots can be utilized in interpersonal and personal business communications as in generating automated messages based on the communicators' previous messages and other implicit feedback. At the same time, those messages can be tailored to every situation and adapted to the user's personal writing style.

Basic AI models also can be used to alter user-generated content. The most common examples include photo- and video filters, which can automatically alter visual content and are already integrated into many content-sharing platforms such as TikTok and Instagram. However, the most sophisticated models are already used for autonomous content generation, such as text-to-image, text-to-video, and even textto-music systems, that can automatically generate content from descriptive text prompts. As these models evolve further, audiences will be able to request content generated according to each individual's tastes, which may include movies with the endings or plots they prefer, music generated for specific events only, or news reports written in a particular writer's style.

Combined together, these systems can be built into programs that can essentially function as personal assistants similar to Microsoft Copilot, designed specifically for user collaboration for productivity enhancement. Copilot is an umbrella brand for the range of programs aimed at solving different issues such as information summarization and organization, idea generation, time planning, information search through user content, etc. In the future, when this system reaches a certain level of development, they will be preinstalled into digital devices' operational systems. Programs like Copilot would be responsible for an even wider range of duties both in professional and personal settings. Users will receive curated newsfeeds tailored according to their preferences and content consumption history. It can have an even bigger impact on modern media and mass communication, transforming "social media" to "personalized media", where content can be generated for every individual user. This will be achieved not only by further developing AI systems but also by their increased ability to self-train on the individual user data.

The ability of AI systems to train on available data will lead to the information flow in political communication being circular, thus making the communication model obtain transactional characteristics. Different AI training processes, such as supervised, semi-supervised, unsupervised, and reinforcement learning, were described in the first chapter of this dissertation. But the common factor across all of these techniques is that AI systems need vast amounts of user-generated data. Therefore, all AI output is derived from existing data. In communication, further integration of AI systems into various digital platforms will lead to a situation where essentially all user-generated data being collected and analyzed. This practice is already commonly used for marketing purposes, and nowadays, explicit and implicit user feedback is already being used to improve AI models. Based on the data, the systems would be able to build prediction models for different groups and individual users on the type of content they would receive better. Then, the generated content would be delivered to users via recommendation algorithms and automated communicators. The users would proceed to generate more data from the consumption of curated content, bringing the process into the full cycle. Figure 12 presents a visual approximation of a transactional model of communication that sets all the communicative actors in the center because they are the receivers of the information content and data generators. At the same time, they are surrounded by different AI models that would be responsible for analyzing, generation, and delivery of information in a circular mode.



Figure 12 – Transactional Communication Model in Political Communication

Note – Compiled by the author

This model is more complex compared to linear and interactive models in political communication. It shifts the focus from the interaction between communication participants to the cycle of information consumption and collection. However, this process features different AI systems integrated across all platforms of communication. The data generated from the interaction between participants of political communication in the form of feedback, individual content, user preference, etc. is automatically collected and analyzed. The output is regurgitated by AI prediction models that determine what information and content to send back to which group of users. Information distribution is also done by different AI systems, such as recommendation algorithms and automated communicators. With the sophistication of AI models, the content that the audiences consume will also be mostly AI-generated. Thus, the fundamental concept of co-creation shared meaning in this model will happen jointly with AI systems.

The need for new communication models stems from the fact that the classical models discussed at the beginning of this section focus either on mass or interpersonal communication. This distinction is important because both types of communication were divided in the past and took place in entirely different spaces. State and other political actors could send their messages only through mass outlets and lay audiences mostly communicated communication through interpersonal channels. However, the emergence of new technology has changed these dynamics. Currently, any person has an opportunity to create their own public platform. At the same time, prominent political actors can use technological means to promote their agenda through interpersonal channels. The cases of politicians and states using automated bots and recommendation algorithms are documented in Chapter 2 of this work. In addition, another factor that complicates and transforms further mass communication is the possibility of content generation through AI. It allows for tailoring for each individual member of the audience. Since the data from content generation is gathered from said audience, we see that political communications are getting more complex and need recontextualization. And this work is one of the attempts to do that.

# **3.3** Analysis of Expert Survey on Attitudes towards Artificial Intelligence in Political Communication

To substantiate the proposed models of interactive and transactional models in political communication, the author conducted an anonymous expert survey on the practice of using AI and its influence on political communication (Appendix A). In sociological research, this method is used to predict the development of a particular phenomenon. Respondents participating in the study are experts with deep knowledge of the processes.

Mass surveys provide data on public opinion and the prevalence of certain phenomena in society. They can also reveal the reflection of a particular problem in the public consciousness, however, respondents' assessments in a mass survey can often be distorted. In comparison, the objective of the expert survey is to obtain substantiated information about the problem under study reflected in the opinions and assessments of specialists. The expert method essentially ensures objectivity, versatility, complexity, and competence of research results and practical recommendations [236].

**Research methodology.** The primary method at this stage of the study was an anonymous expert survey among media experts, journalists, political and data scientists. The expert survey model was characterized by the following features: a voluntary and anonymous online survey using closed-ended questions and a purposive (non-probability) nature of sampling. In addition, snowball sampling was also used as respondents suggested other experts to participate in the study. The validity of this survey relies on the diversity of the sources; the participants represent different fields, such as education, media, and political science. A total of 84 experts to the respondents).

When processing the survey results, the following were used: descriptive and analytical statistics. Mean (relative) values were calculated, including the standard error of the mean. The results obtained were processed using statistical methods in the IBM SPSS Statistics version 23 program. The relationship was assessed using correlation analysis (Spearman's rank correlation coefficient). The null hypothesis was rejected if p<0.05. Spearman's rank correlation coefficient was used to estimate the strength and direction of the relationship between two variables measured on an ordinal scale.

Spearman's correlation coefficient (Rho) varies from -1 to 1, where:

- -1 complete negative relationship (inverse relationship);
- 0.1-0.3 weak relationship;
- 0.3-0.5 moderate relationship;
- 0.5-0.7 noticeable relationship;
- 0.7-0.9 strong relationship;
- 0.9-1.0 very strong relationship.

In the context of statistical analysis, Spearman's p-value shows the likelihood that the observed relationship between two variables did not occur by chance. Therefore:

 $p \le 0.05$  (standard threshold) – correlation is statistically significant. It indicates that the probability that the correlation happened by chance is less than 5%. Thus, when the p-value is less or equal to 0.05, the null hypothesis or lack of relationship between variables can be rejected.

p>0.05 – correlation is not statistically significant, in which case, the likelihood that the observed relationship between two variables is because of chance is greater than 5%. Because of this, the null hypothesis cannot be rejected.

**Distribution of respondents in the study.** Among 84 experts who took part in this study, 69.9% were women (59 respondents) and 30.1% were men (25 respondents) (Figure 13). This circumstance is supported by the fact that women are more inclined to participate in such surveys. In addition, observations during this study also showed that female respondents more often advised other experts to take the survey. As can be seen from the figure below (Figure 15), the main pool of

respondents is in the age groups of 26 to 35 years old (37.4%) and over 45 (27.7%). The gender and age distribution shows that the largest number of female respondents are in the 45+ age group (16 people). The largest number of male respondents is in the age group of 26 to 36 (8 people). The distribution of education level by age groups shows that, predictably, the most significant number of participants with a doctorate are in the age groups 31 to 35 and over 45 years old (33 people). Education distribution by gender among respondents shows women are more evenly distributed across all levels of education. In contrast, male respondents were more likely to have obtained a doctoral degree (11 out of 24 participants).



Figure 13 – Distribution of Respondents by Gender, Age, and Education

Note - Compiled by the author

One of the aims of the study was to identify where experts themselves gather news to understand which platforms they find most valuable (Figure 14). The survey showed that the primary platforms for news following among the experts are Internet media (94%) and social media accounts of other journalists, political bloggers, and politicians (49.4%). 33.7% of the respondents also receive online media enewsletters, and an equal percentage of participants receive news from colleagues and people in their close circle and TV (20.5%). The least popular news sources included radio and print publications (13.3% for each category), suggesting a shift in how experts gather news. Continuing decline of print media reflects increasing digitalization of news.

Analysis of popular news sources according to age, gender, and education level, showed that more women use social media accounts to follow news in comparison to men (52.6% and 35.7%). 28.6% of male respondents follow print publication versus 5.3% of females, indicating preference for traditional forms of media. Additionally, email newsletters are also more prevalent among male experts (35.7%) than with women (23.7%). These findings highlight gender differences in preferred media platforms.

The survey question aimed at determining experts' activity in news commenting revealed that only 3% leave comments and/or comment on other people's responses regularly (Figure 15).



Figure 14 – Preferred News Sources

Note – Compiled by the author

Over a third of experts (37%) leave comments only on special occasions, and another one-fifth (23%) read and validate other commentaries through "likes". 19% of the respondents also indicated that even though they do not leave comments, they can share interesting content and discuss it with people close to them. A substantial number of participants chose the option "None of the above" (18%). The low frequency of active participation in commenting among experts may suggest a professional attitude towards news gathering where the participants prioritize information collection over public engagement.



Figure 15 – Attitudes Towards Commenting On News Items

Note - Compiled by the author

The question "How often do you participate in online discussions?" revealed that only one participant owns a platform where they publish their own content and discuss it with the subscribers. Fifty respondents opted for the "None of the above". Fourteen people publish their opinions on their personal social media accounts, and another fourteen also note that they join discussions on various Internet forums. Five people indicated that they actively comment on other people's posts on social media (Figure 16). The analysis also showed that male respondents had a higher tendency to choose the "None of the above" option (18 out of 25 people).



Figure 16 – Ways to Engage in Online Discussions

Note – Compiled by the author

The study also revealed participants' attitude towards recommendation algorithms on social media. Nearly half of the responses varied from positive to neutral: 28 respondents (33.3%) indicated positive attitude (Response option: "Positive, they optimize the content that interests me"); 22 respondents (26.2%) indicated neutral attitude (Response option: "Neutral, I never think about recommendation algorithms"). Almost a third of the participants had semi-negative (17.9%) and negative (9.5%) attitude towards recommendation algorithms. 13% of the respondents did not have a definite answer to this question (Figure 17). The variance in attitudes towards recommendation algorithms shows that the communication process ceased to be one-directional, reflecting continuing between users and algorithm systems.



Figure 17 – Attitudes towards Recommendation Algorithms

Note – Compiled by the author

Figure 18 illustrates the frequency of study participants using AI tools in their usual work process. Half of the study participants actively use AI tools: 26 respondents revealed that they use such programs daily and 16 indicated that they use such instruments several times a week. Another 21 people use AI tools depending on the needs of a particular project at hand, and 12 indicated the frequency as several times a month. These results indicate increasing integration of AI in workflows. Only 9 participants indicated that they do not use AI at all. Interestingly, out of those 9 people, 7 were women, suggesting potential differences in access to of comfort with suing AI.



Figure 18 – Frequency of AI Tools Use in Work Process

Note - Compiled by the author

The study also learned specific tasks the participants most often use AI instruments in the work process as follows: text content editing -19 respondents; idea generation and content writing -18 respondents each; data analytics -10 respondents; video and image editing -6 respondents; image creation -4 respondents (Figure 19). Relatively high reliance on AI in creative tasks such as idea and content creation in this sample (over 40%) indicates a trend of using these instruments as collaborative instruments. It is also noteworthy that a relatively low number of respondents chose the data analytics option, and no one opted for coding, even when it was available. This may imply that in those areas, experts still prefer using traditional methods.



Figure 19 – Main Tasks for Using AI Tools

Note – Compiled by the author

The respondents also shared their opinions on how AI can influence political processes in the future (Figure 20). The answers to this question are presented in increasing order of choice with the corresponding number of respondents:

- AI can aggravate the problem of manipulation and disinformation in society (fake news, deepfakes, etc.) 30;
- No definite opinion on this issue 30;
- AI can help in public administration and speed up the decision-making process 19;
- AI can fully automate government processes 18;
- AI can aggravate the problem of confidentiality of personal information and opacity of decision-making 17;
- AI can improve elections and other political campaigns through voter analysis and personalization capabilities 14;

- AI can help overcome the problem of political inequality between different actors in political processes 8;
- AI can exacerbate the problem of political inequality between different actors in political processes 5;
- AI can polarize political opinions in society 5.

The relatively high number of respondents who opted for the unclear opinion on the subject may indicate a lack of confidence in judgment on these issues. Most participants tend to have a more negative assessment of the impact of AI on politics. The main concerns are information manipulation and disinformation. Among positive options, study participants view AI as a tool that can improve government efficiency and automate processes.



Figure 20 – Opinions on the AI impact on political processes in the future

Note - Compiled by the author

Half of the study participants indicated an interest in AI-generated content when the content is associated with demonstrating new capabilities of this technology. One-fifth find this kind of content interesting in general. Only 13 people indicated that preference for human-generated content or abstained from responding (Figure 21). This comparatively low number may suggest that respondents tend to view AI content on par with human-created content.



Figure 21 – Interest in AI Content

Note – Compiled by the author

The study also revealed that only 3 respondents unconditionally agreed with the idea of involving AI in political decision-making processes (Figure 22). However, the group that is against the use of AI in this area in this sample also constitutes a significant minority (18 people). The largest number of respondents found it difficult to answer this question, which indicates the complexity of the issue (26 people).



Figure 22 – Assessing Attitudes towards The Use of AI in Politics

Note – Compiled by the author

The final question of the survey was aimed at exploring which of the proposed AI capabilities in political communication were most important to the respondents (Figure 25). Results show that most experts view efficient content moderation and

fact-checking as the most important areas (34 respondents). At the same time, personalized content delivery and increased citizen engagement and AI's ability to predict public sentiment and political trends received same number of responses (21 each). Only 8 respondents chose the option that AI can improve access to information for marginalized groups, which indicates that participants in the sample focus less on these aspects in the context of political communication.



Figure 23 – Opinions on AI Perspectives in Political Communication

Note – Compiled by the author

The survey results substantiate the communication models presented in the previous part of this work. The dominant use of Internet media by experts (94%) indicates a shift towards interactive communication because the audience can always contribute to the discussion. In addition, the high percentage of experts using social media as news sources (49.4%) correlates with the idea of communication being a dynamic process, where audience participation also plays a crucial role. The widespread usage of AI tools in experts' work processes highlights their increasing integration. Moreover, the preference for their use in creative tasks also indicates a shift towards AI-facilitated collaborative work processes. At the same time, experts have mixed perceptions of how AI can influence political processes in the future. There are a significant number of concerns over issues such as manipulation, disinformation and data privacy breaches. However, there is also a substantial number of experts who have positive views on this issue. They think that AI can improve public administration and speed up decision-making. In addition, the study revealed high levels of interest in AI-generated content. This interest in creative context shows that AI content is accepted on par with human-generated content. Finally, a strong preference for efficient content moderation and fact-checking as the most important areas for AI in political communication (34 respondents) suggests that experts especially value its potential to strengthen accuracy and transparency in political discourse.

There are two main hypotheses this survey was designed to prove to substantiate the proposed models of interactive and transactional models in political communication. The main provisions were: 1) people who use AI more often tend to view positively involving AI in political decision-making; 2) people interested in AI to view positively involving AI in political decision-making. These hypotheses aim to discover the relation between use of AI, interest in it and its role in political communication.

Correlation analysis presented as below:

1) Analysis of the correlation between the frequency of AI use and agreement with involving AI in political decision-making processes

A significant relationship was identified between respondents' responses to the statement "How often do you use AI tools in your workflow?" and "Do you agree with the idea of involving artificial intelligence in political decision-making processes" ( $p \le 0.05$ ) (Table 6).

#### Key findings:

## Spearman Correlation Coefficient: 0.261

# **0.017 p-value:** (p≤0.05)

**Conclusion:** The correlation is significant at the 0.05 level.

## **Interpretations:**

- 1) There is a weak positive significant relationship between AI usage frequency and agreement.
- 2) This means that people who use AI more often tend to agree more with the statements in the study.

Table 6 – Correlation Between AI Use Frequency and Political Decision-Making Support

Spearman's Rho	Frequency of AI usage	Support for AI involvement politics
Frequency	1,000	,261
value (double-sided)		,017
Agreement	,261	1,000
Ν	84	84
Note – Compiled by the author	·	

# 2) Analysis of the correlation between interest in AI-generated content and agreement with involving AI in political decision-making processes

A significant relationship was identified between respondents' responses to the statement "Are you interested in content created using AI tools?" and "Do you agree with the idea of involving artificial intelligence in political decision-making processes" ( $p \le 0.05$ ) (Table 7).

## Key findings:

# Spearman Correlation Coefficient: 0.464

## **0.000 p-value:** (p≤0.05)

**Conclusion:** The p-value less than 0.01 indicates a statistically significant level of correlation.

# **Interpretations:**

1) There is a moderately strong positive statistically significant relationship between interest in AI-generated content and support for its involvement in politics.

Table 7 – Correlation Between AI Use Frequency and Political Decision-Making Support

Spearman's Rho	Interest in AI-generated content	Support for AI involvement
		politics
Interest	1,000	,464
value (double-sided)		,000
Agreement	,464	1,000
Ν	84	84
Note – Compiled by the author		

## Additional correlation found in the study results

A significant relationship was identified between respondents' responses to the statement "How often do you use AI tools in your workflow?" and "How do you feel about social media recommendation algorithms?" ( $p \le 0.05$ ).

#### Key findings:

## **Spearman Correlation Coefficient:** 0.218

**0.048 p-value:** (p≤0.05)

**Conclusion:** The correlation is significant at the 0.05 level.

## **Interpretations:**

1) There is a weak positive relationship between attitudes toward recommendation algorithms and the frequency of AI usage.

A significant relationship was identified between respondents' responses to the statement "How often do you use AI tools in your workflow?" and "Are you interested in content created using AI tools?" ( $p \le 0.05$ ).

## Key findings:

## Spearman Correlation Coefficient: 0.444

# **0.000 p-value:** (p≤0.05)

**Conclusion:** The value less than 0.01 indicates that the correlation is statistically significant.

#### **Interpretations:**

1) There is a moderately positive relationship between the frequency of AI use and interest in AI-generated content.

Concluding this section of the dissertation, the first hypothesis of the survey aligns with the transactional communication model in political communication. This model proposes greater integration of AI systems in the communication process. AI models generate content and build communication based on user-generated data, encouraging these users to interact with them even more often. This creates a positive feedback loop when more frequent use of AI normalizes its presence in a broader context, which in turn may lead to a positive influence on attitudes toward its role in political decision-making. The survey key results showed a weak positive significant relationship between AI usage frequency and support for its usage in politics, with a Spearman Correlation Coefficient of 0.261 and p-value of 0.017 (p $\leq$ 0.05). Therefore, the hypothesis that people who use AI more often tend to view positively involving AI in politics supports circular characteristics of the AI-integrated communication model.

In addition, the second proposed hypothesis also aligns with the integration of AI systems in political communication outlined in the transactional communication model. The development of sophisticated AI systems that can predict and generate tailored content for users creates a cycle of information exchange. This cyclical process highlights the importance of audience feedback and AI integration in modern and future political communication. In accordance with this, the second main hypothesis is aimed at finding whether people who are interested in AI-generated content also tend to view AI's involvement in political decision-making positively. The analysis showed a statistically significant relationship between these two variables, with a Spearman Correlation Coefficient of 0.464 and a p-value of 0.000. The results support the proposition that people with a greater interest in AI will also approve of its usage in politics, emphasizing the increasing influence of AI systems on communication.

#### **Conclusion to chapter III**

1. AI development in Kazakhstan is shaped by various socio-economic factors, as shown in the combined SWOT and PEST analysis. Politically, there is strong state support, however, the country has issues with corruption and cybersecurity. Economically, the IT sector in the country is growing rapidly, especially in the areas of fintech and govtech. Socially, one of the advantages in Kazakhstan is relatively high social mobility, but there is also the problem of digital inequality between the regions and rising unemployment because of automation. Technologically, there is rapid development of cutting-edge AI technology, however, it can be challenged by insufficient GDP spending on R&D and lack of unified technological standards. To benefit fully from the potential of AI, Kazakhstan will need extensive collaboration between the state, private businesses, and the citizens.

2. Political communication is a rapidly evolving field, and the integration of AI is transforming it further. Because of technological development, traditional linear models of communication (Lasswell's) have evolved first into interactive forms (Schramm's, Westley and Maclean's) and later into transactional models (Dance's, Barnlund's). These changes reflect the transformation of mass communication from unidirectional to feedback-based models. The introduction of AI into these processes is going to change the way political content is created and consumed, which requires revision of existing models.

3. The linear model of communication was prevalent during the era of traditional mass media, it was characterized by a unidirectional information flow from political actors to passive audiences. It allowed major media outlets to take the role of gatekeeper in public agenda, but at the same time, lacked feedback from the audience.

4. The rise of digital technology and social media facilitated an interactive model in political communications. Social media enabled users to create and share content and eliminated entry barriers in mass communication. Consequently, now political figures, media outlets and individual creators compete for audience attention, highlighting the interactive nature of current political communication.

5. The transactional model of political communication integrates various AI systems that analyze, generate and deliver content based on user data in a circular process. Programs such as chatbots, content generators, and recommendation algorithms personalize messages and create continuous feedback loop. This model shifts from traditional top-down communication to a process where both communicators and users contribute to the interaction, reflecting the growing role of AI in political communication.

6. An expert survey was conducted to support the interactive and transactional models of political communication and analyze AI's influence on these processes. The results revealed significant correlations between frequency of AI use and support for it in political decision-making. There is a weak positive relationship (Spearman Rho = 0.261, p-value = 0.017) between AI use and support for it in politics, a stronger positive relationship (Spearman Rho = 0.464, p-value = 0.000) interest in AI-generated content and support for AI usage in politics. These findings highlight the growing integration of AI in political communication and its influence on public opinion.

#### CONCLUSION

#### Brief conclusions based on the results of the dissertation research.

1. Political communication developed apace with technology, gaining significance and evolving into separate academic discipline in the second half on 20<sup>th</sup> century. The evolution in AI technology has further influenced it. Initially rooted in cognitive science, AI is transforming political engagement. Its capabilities, that include natural language processing and machine learning, are reshaping media and political discourse.

2. Recent trends in digitalization and breakthroughs in the field of AI disrupted the traditional communication models by fragmenting media audience and empower individuals to create and share content. AI systems, such as NLG programs and LLMs based on generative AI streamlined news reporting by automating content creation process. Moreover, news agencies increasingly integrate semi-automation processes by combining journalistic output with NLG technologies. These changes indicate a new area in media and communication both on a global scale and in Kazakhstan.

3. In the context of international relations, AI can be viewed through different perspectives that include classical paradigms such as realism, liberalism, and constructivism. Realism and neorealism view AI primarily as a weapon in military and virtual conflicts. Liberalism and neoliberalism regard it as leverage for various non-state actors, while constructivism focuses on AI's impact in shaping state identity.

4. The role that AI play in international relations can be also analyzed on two levels – supranational and national. At the national level, countries across the globe are competing in AI development to secure political and economic leverage, which are reflected in the national development strategies and attempts to create local AI models. At the supranational level, there is growing international cooperation on AI safety as evidenced by the Bletchley Declaration on AI Safety Summit 2023.

5. The transformation of political communication under the influence of digitalization and AI happened through the shift from traditional media to digital platforms. They disrupted traditional media hierarchy by decentralizing news sources and elevating individuals to key participants in politics. Those changes challenged traditional media theories that emphasize media dominance over public discourse. However, simultaneously media digitalization exacerbated issues such as fake news, audience fragmentation, and the emergence of "echo chambers".

6. Digital technologies and AI also formed new form of public manipulation – digital propaganda also called computational propaganda. It is deeply rooted in AI because of its extensive use of social bots and algorithmic content delivery. Computational propaganda facilitates highly targeted and personalized political campaigns that exploit existing biases among the audience.

7. The influence on political agendas in digital propaganda is achieved by microtargeted political advertising, data mining, and trolling. Micro-targeting entails using users' personal data to tailor political messages. Digital propaganda became even more accessible with the advent of AI tools by automating content creation and user profiling. AI's increasing role in digital propaganda and diplomacy only highlights its influence on political communication and shaping public opinion.

8. One of the ways to analyze and predict the future role of AI in mass communication is using the model of historical periodization. According to it, AI will forego through main development phases: technology, content, advertisement, advertisement as content. Currently, AI is in the technology and content phases of development, attracting both a lay audience and developers. As it proliferates further, advertising will become main revenue source, which in turn will lead to AI-based personalized content. In political communication, AI can strengthen political campaigns by tailoring messages to segmented audiences. Thus, under its influence mass political communication will transform into individually tailored political conversation.

9. The SWOT and PEST analysis on AI development in Kazakhstan showed it is influenced by the following socio-economic, technological and political factors:

# **Political factors:**

- Strengths: the government offers strong support for AI development;
- Weaknesses: public corruption may challenge efficient implementation of state development projects;
- Opportunities: digital acceleration through AI integration can drive sustainable development in the country;
- Threats: cybersecurity threats in addition to lax regulation regarding cybercrime in the country, are the main potential threats to the implementation of future AI development programs.

## **Economic factors:**

- Strengths: rapid growths of the IT market in Kazakhstan provides foundation for AI development;
- Weaknesses: lack of skilled human capital can hinder national AI development;
- Opportunities: developing fintech and govtech sectors provide opportunities for broad AI integration;
- Threats: adverse digital taxes may harming local start-ups at the initial stage of their expansion.

## Social factors:

- Strengths: there is high social mobility and access to education offer advantages in adapting AI technologies;
- Weaknesses: existing digital divide between regions can hinder widespread AI adoption;
  - Opportunities: Openness of other social spheres such as healthcare and smart cities foster opportunities for AI innovation;
  - Threats: rise of automation due to broad AI adoption may lead to significant job losses in the country.

## **Technological factors:**

- Strengths: there is a rapid development of cutting-edge AI technology such as building supercomputers and Kazakh language LLMs foster local innovation;
- Weaknesses: there is insufficient GDP spending on R&D to support long-term innovation;
- Opportunities: high levels of digitalization facilitate the spread of innovative technologies across a wide range of sectors;
- Threats: the lack of unified technical standards can slow progress in AI development.

The analysis showed that to harness the potential of AI technology, Kazakhstan will need extensive cooperation between the state, private businesses, and the citizens.

10. Introduction of AI technologies into the mass communication process is rapidly transforming political communication. Integration of new digital technologies change traditional unidirectional form of mass communication into feedback-based with active audience participation. Because of that the way that political content is created and consumed is also undergoing changes, requiring changes in the exiting models of communication from linear to interactive and later transactional as follows:

- The linear model of communication widespread during the era of traditional mass media, defined by a unidirectional information flow from political actors to passive audiences. In the linear model major media outlets played the role of gatekeeper in public agenda and control public discourse, with limited audience feedback.
- The interactive model of communication emerged from the adaptation of digital communication platforms, that eliminated entry barriers in mass communication. In this model, every communication participant can freely engage in public discourse, that leveraged the field between individual creators, politicians, media outlets and the state.
- The transactional model of communication combines multiple AI systems to analyze, generate and deliver content based on user data in a circular process of content consumption and dissemination. One of the reasons why the information flow in the model of communication with fully integrated AI systems would be circular lays within the methods of their data processing, content generation and dissemination, and feedback analysis. The transactional model transitions traditional top-down communication to a process where both communicators and recipients contribute to the interaction, highlighting the growing role of AI in political communication.

11. An expert survey was conducted among media experts, journalists, political and data scientists to examine and support the interactive and transactional models of political communication, while also analyzing the impact of AI on these processes. The results revealed significant correlations between frequency of AI use and support for it in political decision-making. The results revealed a significant weak positive relationship (Spearman Rho = 0.261, p-value = 0.017) between AI use and support for it in politics, a stronger positive relationship (Spearman Rho = 0.261, p-value = 0.017) between AI use and support for it in politics, a stronger positive relationship (Spearman Rho = 0.464, p-value =

0.000) interest in AI-generated content and support for AI usage in politics. These findings underscore the growing integration of AI in political communication and its influence on shaping public opinion.

Assessment of the comprehensiveness of the solutions to the set tasks of the dissertation. The tasks of the dissertation research are fully solved using integrated approaches that include theoretical analysis, empirical research, expert survey, and the statistical analysis of the obtained data. In addition, the use of combined SWOT and PEST analysis allowed to assess the overall AI development level in Kazakhstan and its impact on political communication, taking into account complex internal and external factors. The author studied the theoretical and practical approaches to integration of AI-based systems in political communication, as well as its influence on media, international relations, and digital propaganda. The study of the main theories on political communication in the context of ubiquitous digital and rapid AI development made it possible to build a model of the evolution of political communication from linear to interactive and transactional. A survey conducted among media experts, journalists, political and data scientists confirmed a research hypothesis about the growth for support of AI application in political processes among active users of these technologies.

Recommendations and initial data on the practical application of the dissertation results. The proposed communication models that reflect the evolution of political communication (linear, interactive, and transactional) can be used to analyze current processes of the digitalization of political space and forecast new trends in this area. The applied SWOT and PEST analysis in the context of AI development and political communication can be a useful tool to evaluate the influence of modern digital technologies on socio-economic processes in the country and to develop strategies for introducing AI technologies in media and politics. The study results can be used in the work of government agencies, think tanks, research groups, political and media to analyze the latest trends in digital transformation. Moreover, the results can be also applied to create communication strategies that take into account modern AI practices. The materials contained in this dissertation can also be used in training master's and doctoral students in the educational programs, as "Media and communication," "Journalism," "Digital media such communications," "Data journalism," and others.

**Evaluation of the scientific level of the dissertation work compared to the best achievements in the field.** The dissertation presents the author's vision on the influence of AI on political communication, based on the analysis of digitalization of the media space, practices of using AI tools in communication, and the transformation of information environment because of it. A methodology of applying SWOT and PEST analysis to study the impact of AI on the government development, allowing to study the opportunities and risks connected to the digitalization of political sphere with particular focus on recent developments in Kazakhstan. The approach used in the dissertation is theoretically substantiated, statistically and logically verified and adapted for use in the Republic of Kazakhstan. An analysis of the scientific and academic literature on the topic of the dissertation work showed that there is a lack of studies on the impact of AI on political communication not only

in Kazakhstan but worldwide. Majority of the research focuses either on individual aspects of AI or digitalization trends in the media. This dissertation addresses this research gap at a scientific and methodological level, it presents both scientific foundation and empirical data based on expert survey and statistical analysis.

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#### Expert survey questionnaire Survey questions on the topic of "Attitudes towards artificial intelligence (AI) and its application in politics"

#### **Dear Expert!**

Thank you for participating in this survey, which aims to analyze the views of professionals on artificial intelligence (AI) and its application in politics. Your knowledge and experience will help us better understand the potential and challenges that arise with the introduction of AI into political processes.

The survey is aimed at professionals with experience in technology and politics and will be used for scientific and analytical purposes. All data will be anonymous and confidential.

We value your time and expert opinion. Please answer the questions based on your professional experience and knowledge.

#### 1. Please indicate your age:

(Single choice)

- 20-25
- 26-30
- 31-35
- 36-40
- 41-45
- 45+

#### 2. Please indicate your gender:

(Single choice)

- Male
- Female

### 3. Please indicate your highest level of education:

(Single choice)

- Bachelor's
- Master's
- Doctorate
- Post-doctorate

## 4. What platforms do you use to follow news?

(Multiple choice)

• Internet media and news portals

- Social media accounts of media, journalists, political bloggers, politicians
- TV
- Radio
- Printed publications
- Internet media email newsletters
- From colleagues and close circle
- I don't follow news

#### 5. Do you leave comments on various news content?

(Single choice)

- I always actively comment and enter into discussions with other commentators.
- I only write comments on special occasions.
- I don't comment, but I read and "like" other people's comments
- I don't comment, but I forward it to people close to me and discuss it with them.
- None of the above

#### 6. How often do you participate in online discussions?

(Single choice)

- I have my own platform (YouTube channel, Telegram channel, X account, etc.) where I publish content for discussion with my subscribers
- I publish my opinions on various issues on my personal accounts on social networks
- I actively comment on various posts on social networks.
- I join discussions on various Internet forums
- None of the above
- 7. How do you feel about recommendation algorithms on social networks? (Single choice)
  - Positively, they optimize content that interests me
  - Neutral, I never think about recommendation algorithms
  - Rather negatively, because of them I receive content that is not interesting to me
  - Negative, I prefer to search for content that interests me myself
  - I find it difficult to answer
- 8. How often do you use artificial intelligence tools in your workflow? (These tools may include programs like ChatGPT, Midjourney, Dall-E, etc.) (Single choice)
  - Daily
  - Few times a week
  - Depending on the project
  - Rarely, several times a month

- Not using
- 9. For what tasks do you most often use artificial intelligence tools? (Single choice)
  - data analytics
  - content writing
  - text content editing
  - image creation
  - video and image editing
  - coding
  - generation of ideas
  - I don't use such tools

# 10. In your opinion, how can artificial intelligence influence political processes in the future?

(Multiple choice)

- Can help in public administration and speed up the decision-making process
- Can improve election and other political campaigns through voter analysis and personalization capabilities
- Can fully automate government processes
- Can help overcome the problem of political inequality between different actors in political processes
- May exacerbate the problem of manipulation and disinformation in society (fake news, deepfakes, etc.)
- May aggravate the problem of confidentiality of personal information and opacity of decision-making
- May exacerbate the problem of political inequality between different actors in political processes
- Can polarize political opinions in society
- There is no definite opinion on this issue

## 11. Are you interested in content created using artificial intelligence tools? (Single choice)

- Yes, I find content created using artificial intelligence interesting
- Sometimes, when it is associated with demonstrating new capabilities of artificial intelligence
- No, I prefer content created without the use of such tools
- I find it difficult to answer

# 12. Do you agree with the idea of involving artificial intelligence in political decision-making processes?

(Single choice)

• Agree

- Rather agree than disagree
- I find it difficult to answer
- Rather disagree than agree
- I don't agree

## 13. What do you think is the most significant opportunity AI offers in political communication?

(Single choice)

- Personalized content delivery, increasing citizen engagement.
- Improved access to political information for marginalized groups.
- Efficient content moderation and fact-checking.
- The ability of AI to predict public sentiment and political trends.