RS Global

Edited by
BARANOV Oleksandr
KOSTENKO Oleksii
DUBNIAK Mariia
GOLOVKO Olha

DIGITAL TRANSFORMATIONS OF SOCIETY: PROBLEMS OF LAW

Warsaw 2024

DIGITAL TRANSFORMATIONS OF SOCIETY: PROBLEMS OF LAW

Monograph

Edited by
Oleksandr BARANOV, Oleksii KOSTENKO,
Mariia DUBNIAK, Olha GOLOVKO

RS Global
Warsaw, Poland
2024

DOI: 10.31435/rsglobal/057

Approved for publication by the State Scientific Institution «Institute of Information, Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine» (Minutes No 12 of November 28, 2023)

ISBN 978-83-965085-9-1 (eBook)

Reviewers
Dovhan Oleksandr, doctor of Law, professor, expert in information law, information, cyber and state security, advisor to the directorate State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine», honoured worker of science and technology of Ukraine.

Korzh Igor, doctor of Law, senior researcher, the head of the research laboratory Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine».

Edited by

Doctor of Law, professor, Head of the Research Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine»
Oleksandr BARANOV

Doctor of Philosophy (Ph.D.) in Law, associate professor, Head of the scientific laboratory of the theory of Digital Transformation and Law of the Scientific Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine», Associate Professor of the Department of Law at the State University «Kyiv Aviation Institute»
Oleksii KOSTENKO

Doctor of Philosophy (Ph.D.) in Law, head of scientific laboratory of legal support of digital transformation, Scientific Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine», Senior Lecturer, Department of Information, Economic and Administrative Law National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»
Mariia DUBNIAK

PhD in Law, senior researcher, senior researcher of the laboratory of the theory of Digital Transformation and Law of the Scientific Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine» senior lecturer of the Department of Intellectual Property and Private Law «Igor Sikorsky Kyiv Polytechnic Institute»
Olha GOLOVKO

Keywords: Artificial Intelligence, Metaverse, Legal Regulation, Digital Transformation, Social Transformation

ISBN 978-83-965085-9-1 (eBook)

© Team of Authors, 2024
© RS Global Sp. z O.O., 2024

CONTENTS

INTRODUCTION.

The monograph "Digital Transformations of Society: Problems of Law" reflects the research results into theoretical and methodological foundations, principles, conceptual, methodological, and doctrinal provisions for regulating existing or projected types of social relations related to the use of digital technologies in the context of social transformation. The author examines the current general trends and features of digital transformation in all spheres of human, social, and state life.

The relevance of the legal research is due to the almost complete absence of relevant legal support for the process of digital transformation, which has become a powerful inhibiting factor for the large-scale introduction of modern digital technologies into all spheres of life of individuals, society, and states.

The monograph consists of four chapters devoted to the legal, social, and ethical regulation of modern social relations in the course of the implementation of modern digital technologies, in particular, artificial intelligence, robotics, WEB 3.0, etc.

Alexandr Baranov's work is devoted to the study of the dynamics of decision-making in the modern world, which is becoming increasingly complex due to the acceleration of political, social, economic, technological, cultural, and educational processes. The author outlines the critical challenges facing humanity, including the decline in the quality and speed of decision-making caused by cognitive limitations and the rapid progress of social change. The study emphasizes the acute need for legal support for large-scale social transformations, as well as the need for their support to be based on updated legislation.

Oleksandr Baranov presents the idea that social transformations become effective when they are synchronized with digital transformations. Legislative frameworks should evolve to take into account the peculiarities of social relations in the digital age, requiring constant improvement of legislation. Digital transformation, as a response to civilization challenges, stands out as a key factor in overcoming the cognitive limitations of humanity through the introduction of digital technologies. This transformation is inextricably linked to social transformation and requires the re-engineering of social processes to optimize the use of technology, which, in turn, requires reliable legal support.

This paper examines the role of the legal system's role in the context of digital transformation, focusing on the mission and purpose of legal systems to create conditions that ensure the efficient functioning of society. The author examines the convergence of legal systems, the need for consistent legal norms for complex social relations, and the importance of legal certainty in the context of transformative technologies such as AI.

The study emphasizes the need for a holistic approach to addressing large-scale development problems and the need to create comprehensive strategies to prevent the collapse of global civilization. The author also proposes a transition to the "results-based economy" characterized by focusing on the conservation of

resources and satisfaction of individual consumer needs, facilitated by the Internet of Things technologies and a fundamental change in the mission of civilization development. The author argues that the convergence of law is a crucial response to the socio-technical convergence taking place in all spheres of society, which requires a change in the economic paradigm and a move towards a sustainable, high-quality life for every person on the planet.

The paper reveals certain problems of legal, technical, and ethical regulation of the use of AI in the Metaverse. This work is a continuation of the study by Oleksii Kostenko on the creation of electronic jurisdiction and the development of law in the context of the current development of Web 3.0 information and communication technologies and the introduction of the Metaverse. The paper analyses the state of development of standards, laws, strategies, normative, regulatory and information reference acts in the field of AI applications in various industries. By way of generalization, the author provides generally accepted definitions of types and subtypes of AI, as well as the scope of their applications. A model for the implementation of AI technologies in the Metaverse is proposed.

The development of information and communication technologies in the world has stimulated a technological breakthrough, which today is called the Metaverse. Given the rapid development of modern social relations in the electronic space, their multidirectional and the emergence of digital objects and subjects, such as avatars, digital personalities, electronic humanoids, electronic works, electronic objects (electronic land, electronic objects, electronic buildings), the author accepts the issue of developing and creating an electronic jurisdiction and regulating the use of AI in the Metaverse, since modern analogy laws are created very slowly and superficially, without the necessary and sufficient detailing of terms and conditions.

Today, the regulation of AI in various industries is gaining more realistic boundaries. The use of AI in the Metaverse, however, like the Metaverse itself, requires technical and legal regulation. Thus, scientists are initiating the development of technical standards related to the Metaverse, technical specifications for the functioning of multimedia virtual space, and algorithms for interaction between Metaverse and states. Governments of different countries, researchers, and the private sector are looking for ways to regulate Metaverse technologies.

However, unlike in the advanced countries of the world, Metaverse technologies are not widespread in Ukraine. AI and blockchain technologies have a chambered development and are developing situationally. The technical, legal, and ethical regulation of the Metaverse, AI, and blockchain is under scientific discussion, as described in detail in previous works.

Metaverse technologies have enormous potential for the development and recovery of Ukraine and need to be implemented as soon as possible in all spheres of Ukrainian society.

The work by Mariia Dubniak examines the norms of ethical codes for the development of artificial intelligence and robotic technologies. The study of

ethical problems in the application of artificial intelligence technologies is a subject of scientific interest to scientists in various fields (philosophers, sociologists, lawyers, engineers, programmers). The results of their work are embodied in philosophical concepts and scientific schools dealing with technological ethics, computer ethics, robotics, robopraxis, and algor-ethics (the ethics of algorithm development). Many specialized centers and laboratories have been established at universities to study the ethical issues of technology use. Considering the practice of developing various technologies and the work of ethical committees, the largest players in the technology market, such as Amazon, DeepMind, Facebook, Google, IBM, Microsoft, and Baidu, also formulate standards, principles, and ethical practices that should be followed at all stages of technology development.

The empirical basis of the study is made up of more than 80 Codes of Ethical Principles for the Development of Artificial Intelligence Technologies. To process this data set, all the codes were classified into 4 groups, depending on the subjects of their creation (the scientific community, government groups, and international organizations, business and corporations), as well as certain areas where the consequences of technology use have a particular impact (healthcare, military, democracy, personal data, law).

The study shows how views on the problem of regulating the process of creating AI technologies have evolved considering ethical standards. It has been proved that most ethical codes for the development of AI and robotics technologies contain recommendations for compliance with evaluation categories, such as fairness, responsibility, and accountability, which relate to theoretical issues of social ethics of technology implementation. For more than a decade, the subject of regulation in ethical codes has changed. The developers of these systems have moved from the principles of regulating robots as devices to the principles of regulating the development of algorithms, neural networks, selection, and analysis of input and output data, which take into account the peculiarities of designing and developing such software.

Using the example of the healthcare sector, the section shows the problems of legal support for data processing (data quality issues, determining the purpose of processing and changing such a purpose, data management and access, data dependency issues, and others). Data collection and model development is the first stage of AI program development. Legal barriers to data access and processing lead to insecurity of data subjects, violation of their rights, and, on the other hand, slow down the development of technologies. In addition, low-quality data magnifies all ethical problems and social contradictions.

The study deals with a problematic issue concerning the need for a comprehensive revision of the legal system, including data law. It is necessary to formulate binding legal norms that would discipline all participants in the process of developing AI technologies because, without sanctions, there are high risks of human rights violations.

The work by Olha Golovko presents retrospective elements of Ukrainian legislation and a vision of the prospects of the law-making process regarding countering informational and psychological influences. A review of some international legal acts on information security was carried out. Conclusions are made, including considering international practice. It was established that the dynamism of the development of the latest technologies, including artificial intelligence, should be considered on the basis of the formation of legislation. The need for prevention of threats posed by deep fake technologies, for political elections and democratic institutions, is emphasized.

CHAPTER 1. DIGITAL TRANSFORMATIONS AND TRANSFORMATIONS OF SOCIETY: PROBLEMS OF LAW

BARANOV Oleksandr
Doctor of Law, professor, Head of the Research Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine»
ORCID ID: 0000-0003-3233-6687

Part 1. Legal support for the introduction of digital technologies.

Part 1.1 Civilization mission of digital technologies.

In recent decades, the processes of introducing digital technologies in all spheres of public life have been gaining momentum. The history of the introduction of computer (digital) technologies began in the middle of the last century. Shortly before the end of the 20th century, the process of introducing computers ceased to be spontaneous, and many countries adopted a variety of large-scale state informatization programs for various spheres and segments of social activity. With increasing complexity and scaling, the process of introducing computers has historically had the following names: automation, computerization, informatization, development of the information society, digitalization, and digital transformation.

The main driver of the intensification of the digital transformation process has been and remains the real sector of the economy, in particular, private business, for which this has always meant an increase in the efficiency of their activities. State institutions are significantly lagging, trying to master the process of digital transformation, create favorable conditions for the introduction of digital technologies, and allocate certain financial resources for individual programs.

Both on a global and national scale, the process of introducing digital technologies has been heterogeneous, both in terms of time and quality, as well as in individual spheres and segments of society's social activity. Optimistic expectations of rapid, significant social results from digital transformation have generally not been met.

Among the many reasons for the discrepancy between the results of current and future digital transformation and the organizational, intellectual, financial, economic, material, technical, and time resources spent, one unresolved problem is of particular importance. This is a problem of imperfect awareness at the level of all humanity, individual states, societies, sectors of the economy, businesses, and individuals of the strategic importance of organizing a simultaneous, omnipresent, synchronized, and meaningfully understandable process of digital transformation.

Therefore, the justification and awareness of the mission and systemic importance of the introduction of digital technologies for the development of civilization is an urgent task, which will be the subject of the next section, based on the materials of previous studies (Baranov O., 2023).

Part 1.1.1 Information and Decision-Making as a Basis for Human Development.

Any social and personal activity of people is based on information interaction, the process by which information is exchanged. Information is on par with such fundamental, basic categories as energy, matter, and time. In this paper, we will use the following definition: ***information*** *is information presented in any form and form, on any media, about events, phenomena, or facts that have been, have, or may take place* (Baranov, 2014).

The presence of language is the most characteristic and important distinction of Homo Sapiens, since its considerable level of abstraction allows people to convey information through completely different means of transmission. The Ukrainian psychologist and philosopher argued that language has two main functions: significative and communicative, due to which language is a means of communication and a form of existence of thought and consciousness. The semantic, significative function was formed and developed exclusively in the process of communication during people's joint activities. The emergence of language outside of society is impossible since language is a social product that is intended for communication and arises only in the process of communication. The communicative function of human language consists of the functions of communication or communication as a means of expression and as a means of influence (Rubinstein, 2000). In other words, the communicative function of language is the function of information interaction between people.

Man is constantly in a state of searching, developing, and making decisions (Wiener,1948) that are central to the management of the functioning of human society, organisms, and technical systems. The quality of life of a person and the entire society, the future of the planet, and civilization depend on the quality of decision-making and implementation.

To make any decision, it is necessary to ensure: collection, accumulation, memorization, use, exchange, selection, analysis, comparison, evaluation, and generalization of information, generation of new information and knowledge, as well as complex functional transformations of information, such as goal setting and planning of activities, self-learning, self-organization, etc.

Using the provisions of the theory of decision-making in complex systems (Slepkov and Sodenkamp, 2007), we will assume that a decision is an integral result of human activity, primarily the functioning of the intellect, the purpose of which is to choose the best option for behaviour or actions under a certain set of parameters of the variables of the state of the internal and external environment.

At the same time, there is no doubt that it is essential for quality decision-making to ensure the use of information that meets certain quality requirements, such as relevance, timeliness, completeness and reliability.

With the development of civilization, the amount of information necessary for decision-making is constantly increasing due to: an increase in the number and scale of spheres, processes, and objects on which decisions are made; expansion of geography and scale of human activity; intensification of intertribal, interstate,

international, interregional and intercontinental economic ties; globalization of communications (transport, commodities, economic, financial, cultural, informational, etc.), etc.

Language and information exchange has become the basis for the rapid evolution of human intelligence (Lakatos and Janka, 2008), which is usually characterized by the presence of a specific set of cognitive functions (Wang, 2008), some of which are basic for decision-making. The term cognitive function derives from the term cognition, which refers to internal mental processes that are studied in a subfield of psychology called cognitive psychology (Roy, 2013).

As a result of human evolution, several cognitive functions have emerged and subsequently improved the diversity and quality of some cognitive functions, such as (Paz-Alonso at el., 2014; Kaptelinin, Kuutti, 1999): perception, memorization, sharing, analysis, comparison, evaluation, generalization and use of information to solve problems or make decisions, recognition of objects and their classification (gnosis), choice of strategy and specific actions, expert assessment of the situation, goal-setting, planning, text-to-speech and vice versa, self-learning, self-organization, generation of new knowledge, etc.

What is the nature of the influence of language (information exchange) on the development of human cognitive functions? On the one hand, the various activities of a person in society, and the realization of various social relations became the source of the emergence and development of language, and on the other hand, any social activity could take place only when there was an opportunity to support it with the potential of the communicative function ensuring the information interaction of people through the exchange of necessary information.

At the same time, the increase in the volume and complexity of information communications resulting from the increased diversity of human social activities required a significant increase in energy expenditure on brain activity (Lakatos, and Janka, 2008), which potentially exceeded the resources of the human body. Under such conditions, the only way to preserve and further develop the population of Homo sapiens is to ensure the energy efficiency of brain activity through an evolutionary increase in the efficiency of each cognitive function and its totality.

The evolution aimed to optimize brain functioning through the development of abstract thinking and high-level abstract language, which significantly reduced the energy consumption of the human brain. But, at the same time, the increase in the level of abstraction allowed Homo sapiens to move from the actual exchange of information about objects and phenomena that he directly observed, to the generation and transmission of information reflecting the results of their brains. That is, Homo sapiens became able to carry out more complex, energy-efficient communicative actions due to the development of their intelligences.

As a result, people have the opportunity to exchange not only factual information about observations but also information about plans, analysis, goals,

forecasts, predictions, assumptions, decisions, and algorithms for their implementation, etc., which has become a revolutionary, catalyzing condition for the deployment of a wide variety of activities necessary, first of all, to increase the effectiveness of the fundamental function of the Homo sapiens population namely the function of self-preservation and development.

The accelerated development (evolution) of abstract thinking, the improvement of the implementation, and the expansion of the range of human cognitive functions were a response to the increasing complexity of existence and the growth of threats from the external environment. This, on the one hand, made it possible to increase the efficiency of the self-preservation function of the Homo sapiens population, and on the other hand, it required the improvement of the information exchange between people.

The permanent expansion of the nature and content of the threats to the existence of human civilization systematically led to the need to expand, diversify and complicate social and personal activities, to intensify the socialization of individuals and groups, which in turn required a significant increase in the volume of circulation of necessary information and the quality of information interaction between people. At the same time, high-quality information interaction means the exchange of high-quality information: timely, relevant, complete, and reliable.

Information relations as relations related to the creation, transmission, use, and storage of information can have both an independent character and a concomitant character, that is, they can be a necessary, harmonious component of primary social processes in specific subject areas of human activity. For example, independent relations include information relations in the field of mass media, and information relations are components either in the sphere of retail trade, where the primary relations are purchase and sale, construction, or military affairs, etc.

The historical development of mankind has led to an almost exponential increase in the volume of information relations, which has been especially clearly manifested in the last one and a half to two centuries in the form of continuous intensification of information processes in society; an annual increase in the volume of new information; steady growth in the volume and speed of information transfer; increasing the sources, flows and types of information circulating in society; complication of the structure and content of information, information flows and processes, etc.

Thus, information, information relations, and information interaction have always been, are, and will be extremely important and necessary for the implementation of all social processes, and the implementation of all types and types of human activity. At the same time, high-quality information, the effectiveness of information links and information interaction is the basic condition for ensuring the effectiveness of human activity in any sphere of social activity, which, in turn, is the fundamental condition for ensuring the effectiveness of the function of self-preservation and development of civilization.

An important conclusion for the legal system: the state and development of information law is the basis for ensuring the high quality of information

interaction in the process of implementing public relations, which is the basic condition for effective activity in any spheres and segments of public activity.

Part 1.1.2. The first civilizational cognitive contradiction of humanity.

In the last period of human development (fifth and sixth centuries), there was a quite natural expansion, deepening, and complication of interstate, economic, industrial, scientific, cultural, educational, and other social processes, both within individual states and between states. With each new century, the pace of change has accelerated, and the scale has multiplied exponentially.

In such conditions, it was necessary to use an increasing amount of information to make appropriate decisions, so the volume of information interaction and information flows in all spheres of society increased significantly.

However, since the middle of the nineteenth century, humanity has become acutely aware of the growing difficulties in the field of information interaction. These problems have been enormously exacerbated in the last 60-70 years due to the increased connectivity and interdependence of the modern world, which has significantly complicated the decision-making process because (Baranov, 2018):

– it has become necessary to have large amounts of timely, relevant, complete and reliable information: about the social process and its parameters, about subjects and objects, about the surrounding world, about social relations in specific spheres of human activity that are relevant to this process;

– due to the great transience and high dynamics of changes in various social and natural processes, it becomes increasingly necessary to make decisions in a limited time or even in real time.

At the same time, there was an increase in the volume of publicly available information, which, on the one hand, was exponential, and, on the other, spasmodic. The abruptness occurred due to the invention and application of breakthrough technologies for transmitting (disseminating) and storing information, such as (Fang, 1997): writing, printing press, telegraph, telephone, radio, television, telecommunications, and the Internet.

In addition, several factors had a negative impact on the quality of information processes in society, such as (Baranov, 2018):

– increasing organizational, legal, intellectual, financial, economic, and technological barriers to ensure the collection and processing of information (data) is sufficient both in volume and quality;

– the rapid increase in the sources and volumes of diverse and heterogeneous information that a person is forced to use during the day, week, month, or year;

– the constant increase in the requirements for the speed and quality of decision-making, which led to an inexorable reduction in the time that could be used to collect, process, and transmit information.

But overcoming the problems of information interaction is becoming more difficult, and sometimes impossible, due to: the notorious natural limitations of

human cognitive capabilities (Scherer 2015), limitations in the simultaneous processing of variables in human working (operational) memory (Miller 1956), limited storage time in visual short-term memory, small time limit for storing information in human memory (Buschman et al., 2011), insignificant speed of cognitive processes (Holley, 2015), limited ability of a person to perceive, remember and process information (Mattarella-Micke, and Beilock, 2012).

As a result, from about the middle of the 18th century to the middle of the 20th century, a fundamental barrier to the development of civilization began to appear, take shape and continue to strengthen, which consisted of the fundamental natural limitation of human cognitive capabilities in collecting, processing and transmitting information. Thus, humanity is once again faced with the problem of the need to resolve the civilizational contradiction as a threat to its existence.

Let us formulate a definition of this phenomenon: ***the first civilizational cognitive contradiction*** *– is the contradiction between the presence of a natural limitation of the cognitive capabilities of a person and the need to collect, process, use, and transmit various information at an increasing speed and in ever greater volumes to carry out effective human activity in the interests of ensuring the self-preservation of the developing world Civilization.*

The reality of the first civilizational cognitive contradiction becomes an insurmountable obstacle to the formation of a timely optimal response to changes in external and internal factors that negatively affect the life of humanity. The consequence of the insurmountable cognitive contradiction is the widespread use of untimely, irrelevant, incomplete, and unreliable information, that is, information that is not relevant to real circumstances; a sharp deterioration in the quality of social modelling and forecasting; a sharp reduction in the time horizon for confident forecasting, especially concerning medium- and long-term development strategies; unacceptable decrease in the quality and speed of decision-making in any sphere of public activity.

Part 1.1.3. The Triumphant Progress of Information Computer (Digital) Technologies.

By the middle of the last century, the first civilizational cognitive contradiction *had finally taken shape*, creating systemic threats to quick and high-quality decision-making to ensure the effectiveness of social activities. This contradiction has become an insurmountable barrier to the further development of civilization. But, as it was earlier in the history of mankind, this civilizational challenge was overcome thanks to the achievements of the next industrial (technological, scientific and technological) revolution.

The computer, invented in the middle of the last century (Woodford, 2021), made it possible to neutralize the acuteness *of the first civilizational cognitive contradiction*. Humanity has embarked on the path of using an amplifier of human cognitive abilities that is the use of a computer. The problem of the limitation of the intellect has been solved in the same way as the problem of the limitation of man's physical capabilities was solved by the invention of the hoe, the plough,

wheels, carts, steam and electric machines, excavators, automobiles, steamships, airplanes, etc.

An epochal stage in the history of mankind has begun that is the stage of widespread and widespread introduction of information computer technologies (hereinafter referred to as ICT or information and communications technology), which historically successively received names: automation, computerization, informatization, development of the information society, digitalization and digital transformation. The terms have changed, but the essence has remained the same namely humanity has begun to widely implement digital transformation due to the widespread introduction of digital technologies (ICT) for solving the problem of countering the first civilizational cognitive contradiction.

Based on the results (Baranov, 2021), we will give the following definition: ***digital transformation*** *is a social transformation that occurs based on the maximum use of digital technologies, such as computers, telecommunications, the Internet, Internet technologies, the Internet of Things, Industry 4.0, artificial intelligence, robotics, big data processing, cloud computing, and many others.*

The end of the last century was marked by the beginning of an active global movement to approve strategic documents, policies and programs for the development of the information society in the context of digital transformation both at the national and international levels. Of the several hundred such documents, let us recall the annual reports of the UN Secretary-General "Progress Made in the Implementation of and Follow-up to the World Summit on the Information Society at the Regional and International Levels". Thus, the report of the UN Secretary-General made the following main conclusions and proposals (UN Secretary-General, 2022):

– the pace of technology development is accelerating and most of today's technologies, products, and services were in their infancy at the beginning of the 21st century, including social media and cloud technologies, big data, and the Internet of Things;

– the scope of activity of the largest IT companies extends to advanced technologies that create conditions for the development of the information society, including artificial intelligence, machine learning, robotics and quantum computing;

– cybersecurity has become one of the top concerns of governments, businesses, and citizens;

– the rapid pace of technological development will lead to a change in the modern understanding of the information society;

– the digital interdependence of people requires continuous analysis of trends in ICT technology and use, as well as new approaches to their implementation and management to maximize benefits and minimize risks;

– there is a need to explore perspectives and set new and broader goals to increase the use of ICT opportunities for the development of industries ranging

from environment to trade and conflict prevention.

Similar processes are taking place at the level of regional international organizations and regional associations namely the Council of Europe, the EU, the OSCE, the Organization of American States, the African Union, the League of Arab States, etc., as well as in a large number of individual states.

Thus, the mission and main goal of digital transformation is practically implemented in the world to create favorable conditions for the widespread use of digital technologies to ensure high efficiency of decisions made in any industry or segment of human activity.

Part 1.1.4. Civilizational Challenges and the Second Civilizational Cognitive Contradiction of Humanity.

At the turn of the millennium, several extremely dangerous civilizational challenges were formed: the depletion of planetary resources, such as clean air, hydrocarbons, minerals, forests, fresh water, and fertile lands; reducing the resilience of the human ecosystem; oversaturation of cities, infrastructures, industries, cars, etc.; global food shortages; environmental degradation and climate change; extremely high rates of social processes; low probability of reliability of forecasting natural, social, political, economic, technical and technological processes and phenomena, etc.

Humanity is almost running out of strategic planetary reserves in the form of undeveloped territories and explored, but undeveloped, industrial reserves of minerals. That is why there has been a lot of talk lately about great journeys in near and deep space, the purpose of which is to discover and explore new near and distant planets.

In 2015, the UN General Assembly adopted the Resolution "Transforming our world: the 2030 Agenda for Sustainable Development" (UN General Assembly, 2015) was dedicated to the search for a way out of the critical state of human civilization. The UN Secretary-General, in his synthesis report on the agenda, identifies the following as the causes that have led to the critical state of humanity (UN Secretary-General, 2014): *insufficient information for decision-making; indecisiveness and lack of courage on the part of the top leadership of states in formulating policies for change in society and changes in economic management; unreasonableness of strategic decisions; lack of holistic and integrated approaches to addressing large-scale development challenges.*

We can agree with these conclusions, but, in our opinion, they are only a consequence of deeper and more systemic causes.

One of the systemic, basic reasons for the degradation of the planet and human civilization should be recognized as the general situation in the world with an extremely low quality of decision-making. The more complex the solutions, the more they do not meet the criterion of optimality. In most cases, the decisions made are trivially irrelevant to the goals set and the real state of social processes, and even the circumstances in which they were made. A certain part of the strategic goals formulated as a result of the decisions taken does not correspond to

either the current state of development of civilization or its expected (desired) future state.

Modernity is characterized by an innumerable number of mistakes in decisions made in all spheres of human activity, at all social levels. As a result, we see a huge pile of political, managerial, social, personal, technological, and technical mistakes piled on top of each other year after year. It is erroneous decisions that become the real cause of various local and global crises, the frequency of which is increasing due to the rapid reduction of the period of confident forecasting and planning of social activities, a sharp decrease in opportunities for long-term, innovative investments, etc.

Decision-making as a cognitive process is the collection of qualitative information with the subsequent selection of the best option from the formed various options of behaviour or actions of society. All this involves the implementation of the cognitive functions of collecting, analyzing, comparing, defining criteria, evaluating, planning, searching, forecasting, learning, choosing, etc.

The problems of collecting qualitative information as the first component of the decision-making process are the problems of the first civilizational cognitive contradiction, the conditions for the potential resolution of which humanity practically created by the end of the 20th century.

It is not difficult to assume that since the second component of the decision-making process is based on the implementation of cognitive functions, we will again face the problem of natural limitation of human cognitive abilities, but this time in terms of ensuring the high speed and quality of decision-making. We are talking about the second civilizational cognitive contradiction of humanity.

Indeed, in the last 20-30 years, due to the increasing connectivity and interdependence of the modern global world, the decision-making process has become dramatically more complicated, thus (Baranov, 2021):

– it is necessary to analyse and compare more and more volumes of timely, relevant, complete and reliable information: about the surrounding world, about social processes and their parameters, about numerous subjects and objects, about social relations in specific spheres of human activity;

– it is necessary to take into account the high dynamics of changes in the goals and content of political, state, social, economic, technological, cultural, educational, etc. processes both in individual states and in the world community;

– increasingly, it is necessary to make decisions in a limited time frame or even in real-time due to the great transience and high dynamics of changes in various social and natural processes;

– requirements for the quality of decision-making in all sectors and segments of government activity are constantly and significantly increasing.

In addition to the naturally limited cognitive capabilities described above, one more significant one should be added as a constant attempt to use previously developed clichés, models, methods, and paradigms for the implementation of

cognitive functions (Peterson, 2017). This fact of human attempts to use previous experience can be explained by the presence of potential limitations in the biological capabilities and mechanisms of the neural network of the brain (Sapolsky, 2017). At the same time, the factor of the limited total energy resources of the human body, especially the energy resources of the brain, plays a significant role (Lakatos, and Janka, 2008). It is the mass use of standard neurobiological algorithms for the implementation of cognitive functions by the brain of Homo sapiens that can significantly accelerate the development of civilization both in the general case (Riedl, 1977) and in the individual case, namely energy-saving decision-making.

The special importance of the human ability to develop standard cognitive algorithms for decision-making is emphasized in the psychological theory of decision-making, the beginning of which was developed by W. Edwards (1954). American psychologist R. Jensen (2017) notes that at the beginning of training, pilots demonstrate a fairly intensive cognitive process of finding solutions, but then standard patterns of behaviour are formed, which are most effective in conditions of performing complex tasks and an acute lack of time.

However, the natural desire to save energy in the process of implementing cognitive functions is fraught with systemic danger in relation to:

– involuntary ignoring of such variables of the state of the internal and external environment, and information processing that were not taken into account by previously developed standard neurobiological algorithms;

– formation of a systemic predisposition in a person to avoid the search for new creative, innovative solutions, which would require additional energy expenditure of the brain for the development of additional neurobiological algorithms for the implementation of cognitive functions.

Systemic energy limitation in the implementation of cognitive functions has led to the emergence of serious systemic problems concerning the timely adoption of optimal decisions based on the use of the most effective algorithms for the implementation of cognitive functions, especially in conditions of time shortage and in difficult conditions of constant change in the state of internal and external space.

So, there is the following contradiction:

– on the one hand, the rapid adoption of optimal (qualitative) decisions is the basic condition for the self-preservation and development of civilization in the context of the constant complication of the multi-connected and interdependent globalized world, permanent and random dynamic changes in the parameters of the social and natural environment;

– on the other hand, the presence of a natural limitation of human cognitive functions makes it impossible to make optimal decisions quickly.

Thus, let us formulate the following definition: ***the second civilizational cognitive contradiction*** *is the contradiction between the presence of a natural limitation of human cognitive capabilities and the need to quickly make optimal*

decisions for the implementation of effective human activity in the interests of ensuring self-preservation and the development of civilization.

The presence of the second civilizational cognitive contradiction becomes an insurmountable barrier to the elimination of the systemic problem of the extremely low quality of decisions made and implemented by man, as a result of which a number of extremely dangerous civilizational challenges are formed, potentially creating conditions for a progressive deterioration in the quality of life of humanity.

Persistent efforts by governments, politicians, industry, global corporations, businesses, education systems, all sectors of the economy, civil society institutions, scientists, experts, and specialists to implement the digital transformation of the information society have created conditions for overcoming the second civilizational cognitive contradiction. This was due to the fact that humanity had at its disposal powerful ICT resources, various computer programs, and hardware and software complexes, which made it possible to significantly improve the quality of decision-making and implementation in certain cases.

Thus, at the turn of the second millennium, humanity managed to neutralize the second civilizational cognitive through the widespread use of digital and Internet technologies.

Part 1.1.5. The Dunning-Kruger Effect and the Third Civilizational Cognitive Contradiction of Humanity.

Over the past few decades, a myriad of challenges have arisen due to the increasing complexity, connectivity, and interdependence of today's globalized world. To solve these problems, there is an unprecedented intensification of the integration of science and an avalanche-like growth of interdisciplinary research, which leads to the generation of a large amount of new interdisciplinary knowledge. The importance of knowledge in the destiny of humanity is becoming so obvious that even concepts of the next phase of society's development, the knowledge society, are emerging (David, and Foray, 2002; Drucker, 1993).

The process of social management, or the management of social activities to achieve objectives, is a continuous decision-making process (Simon 1966). It is clear that any managerial decision is aimed at eliminating the contradiction (elimination of deviation) that arises between the initial state (actual state) and the goal of activity (expected state) of a complex dynamical system (Trofimova, and Trofimov, 2011). In turn, based on the results of the analysis of information and knowledge, decisions are made on the reasons for the discrepancy between the initial (current) and expected state of the object of management, on the parameters of the state of subjects associated with specific social activities, on the parameters of the state of internal and external factors affecting social activity, etc.

Thus, we come to the following conclusion: social management, as a continuous chain of interdependent decisions made by the subject in the process of implementing social relations, in modern conditions requires the acquisition of a large amount of various interdisciplinary knowledge.

Therefore, one should ask the question: why, despite the modern close attention to the availability of knowledge, civilizational cognitive contradictions continue to have a negative impact on humanity's understanding of the problem of poor quality of decision-making?

Evidence of the understanding of the relevance of this problem is the emergence of the theory of decision-making. Ideas related to the problem of decision-making date back at least to the eighteenth century, but much has been made to the theory during the last 80 years (Mendoza, and Gutiérrez-Peña, 2010). General decision theory is a mixture of several theories: utility theory, statistical decision theory, game theory, public choice theory, normative decision theory, behavioral decision theory, quantum decision theory, and so on (Peterson, 2017). The existence of a large number of different theories about decision-making is indicative of the extreme complexity of this problem.

Indeed, decision-making is a rather complex process, as it is influenced by many social, biological, physiological, psychological, environmental, cultural, and other factors, thus the subject of research in the field of decision-making requires interdisciplinary research in philosophy, mathematics, statistics, economics, sociology, psychology, cognitive psychology, neuroscience, information technology, etc. (Shahsavarani, and Abadi, 2015). As a result, it can be argued that in modern conditions, the main condition for making optimal, high-quality decisions is the use of interdisciplinary knowledge both about the field in which decisions are made and about the decision-making processes themselves.

To date, a huge amount of research has been formed on various aspects of the theory of decision-making, which is not surprising, since the requirement for high-quality decision-making has become critical for any human activity. However, despite this, there are a large number of questions and problems that remain almost unanswered, which significantly reduces the effectiveness of the application of the provisions of decision theories in practice (Armendt, 2019; Baccelli, and Philippe, 2022; Doyle, and Thomason, 1999).

So, all this allows us to conclude that all the causes-problems that have led to the emergence of various separate theories of decision-making are derived from some common cause-problem of the unsatisfactory quality of decision-making in the conditions of the 21st century.

There is a well-known psychological paradox, the Dunning-Kruger effect (Kruger, and Dunning, 1999), which is formulated as follows: when people are incompetent in the strategies, they use to achieve success and satisfaction, they bear a double burden: not only do they come to the wrong conclusions and make the wrong choices, but their incompetence deprives them of the ability to realize themselves as they're doing well.

In addition to the well-known problems of studying the Dunning-Kruger effect, a number of researchers pay attention to the knowledge factor that political competence depends on the quality of political knowledge, its level of limitation and breadth of coverage (Anson, 2018), even those with skills can rely on incorrect information when evaluating their actions (Ehrlinger, 2008), confidence

is closely related to the total time it takes to obtain specific information, and this relationship is inversely proportional (Çatalbaş, 2020), problem-solving is the brain's metacognitive process, consisting of its cognitive processes of abstraction, search, learning, decision-making, inference, analysis, and synthesis (Acosta at el., 2020), experienced experts not only give more accurate assessments of various situations than novice experts, and also give more accurate estimates of the accuracy of their assessments (Acosta at el., 2020), meta-ignorance will always be there until people know everything (Huang, 2013). Regardless of the level of intelligence (Small, and Holt, 2021), bad performers tend to be doubly doomed: they lack knowledge of the material and are unaware of what knowledge they have and what they don't (Miller, and Geraci, 2011).

Thus, it can be concluded that the factor of knowledge availability, especially multidisciplinary knowledge, plays almost the main role in determining the competence of a person. But, in turn, what factors affect the formation and availability of knowledge in a particular person? What is the relationship between information and knowledge? We have to accept that information and knowledge are not the same thing. Many researchers use these terms very carelessly considering them interchangeable, but D. Stenmark (2001) argues that information is the basis for reflection and that it helps the individual to expand or change his or her state of knowledge based on personal experience and cultural heritage.

To perform a simple information-processing operation, one or more simple cognitive functions of the human brain are usually involved. The increasing complexity of information-processing tasks naturally leads to the need to increase both the number and complexity of the set of cognitive functions involved. A complex cognitive process, such as solving a problem, finding a solution, or forming a creative proposal, is suggested to be called a metacognitive process of the brain (Wiener 1948). By analogy, the set of simple and complex cognitive functions necessary for the realization of the brain's metacognitive process will be called the metacognitive function.

Undoubtedly, the metacognitive process of the brain always takes place when a person performs a sufficiently large set of intellectual and creative tasks that are inherent in his activity related to the production of knowledge and the search for solutions in all spheres of social and personal activity. It is also associated with the creation of products of scientific, artistic, literary, musical and technical creativity, the implementation of a whole variety of managerial, economic, industrial, and professional activities, etc.

Without a doubt, the performance of a specific intellectual or creative task determines the determination of specific conditions, requirements, limitations, and features of the implementation of both the metacognitive process of the brain and the metacognitive function, which are individual (personified) for each person.

On the basis of a large number of works, the results of each of which, unfortunately, cannot be exhaustively effectively used in this study, we will formulate the most characteristic features of the relationship between information and knowledge:

– the source of information for a person can be: directly other people; events, phenomena, and facts taking place in society and the surrounding reality; information products presented in any form, in any form and on any media;

– the transformation of information into knowledge occurs during the implementation of the metacognitive process of the human brain;

– the processing of information during its transformation into knowledge takes place taking into account the information and knowledge available to a person, personal and social experience, education, mentality, worldview, peculiarities of the historical development of society, social and family traditions, and much more, which is the basis for the formation of his inner world and his personality;

– the criterion of the correctness of information processing in the implementation of the metacognitive process by the brain and the reliability of the knowledge obtained is the effectiveness of their use in practice;

– information and knowledge that has not been tested in practice can be used to make decisions with certain reservations;

– knowledge obtained from various sources, including from other people, has the status of information;

– a piece of information that does not require proof under the social contract is called an axiom or dogma and is knowledge obtained without the use of the metacognitive process of the human brain.

Based on the above, we will give the following definition: ***knowledge is*** *information processed through the implementation of the metacognitive process of the human brain, which occurs using the information and knowledge available to him: personal and social experience, education, mentality, worldview, information about the features of the historical development of society, social, cultural and family traditions, and much more, which is the basis for his formation inner world and his personality.*

It is obvious that since the content of a person's inner world and his characteristics as a person are purely individual phenomena, the knowledge about the same process, object, or phenomenon developed by different people, obtained as a result of a personified metacognitive process, will have differences in content. To facilitate the understanding of the relationship between information and knowledge, we can say the following metaphorically: information is an ore from which, with the help of open-hearth furnaces (the brain and its cognitive functions) with the use of certain additives (the content of the human inner world), steel is smelted–knowledge, which, in turn, as information (scrap metal) can be used in the future for the production of new knowledge.

For the purposes of this study, it is also useful to clarify the relationship between competence and knowledge. Most authors share the following point of view: competence should be understood as knowledge and skills (Krasnovska, 2020), and the essence of competence is defined through the term’s knowledge,

skills and abilities (Chenusha, 2017), competence includes a number of skills, and abilities (Hilsen, and Olsen, 2021), competence is the ability to consistently apply attitudes, knowledge, and skills (From, 2017).

Thus, improving the quality of decision-making requires a high level of competence of decision-makers. The conditions for ensuring a high level of competence of decision-makers are:

– the possibility of obtaining information of the required quantity and quality, which should be ensured by the existence of an effective system of information interaction and interconnections, as well as an effective information infrastructure;

– the ability to produce high-level multidisciplinary knowledge, which is ensured by the ability to receive and process information and knowledge of the required volume and quality through the metacognitive process of the brain;

– possession of high-level interdisciplinary knowledge relevant to the problems that require appropriate solutions.

Based on the results of numerous studies and the previously formulated definition of the term knowledge, it can be argued that the specific content of knowledge about the same process, object, or phenomenon is different for different people and has an individual character. Such diversity and differences in the content of knowledge among different people have become significant obstacles to making coordinated decisions. In the early stages of the historical development of mankind, when the mass of knowledge and the differences in it were insignificant, the problem of the individual character of knowledge was more or less successfully overcome as a result of the process of coordination, creative discussions, and the search for compromise.

However, the current state of civilizational development is characterized by the need to use more and more interdisciplinary knowledge in a relatively short time. In such conditions, the diversity and differences in the content of knowledge of specific people become one of the significant barriers to ensuring the adoption of high-quality decisions that correspond to the real state of social processes as well as the circumstances in which they are made.

Therefore, it can be stated that today and in the future, the main condition for making the right decisions is the use of high-quality (timely, relevant, complete, and reliable) multidisciplinary knowledge related to the real state of social processes as well as the circumstances in which decisions are made.

Thus, a contradiction arises: in order to make good decisions, it is necessary to use multidisciplinary, precise, and reliable knowledge, but different people usually have different knowledge about the same process, object, or phenomenon. In addition, the individual has significant cognitive limitations in acquiring the full range of interdisciplinary knowledge necessary to make optimal decisions.

Summarizing the above, let us formulate the following definition: ***the third civilizational cognitive contradiction*** *is the contradiction between the*

presence of a natural limitation of a person's cognitive capabilities to master a variety of knowledge that is developed by different people in relation to the same process, object, or phenomenon as a result of a personified metacognitive process of the brain and the need to use a variety of accurate interdisciplinary knowledge in making optimal decisions on the implementation of human activities in the interests of ensuring the self-preservation of a developing civilization.

It was the presence of the third civilizational cognitive contradiction that became the catalyzing factor in the development of cognitive distortion, that is, a new stage in the expansion of the Dunning-Kruger effect, but with new threatening features.

Today, the Dunning-Kruger cognitive bias extends to people who have a generally high level of competence and consider themselves professionals, but make erroneous decisions due to a lack of up-to-date interdisciplinary knowledge. Knowledge that emerges from breakthrough, innovative, usually interdisciplinary research.

The answer to the challenge of the third civilizational cognitive contradiction is the implementation of modern digital transformation based on the intensive and widespread introduction of digital technologies based on the use of artificial intelligence and robotics.

Modern capabilities of artificial intelligence, although still limited, are much more powerful than human cognitive capabilities. They allow a large number of people to operate with significant amounts of interdisciplinary knowledge and information, quickly attract new knowledge, generate the most effective solutions, and implement them.

The high efficiency of information interaction and the collection of a huge amount of information are ensured by such digital technologies as big data processing, cloud computing, electronic communications, etc.

Conclusions.

The main reason for the degradation of civilization is the long-term accumulation of political, managerial, social, personal, technological, technical, etc. erroneous decisions in all spheres of human activity at all social levels.

The source of erroneous decision-making is the presence of the first, second, and third civilizational cognitive contradictions, the existence of which is due to the natural limitation of the capabilities of the human intellect as a system of cognitive functions.

Systematic decision-making in any sphere of social activity in the context of the threatening impact on the development of civilization of the natural limitations of human cognitive capabilities can be ensured only through the widespread use of modern digital technologies.

Therefore, the mission of modern digital technologies is to provide effective conditions for making optimal decisions everywhere that are relevant to the goals set and the circumstances in which they are made.

Part 1.2. Social and digital transformations.

Part 1.2.1. Generalized characteristics of the development of modern society.

In the last three or four centuries of human development, there has been an "unexpected" expansion, deepening, and complication of economic, industrial, cultural, educational, and other social ties both within individual states and between states. At the same time, there was a significant quantitative and qualitative growth of the subjects of social relations participating in or associated with certain processes in society.

In such conditions, making informed decisions requires an increasing amount of information and data about social processes, internal and external conditions for their implementation, as well as a variety of information about the subjects that are associated with them. In contrast to previous times, in the last century and a half, the problem of ensuring optimal (rational) decision-making in these conditions has begun to grow (Baranov, 2018):

– complicating the conditions for ensuring the collection and processing of the necessary amount of information (data);

– too rapid dynamics of changes in the goals and content of political, state, social, economic, technological, cultural, and educational processes both in individual states and in the entire world community;

– the presence of a natural limitation of the cognitive capabilities of humanity to collect and process a significant amount of information, the speed and quality of decision-making.

All these factors led to a constant decrease in the quality and speed of decision-making by humanity, which became the main reason for the formation of a system of threatening civilizational challenges before the beginning of the 21st century. This is stated in the report of the Club of Rome "Come on! Capitalism, Myopia, Population, and the Destruction of the Planet" (Anders, 2020). The overall conclusion of the report is that the results of humanity's planetary activities are leading to the collapse of the global economy, so there is a need to rethink the direction and content of how governments, businesses, financial systems, innovators, and families interact with our planet.

Historically, it is known that the response to civilizational challenges is numerous social transformations (reforms) in various spheres of society. These reforms are being implemented at the personal, corporate, local, national, regional and international levels and are taking place in all countries in the world. One of these recent large-scale reforms has been the widespread introduction of digital technologies (digitalization), the civilizational mission of which is to overcome the cognitive contradictions of humanity. The widespread adoption of digital technologies has been called digital transformation.

Taking into account the discussions that have taken place over the past few decades with the participation of politicians, government officials, scientists, top managers of various global companies, specialists and experts in various fields of

activity, including law, it is possible to formulate an almost consensus understanding of the specifics of social and digital transformation in the modern world:

– firstly, the implementation of any large-scale social transformation requires appropriate legal support, which should be largely based on updated legislation;

– secondly, the effectiveness of social transformations increases significantly if they are accompanied by the digital transformation of the relevant social processes, which is carried out synchronously;

– third, the implementation of digital transformation leads to the emergence of peculiarities in the implementation of public relations, taking into account the use of digital technologies, which, as a rule, necessitates the improvement of legislation;

– fourth, the effectiveness of digital transformation requires a concomitant social transformation as a result of the mandatory reengineering of social processes in order to simplify their algorithms and further optimize the use of digital technologies, which, in turn, also requires appropriate legal support;

– fifth, the understanding of the essence, content, and features of social and digital transformation has a significant impact on the quality of legal support and the improvement of legislation.

Thus, the issues of determining the essence, content, and features of social transformation and digital transformation, clarifying the legal problems of forming legal support for their implementation are relevant.

For many decades, the world community has been waiting for scientists and practitioners to objectively analyze the systemic state of civilization and the planet, identify reliable causes of planetary challenges, confidently predict further development, and, most importantly, provide well-grounded recommendations for overcoming the negative consequences of permanent crisis phenomena and preventing them in the future.

But modern science is experiencing certain difficulties in developing tools for creating models of global, regional, national, or local development that would be relevant to real social processes. The imperfection of development models is fully characteristic of almost the entire spectrum of social life of society: foreign policy, public administration, economy, law enforcement system, military sphere, health care, education, culture, etc., which has significant negative consequences. This is especially true for the economy, which is the basis of human life. Thus, the use of imperfect economic models in the process of strategic and medium-term forecasting and planning, as a rule, leads to macroeconomic errors, even on a planetary scale, and to microeconomic miscalculations.

Constant "unplanned" global, national and sectoral economic crises and ineffective recipes for overcoming them are clear evidence of the imperfection of methods, methods and mechanisms of modelling and decision-making both in the preparation of forecast models of economic development and in the process of practical implementation of these models. In real life, as a rule, the correction

or change of economic models of development occurs only after establishing the presence of a crisis, either in the economy as a whole or in its particular segment; that is, in other words, the reaction to crisis phenomena almost always occurs with a delay.

A number of experts rightly believe that it is the results of modern economic activity of mankind that have become a negative factor that really threatens the prospects of civilization on Earth. This has led to the emergence of many competing theories of humanity's way out of the economic crisis (Reinert, Ghosh & Kattel (Eds.), 2016; Maurizio, 1995), almost all of which propose some kind of model of social transformation. Therefore, over the past century, all sorts of reforms and transformational changes in the state and society have been carried out almost continuously in different countries around the world, but without a clear long-term positive result.

Thus, we observe the action of a "perpetual motion machine" according to which society moves in a vicious circle: a mistake in decision-making (crisis) – an indication of the cause of the crisis – the construction of a new social model – the transition to a new model (reform) of the functioning of society – the functioning of a new model – a new crisis... and so on. In order to break this circle, it is extremely important to answer the question: Why do crises arise in the process of civilizational development?

As a systemic cause of crisis phenomena in the economy, which occur more and more often, the main reason can be named: the constant decline in the quality of decisions made to determine the sources of crisis phenomena, the purpose and content of reforms and the plan for their implementation, the process of implementing reforms, and the process of further current economic activity. The decrease in the quality of decision-making is due to:

– the constant increase in the pace of social processes compared to the past;

– the need to make decisions almost simultaneously on a large number of social processes in real-time;

– Progressive limitation of a person's cognitive, physical, and biological ability to engage in a large number of current and future social activities.

Part 1.2.2. Inevitability of transformation processes.

World civilization, individual states, as well as any other dynamic systems (biological, technical, or social), develop under conditions of *continuous external and internal influences of various nature and various forms, the time of emergence and parameters of which are not always known.* The general idea of the essence of the term "dynamical system" is as follows: it is a system whose state changes over time under the influence of external and internal forces (Katok, Katok, & Hasselblatt, 1995).

A dynamic system (hereinafter referred to as a DS), like any system, is characterized by the structure and a set of its constituent elements, their functional

capabilities, internal and external connections, as well as internal and external influences. At the same time, the concept of "dynamic system" has been established in modern science and practice. This concept embraces systems of almost any nature, namely physical, chemical, biological, technical, economic, and social, etc. *It is expedient to refer to socio-dynamic systems of individual states and their international unions, legal entities of public and private law and their associations, individuals and their associations, and operating in any segment of social activity.*

Stability, which is the most important property, means that a dynamic system retains its basic structure and the main indicators of function performance for a certain time under conditions of external and internal influences. External and internal influences can have both positive and negative effects on the functioning of the DS. Positive influences are those that contribute to the achievement of the purpose of the functioning of the DS and, at least, do not degrade the qualitative characteristics of this functioning. Negative impacts are those that lead to a significant deterioration in the quality of the functioning of the DS and can even lead to the impossibility of achieving the goal of functioning (to the functional "death" of the DS).

It is known that self-preservation is the desire to preserve one's life as long as possible, the desire to protect oneself from something (Dahl, 2005). Consequently, the self-preservation of the dynamic system is a property that ensures the achievement of the goals of the DS functioning by neutralizing the effect of negative impacts.

Thus, the main condition for the existence, functioning, and development of DS is the presence of such a fundamental attributive property as self-preservation. The lack of self-preservation in the face of changing external and internal negative influences leads to the stagnation of the system due to a decrease in the level of quality of functioning, sometimes to such a tragically low level that it leads to its death.

The presence of the property of self-preservation is provided by a special subsystem of adaptation of the DS, which is designed to neutralize the effect of negative impacts that impede the achievement of the goal of the DS functioning. Neutralization of the effect of negative impacts occurs as a result of a certain reaction of the DS initiated by the adaptation subsystem, which allows, at a minimum, to preserve the qualitative characteristics of the DS functioning and, at a maximum, to create the most favourable conditions for their increase.

The spectrum of the DS reaction (the formation of control actions and for social DS – decision-making) as a response to the activities of the adaptation subsystem can be very wide: from changing some internal parameters of the DS to carrying out a certain internal transformation (restructuring) at the level of goal-setting, at the functional and/or structural levels, to attracting external resources.

Thus, it is the property of self-preservation that makes it possible to minimize the effect of negative impacts by changing (restructuring, transforming)

the DS, which underlies all processes of evolution and development in living nature and the social environment.

It should be noted that, in the best case, in order to ensure the effectiveness of self-preservation, the adaptation subsystem must have time to initiate the necessary reaction to a certain parameter of negative impact, and the DS must have time to form and perform the appropriate control action (make and implement a decision) before the next change in this parameter of negative impact occurs. However, real DS and their adaptation subsystems cannot fulfil this condition, since they have a number of limitations in initiating and implementing a timely response to negative impacts. Among the limitations, the main ones are restrictions on the speed of formation and implementation of control action (decision-making), as well as informational, energy, structural, spatial, resource, organizational, managerial, and even intellectual limitations. This will be true as long as the adaptation subsystem does not have a forecasting function that allows you to initiate the necessary reaction in advance, before the occurrence of an event associated with negative impacts.

Summing up, we state the following: in any DS, the implementation of the function of self-preservation as the basis of existence and development faces a contradiction between the need for a timely response to negative impacts and the objective existence of restrictions in ensuring the quality and speed of such a response.

One of the most effective ways to resolve the above contradiction is to carry out the transformation (change, transformation) of the DS.

Let us formulate the basic category for this study (Baranov, 2021): ***transformation*** *is a change, conversion, or correction of the purpose of functioning, structures, and/or functions of a dynamic system, as well as methods, ways, and mechanisms for implementing these functions, in order to neutralize or stimulate the influence of external and internal influences on the further development of this system.*

At the same time, development is a process of regular change, the transition from one state to another, more perfect, the transition from the old qualitative state to the new, from the simple to the complex, from the lower to the higher (Grushin, 2001).

Therefore, in order to ensure the effectiveness of the self-preservation property, the DS and its adaptation subsystems must be able to perform the following tasks:

- identification of impacts;
- observation and forecasting of the development of impacts;
- analysis of the impact of positive and negative impacts on the performance of the DS;
- synthesis of targeted, functional, structural and other "proposals" for the transformation of the DS, in particular, for changing the rules of conduct (improving or creating new legislation) to minimize the consequences of

negative impacts;

– formation of "proposals" on ways, methods, ways and means to ensure the transformation of the Kyrgyz Republic;

– analysis of the impact of positive and negative impacts on the performance indicators of the transformed DS;

– adjustment (if necessary) of the previous "proposals" for the transformation of the DS.

The described algorithm is in full agreement with the closed-loop control theory of N. Wiener (1948). It is the presence of "feedback" in DS, i. e. the availability of information about the results of the implementation of the decisions made, that makes it possible to form a control action not only depending on changes in internal and external influences but also depending on the effectiveness of the DS response to the previous control action. Moreover, in the formation of control actions, it becomes possible to take into account the results of forecasting the future states of internal and external influences, possible transformations of the DS, etc. Transformation processes in the DS make it possible to adapt its functioning in accordance with changing internal and external conditions (impacts).

Since the presence of any impacts, in particular, negative ones, on the functioning of the DS is a priori due to a fairly high level of entropy of the surrounding ecosystem, the presence of the possibility of transformations is a prerequisite for the development of the DS. Or, in other words, it is impossible to function and develop dynamic systems in real conditions without the possibility of carrying out transformation processes.

Social transformation. Recently, the term "social transformation" has been widely used to refer to processes of change, modernization, improvement, or reform, the purpose of which is to ensure an increase in the efficiency of the functioning of society or its parts. But the processes of social transformation have been carried out throughout the life of mankind.

Historically, it is possible to count several turning points in civilizational development that required fundamental and systemic changes in the foundations of the functioning of society. As a rule, the indicator of the need for change in society was a sharp decrease in the efficiency of its functioning, which led to a deterioration in the living conditions of people and the quality of their life both on the planet as a whole and in individual regions or countries.

One of the dominant methods of social transformations (fundamental and systemic changes in the development of society) is the technical and economic method, the main criterion of which is the efficiency of the functioning of society. History shows that technical and economic methods of transformation are implemented with the help of industrial (technological, scientific-technological, etc.) revolutions, the results of which are perceived by mankind as revolutionary changes in the productive and in the organization of its activities in the broadest sense (World Economic Forum, 2016).

Analyzing the conditions, causes and results, we concluded that the industrial revolution has always been a response to the civilizational challenge caused by the emergence of a systemic contradiction between the need to ensure the self-preservation and development of civilization and the presence of systemic crises that threatened the very existence of civilization.

Modern civilizational challenges include the low quality of strategic planning for the development of individual industries, countries, and civilization as a whole; a sharp increase in the interconnection and interdependence of objects, subjects, processes, and phenomena both in the local and global dimensions due to the all-consuming penetration of globalization; the need to have large amounts of information and take into account a large number of objects and subjects for a relevant description of social processes and decision-making; the need to make decisions in real-time; limited cognitive abilities of a person to make decisions that are adequate to the current state of social processes, internal and external influences; limiting the physical and biological capabilities of a person to carry out a large number of current and future types of social activities.

What is qualitatively new in this list of challenges is that some of them are related to the limited cognitive capabilities of the human being and his capabilities as a biological being. It is these limitations that are one of the main reasons for the low level of efficiency of the human decision-making process. The essence of this challenge and ways to overcome it have been written above.

The implementation of industrial and technological revolutions to overcome certain historical civilizational challenges naturally led to transformations of the principles, structure, and mechanisms of the functioning of society, methods of production, legislation, etc.

Based on the proposed definition of the category "transformation", taking into account the previously obtained results (Baranov, 2018; Baranov, 2023), we will formulate the following definition**:** ***social transformation*** *is the process of correction, conversion or change of the mission and goals of social systems, their structure, interrelations and parameters of life, basic and local functions, methods, mechanisms and tools for the implementation of these functions in order to ensure their self-preservation and development, and increase the efficiency of functioning in the interests of ensuring a high level of human quality of life.*

Digital transformation. The response to modern civilizational challenges was the fourth industrial (technological) revolution, the main achievements of which include such digital technologies as Internet technologies, the Internet of Things, Industry 4.0, artificial intelligence, robotics, Big Data, cloud computing, as well as genetic engineering, nano- and biotechnologies and much more.

The scale of implementation of the achievements of the fourth industrial-technological revolution, as a rule, requires a certain social transformation both within a single country or a group of countries, and within the framework of the entire civilization. This is due to the fact that the synergy of the civilizational effect from the use of new models of the functioning of society increases

exponentially, provided that they are scaled on the basis of the widespread use of digital technologies (Agenda, 2015; World Economic Forum, 2016).

As it is known, the widespread use of digital technologies, which began in the mid-60s of the last century, in the late 90s in almost all countries is perceived as a basic condition for increasing efficiency in any sphere of human activity. The efficiency of human activity is the basis for ensuring significant savings in resources, a significant improvement in the quality of life of people, etc. (Liao, Loures, Deschamps, Brezinski, & Venâncio, 2018).

Evidence of the great attention of the world community to the use of digital technologies was the development of the idea of an information society, which was shared by almost all countries. The World Summit on the Information Society (WSIS), which was held in two phases namely in Geneva (2003) and in Tunis (2005) has played a special role in the development of the information society on a global scale. As a result of the forum, the following documents were adopted: "Declaration of Principles. Building the Information Society is a Global Challenge in the New Millennium" (ITU, WSIS, 2003a), the Geneva Plan of Action (ITU, WSIS, 2003b), the Tunis Commitment (ITU, WSIS, 2005a) and the Tunis Agenda for the Information Society (ITU, WSIS, 2005b).

In addition to the close attention of the UN to the problems of the introduction and use of ICT on a global scale, an equally intensive process is taking place at the level of regional international organizations and regional associations and a large number of individual states.

Thus, modern humanity associates positive expectations in its development with a wide range of digital technologies, primarily with the achievements of Internet technologies, the Internet of Things, Industry 4.0, artificial intelligence, robotics, Big Data, cloud computing, electronic communications, etc.

Taking into account the modern understanding of the results and prospects for the development of the widespread use of ICT, we consider it appropriate to give the following definition**:** ***the information society*** *is a society in which the totality of social relations is maximally realized on the basis of the use of information computer technologies in order to increase the efficiency of activities in various spheres (politics, economy, public administration, military affairs, health care, education, culture, entertainment, personal life, etc.).*

With the beginning of the 21st century, the term "digital transformation" began to be actively used in the lexicon of humanity along with the term "social transformation".

Based on the previous definitions and results (Baranov, 2018; Baranov, 2023), we will formulate the following definition: ***digital transformation*** *is an independent process or a process within the framework of social transformations, which occurs on the basis of the maximum use of digital technologies, such as: Internet technologies, Internet of Things, Industry 4.0, artificial intelligence, robotics, big data processing, cloud computing and others in order to increase the efficiency of group and individual human activities Community.*

Based on the analysis of the definitions and the inner essence of social transformation and digital transformation, it can be concluded that they are dialectically correlated as categories of content and form. Content is a social transformation, which consists of changing or transforming the organization of social life, sometimes radically. The use of digital technologies in the process of social transformation means a special form of its implementation, namely digital transformation. At the same time, there may be certain consequences of the dialectical connection between the categories of content and form. The specific content of social transformation necessarily determines the choice of forms (methods, ways, means, and mechanisms) of digital transformation. In turn, the obligation to provide certain conditions for the implementation of specific forms of digital transformation may lead to the need to carry out an appropriate social transformation, or adjust its content, if the social transformation involves the implementation of digital transformation.

Therefore, digital transformation can be carried out either within the framework of social transformation as a basic condition for ensuring the effectiveness of the latter, or independently. But in the latter case, an indispensable stage in the implementation of digital transformation is the reengineering of social processes in the field of activity subject to digitalization, which, for the most part, leads to the need for a certain social transformation.

Part 1.2.3. An example of possible social and digital transformations.

Among the main reasons for the emergence of civilizational challenges are: conservatism of political, social and economic theories, inertia in the development of society and states; the ravages of globalization; the growth of oligarchy and the centralization of power; inefficiencies in public administration and economic systems; overexploitation of natural resources; changes in climatic conditions, etc.

In addition, other variants of the causes of the degradation of modern civilization are considered: reckless and uncontrolled consumption of fossil fuels; profit as the goal of economic activity, uncoordinated, multi-vector, and chaotic activities of humanity to neutralize civilizational challenges (Collins, 2020); dialectical process of constant complication of human society and simultaneous decrease in the efficiency of its activities (Tainter, 1988); inefficiency information interaction and lack of socio-economic integration across class boundaries and at different spatial scales (Butzer, 2012); degradation of economic structure and complex social hierarchy (Martin-Merino, 2021).

At the same time, the UN identifies the following reasons: lack of information for decision-making; indecisiveness and lack of courage on the part of the top leadership of states in the formation of policies for changes in society and changes in economic management; unreasonableness of strategic decisions; lack of holistic and integrated approaches to solving large-scale development problems (General U.N., 2014).

Thus, the global goal of the World Community for the near future can be formulated as activities to neutralize a large number of heterogeneous causes of

the degradation of civilization and the planet. Achieving this goal is an incredibly difficult task.

Given the astonishing heterogeneity of the causes of the degradation of civilization, let us ask ourselves: Are there one or more root causes for all these causes? Without a doubt, hypothetical primary causes must reasonably be the source of the complex of different secondary causes that are now being identified and observed by numerous researchers. However, today numerous studies are devoted to a huge number of heterogeneous and diverse secondary causes, which does not allow the formation of a harmonious system of cause-and-effect relationships between crisis phenomena and their sources.

Earlier, we showed that one of the systemic, basic reasons for the degradation of the planet and human civilization should be recognized as the general situation in the world with an extremely low quality of decision-making. The source of this reason is the three civilizational cognitive contradictions of humanity, which can be overcome through the widespread use of digital technologies.

Another systemic root cause of the problem of the degradation of civilization is the collapse of the traditional economic model (Weizcacker, & Wijkman, 2018), which is characterized by the dominance of various models of capitalism, large-scale industrialization, and the fetishization of profit in all spheres of economic activity. The main features of such an economy were mass (industrial) production, mass market, mass consumer, average consumer demand, etc. The natural result of the development of the traditional economic model was constant cyclical overproduction and total crises.

In addition, consumer ideology made a powerful contribution to the collapse of the traditional model, which flourished and became extremely popular in the mid-twentieth century (Schmitt, Brakus, & Biraglia, 2022). It is believed that the ideology of consumption has powerfully contributed to the creation of conditions for achieving the main goal of economic activity, namely increasing profits. The ideology of consumerism catalyzed the growth of competition in production and competition in the sale of goods and services. The natural result of such competition is an even more intensive growth of production and widespread cyclical overproduction, which has tragically increased the unproductive use of resources in all segments of the economy, namely natural, material, financial, technological, energy, human capital, etc.

Thus, in modern conditions, the observed trend towards an increase in the scale of crisis phenomena and the degradation of civilization is becoming absolutely inevitable. The main reason for the inevitability of catastrophically negative results of economic activity under the dominance of the ideology of unlimited consumption is two insoluble contradictions:

– inability to ensure the resource-saving nature of the process of satisfying the rights, interests, and needs of each consumer in the conditions of mass (industrial) production and the mass consumption market;

– the impossibility of ensuring the adoption of effective optimal decisions

to neutralize "spontaneous", unpredictable global and local crises due to the presence of civilizational cognitive contradictions of humanity.

Thus, on the one hand, the negative consequences of global and local economic activity have become and remain one of the main reasons for the formation of a system of acute civilizational challenges in the 21st century. On the other hand, the negative consequences of humanity's planetary activities are leading to the collapse of the world economy. The circle is closed: an inefficient economy leads to the degradation of human civilization, and a decrease in the quality of civilization leads to the collapse of the economy.

Understanding the root causes of crisis phenomena allows us to systematically solve the problem of finding an "antidote" to the degradation of civilization. The descent of humanity into a situation of general collapse can be prevented by radically improving the quality of decisions made in all spheres of social activity at all levels of society and changing the economic model of society. And this means a broad and synchronized implementation of social and digital transformations within the entire global community. Most likely, only such a paradigm for the further development of civilization makes it possible to formulate comprehensive and coordinated strategies, programs, and plans to solve the problem of the degradation of civilization on a global scale, which could be as concise, transparent, meaningful, and specific as possible.

Economics and the Internet of Things. The collapse of global civilization (Ferraro, Sanchirico, & Smith, 2019) has led to the emergence of many economic theories of humanity's recovery from the crisis (Raworth, 2017). Virtually all of these theories propose some model of social transformation, and some emphasize that any transition to sustainability for the sake of efficiency must be digitally driven, especially the achievements of the Fourth Industrial Revolution (Ekholm, & Rockström, 2020). The most forward-thinking researchers conclude that the way to achieve sustainability and sustainability lies in renewing the way of life of individual communities and society as a whole, which should consume less. At the same time, the new way of life should be attractive to everyone, not just people with environmental, spiritual, or ideological values (Ferraro, Sanchirico, & Smith, 2019). Therefore, in recent decades, the idea of carrying out all kinds of social, in particular economic, reforms, and transformational changes in states and societies has gained wide popularity.

Attention should be paid to the ideas outlined in the book “The Great Transformation” (Polanyi, 2002): industrialism must be subordinated to the demands of human nature; the vice of nineteenth-century society is not industrial, but it is market-based and the experiment with a self-regulating market is utopian.

In recent decades, theories based on the system-wide idea of transition to a resource-based economy have been gaining popularity among the proposals for overcoming the crisis (Fresko, 2015). One such theory is the circular economy theory, which is most often seen as a set of actions to reduce resources, reuse them, and recycle them (Ferraro, Sanchirico, & Smith, 2019). The ideas of the circular economy are most effectively implemented in the theory of the

bioeconomy, which proposes to restore biological resources and reuse them to the maximum extent possible (Korotayev, 2020). The bioeconomy encompasses agriculture, forestry, fisheries, food, bioenergy, and bioproducts (Ferraro, Sanchirico, & Smith, 2019). At the same time, the conditions for the implementation of the ideas of the circular economy have been determined: development of trust mechanisms; systematic re-engineering of traditional business models; and creation of effective legal regulation in the interests of sustainable development of society (Martin-Merino, 2021).

However, of particular interest in this context is one of the new paradigms of economic activity voiced at the World Economic Forum, namely the Outcome Economy strategy, which is based on the idea of widespread use of Internet of Things technologies (Agenda, 2015). It is noteworthy that the first authors of publications on the Economics of Results were mainly top managers of transnational technology companies related to digital technologies or Internet of Things technologies, who are simply obliged to predict the direction of their business development with a planning horizon of 10-20-30 years.

The key difference between traditional economic models and the result economy model is the purpose of functioning:

– for the traditional economy, the goal is to make a profit based on the saturation of the consumption market with services, goods and labour results to meet the needs and interests of the average mass consumer;

– for the Economy, the result: the goal is to make a profit based on the direct solution of the personalized satisfaction of the rights, interests and needs of each consumer.

Based on the results obtained in the paper (Baranov, 2022), we formulate the following definitions:

The basic principle of the Result Economy*: any entrepreneurial activity should be resource-saving, cost-effective and carried out in such a way that work, goods or services with characteristics and parameters corresponding to the rights, interests and needs of a particular consumer are provided at the specified time and anywhere in the world;*

Result economy *is a jurisdiction-invariant human-centered, resource-saving, functionally targeted economic activity of mass market entities aimed at satisfying the individual rights, interests, and needs of any specific consumer with the possibility of dynamic formation of situational cooperation with any other market participants based on the use of the global Internet of Things;*

Functional targeting *is the methods, ways, and mechanisms of collecting and processing unstructured information about a person (consumer) from various sources, which make it possible to determine with high reliability the qualitative and quantitative characteristics of his unsatisfied rights, interests, and needs, the patterns of his behaviour for the further formation of individual offers of works, goods and services in the right place and at the right time in order to solve the most problematic situations.*

The transition to the strategy of the Economy of Results means the implementation of tectonic shifts in society on the basis of large-scale social transformations, which is due to several necessary conditions for such a transition:

– the first is the transformation, change, or correction of the understanding of the mission of civilizational development, which should be reduced to ensuring the sustainable development of human society as a whole as a fundamental condition for ensuring a high quality of life for every person on the planet;

– the second is the transformation, change, or correction of the worldview, social ideology, value system, and lifestyle of the entire society, including representatives of public authorities, producers, and consumers, as well as the acquisition of the necessary set of knowledge and skills;

– the third is the transformation, change, or adjustment of the mission, purpose, methods and methods of functioning of public authorities, economic entities in all segments of economic activity.

In addition, it should be borne in mind that such a transition will inevitably lead to:

– changes in the institutional structure and functions of the system of public administration and regulation in the economic sphere, the system of sectoral self-regulation and civil society institutions;

– the need to create an effective international ecosystem for the evolutionary development of segment-oriented associations of economic entities in order to optimize the processes of situational interaction and coordination, to promote flexible and prompt cross-border and national formation of functional ties between economic entities, and the formation of various cooperation chains: added value, commodity, commodity and commodity-logistics chains, global production networks, etc.;

– carrying out a significant modernization of the system of legal support for new methods, methods and mechanisms for the implementation of the functions of public administration and regulation in the economic sphere;

– the need to carry out large-scale work on the creation of legal support for the formation and functioning of segment-oriented ecosystems of cooperative interaction of economic entities of different industry affiliation, the performance of work and the provision of services in favour of specific users in different state jurisdictions, the functioning of various hybrid business models, etc.;

– formation of organizational and legal foundations for large-scale reengineering of old and creation of new models of public administration, business models and processes in the economic sphere.

The transition to the "Economy of Results" strategy undoubtedly means a large-scale social transformation in the field of economic activity based on digital transformation, which should be based on the relevant legal system.

It is quite obvious that the transition to the Result Economy based on the use of digital technologies such as Internet technologies, the Internet of Things, artificial intelligence, robotics, Big Data, and cloud computing cannot take place

in isolation from other spheres of public life. Therefore, the systematic approach to social transformations proposed in the Outcome Economics strategy will become a driver of social and digital transformation in other areas of public activity, such as public administration, industry, agriculture, law enforcement, defence and security, healthcare, education, culture, etc. Transformations in the world will become ubiquitous and pervasive.

Part 1.3. Directions for the development of legal systems in the context of digital transformation.

Politicians, academics, and experts from various fields of knowledge and practice are persistently convincing society of the need to transform its institutions, change policies, and increase resilience in certain areas to mitigate the collapse (Brozović, 2022). But it is much more expedient to build future policy in such a way as not only to avoid collapse but also to ensure the development of civilization.

An analysis of the current state of civilization and the functioning of society's institutions shows that it is impossible to stop the collapse without social transformations in various spheres of social activity both at the international and national levels. We are talking about economic, infrastructural, environmental, humanitarian, and other spheres, as well as areas of international cooperation to create effective ecosystems for humanity. Since these spheres are among the basic components of the life of society, which are crucial for ensuring a high level of quality of life for people, it becomes obvious that numerous large-scale social transformations must take place as synchronously and coordinated as possible.

Taking into account the unprecedented pace of social development and the speed of permanent changes in the living conditions of mankind, along with other factors affecting the effectiveness of social transformations, legal support is of particular importance. In turn, the quality of legal support for social transformations depends on the state of the legal system.

Therefore, the assessment of the compliance of the state of the legal system with future reforms should precede the beginning of social transformations. It is necessary to pay attention to the fact that the basic condition for the effectiveness of modern social transformations is the widespread use of the achievements of the fourth industrial revolution, in particular digital technologies (Baranov, 2022).

The widespread introduction of digital technologies in all spheres of public relations is significantly complicated by the problem of legal uncertainty regarding the regulation of the use of the Internet of Things, artificial intelligence, robotics, etc. military, medicine, energy, etc.

The relevance of holding broad discussions on improving the legal system is due to its exceptional importance for the current stage of development of any state. This is due to the fact that many countries, like Ukraine, are actually at the beginning of mobilizing all possible forces and resources to achieve progress in the fight against the degradation of civilization. It is clear that this desperate struggle will require an active, dynamic, unprecedented scale and depth of

social and digital transformations of society, both at the national and global levels. The success of future social and digital transformations, which will need to be implemented in a short time, largely depends on the effectiveness of their legal support.

The current conditions for the implementation of social relations in the context of the widespread use of digital technologies are strikingly different from those that have existed over the past centuries. This requires caution in the use of certain theoretical foundations and methodological provisions developed earlier, as well as the use of innovative ideas and approaches in determining the legal regulation of future social relations. In this case, jurisprudence is confronted with a new, almost unknown problem of the legal singularity.

Recent significant changes in the conditions for the implementation of social relations in various spheres of public activity are due to the following:

– there is a rapid increase in the pace and scale of globalization, which has become a natural consequence of the modern process of development of civilization;

– the gradual transformation of the content of traditional globalization, which now encompasses not only transnational corporations but also other various economic actors, in particular medium and small enterprises of different national jurisdictions, moreover, penetrates into people's personal relationships;

– Under the influence of global factors, especially the use of the results of the fourth industrial revolution, entire spheres of social life are being transformed, in particular, the spheres of economy, public administration, production, etc., and the composition and configuration of the system of international division of labour is being transformed;

– there is a steady increase in the number of participants in various social processes, including economic ones;

– The capacity and topology of the global logistics infrastructure continue to develop rapidly, creating real opportunities for the rapid movement of people, capital, goods and services anywhere in the world;

– Information interaction is constantly improving due to the rapid increase in the scale, volume, and pace of the use of digital technologies, which contributes to increasing efficiency in all spheres of human activity.

Some of the following statements are based on the results of legal research conducted by the author mainly in the last decade, while others are further developments of these findings. All this, of course, presupposes further discussions among legal scholars with the obligatory participation of scholars, experts, and practitioners specializing in certain subject areas of society.

Part 1.3.1. Mission and purpose of the legal system.

A conceptual question for any system of law: What is the purpose of legal regulation of social relations?

Rudolf von Jhering (1877) famously said: "Purpose is the creative force of all law, and there is not a single legal norm that does not owe its origin to a certain

purpose," and "The cause belongs to the sphere of the past, the purpose to the sphere of the future." The effectiveness of the basic function of civilization, the function of self-preservation and development, directly depends on the effectiveness of the implementation of all types of human activity. Direct or indirect interactions of people in the process of implementation of activity are called social relations. The effectiveness of any joint activity is ensured by the relevant social regulation of people's behaviour in the process of implementing social relations. Historically, various types of regulation have been used for social regulation: taboos, traditions, rituals, religious norms, moral norms, ethical norms, corporate norms, and legal norms. A set of legal norms, the most effective type of social regulation, constitutes a system of law.

Let us pay attention to the fundamental work of one of the founders of cybernetics, N. Wiener (1948) “Cybernetics or control and communication in the animal and the machine”. In this work, it was argued that an organism or community of organisms would tend to function for a long time in such a way that the different parts worked in concert according to a model that more or less made sense.

In the modern sense, the content of this statement means that the human community has always sought to create a coherent (non-contradictory) ecosystem for the implementation of any human activity. To this end, society has always sought to develop a set of rules for the group and individual behaviour of its members, which would provide conditions for maximizing the effectiveness of any activity by minimizing possible harm (damage) from uncoordinated (conflict) actions.

According to the abovementioned we conclude that the system of social regulation of the behaviour of members of the human community, including the system of law as the highest evolutionary form of such regulation, has always been entrusted with a certain civilizational mission. This civilizational mission boiled down to the creation of a coordinated, coordinated ecosystem for the effective implementation of human activity as the basis for the self-preservation and development of humanity as a whole or its particular components. The main content of the mission was common with certain variations in different periods of the development of civilization, on different continents, among different peoples with different cultures, and in states of different types and forms.

Thus, the mission of the **legal system** is to create a coordinated, supportive and coherent legal ecosystem for the effective implementation of human activities to ensure the self-preservation and development of civilization in the interest of guaranteeing a high quality of life for each member of the human community.

Taking into account the above, we propose the following definition: ***the main purpose of legal regulation (system of law)*** *is to create legal conditions to ensure the effectiveness of the life of society as a set of all types of human activity in all spheres or segments of social and personal activity in the interests of a high quality of human life, self-preservation and development of civilization.*

Interestingly, achieving high efficiency of activity as a goal is a universal approach in all spheres of public activity, in particular in the field of legal regulation. For example, there are proposals on methods for assessing the effectiveness of legal norms (Ustymenko, Dzhabrailov, 2020).

A more perfect criterion for the effectiveness of legal regulation of social relations in the economy can be the assessment of transaction costs. The theory of transaction costs in economics is used to assess the adoption of digital technologies (Tapscott, 1999); in the formation of criteria for the effectiveness of economic transformations (Ivashina, & Ivashina, 2014); is reflected in the theory of the economics of law (Calabresi, 2016). The presence of transaction costs and the determination of their volumes provide the basis for a comparative assessment of regulatory barriers.

Therefore, in our opinion, the method of assessing the effectiveness of legal regulation based on the provisions of the theory of transaction costs can become universal in the legal system in terms of conducting a comparative assessment of regulatory barriers that may arise in certain options for legal regulation of specific social relations or a certain group of them (Baranov, 2021a).

In order to extend the methodology for assessing the effectiveness of legal regulation not only to economic activity but also to any other types of human social activity, we will give the following definition: ***transactional (non-productive) costs of legal regulation*** *are organizational, intellectual, financial, technological, material, time and other resources, the expenditure of which is due to the need for legal regulation. And the volume of their expenditure is due to the sufficiency of legal regulation to achieve the set goal.*

At the same time, the effectiveness of legal regulation consists in maximizing the efficiency of human activity by minimizing the transaction (non-productive) costs of implementing legal regulation.

At first glance, it seems that the approach to defining the purpose of the legal system as creating conditions for ensuring the effectiveness of social relations (activities) is an alternative to the approach based on the norms of morality and social ethics. In our opinion, the proposed understanding of the content of the mission and the main purpose of the legal system does not contradict the previous results of the work of many scholars. On the contrary, such an understanding is integral, which unites at the highest level of the hierarchy all previous local interpretations of various aspects of the mission and purpose of legal regulation.

The approach to determining the purpose of the legal system presented in the article coincides with the views of other researchers. For example, G. Sabatino (2020) believes that we have two models of legal regulation: 1) efficiency-oriented, which should regulate the objects of economic relations (for example, competitive relations, production, etc.); 2) Ethics-oriented, which focuses on the behaviour of subjects. Others argue that in the context of socio-technical organizations with digital infrastructure, it is no longer enough to protect people

just enough to be able to act autonomously in this environment (European Parliament, 2021).

Part 1.3.2. Law and virtuality.

The term "virtuality" has become extremely popular due to the development of Internet technologies, especially after the widespread use of Web-3.0 technologies (WikipediA, 2023) and Metaverse (WikipediA, 2023a). For some time, this term began to be used by lawyers, which caused ambiguous discussions. The problem of virtuality is revealed on the basis of the results obtained in the author's work (Baranov, 2017). The term "virtual reality" (space, activity, relationships, communication, etc.) is widely used in various fields of knowledge and practice. In jurisprudence, the term "virtual reality" (virtual space) began to be used to describe certain processes associated with the use of Internet technologies for the implementation of social relations.

On the one hand, in scientific articles and in legislation, there are such phrases as "when working on the Internet", "protection of intellectual property rights on the Internet", "legislative regulation of the Internet as a special information space", "legal relations arising in the virtual space", "regulation of legal relations in the virtual space", "offenses on the Internet", "regulation of the virtual space", etc.

On the other hand, there is a widespread position, the content of which boils down to a diametrically opposite understanding of the role of Internet technologies as technical means of transmitting and processing information. Other expressions began to be used more and more often: "legal regulation of social relations related to the Internet" or "social relations arising and (or) developing when using the Internet", "activities carried out with the use of Internet technologies", "obtaining information using the Internet", etc.

The use of the concept of "virtual" in law leads to the assumption of the possibility of the existence of some other "reality" (for example, virtual, Internet, cyberspace, etc.), different from the objective one, in which the "realization of social relations" allegedly becomes possible. We can already hear the proposals of innovators from jurisprudence to create "virtual law", "virtual world law", "virtual civil law" or "virtual criminal law", etc.

Based on the results of a philosophical analysis of the concepts of virtual reality, for example, (Shmigol, & Yushkevich, 2019) and on the provisions of Part 1 of Article 207 of the Civil Code of Ukraine, we recommend lawyers to use the following formulations: "legal regulation of social relations carried out using the Internet", "conclusion of contracts using the Internet", "crime committed with the use of computers or Internet technologies". Such formulations make it possible to reflect the real situation related to information interaction in the process of implementing public relations with the help of digital and Internet technologies.

Therefore, in our opinion, it is quite sufficient and necessary for the theory of law to understand the Internet and Internet technologies as a means of transmitting (disseminating) or processing information, with the help of which

certain social relations are realized, which can only take place in the real world. The use of the Internet and Internet technologies may cause the emergence of some peculiarities in the implementation of social relations. It is these features, and not far-fetched virtuality, that should necessitate a certain improvement of legal regulation or even become a reason for the emergence of new legal norms within the framework of the traditional system of law or legislation.

Without denying the possibility of using the term "virtual" in other scientific disciplines, we believe that the use of such concepts as "virtual world", "virtual space or environment", "virtual law", "protection of rights in the virtual environment", "copyright in the virtual world", "virtual activity", "the right of virtual space" in jurisprudence is conceptually unfounded and even harmful.

Thus, the use of such metaphors as "virtuality", "virtual space" and many similar ones in the field of law is artificial, inexpedient, and even toxic.

Part 1.3.3. Artificial intelligence.

Traditionally, the degree of attention paid by state institutions to a social problem is an indicative marker of its importance for the development of society. Artificial intelligence (AI) is one of the most important, basic achievements of the 4th industrial revolution, as evidenced by the fact that over the past 5 years, more than 60 countries have adopted or are developing national strategies for the development and use of AI (Van Roy, Rossetti, Perset, & Galindo-Romero, 2021). Many states are aware that the use of robots with artificial intelligence can create conditions for overcoming many problems associated with the problem of ensuring prompt adoption and implementation of optimal decisions.

However, there is a significant barrier to the widespread use of AI robots, namely the uncertainty of legal regulation of their use. The main problem is the recognition or non-recognition of an autonomous robot with AI as a subject of law. Autonomy, in this case, refers to the ability of an AI robot to make decisions and carry out activities without human intervention.

Against the backdrop of almost weekly reports on progress in the development of AI, there are numerous discussions about solving the problem of the possible consideration of a robot as a subject of legal relations. Positions in these discussions are radically different: from denying the subjectivity of robots to the need to create a special legal system for robots.

Of course, many researchers, in particular lawyers, hope to use historically confirmed legal mechanisms for regulating social relations when solving the problem of legal regulation of robots with AI. But at the same time, work with AI is recognized only as an object of legal relations.

Another group of legal scholars suggests, even believes, that robots with AI may soon become the subject of legal relations. In a number of countries, vigorous measures are being taken to develop conceptual provisions for the legal regulation of the use of AI technologies and robots with AI. The European Union has taken the world's first step into a mysterious future by proposing a bill on artificial intelligence (European Parliament, 2021).

To solve this problem, the author proposes a number of theoretical and methodological provisions for the creation of a system of legal regulation of the use of autonomous robots with artificial intelligence. The basic term for this topic is defined (Baranov, 2023a): artificial intelligence is a certain set of methods, methods, means and technologies, primarily computers, that imitate (model) cognitive functions that have criteria, characteristics, and indicators equivalent to the criteria, characteristics and indicators of the relevant human cognitive functions.

Based on the proposed definitions of the terms "artificial intelligence", and "robot with AI", their classification, and several proven hypotheses, proposals have been developed for the methodology for determining the legal status of a robot with AI (Baranov, 2018a). Doctrinal provisions on the relevant legal dogmas and fictions have been formulated, which makes it possible to recognize an autonomous robot with AI as a subject of law within the framework of modern legal doctrine (Baranov, 2018b). The results obtained open up prospects for the creation of a certain system of legal regulation of the autonomous activity of AI robots, which can be harmoniously incorporated into modern public and private law.

For the final development of the proposed theoretical and methodological provisions for the creation of a system of legal regulation of the use of autonomous robots with AI, extensive legal research is required. In particular, the specifics of the application of an AI robot for all possible types and kinds of social relations require additional research.

The developed approach potentially makes it possible within the framework of the traditional system of law, using all the centuries-old positive experience of its functioning, to form:

– theoretical and methodological foundations of legal regulation of the use of robots with AI in any sphere of public activity;

– to offer practical recommendations for the creation of a system of legal support for the use of a robot with AI as the most important element of the Internet of Things technologies.

Part 1.3.4. Convergence of branches of law.

The topic of convergence is one of the main problems of the development of the legal system in the interests of the Economy of Results.

In the modern conditions of the need to change the paradigm of economic activity, the transformation of globalization and the international division of labour, and the integration of various types of activities, the urgency of solving the problem of convergence of branches of legislation is increasing. This complex problem requires minimizing systemic competition between individual branches of law and strengthening the interconnection of their improvement processes. The problems of convergence of the system of law relate both to the legal systems of different states and branches of law within one system of law.

At one time, due to its universality, the feature of homogeneity of social relations became basic in the process of formation and systematization of the system of law. With the complication of the content and conditions of human life, at the same time, there is a complication of the system of law, which has led to the emergence of certain difficulties on the way of its development, so the process of its differentiation into separate branches of law has begun.

For various reasons, many states have their sectorial structure of the legal system. Certain branches of law began to form their own "sovereign territories," "jurisdictions," and inviolable "borders." At a certain historical stage in the development of jurisprudence, the formation of certain branches of law had a rather positive effect. The differentiation of the entire mass of legal norms according to the principle of homogeneity has created conditions for concentrating the efforts of scientists and practicing lawyers on solving homogeneous sectoral legal problems. But this was not the end of the differentiation into numerous branches of law for the system of law. Further, a deeper differentiation began to take place within individual branches of law, namely sub-branches, institutes, and sub-institutions of law appeared. This has led to the emergence of deep niche specialists in highly specialized issues such as value-added tax (VAT), state registration of enterprises or real estate, divorce proceedings, cybersecurity, human rights protection, etc.

On the other hand, it is indisputable that society is a complex dynamic system in all the diversity of spheres and segments of human social activity, in which the system of law is one of many subsystems that ensure its functioning. Therefore, the system of law with its special functionality is an internal subsystem of such components of the subsystems of society as the sphere of economy, domestic policy, defense, agriculture, industry, health care, etc.

In the existing subsystems of society, in the conditions of complex activity, real social relations are carried out. Real social relations are a set of interconnected and interdependent heterogeneous refined (pure) social relations that are realized simultaneously or almost simultaneously. Each of these types of "pure" social relations is regulated by the norms of "its own" branch of law. Consequently, modern legal relations are mainly complex social relations as an integral (inseparable) set of separate "pure" social relations, each of which is regulated by the norms of a certain branch of law.

Thus, the behaviour of subjects of law in the implementation of complex activities should be simultaneously determined by the norms of different branches of law, which often gives rise to the problem of intersectoral legal competition and the emergence of conflicts between them.

In this regard, the system of legislation, as a form of reflection of the content of the system of law, in the regulation of complex social relations, should be coordinated, not contradictory, and not have conflicts between the norms of different branches of legislation. Therefore, it becomes relevant to conduct research on the convergence (convergence) of various branches of law and legislation in the context of their simultaneous application to specific complex

social relations within the framework of specific types of activities and specific actions of subjects of law. At the same time, the convergence of law should mean a mutual movement toward the convergence of the main components of individual branches of law in terms of their principles, institutions, categories and terms. The methodological basis of this process should be a common understanding of the mission and purpose of the legal system.

In addition, the convergence of law is a necessary response to the socio-technical convergence, which, in order to increase efficiency, is taking place in almost all spheres of society in the process of social transformations, reengineering of traditional models of social relations, the introduction of digital and other technologies, etc.

Thus, the problem of convergence of law becomes extremely relevant in the context of a change in the paradigm of economic activity, in which complex social relations become dominant, and the convergence of certain types of activity becomes the norm. The convergence of the branches of law will ensure the 46ulfilment of strict requirements in terms of the absence of legal uncertainty, contradictions and conflicts between the involved norms of different branches of legislation, which is one of the main conditions for ensuring the effectiveness of legal regulation.

In the context of the transition to a new paradigm of economic activity of all mankind, in addition to the relevance of the problem of legal convergence within one legal system, the problem of convergence of legal systems of different states is also becoming relevant.

REFERENCES

1. Acosta, G. at el. 2020. “Analytical techniques for gauging accuracy of expert knowledge: a simple system-based explanation of the Dunning – Kruger effect”. *Towards Analytical Techniques for Systems Engineering Application:* 27-32.
2. Anson, I. 2018. “Partisanship, political knowledge, and the Dunning-Kruger effect”. *Political Psychology* 39.5:1173-92.
3. Armendt, B. 2019. “Causal Decision Theory and Decision Instability”. *The Journal of Philosophy:* n. pag.
4. Baccelli, J. and M., Philippe. 2022. *“Can redescriptions of outcomes salvage the axioms of decision theory?” Philos Stud.* 179:162.
5. Baranov, O. 2014. *Legal Support of the Information Sphere: Theory, Methodology and Practice. Edelweiss.* [in Ukrainian].
6. Baranov, O. 2018. “Internet of Things (IoT) and Blockchain”. *Information and pravo* 1:59. [in Ukrainian].
7. Baranov, O. 2021. “Social and Digital Transformation: Source of Legal Challenges”. *Informatika i pravo* 3: 59. [in Ukrainian].
8. Baranov, O. 2023. "The Civilizational Mission of Digital Transformation". *Information and Law* 3(46): 25-41. [in Ukrainian].

9. Buschman, T.J. et al. 2011. “Neural substrates of cognitive capacity limitations”. *Proceedings of the National Academy of Sciences* 108:11252-55.
10. Çatalbaş, M. 2020. “An Investigation into the Relationship between Curse of Dimensionality and Dunning-Kruger Effect”. *Sakarya University Journal of Computer and Information Sciences* 3.2:121-30.
11. Chenusha, O. 2017. “Differences between the concepts of “competence”and “competence” in business management”. *Cuchasni pidhodi do upravlinnya pidpriyemstvom*: 93-93. [in Ukrainian].
12. David, Paul A. and Dominique Foray. 2002. “An introduction to the economy of the knowledge society.” *International Social Science Journal* 54: 9-23.
13. Doyle, J. and R. Thomason. 1999. “Background to Qualitative Decision Theory”. *AI Mag*. 20: 55-68.
14. Drucker, P. 1993. *Post-Capitalist Society*. NY: Harper Business
15. Edwards, W. 1954. “The theory of decision making”. *Psychological Bulletin* 51(4): 380.
16. Ehrlinger, J. 2008. “Skill level, self-views and self-theories as sources of error in selfassessment”. *Social and Personality Psychology Compass* 2.1:382-98.
17. Fang, I. 1997. *A History of Mass Communication: Six Information Revolutions.* Taylor & Francis.
18. From, J. 2017. “Pedagogical Digital Competence-Between Values, Knowledge and Skills”. *Higher Education Studies* 7.2: 43-50.
19. Hilsen, A. and D. Olsen. 2021. “Competence and Knowledge at Work”. The Importance and Value of Older Employees. *Palgrave Macmillan:* 9-20
20. Holley, P. 2015. “Apple co-founder on artificial intelligence: The future is scary and very bad for people”. *Washington Post*, 24 March.
21. Huang, S. 2013. “When peers are not peers and don’t know it: The Dunning-Kruger effect and self-fulfilling prophecy in peer-review”. *Bioessays* 35.5:414-6.
22. Jensen, R. S. 2017. *Pilot judgment and crew resource management.* Routledge.
23. Kaptelinin, V., Kuutti K. 1999. “Cognitive Tools Reconsidered: From augmentation to Mediation”. *Human Factors in Information Technology.* 145:145-160.
24. Krasnovska, I. 2020. “Theoretically, it is necessary to understand “competence” and “competenc” in the achievements of science (the second half of XX – the cob of the XXI table)”. *Pedagogichnij almanah* 45: 233-38.
25. Kruger, J. and D. Dunning. 1999. “Unskilled and unaware of it: how difficulties in recognizing one’s own incompetence lead to inflated self-assessments”. *Journal of personality and social psychology* 77 6: 1121-34
26. Lakatos, L. and Z. Janka. 2008. “Evolution of human brain and intelligence”. *Ideggyogyaszati szemle* 61 7-8: 220-9. [Hungarian]
27. Mattarella-Micke, A. and S. Beilock. 2012. "Capacity Limitations of Memory and Learning." *Encyclopedia of the Sciences of Learning. Springer* : 498-501.
28. Mendoza, M., and E. Gutiérrez-Peña. 2010. "Decision theory." International Encyclopedia of Education 3: 119-124.

29. Miller, G. 1956. “The magical number seven plus or minus two: some limits on our capacity for processing information”. *Psychological review* 63 (2) 81-97.
30. Miller, T. and L. Geraci. 2011. “Unskilled but aware: reinterpreting overconfidence in low-performing students”. *Journal of experimental psychology: learning, memory, and cognition* 37.2:502.
31. Paz-Alonso, Pedro M. at el. 2014. "Emergence of higher cognitive functions: Reorganization of large-scale brain networks during childhood and adolescence."
32. Peterson, M. 2017. *An introduction to decision theory*. Cambridge University Press.
33. Riedl, R. 1977. “A Systems-Analytical Approach to Macro-Evolutionary Phenomena”. *The Quarterly Review of Biology* 52: 351-370.
34. Roy, E. 2013. “Cognitive Function”. In: Gellman, M.D., Turner, J.R. (eds) *Encyclopedia of Behavioral Medicine. New York: Springer.*
35. Sapolsky, R. M. 2017. *Behave: The biology of humans at our best and worst. Penguin.*
36. Scherer, Matthew U. 2015. “Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies”. *Harvard Journal of Law & Technology* 29:353.
37. Shahsavarani, A. and E. Abadi. 2015. "The Bases, Principles, and Methods of Decision-Making: a review of literature." *International Journal of Medical Reviews* 2.1: 214-225.
38. Simon, H. 1966. “Theories of Decision-Making in Economics and Behavioural Science”. *The American Economic Review*. 1-28.
39. Slepkov, A. and M. Sodenkamp. 2007. *Decision Making in Complex Systems. Soft Information Technologies. NPU named after M. Dragomanov*. [in Ukrainian].
40. Small, M. and P. Holt. 2021. “Impeding Transformative Learning: Combatting the Dunning-Kruger Effect”. 45th Annual Conference Proceedings.
41. UN General Assembly. 2015. Transforming our world: the 2030 Agenda for Sustainable Development. Resolution adopted by the General Assembly on 25 September 2015, A/RES/70/1.
42. UN Secretary-General. 2014. The Road to Dignity by 2030: Ending Poverty, Transforming All Lives and Protecting the Planet Synthesis.
43. UN Secretary-General. 2022. Progress made in the implementation of and follow-up to the outcomes of the World Summit on the Information Society at the regional and international levels.
44. Wang, P. 2008. “What Do You Mean by “AI”? *Proceedings of the First AGI Conference.*
45. Wiener, Norbert. 1948. Cybernetics or control and communication in the animal and the machine. Technology Press.
46. Woodford, Chris. 2021. "A brief history of computers." *Explain that Stuff.*

CHAPTER 2. ARTIFICIAL INTELLIGENCE: FORMATION OF THE CYBER CIVILIZATION OF THE META-UNIVERSE

KOSTENKO Oleksii
Doctor of Philosophy (Ph.D.) in Law, associate professor,
Head of the scientific laboratory of the theory of Digital Transformation and Law of the Scientific Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine», Associate Professor of the Department of Law at the State University «Kyiv Aviation Institute»
ORCID ID: 0000-0002-2131-0281

Introduction. Systematic views on the development of law governing social relations arising from the use of artificial intelligence technologies in various branches of law are set out in the works of well-known researchers (Baranov, 2018a; Kostenko, 2021a; Radutny, 2017a; Kostenko, 2022b; Yaremenko, 2021; Radutny, 2018b; Androshchuk, 2019a; Androshchuk, 2021b).

Instead, the problems of legal regulation of the use of AI in the Metaverse have not been fully and systematically studied by Ukrainian scholars. The study of the development of social relations arising in the process of applying artificial intelligence technologies in the Metaverse is different from the actual ones and is the first step towards actualizing deeper and more fundamental areas of electronic jurisdiction formation.

Part1. General Approaches to the Application in Metaverse.

The Metaverse is an electronic environment formed by a set of electronic subjects and objects that interact with each other, as well as electronic or other technologies that ensure their interaction (Kostenko, 2022c). Metaverse technologies are information and communication decentralized electronic e-networks operating on the basis of blockchain, electronic neural networks, machine learning, AI, IoT, AR, VR, and continuous availability. According to research, the concept of "Metaverse" is now the most popular term, has many interpretations, and is used to characterize digitalization processes in almost all areas of human life (Özkahveci and all, 2022).

The recently proposed Metaverse model consists of seven levels:

Level 1: experience (games, social programs, e-sports, shopping).

Level 2: information search and discovery (social networks, media, search engines, advertising, trade clusters, aggregators, etc;).

Level 3: creative economy (design tools, asset markets, workflow, commerce).

Level 4: spatial programming (3-7D, AR/VR, multitasking user interfaces, geospatial mapping).

Level 5: decentralization (artificial intelligence, intelligent agents, microservices, blockchain).

Level 6: neurointerface (smart glasses, mobile technologies, touch, facial expressions, verbalization, tactility, etc.).

Level 7: infrastructure (5G, Wi-Fi, 6G, cloud computing and technologies, microelectromechanical systems, GPU-graphic processor) (Kostenko, 2022c).

The current structure of the Metaverse can be classified as interconnected technological and information domains or electronic and information meta corporations. Meta corporations compete with each other in the struggle for users, finances, products and technologies. Users of corporate metaverses still have the opportunity to be anonymous, use pseudonyms to register accounts, and create impersonal avatars or electronic personalities (Radoff, 2021).

It becomes quite obvious that the Metaverse will go through three stages of development:

1) all components of the Metaverse, subjects and objects, are completely dependent on the developers and owners of the Metaverse's technical resources;

2) all components of the Metaverse, subjects and objects, are partially owned by developers and partially owned by owners/users;

3) technical resources are decentralized, and subjects and objects are managed either by the owner (hardware bioidentification) or autonomously (subjects and objects are endowed with the functionality and rights inherent in the owner).

Structurally, the Metaverse will become more organized and will consist of the following objects: Personal metaverse (PM), Collective metaverse (CM), Corporate metaverse (CorpM), Confederate metaverse (CfM), State meta world (SM) and Megametaverse (MMV) (Kostenko, 2022d).

Only individuals will be considered subjects of the Metaverse, and legal entities, avatars, electronic personalities, virtual digital robots of the AAI and ASI class, and digital humanoids will be included in the category of objects for some time to come. It is likely that in the third phase of Metaverse development, a number of objects such as avatars, electronic personalities, AI-class virtual digital robots, and digital humanoids will be transferred to the category of subjects, as they will be endowed with certain rights and obligations inherent only to subjects at the legislative level. Currently, the Metaverse is undergoing the initial stage of formation and development (Kostenko, 2022e).

Technologically, the Metaverse consists of four basic elements: identification data (ID), virtual reality (VR), blockchain, and AI.

A blockchain is a special type of database built on distributed ledger technology (DLT) and is a continuous sequential chain of blocks containing information, copies of which are stored on many different computers independently of each other. A blockchain can be compared to an e-book or mega-database that stores data on all transactions and electronic assets of the Metaverse using cryptography methods. The blockchain of the Metaverse is filled with data that is created as a result of the use and functioning of entities and objects using such blockchain platforms as Ethereum, Theta, Bitcoin, Binance, Smart Chain (BSC), and many others.

Over the past decade, many countries have recognized that their future success will depend on Big Data processing and AI capabilities. Significant investments are already being made in this area. Many private and public companies, research laboratories, and academic institutions follow a typical path of developing and creating AI products. First, they build their own intellectual resources to accelerate the end result of a research or business task. As a rule, the results obtained by such a separate AI development team do not achieve the global goal or their use is narrowly focused. Subsequently, the development team enters the so-called "ice age" during which either the project is closed or it adapts to new tasks very slowly.

It quickly became clear that local successes in the creation of AI technologies do not have a long-term scientific and technological perspective. Only a global, comprehensive, state-led approach has greater opportunities for the development of modern technologies.

That is why there is a need to formulate state strategies for big data management and processing through the development and application of AI technologies. As we can see from the analysis of the annual Artificial Intelligence Index Report of Stanford University, in recent years, many countries have developed long-term national strategies for the development of artificial intelligence and are taking certain measures to implement them.

Part 2. Analysis of AI Development Strategies of Different Countries.

In general, AI development strategies can be divided into three main groups:

A. The group is characterized by a realistic attitude to the formation of AI strategies, and a deep analysis of not only the state of the artificial intelligence application in the country but also the actual needs of its development. The strategies are characterized by detailed plans and tasks of each stage, as well as tasks for government agencies and research institutions regarding the control points of the tasks.

B. A group of countries characterized by a thorough and rather pragmatic approach to the goals and stages of their achievement, taking into account the actual needs of the state and the formation of certain unique tasks and goals of AI development.

C. This group includes countries whose strategies are formalized and include basic goals of the country's development in the direction of AI technologies implementation in certain areas of social activity.

The strategies of Group C countries are mostly declarative, namely: to become one of the most developed digital societies in the world; to create a sustainable AI-driven economy; to support the development of human-centered artificial intelligence; to develop research and innovation activities focused on regulating the framework for the use of data for AI; to ensure the formation of an attractive and modern environment with elements of artificial intelligence

management; to achieve regional or global leadership in AI in a certain perspective.

Part 3. General approaches to the application of AI in metaverse.

AI is a certain set of algorithms, methods, techniques, and computer programs that implement one, several, or many human cognitive (intellectual) functions (Özgökçeler, 2021) or engineering and mathematical research that deals with the creation of programs and devices that mimic human cognitive functions, including data analysis and decision-making. AI can be divided into weak, general, and superintelligence.

Narrow AI/Applied AI (Narrow AI, ANI) is a mathematical algorithm that imitates (models) one or more human cognitive functions as closely as possible and is used to perform specific activities without human intervention to achieve goals under the predefined criteria and parameters. General AI (Artificial General Intelligence, AGI) is an algorithm that equivalently imitates (models) a significant number of human cognitive functions and is used in the implementation of any type of activity without human intervention to achieve the set goals under certain criteria and parameters. Super AI (Super AI ASI) is an intelligent algorithm capable of solving a wide range of intellectual tasks, at least on par with the human mind, and implementing a variety of human cognitive functions in the process of performing any type of activity without human participation, individually or in society, related to heterogeneous objects with tangible or intangible content.

At the current stage of development of technologies, scientific approaches, and methods of BigData processing, it is believed that AI is reaching the maximum capabilities of ANI and may soon cross the threshold to start developing the AGI stage. ANI has several subspecies that are actively developing in parallel and conditions for their integrated application are being created:

a) machine learning (ML) is the process of teaching a machine to draw conclusions based on previous experience by analyzing data;

b) Deep Learning (DL): a subset (function) of machine learning in AI consisting of networks that have the ability to learn without supervision from unstructured or unlabeled data and is used for object identification, speech recognition, language translation, and decision prediction;

c) Artificial Neural Networks (ANN): a type of ML, a system of interconnected and interacting simple processors (artificial neurons) that function according to the model of human nerve cells. Common types of ANNs are convolutional neural networks (CNN) and generative adversarial networks (GAN), which are used for classification and recognition of objects, faces in photos, speech recognition, content creation (generation), human identification and authentication (Baranov, 2018b);

d) Natural Language Processing (NLP) is a systematic combination of computer science, AI and mathematical linguistics aimed at studying the problem

of computer analysis and synthesis of natural language, using a machine to read, understand and interpret human speech;

e) computer vision (vision) - the theory and technologies of creating ICT systems with the ability to detect, track, and identify objects based on current or previous data;

f) cognitive computing: algorithms that model human cognitive properties aimed at reproducing the mechanisms and structure of human consciousness.

AI is actively used in the Metaverse. Studying the impact of EDGE (Enhanced Data Rates for GSM Evolution) technologies on the Metaverse development, Chinese researchers assume that AI applications in the Metaverse will develop in three main directions: centralized, decentralized, and hybrid AI architecture.

A centralized AI architecture is characterized by a single cloud server (single cluster) that collects data from MetaUniverse objects that are required to train AI models. The AI cloud server trains AI models or deploys them for modeling.

The decentralized architecture is characterized by a number of separate clusters responsible for training specific AI models on their local data. The clusters can exchange information about AI models via network connections, eventually forming a global AI model.

A hybrid architecture is a combination of centralized and decentralized architecture clusters, and any of the clusters can act as a master cluster and architecture center responsible for optimizing the global AI model and using network connections to distribute the updated AI model to other clusters (Baranov, 2018b; Androshchuk, 2019c; Androshchuk, 2019d).

Virtual reality is divided into augmented reality (AR), mixed reality (MR), and augmented/cross reality (XR). The combination of AI and augmented reality (XR) in the Metaverse will allow simultaneous encapsulation of VR, AR, and mixed reality (MR), which will lead to the possibility of simultaneous use of various services in both the physical and digital worlds.

The key areas of application of AI technologies in the Metaverse are:

-reliable avatar creation based on identification data (Pham,2018);

- development and application of a digital human as a more advanced version of a chatbot, meta-ecosystem object, or AI-enabled game character;

- technologies of multilingual accessibility and natural language processing;

- unlimited expansion of virtual reality;

- intuitive traditional interfaces and neuro interfaces [Chang and all, 2018);

- Detection and prevention of destructive use of media echo chambers (Kostenko, 2022f; Seok Jin, 2021);

- DeHealth (Barberá and all, 2015).

Part 4. Areas of AI regulation in the metaverse and electronic environments of different countries.

The multidirectional application of AI is primarily related to the creation of the Metaverse and thus requires technical, legal, ethical, and political regulation.

While the problems of regulating AI in the Metaverse are only beginning to be discussed, the regulation of AI is already actively developing.

For example, the European Parliament is working to study the problems of legal regulation of AI. For instance, the European Commission has established a high-level expert group on artificial intelligence, which is responsible for preparing recommendations for the development of policies and processes of legislative assessment as well as digital strategies in the field of AI. A corresponding working group has also been established in the European Parliament's Committee on Legal Affairs to prepare conditions for the generation of quality rules as a basis for future lawmaking in legal relations related to robotics and AI (Bibri, 2022), as well as to achieve sustainable development in accordance with the goals of Agenda 2030 (DeHealth). In February 2017, the European Parliament prepared a report on the "Civil Law Rules on Robotics" and adopted a resolution and recommendations for the Commission, and in October of the same year, the Council of Europe proposed that the European Commission develop a "European approach" to the AI problem (Knowledge of European law, 2022).In April 2018, 24 EU member states and Norway reached a political agreement on cooperation on Artificial Intelligence for Europe (Renda, 2019). On July 11, 2019, the European Commission proposed the creation of a network of centers of excellence for AI research within the Horizon 2020 program for the period of 2018-2020. On April 10, 2018, Digital Day 2018 took place, an event organized by the European Commission, attended by representatives of the European Union, private companies, academia, and civil society, during which the Declaration on Cooperation in the Field of AI was signed (Artificial Intelligence and Robotics). In the same year, the European Commission formed the High-Level Expert Group on Artificial Intelligence. On April 25, 2018, the Group of Experts adopted the Commission Communication to the European Parliament, the European Council, the European Economic and Social Committee, and the Committee of the Regions on Artificial Intelligence for Europe (Artificial Intelligence for Europe,2018a). On December 7, 2018, a Coordinated Plan for Artificial Intelligence was developed (Declaration, 2019). The next documents developed by the High Level Group of Experts on April 8, 2019, were the Communiqué "Building Trust in Human-Centric Artificial Intelligence" (Artificial Intelligence for Europe, 2018b) and "Ethics Guidelines for Trustworthy AI" (Coordinated Plan). On February 19, 2020, the European Commission published a White Paper on Artificial Intelligence. A European approach to excellence and trust" (Building Trust; Ethics guidelines). On April 21, 2021, the European Commission published proposals for regulatory rules to create conditions for the safe and ethical use of AI in the interests of EU citizens (White paper, 2020; Shaping Europe’s digital future), as well as a Coordinated AI Plan (Proposal for a Regulation).

The International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) have also joined the development of international technical standards. The Joint Technical Committee

ISO/IEC JTC 1 (Information Technology) and Subcommittee SC 42 (Artificial Intelligence) developed the standards ISO/IEC 23053:2022 "Framework for artificial intelligence (AI) systems using machine learning (ML)" (Europe fit for the Digital Age) and ISO/IEC 22989:2022 "Information technology - Artificial intelligence - Concepts and terminology of artificial intelligence" (Annexes). These standards are intended to be used by organizations of all types and kinds, including public and private companies, government agencies, and non-profit organizations that implement or use AI systems.

The European Telecommunications Standards Institute (ETSI) and the Industry Specification Group for Security of Artificial Intelligence (ISG SAI) have published standards to preserve and improve AI security: "Artificial Intelligence (SAI) Security; Role of Hardware in AI Security (ISO/IEC 23053:2022), Artificial Intelligence (SAI) Security; AI Threat Ontology (ISO/IEC 22989:2022), Artificial Intelligence (SAI) Security; Data Supply Chain Security (ETSI GR SAI 006), Artificial Intelligence (SAI) Security; Mitigation Strategy Report (ETSI GR SAI 001), Artificial Intelligence (SAI) Security; Problem Statement (ETSI GR SAI 002).

The number of AI technologies application areas is growing rapidly from year to year. The study by Stanford University "Artificial Intelligence Index Report 2021,2022" (ETSI GR SAI 005; ETSI GR SAI 004), as well as the analysis of AI development strategies in a number of countries, shows that society and governments understand the importance of using modern AI technologies and their technical and legal regulations, and plan to take appropriate measures (AI Report, 2021).

It should be noted that some countries apply innovative approaches to AI regulation. For instance, in July 2022, the Secretary of State for Digital, Culture, Media and Sport presented the "Consultation Paper. Creating an innovative approach to AI regulation" (AI Report, 2022).

In pursuance of the National AI Strategy (Kostenko, 2002g), a ten-year plan for the development and implementation of AI technologies (Policy paper, 2022; National AI Strategy) for the United Kingdom is proposed. Although there are currently no laws in the UK that explicitly regulate AI, its application is partially outlined by certain regulatory requirements. For example, the UK Data Protection Act contains specific requirements for "automated decision-making" and deep processing of personal data (World Bank), which also covers processing for the purpose of developing and training AI technologies (GII,2021). Some UK regulators have started to take measures to support the responsible use of AI. They have taken the following measures. The Information Commissioner's Office (ICO) has developed and released the Artificial Intelligence and Data Protection Guidance (AI produces), Explanation of Decisions Made with Artificial Intelligence (UK GDPR, 2018), Toolkit for Artificial Intelligence Risk and Data Protection (Guidance on AI), Artificial Intelligence Audit, Framework and AI Blog Resources (Explaining). The Equality and Human Rights Commission has identified AI as a strategic priority in its Strategic Plan 2022-2025 and committed

to provide guidance on the application of the Equality Act to the use of new technologies such as AI in automated decision-making (AI and data protection). The Medicines and Healthcare Products Regulatory Agency has implemented a program to change the software and AI for medical devices and held consultations on possible changes to the regulatory framework (ICO, February 2020) to ensure a high level of guarantee of safe functioning of AI as intended.

The Health and Safety Executive, in its 2020-2023 Science and Evidence Delivery Plan, together with industry and academia, committed to developing research to determine a clear understanding of the health and safety implications of AI in the workplace (Strategic Plan 2022-2025). In November 2021, the Cabinet of Ministers' Central Digital and Data Office (CDDO), together with the Center for Data Ethics and Innovation, developed and published one of the world's first national standards for algorithm transparency, thus strengthening trust in the use and management of artificial intelligence (Software and AI). In December 2021, the UK's Center for Data Ethics and Innovation (CDEI) developed a roadmap for creating a leading AI ecosystem in the UK. The Digital Regulatory Cooperation Forum (DRCF) (Plan 2020-2023) studies the impact of AI algorithms in these industries and develops proposals for its regulation and audit (UK Government). The Bank of England and the Financial Conduct Authority have established the Artificial Intelligence Public-Private Forum (AIPPF) to further the dialogue on AI innovations in financial services between the public and private sectors (DRCF). In January 2022, the Department for Digital, Culture, Media, and Sport (DCMS) announced a pilot AI standards center to increase the UK's participation in the development of global technical standards for artificial intelligence.

Other countries have also accelerated the process of AI regulation. For example, Canada has prepared a "Beta version of the principles of ethical use of artificial intelligence and advanced data technologies in Ontario" (Research and analysis, 2022).

The Ministry of Science and Technology (MOST) of the Kyrgyz Republic introduced the Code of Ethics for a New Generation of Artificial Intelligence (Forum, February 2022), and the Secretariat of the Technical Committee for National Information Security Standardization developed a practical guide to cybersecurity standards - Recommendations for Preventing Ethical Risks to AI Security (TC260-PG-20211A) (Beta, 2021).

Starting from January 10, 2023, China has been restricting the use of uncontrolled (creative) AI by law. The Chinese authorities decided to build their own parallel Metaverse universe for the use of AI. The reason for this was the unprecedented global progress in the field of generative AI. As a result, a new, potentially huge in scope and impact (socio-political and cultural) creative AI industry has emerged, combining deep learning, virtual reality, and algorithmic generation of texts, images, audio, video, and 3D scenes. Now, creative AI is capable of being:

- partially (and possibly completely) replace people in many creative professions;

- transform most fields of culture and science in unpredictable directions;

- blur (perhaps completely erase) the boundaries of truth and lies in commercial, humanitarian, and political discourse.

The uncontrolled use and spread of creative AI can cause irreparable damage to society, undermining its moral foundations and bringing down existing national security structures. Since it is impossible to stop the development and widespread implementation of creative AI, the Chinese government has made a decision on January 10, 2023, to legislate:

1. To equate the use of creative AI of any type without labeling its products (indicating that it is a product of creative AI) to the production of counterfeit banknotes.

2. Any creative AI product, similar to money, should bear "reliable identification marks" of its ownership.

3. Any deep fake content produced with the help of creative AI should be labeled as "Fake".

The Chinese Metaverse will have special places to monetize creative AI works, namely its own parallel universe with free AI discovery, similar to technology parks. The official goal of building a Chinese parallel universe for creative AI is to make China a global leader in the field of generative AI (Liao, 2022; China Bans Generative AI Media).

The French Data Protection Authority (CNIL) has published the GDPR AI Developer's Guide and a self-assessment tool that allows organizations to evaluate their AI systems in terms of GDPR requirements (Code of Ethics; TC260-PG-20211A).

The Federal Financial Supervisory Authority (BaFin) of Germany has published a document "Big Data and Artificial Intelligence" that outlines the key principles and best practices of using algorithms and AI in decision-making processes (IA: comment). Also, the Federal Office for Information Security (BSI) has introduced the document "Towards Verifiable Artificial Intelligence Systems", which addresses current problems and possible solutions for artificial intelligence systems for the verification and standardization of artificial intelligence systems (Guide d'auto-évaluation).

As we can see, the regulation of AI in various industries is now gaining more realistic boundaries. The use of AI in the Metaverse, however, like the Metaverse itself, requires technical and legal regulation.

That is why scientists are stepping up the development of technical standards related to the Metaverse, the creation of technical specifications for the functioning of the multimedia virtual space (terms, concepts, technical frameworks), and algorithms for ensuring interaction between Metaverse and states.

Part 5. Areas of AI regulation in the metaverse proposed by researchers, business, and the private sector.

Governments, researchers, and the private sector are constantly looking for ways to regulate Metaverse technologies. Today, there are several non-governmental initiatives aimed at shaping the regulatory policy of the Metaverse.

Thus, the ITU-T Study Group 16 (multimedia) [73] of the ITU Telecommunication Standardization Sector (ITU-T), which brings together experts from around the world to develop international standards known as ITU-T Recommendations, has started work on establishing preliminary standards for AI-driven Metaverse applications [74].

The Khronos Group, a non-profit organization (uniting Adobe, Epic Games, Ikea, Qualcomm, Sony, XR Association and SDO The Khronos Group, World Wide Web Consortium and Open Geospatial Consortium, and other 150 companies) [75, 76], launched the Metaverse Standards Forum (or MSF) to investigate the lack of compatibility that hinders the development of the Metaverse and to coordinate and accelerate the work of Metaverse standards development organizations (SDOs).

In June 2022, the Lexing Legal Association held the World Conference "Artificial Intelligence and the Metaverse: Legal Aspects 2022." "Lexing is a network of lawyers created on the initiative of Alain Bensoussan to meet the needs of international clients or multinational corporations by attracting lawyers whose skills are recognized in their respective countries in the field of advanced technologies [77].

The global legal community has also created the SL Bar Association, which aims to explore the intersection of law and virtual worlds, and formulate new laws and doctrines to address virtual problems [78]. In addition to this association, a number of governing bodies and industry working groups have been created and are operating, such as the Open Voice Network [79], Interactive Advertising Bureau [80], Center for the Governance of AI [81], Entertainment Technology Center [82], and others.

However, standardization measures or attempts to apply analog law to regulate relations in the Metaverse do not solve the problems that are rapidly accumulating. These are not only civil law problems but also problems of criminal liability for offenses committed in the Metaverse in relation to its objects or subjects or with the use of subjects and objects of the Metaverse.

Certainly, the concept of criminal liability in cyberspace is not completely new. Enough people are now aware that the behavior of Internet users can have real consequences for their lives. In recent years, we have witnessed the emergence of many government and citizen initiatives aimed at making cyber aggressors fully accountable [83].

Certain cases of offenses in virtual environments can still be regulated by means of separate legal provisions in national jurisdictions. At one time, it was proposed to systematize the issues of civil law application of the provisions of Council Directive 85/374/EEC on the approximation of the laws, regulations, and

administrative provisions of the Member States relating to liability for defective products. In other words, AI is equated to products (e.g., a car), and liability can only cover damages caused by manufacturing defects of AI objects, provided that the victim is able to prove actual damage and a causal link between the damage and the defect. Therefore, at this level of development and application of AI, it is advisable to form civil law relations by analogy with automobile insurance [84], by establishing or identifying the parties to legal relations to determine the degree of liability of entities (developers, owners, users, and other persons affected by the destructive use of AI) [85].

It should be noted that when objects or subjects interact in the Metaverse, including with the use of AI technologies, situations will arise that will be equivalent to a violation of the law, just as it would be in the real world. Such incidents may be a violation of tort law (which covers civil claims such as negligence or nuisance) [86-90] or criminal law (including illegal acts and crimes such as assault, murder, burglary, or rape) [91, 92].

Therefore, if an avatar has AI capabilities that constantly learn from its physical owner, then the avatar will be able to act independently in the Metaverse. In this regard, there is a widespread opinion that avatars should be granted the status of a legal entity in the Metaverse. This legal personality can be granted through the registration process, with each individual having the right to only one avatar in this decentralized and boundless Metaverse [93].

At the same time, it should be noted that when artificial intelligence development is combined with the Metaverse, the situation becomes too complicated. Thus, if avatars eventually become capable of "machine learning" and can perform everyday tasks without human intervention, it would be advisable to give avatars in the Metaverse the rights and responsibilities that a human would have [94].

As the Metaverse becomes more and more developed, and the issues of jurisdiction related to the location of the avatar to determine the appropriate forum for resolving potential disputes become unclear, it may be advisable to formulate international Metaverse law to address these issues [12, 91].

Given the above, we can state that technical, ethical, and legal regulation of AI application in various spheres of human life is becoming an inevitable process that simultaneously forms a basic set of standards, norms, and rules in the field of AI in a centralized and decentralized manner. At the same time, the Metaverse is developing much faster than its regulation is being created. It is also worth considering that this also applies to the use of blockchain and AI technologies in the MetaUniverse. At this stage of development and formation, the Metaverse is corporate and, accordingly, corporate rules and regulations prevail in the virtual realm, and control, prevention and deterrence of threats of offenses are based on the internal capabilities of the Metaverse corporation. However, there are a growing number of precedents when offenses committed in the digital space become the basis for litigation in ordinary reality.

Part 6. The problem with implementing AI algorithms is the uncontrolled use of military AI and the problem of ensuring the confidentiality of identification data of subjects and objects in the metaverse.

Another problem with the implementation of AI algorithms is the uncontrolled use of military AI, i.e., the so-called "Problem of the 37th Move." There are already autonomous lethal weapons (ALWs) that operate on limited AI algorithms and will soon become a regular element of all warfare systems. The development and use of ALW cannot be stopped or banned (like landmines) because there are no controls over the development of AI algorithms. It is impossible to limit the automation and autonomy of conventional (non-autonomous) weapons, which turns them into ALW. Attempts to describe rules of engagement for ALWs that leave lethal decisions to humans are futile, as the likelihood of their implementation is illusory in real military operations [95].

Also fundamental is the problem of ensuring the confidentiality of the identification data of subjects and objects, as well as the ultimate loss of privacy. Many IoT devices capture and transmit data about the world and people around us. Our digital footprints in the digital reality of the Internet are constantly monitored and analyzed by another huge number of algorithms – what information, goods, and services we prefer and consume, what and who we are interested in, our plans, contacts, and communications – everything is under control. Our increasingly intelligent gadgets provide a lot of additional information to both of these armies of algorithms, monitoring our lives in both realities (physical and digital). People will finally lose the remnants of privacy in the Metaverse, where they will soon have to live and work for an increasingly large part of their physical existence.

Metaverse entry devices will have sensors to monitor the user's "inner world," and existing privacy policies for such headsets state that data transmitted to external companies "will be governed by their own terms and conditions and privacy policies," and their own terms and conditions and privacy policies are closed [96].

Another very dangerous direction of AI development is imitation of the human mind or intelligent activity through mastering language and verbal functions. Language is one of the fundamental tools of interaction in any society. Today, modern AI systems cannot learn to assign and extract meaning from a linguistic text using machine learning mechanisms [97].

Artificial intelligence is likely to play a fundamental role in both optimizing and expanding the Metaverse in areas such as accurate avatar creation, digital humans, digital twins, multilingual accessibility, intelligent interaction, network performance, large-scale expansion of the VR world, creation of intuitive interfaces, and content management [98].

This means that it is necessary to formulate standard (generally accepted) rules for the functioning of the Metaverse and the use of identification, blockchain, and AI technologies in Metaverse structures as soon as possible. Among the priority tasks for legal and technical regulation are the following creation of an electronic jurisdiction; copyright for content created by humans and/or AI; deep fakes; transparency of user IDs, i.e. guaranteed identification of a human or AI

entity; fair use of AI and ML; permission to use blockchain data to train AI models; granting permission to use IDs to train an AI model control over the collection of unprecedented volumes and types of ID, primarily bioidentification data; insurance of subjects against destructive use of AI algorithms; export and localization of blockchain data and AI predictions; protection of identification data of children and minors; limitation and control of private space in the Metaverse, etc.

Part 7. Conclusions and prospects for further research.

The development of information and communication technologies in the world has stimulated a technological breakthrough, which today is called the Metaverse. However, at present, in Ukraine, unlike in the advanced countries of the world, the technical, legal, and ethical regulation of the Metaverse, AI, and blockchain is currently under scientific and public discussion, as the author has described in detail in previous works: "Electronic Jurisdiction, Metaverse, Artificial Intelligence, Digital Personality, Digital Avatar, Neural Networks: Theory, Practice, Prospects", "Metaverse: Legal Prospects for Regulating the Use of Avatars and Artificial Intelligence", "Analysis of National Strategies for the Development of Artificial Intelligence", "Genesis of Legal Regulation Web and the Model of the Electronic Jurisdiction of the Metaverse", "Problems of Using Autonomous Military AI Against the Background of Russia's Military Aggression Against Ukraine", "Artificial Intelligence (AI) and the Metaverse: Legal Aspects", "Blockchain and the Metaverse: Legal Aspects".

AI and blockchain technologies, both in various spheres of life in Ukraine and in the Metaverse, are in a laboratory state and are being implemented on an ad hoc basis. At the same time, Metaverse technologies have enormous potential for Ukraine's development and recovery. Looking ahead, Ukraine needs to urgently start developing the National AI Development Strategy and the National Strategic Initiative for the implementation of the National Metaverse. It also needs to start modernizing the national legal system aimed at its rapid adaptation to the social relations that have emerged and are continuously being created with the use of modern information and communication technologies, such as Metaverse, AI, blockchain, ML, AR, VR, etc.

REFERENCES

1. Baranov O. A. Internet of Things (IoT): robot with artificial intelligence in legal relations. 2018 *Yurydychna Ukraina,* 75-95.
2. Kostenko O. Directions of development of law in the field of Internet of Things (IoT) and artificial intelligence. 2021. *Actual problems of national jurisprudence: a scientific journal,* 130-136.
3. Radutny O..Artificial intelligence as a subject of crime. 2017. *Information and Law: scientific journal,* 4(23), 106-115.

4. Kostenko O. Electronic jurisdiction, metaverse, artificial intelligence, digital personality, digital avatar, neural networks: theory, practice, prospects. *Scientific Innovations and Advanced Technologies,* 2(4), 54-78.
5. Yaremenko O. Theoretical problems of legal regulation of information relations in the virtual space. 2021. *Public administration and law: history, theory, practice: a collection of scientific papers,* 67-73.
6. Radutny O. Digital person from the point of view of general and information security: philosophical and criminal law aspect. 2018. *Information and Law: scientific journal,* 158-171.
7. Androshchuk G. Trends in the development of artificial intelligence technologies: economic and legal aspect. 2019.*Theory and practice of intellectual property,* 3, 84−101.
8. Androshchuk G. Artificial intelligence and intellectual property: problems of regulation 2021. *Expert: Paradigms of legal sciences and public administration*, (14), 58-78.
9. Kostenko O. Problems of legal regulation of the metaverse. Modern science: innovations and prospects. Proceedings of V International Scientific and Practical Conference Stockholm, Sweden 6-8 February 2022 Stockholm, Sweden, 729-734.
10. Esra Özkahveci, Funda Civek, Gürkan Ulusoy Endüstri 5.0 Döneminde Metaverse (Kurgusal Evren)'Ün Yeri. The Place Of Metaverse (Fictional Universe) In The Period Of Industry 5.0 International Journal Of Social, *Humanities And Administrative Sciences (JOSHAS JOURNAL).* 2022, 8, 398-409.
11. Jon Radoff. The Metaverse Value-Chain. 2021. https://medium.com/building-the-metaverse/the-metaverse-value-chain-afcf9e09e3a7
12. Kostenko O. V. Electronic Jurisdiction, Metaverse, Artificial Intelligence, Digital Personality, Digital Avatar, Neural Networks: Theory, Practice, Perspective. World Science. 2022,1(73), 1-13.
13. Oleksii Kostenko, Vladimir Furashev, Dmytro Zhuravlov, Oleksii Dniprov. Genesis of legal regulation weband the model of the electronic jurisdiction of the metaverse, *Bratislava law review*, 6(2), 21-36
14. Doğancan Özgökçeler, "The Methods And Ways Of Implementation Of The Metaverse Concept That Can Be Transferred To The General Audience Of Its Cultural And Commercial Potential In. *The Near Future".* https://www.academia.edu/70076301/he_Methods_And_Ways_Of_Implementation_Of_The_Metaverse_Concept_That_Can_Be_Transferred_To_The_General_Audience_Of_Its_Cultural_And_Commercial_Potential_In_converted
15. Baranov O. Internet of Things (IoT): Regulation of the provision of services by robots with artificial intelligence. 2018. *Information and Law,* 4(27), 46-70.
16. Androshchuk G. Artificial intelligence technologies: development trends. 2019. *Modern problems of law and economy development in an innovative society*, 6-17.
17. Androshchuk G. Global standards of ethics of artificial intelligence. *Problems of theory and practice of forensic examination on intellectual property issues ("Krainevsky readings"),* 2021, 16-26.

18. D. M. Pham, “Human identification using neural network-based classification of periodic behaviors in virtual reality”, in Proc. IEEE Conference on Virtual Reality and 3D User Interfaces (VR), Tuebin-gen/Reutlingen, Germany, Mar. 2018, 657-658.
19. Luyi Chang, Zhe Zhang, Pei Li, Shan Xi, Wei Guo, Yukang Shen, Zehui Xiong, Jiawen Kang, Dusit Niyato, Xiuquan Qiao, Yi Wu, “6G-Enabled Edge AI for Metaverse: Challenges, Methods, and Future Research Directions”. *Journal of Communications and Information Networks,* 7(2), 2022, 107-121.
20. Kostenko O., Mangora V. Metaverse: Legal perspectives of regulation. Application of avatars and artificial intelligence. *Legal scientific electronic journal*. 2022, 2, 102-105
21.Choi Seok Jin, A combination of Artificial Intelligence (AI) and the Metaverse... Avatar, multilingualism, infinite expansion of virtual reality. [WIKI Prism]. URL: https://www.wikileaks-kr.org/news/articleView.html?idxno=119521
22. Pablo Barberá, John T. Jost, Jonathan Nagler, Joshua A. Tucker, Richard Bonneau, "Tweeting from left to right: Is online political communication more than an echo chamber?" *Psychological Science* 2015, 26(10), 1531-1542.
23. Simon Elias Bibri, Zaheer Allam, "The Metaverse as a virtual form of data-driven smart cities: the ethics of the hyper-connectivity, datafication, algorithmization, and platformization of urban society". *Computational Urban Science.*2022,1-22.
24. DeHealth. https://www.healthtechalpha.com/digital-health-startups/dehealth/108401
25. Legal regulation of the use of artificial intelligence based on the European approach. *Knowledge of European law.* 2022, 141-145.
26. Renda A. Artificial Intelligence. Ethics, governance, and policy challenges. *Report of a CEPS Task Force. Brussels.* 2019, 1-3.
27.Open letter to the European Commission. Artificial Intelligence and Robotics.
28. Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and social committee and the Committee of the Regions. Artificial Intelligence for Europe, COM(2018) 237 final.
29. Declaration. Cooperation on Artificial Intelligence.
30. Communication from the commission to the European Parliament, the European Council, the Council, the European economic and social committee and the Committee of the Regions. Artificial Intelligence for Europe.
31. Coordinated Plan on Artificial Intelligence.
32. Communication from the commission to the European Parliament, the Council, the European economic and social committee and the Committee of the Regions. Building Trust in Human-Centric Artificial Intelligence.
33. Ethics guidelines for trustworthy AI.
34. White paper. On Artificial Intelligence - A European approach to excellence and trust. Brussels, COM(2020) 65 final.
35. Shaping Europe’s digital future. A European approach to artificial intelligence.

36. Proposal for a Regulation laying down harmonised rules on artificial intelligence.
37. Europe fit for the Digital Age: Commission proposes new rules and actions for excellence and trust in Artificial Intelligence.
38. Annexes to the Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions Fostering a European approach to Artificial Intelligence. European Commission.
39. ISO/IEC 23053:2022(en) Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML).
40. ISO/IEC 22989:2022(en) Information technology – Artificial intelligence – Artificial intelligence concepts and terminology.
41. ETSI GR SAI 006 V1.1.1 (2022-03)
42. ETSI GR SAI 001 V1.1.1 (2022-01)
43. ETSI GR SAI 002 V1.1.1 (2021-08)
44. ETSI GR SAI 005 V1.1.1 (2021-03)
45. ETSI GR SAI 004 V1.1.1 (2020-12)
46. Artificial Intelligence Index Report 2021.
47. Artificial Intelligence Index Report 2022.
48. Kostenko O. Analysis of national strategies for the development of artificial intelligence. Information and law. 2022, 2(41), 58-69.
49. Policy paper Establishing a pro-innovation approach to regulating AI. Updated 20 July 2022.
50. National AI Strategy.
51. The World Bank in its Global Indicators of Regulatory Governance analysis gives the UK a score of 5/5
52. The 2021 edition of the Global Innovation Index (GII) gives the UK a score of 92.4/100 for 'Regulatory Environment'.
53. Other examples include equality law, which would apply where the use of AI produces discriminatory outcomes. Sector specific regulation such as for financial services and medical research may also capture the use of AI in these sectors.
54. UK GDPR and Data Protection Act 2018.
55. Guidance on AI and data protection, ICO.
56. Explaining decisions made with AI, ICO.
57. AI and data protection risk toolkit, ICO.
58. I CO consultation (now closed) on the AI auditing framework, ICO
59. Strategic Plan 2022-2025, Equality and Human Rights Commission (March 2022).
60. Software and AI as a medical device change program, Medicines and Healthcare products Regulatory Agency (September 2021).
61. Science and Evidence Delivery Plan 2020-2023, Health and Safety Executive.
62. UK government publishes pioneering standard for algorithmic transparency.
63. The Digital Regulation Cooperation Forum (DRCF).

64.Research and analysis. Findings from the DRCF Algorithmic Processing workstream – Spring 2022.
65. The AI Public-Private Forum: Final Report, Bank of England and Financial Conduct Authority's Artificial Intelligence Public-Private Forum (February 2022).
66.Beta principles for the ethical use of AI and data enhanced technologies in Ontario.
67. Rita Liao How China is building a parallel generative AI universe. https://techcrunch.com/2022/12/31/how-china-is-building-a-parallel-generative-ai-universe/?fbclid=IwAR1uKXjILRuKu9tiEpDa4nBxNOp5g-29P2WqgV0hfU8Fb9Eurs9o_V53CjQ
68. China Bans Generative AI Media (Midjourney, Stable Diffusion, DALL·E 2) https://www.youtube.com/watch?v=ZGWaLWAwmlI
69. The "Code of Ethics for Artificial Intelligence of the New Generation" has been released. http://www.most.gov.cn/kjbgz/202109/t20210926_177063.html
70. TC260-PG-20211A.
71. IA : comment être en conformité avec le RGPD? https://www.cnil.fr/fr/intelligence-artificielle/ia-comment-etre-en-conformite-avec-le-rgpd
72. Guide d'auto-évaluation pour les systèmes d'intelligence artificielle (IA). https://www.cnil.fr/fr/intelligence-artificielle/guide
73. Big data and artificial intelligence: Principles for the use of algorithms in decision-making
processes. ttps://www.bafin.de/SharedDocs/Downloads/EN/Aufsichtsrecht/dl_Prinzipienpapier_BDAI_en.pdf.
74. Towards Auditable AI Systems. Current status and future directions. https://www.bsi.bund.de/SharedDocs/Downloads/EN/BSI/KI/Towards_Auditable_AI_Systems.pdf?__blob=publicationFile&v=4
75. ITU-T SG16: Multimedia and related digital technologies.
76. How can AI enhance the metaverse? https://www.itu.int/hub/2022/06/can-ai-enhance-metaverse/
77. What, Exactly, Is the Metaverse Standards Forum Creating? https://www.wired.com/story/metaverse-standards-forum-explained/?fbclid=IwAR3kWJHSJiYLOHBa81hu7wujFrVIW7aFgFC9Y_qwIpg2ir7D48MB0mtuC0A
78. Scharon Harding. Meta and Microsoft team up to create metaverse standards; Apple, Google sit out. https://arstechnica.com/gadgets/2022/06/meta-and-microsoft-team-up-to-create-metaverse-standards-apple-google-sit-out/
79. World conference: AI and Metaverse (2022).
80. Jody Westby. Self-Sovereignty in the Metaverse. https://www.leadersedge.com/industry/self-sovereignty-in-the-metaverse
81. The Open Voice Network. Voice worthy of user trust. https://openvoicenetwork.org/
82. IAB Advertising Spend and Revenue Research. https://www.iab.com/topics/ad-revenue/

83. Centre for the Governance of AI. https://www.governance.ai/
84. Entertainment Technology Centre. https://www.etcenter.org/
85. Antoine Gautherie. Métavers : et si le fait de tuer un avatar devenait un véritable crime? https://www.journaldugeek.com/2022/05/27/metavers-et-si-le-fait-de-tuer-un-avatar-devenait-un-veritable-crime/
86. Future of Robotics and Artificial Intelligence. http://www.europarl.europa.eu/committees/en/juri/robotics.html?tab=Introduction
87. REPORT with recommendations to the Commission on Civil Law Rules on Robotics.
88. Eri Niiya. Court: Smear attack against YouTube avatar defamed creator. https://www.asahi.com/ajw/articles/14585849
89. Visa AJ Kurki, "A Theory of Legal Personhood". *Oxford University Press*, 2019.
90. Ben Chester Cheong. Avatars in the metaverse: potential legal issues and remedies. *Int. Cybersecur. Law Rev.*
91.Tania Su Li Cheng, "A Brave New World for Intellectual Property Rights", *[2006] JlLawInfoSci 2; 17 Journal of Law, Information and Science 10*, 2006.
92. Weilun Soon. A researcher's avatar was sexually assaulted on a metaverse platform owned by Meta, making her the latest victim of sexual abuse on Meta's platforms, watchdog says. https://www.businessinsider.com/researcher-claims-her-avatar-was-raped-on-metas-metaverse-platform-2022-5
93. Pin Lean Lau, From Data to User Interactions: Legal Issues Facing the Metaverse (1 February 2022). *The Fashion Law.*
94. Joanna J. Bryson, Mihailis E. Diamantis, Thomas D. Grant, "Of, for, and by the people: the legal lacuna of synthetic persons". *Artificial Intelligence and Law 25,* 2017, 273-291.
95. Martin Heller. Deep learning vs. machine learning: Understand the differences. https://www.infoworld.com/article/3512245/deep-learning-vs-machine-learning-understand-the-differences.html
96. Bettina M. Chin, "Regulating Your Second Life: Defamation in Virtual Worlds", *Brooklyn Law Review, 2007*, 72(4), 1303-1349.
97. Robotic Weapons Are Coming – What Should We Do About It? https://www.wired.co.uk/bc/article/robotic-weapons-are-coming-bae-systems?fbclid=IwAR19lkJHwXu-M3r5DYb63g_DlshgackBijki5dskFOxESTdpP2tmv3cfw5I
98. AI-Powered Metaverse. https://aiforgood.itu.int/event/the-ai-powered-metaverse/?fbclid=IwAR3pK1t4dIOa7xmfazTB8teEcLfAc4_43vS7t6CEE1gvSwTmoJBKBblBJUQ

CHAPTER 3. LEGAL REGULATION OF ARTIFICIAL INTELLIGENCE: THE ROLE OF ETHICAL NORMS

DUBNIAK Mariia
Doctor of Philosophy (Ph.D.) in Law, head of scientific laboratory of legal support of digital transformation, Scientific Center for Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine», Senior Lecturer, Department of Information, Economic and Administrative Law National Technical University of Ukraine «Igor Sikorsky Kyiv Polytechnic Institute»
ORCID ID: 0000-0001-7281-6568

Introduction.

The implementation of artificial intelligence (hereinafter referred to as AI) technologies in various fields creates a number of practical problems. In the field of intellectual property, it is the issue of the legal regime and protection of objects created with the help of AI technologies (*Nikolaeva, 2022; Perminova 2021; Kapitsa*, 2021*; Pavliuk 2021; Dubniak*, 2019*; Kulchii, 2019)*. In the field of medicine and healthcare, the problem is the reliability of medical forecasts and developed medicines *(Preisner, 2020)*. In the field of ecology and environmental protection, the problem of carbon footprints (*Malysheva, 2022; Markevich, 2021),* the processing and monitoring of environmental data, accounting of objects and substances that have a harmful effect on the environment, and public access to environmental information *(Malysheva, 2022)*. In the judicial and law enforcement systems, there is the problem of predicting a criminal's recidivism when a judge makes a decision, more frequent prosecution of representatives of marginalized groups, and the use of AI technologies to prevent crime *(Zavadskyi 2019; Bugera 2021)*. In the field of public administration, mechanisms of control and balance in the process of implementing technological solution*s are important (Karpenko, 2019).* In the field of employment and labor, the problem is the phenomenon of technological unemployment *(Karpenko, 2019; Hrytsai 2018; Balabaniuk 2021).*

Since there are manifestations of discrimination in society and problems with privacy, confidentiality, and personal data protection, these contradictions are copied, scaled up, and emphasized in the development and implementation of AI technologies.

There is currently no systemic or sectoral legal regulation of the specifics of the use of AI technologies. There are certain developments in the form of Codes of Ethical Principles for the Development of Robotics and Artificial Intelligence Technologies. The ethical issues of technology application are studied in philosophical concepts and scientific schools dealing with technological ethics, computer ethics, robotics, and algor-ethics (ethics of algorithm development), but the issue of forming legal approaches based on the developed ethical principles remains open.

States, special governmental groups, research centers at world-renowned universities, and individual scientists are dealing with the problems of formulating ethical principles for the development of artificial intelligence technologies. The development of ethical principles requires an interdisciplinary approach that combines the expertise of specialists in computer technology, big data processing and analysis, programming, philosophers, sociologists, and lawyers.

Specialized centers supported by the Institute for the Future of Life and patrons, such as the Leverhulme Center for the Future of Intelligence (LCFI) in Cambridge, The One Hundred Year Study of AI (AI100) at Stanford University, and The Institute for Ethics in AI at Oxford University.

Corporations: Amazon, DeepMind, Facebook, Google, IBM, and Microsoft have created the Partnership on Artificial Intelligence to Benefit People and Society initiative. Government agencies are developing analytical reports on specific issues, such as the White House Report on the Future of Artificial Intelligence and the Report on Robotics and the Law of the European Union's Committee on Legal Affairs, or the Ethical Guidelines for Trustworthy AI (08.04.2019) [27], Policy and Investment Recommendations for Trustworthy AI (26.06.2019) [28], prepared by the AI High Level Expert Group (AI HLEG).

The work of professional organizations such as The IEEE Global Initiative on Ethical Considerations in the Design of Autonomous Systems, for example, or the Engineering and Physical Sciences Council (EPRSC), which developed the Robotics Principles *(EPSRC, 2010).*

Given the breadth of views and the number of stakeholders involved in the issue of ethics and legal regulation of artificial intelligence, special attention should be paid to establishing the relationship between ethics and law, the place of artificial intelligence ethics in the system of ethical knowledge, the development of scientific views on AI ethics, and the formulation of methodological proposals for transforming ethical norms into legal obligations.

Part 1. The objectives of this study.

To classify and systematize Codes of Ethical Principles for the Development of Artificial Intelligence and Robotics Technologies (hereinafter referred to as AI ethical codes);

to analyze the processes of formation and evolution of approaches to the formation of Codes of Ethical Principles for the Development of Artificial Intelligence and Robotics Technologies by governmental groups and industry professional organizations;

to research and characterize ethical principles of AI formed in the scientific and professional environment;

to form approaches to legal regulation of AI technology development, taking into account ethical principles.

Part 2. General provisions on machine learning and data processing issues.

In order to identify problems related to the ethical use of AI technologies, it is advisable to divide the process of technology development according to the stages of its design:

1. Data collection: this is the initial stage that involves the selection and evaluation of data, their sources, collection, selection and preliminary analysis, and the formation of a structured data set for the following stages.

2. Model selection: the stage that deals with the selection and implementation of the data analysis model;

3. Training: the stage where developers choose automatic learning methodologies;

4. Validation: the stage that deals with the phase of verification of the process from an internal and external point of view to ensure its reliability;

5. Reporting-Presentation: a stage that deals with the presentation of the results of the developed technology (*Mantini A, 2022).*

By analyzing the content of the stages of AI technology development, we can both identify ethical issues at each of these stages and build ethical requirements for developers, since it is they who determine the quality of the algorithm and its use at each stage. In other words, by the concept of "artificial intelligence ethics," we mean, first of all, ethical principles for human developers, corporations that own technologies, and governments that will use technologies at the national level and make decisions on the certification of technologies or devices where they are deployed. With this understanding, no technological artifact is ever neutral in itself, nor is it one that emerged on its own. And the issue of technology ethics is only to formulate the most complete list of problems at different stages of AI technology design to minimize potential risks in the finished product.

1. For example, let's analyze the first stage of AI technology design: data collection. The widespread use of digitization emphasizes several problems: the problem of data formats suitable for processing.

2. The problem of data storage quality: who is the specific subject of data storage and on what legal grounds the data is stored; what technical devices are used to store digitized data; and whether their quality and content are not deteriorating.

Therefore, big data management requires special ethical attention, as it is the very first stage of developing more complex technologies.

A quality data set is a qualitative and quantitative data set in a volume that ensures its processing and use following the purpose.

It is at this stage of data collection that the manifestations of inequality and discrimination that exist in the real world are copied and transferred to AI technologies. This aspect can be called the effect of "poor big data."

In this case, it is not advisable to use the term "unreliable information" or "unreliable big data," since the data may be reliable and objective, but its

interpretation at the stages of "program model selection," "training," or "validation" may strengthen the discriminatory manifestations that were previously recorded in this data. Starting the development of a new AI technology with the processing of "poor big data" results in the selection of the wrong mathematical model.

A model for AI technology development is a synthetic and artificial representation of a part of reality intended to develop simulations, forecasts, or simulations for various needs when designing an AI technology (hereinafter referred to as the model). However, the model requires the correct selection of a mathematical algorithm for efficient data processing. Besides, mistakes at the data collection stage will result in errors at the subsequent stages of technology development.

Machine learning is all about using data at at least three different and related stages:

1. "Familiarization": this stage is aimed at defining parameters within the model so that it learns to familiarize itself with different types of data (which are training data).

2. "Learning process," in which the machine somehow adapts to recognize the structure of the data it receives so that it can recognize, at the end of the process, similar data with a certain flexibility and accuracy.

3. "Testing," which consists of using a part of the collected data (test data) to verify at the end of the training phase that the machine has indeed learned from the training data, showing that it can effectively recognize it with an acceptable error.

Machine learning identifies and tunes numerical parameters structured in a more or less complex network of relationships (linear, nonlinear, two-, three-, or multi-dimensional, neural, etc.), statically (parameters set during the training phase) or dynamically (parameters set during the training phase and then gradually refined with use). However, these are numerical parameters, which, since they are derived algorithmically from bad big data, should in turn be treated in the same way as bad parameters.

Once the data results and training parameters are obtained, the precious problem of validation arises, which refers to checking their reliability for the operational phase. It is about assessing the quality of the results with additional relevant parameters, both inside and outside the system.

In this part, we can identify problems between different competing fronts:

- designers' expectations;
- quality of the input data;
- quality of the model;
- error of the results (standard deviation);
- user expectations and satisfaction.

The final dimension of the algorithmic process development is the data presentation phase, i.e., the user interface.

By analyzing the content of the data processing stages, we can build an ethics framework for the AI project and define quality indicators for the algorithm's use.

The use of digitized data emphasizes the ethical issue related not only to data processing but also to data storage (who stores it, how they store it, and how they use it) and what its value is. Big data management requires special ethical attention. The choice of a data processing model ensures the adequacy and sufficiency of the virtual image, which will then be artificially processed or improved (*Mantini A, 2022).*

Part 3. Classification of AI ethical codes.

The classification is based on several factors. The risk-oriented approach helped to clarify that AI technologies can pose different types of risks for different areas. This helped to identify the areas critical for analysis and ask the question, "Are there separate codes of ethics for AI development for these areas?" We chose a chronological approach to organize the list, arranging most of the codes and recommendations by the year of their appearance and summarizing the codes of ethical principles for AI development by country and developer.

Organizing the codes of ethical principles in chronological order allowed us to identify several stages in the formation of scientific views of the periods.

2010-2015: The first interdisciplinary conferences are held, and ethical issues are raised. A generalized vision of practical and ethical problems regarding the use of robotic objects is being formed.

2015-2019: Specially created governmental working groups and commissions are actively involved in scientific and private initiatives. The focus of consideration shifts from the development of robotics to artificial intelligence technologies. The period of adoption of the largest number of codes at the corporate level.

2020-2023: Codes of ethical development and use of AI in socially sensitive areas such as healthcare and military affairs, addressing ethical issues of using AI technologies in decision-making and democratic procedures, data quality, and personal data protection. Among AI technologies, the focus is on the development of algorithms for decision analysis.

On the other hand, the proposed periods are not formally defined, as some AI codes of ethics were adopted earlier or later than the specified time periods.

For the sake of systematic perception, the Classification precedes the name of the codes of ethical principles for the development of AI and robotics with the country where the codes were developed, or an international document that unites the efforts of developers from different countries.

The criteria for systematizing codes of ethics are as follows: "year, country, developer".

We will refer to the following subjects as developers:

1. The scientific community.
2. Government groups and international organizations.

3. Business, corporations.

Special attention should be paid to codes of ethics in highly critical industries (healthcare, security and defense, personal data protection).

Part 4. Formation and characterization of provisions in codes of ethical principles for AI development.

In September 2010, a joint conference was held under the auspices of the Engineering and Physical Sciences Research Council (EPSRC) in the UK. It brought together experts from the worlds of technology, industry, art, law, and social sciences to discuss robotics. The conference resulted in a document of five principles for designers, developers, and users of robots (*AI-Ethics: Law, Technology and Social Values, 2010*). The main provisions of this document include the following conclusions:

1. Robots are tools for performing various household tasks, and humanity should not create robots with lethal or offensive capabilities that could harm national security.

2. Robots must have a responsible agent – a person who is responsible for the actions or damage caused by the use of robots.

3. Robots are elements of technology. They must be safe for operation, and legal mechanisms must be created to ensure the safety of ownership of their property.

4. Robots are artificial artifacts, and their machine nature should be obvious. Creation of humanoid robots.

5. Mechanisms for determining responsibility for a robot (e.g., a register of robots, similar to the register of car owners).

This document refers to robots as separate physical devices, so these rules apply to manufacturers and designers of technical devices.

In 2017, a conference on safe artificial intelligence was held, which resulted in the adoption of the Asilomar Principles of Artificial Intelligence *(Asilomar Principles, 2017).*

This document establishes a number of ethical principles that can be classified by the stages of the robotics development process. These are development, design (embodiment in material form), programming, operation, use, and civilian circulation.

The Asilomar Principles contain the following ethical standards for the process of developing robotic objects:

1. The priority of safety means that the safety of a person, society, and the state must be ensured at all stages of the creation of robotic objects.

2. Inadmissibility of harm to humans, living beings, and their environment.

3. The principle of foreseeing negative consequences that may arise in any sphere of public life due to the use of robots. Developers should foresee and minimize these consequences.

4. The principle of minimal harm and maximum benefit at all stages of the process of developing robotic objects for all participants in this process.

5. The principle of human control and the principle of reversibility of action.

6. The principle of human irreplaceability. It means that the emergence of robots in public life should not lead to a reduction in the scope of human rights and freedoms or the diversity of culture. It should be used exclusively to supplement human functions and activities, not to replace them.

However, not all technological solutions are limited to robotic devices. Artificial intelligence technologies can also exist in the form of software (e.g., neural networks), the use of which has its own peculiarities.

In 2017, Sage (UK) adopted five principles of ethical AI development for business (The Ethics of Code: Developing AI for Business with Five Core Principles).

To overcome the problem of data bias, the company proposes to develop a reward mechanism for providing high-quality data sets. The current process of data collection is not regulated in any way and is mainly the responsibility of the developer at the system design stage. A system of public rewards for data transparency and transparency practices should be developed (*Sage Code Ethics, 2017)*.

In our opinion, this principle is important, but rather "romantic" and idealistic in its formulation. The fact is that commercial benefits from the development of new technologies are gained by large market players such as Facebook, Google, Microsoft, and Baidu, and they are the ones who invest heavily in the development of AI technologies and intellectual property protection. Therefore, from the perspective of a competitive approach, it is very difficult to talk about full transparency and openness. However, all of these companies also declare the principle of transparency, which is realized at the stage of demonstrating implemented, ready-made solutions. Obviously, Sage is talking about transparency at the initial stages of development.

In 2018, Google published the principles of responsible practice in the field of AI (*Google AI Principles, 2018)*. Google has formulated the main goals for applications using AI technologies. These are public utilities, as AI technologies have a transformative impact in many industries, including healthcare, security, energy, transportation, manufacturing, and entertainment. Therefore, the likely benefits should far outweigh other foreseeable risks and disadvantages.

In addition to the overall objective, the document contains recommendations for responsible development practices. They include five sections: General Recommendations, Fairness, Interoperability, Privacy, Security.

The Section on Fairness. Artificial intelligence systems are widely used for forecasting. AI decision-making systems have the potential to be fairer and more inclusive on a broader scale than decision-making processes based on ad hoc rules or human judgment. The main risk is that any injustice in such systems can also have a wide-ranging impact across sectors and society.

Firstly, machine learning models (hereinafter referred to as ML systems) study existing data collected from the real world. Therefore, the built model can

recognize (or even reinforce) already existing problematic biases in metadata based on race, gender, religion, or other characteristics.

Secondly, even with the most rigorous and multifunctional data selection for training ML systems, it is difficult to ensure that the system will be fair in all situations. For example, a speech recognition system that has been trained on a dataset of adult voices in the United States may not recognize new slang words or phrases used by teenagers.

Third, there is no standard definition of fairness, regardless of whether decisions are made by humans or ML systems. Defining appropriate fairness criteria for ML systems requires taking into account user experience, cultural, social, historical, political, legal, and ethical considerations, which may vary depending on the context. What would be more equitable: lending the same rate to two different groups, even if they have different incomes, or lending in proportion to the income of each group? Or maybe neither approach is fair? At what level of detail should groups be defined? How do you define the boundaries between groups?

Maybe it is better to take into account individual differences? And this chain of ethical questions can be continued. In situations that seem simple, different people may see different "fair" solutions and disagree with other "fair" solutions (*Google AI Principles, 2018).*

The Interpretability section describes the practices of generating automated predictions for decision making. It is difficult for developers to communicate how an ML system combined all the data available to it to make a forecast, a phenomenon called a "black box."

Creating and testing AI systems also raises new challenges when comparing AI to traditional software. All programming can be described as a set of rules: "if-then....", "if not, then...". Interpretation performance consists of finding the problem in the branched program code of the so-called "decision tree." In artificial intelligence systems, the "code path" can include millions of parameters and mathematical operations, so it is much more difficult to identify one specific error that leads to a fatal decision. In general, an artificial intelligence system is best studied by the underlying training data and the training process itself – the transformation of simple commands, symbols, and definitions into AI technology. As a result, one can obtain one of the possible models of artificial intelligence. And here, developers are faced with the issue of the transparency of the source data on which the respective ML system was trained and the methods of processing the results (*Google AI Principles, 2018).*

The "confidentiality" and "security" sections oblige developers to take into account the legislation on personal data protection, privacy, confidentiality, operational security, and reliability against hacker attacks in all jurisdictions where AI systems are planned to be used.

Google's AI development principles take into account the ethical issues that have been identified in connection with the use of "incomplete" or "biased" data sets. They explain the problems of using certain solutions and suggest technical

practices to reduce these "biases." The sections on "fairness" and "interpretability" highlight ethical issues and explain why they arise. The final part offers practical cases and educational materials to reduce their manifestations at the stage of AI technology development (*Google AI Principles, 2018).*

The preamble of the Montreal Declaration on the Responsible Development of Artificial Intelligence states that its main goals are to develop an ethical framework for the deployment of AI in order to manage digital transformations in open national and international forums to achieve equitable, inclusive, and environmentally sustainable AI development *(Montreal Declaration on the Responsible Development of AI, 2017).*

The Montreal Declaration describes the principles of well-being, autonomy, privacy, solidarity, democratic participation, equity, inclusion of diversity, precaution, responsibility, and the principle of sustainable development.

The Declaration sets out a caveat for the correct perception of the principles set out, in particular, that the principles presented in the form of a list should not be perceived as having certain priorities. This arrangement only ensures their consistent interpretation and perception. Often, ethical principles are developed through the prism of potential AI risks, such as the risk that the growth of AI technologies will lead to the management of human interests and preferences through the analysis of large sets of algorithms.

The interpretation of the principle of "autonomy" is interesting. In particular, the development of AI technologies should not be a tool for discrediting, generating, and disseminating propaganda and imitating human characteristics. To minimize these risks, it is necessary to increase the level of digital and media literacy and promote the development of critical thinking *(Montreal Declaration on the Responsible Development of AI, 2017)*. The principle of "solidarity" indicates that AI technologies should promote cooperation between individual and collective tasks and not be a tool for increasing the isolation of individuals *(Montreal Declaration on the Responsible Development of AI, 2017).*

The principle of "democratic participation" requires openness and transparency in terms of data availability, which means that decisions affecting the quality of life should be provided in an accessible language. The public should have the tools and competencies to discuss these recommendations and they should be aware of the data on which these decisions were formulated using AI technologies. The same principle requires the right to "awareness" of the communication partner – communication takes place with a real person or an algorithm *(Montreal Declaration on the Responsible Development of AI, 2017)*. In the context of digital transformation processes, when some public services are provided online, this principle is extremely important because, indeed, in order to save time for civil servants, some information can be clarified using algorithms, but the decision must be made by an authorized person. Therefore, a citizen should be aware of the fact that AI technologies are used in the form of chatbots, who

they are really communicating with, and when they start communicating with an authorized person.

The principle of "equity" can be considered new, the essence of which is to ensure that the use of AI systems is fair to all members of society, in particular, taking into account the life cycles of industrial AI at all stages from data processing to the extraction of natural resources, taking into account working conditions, sharing algorithms should be available to all, without restrictions, and the digital activities of platform users should be recognized as work, as it contributes to the generation of data and the further functioning of algorithms *(Montreal Declaration on the Responsible Development of AI, 2017)*. The principle of "inclusion of diversity" is aimed at limiting the manifestation of the "filter bubble" phenomenon, and search queries should contain results from different categories of services to prevent the facts of standardization of behavior, the formation of monopolies, and the undermining of individual freedoms *(Montreal Declaration on the Responsible Development of AI, 2017).*

The principle of "sustainable development" formulates the vision of AI technology developers that hardware and digital infrastructure should generate the least amount of electrical and electronic waste, the maintenance of these infrastructures should meet the conditions of the circular economy, and data centers should be energy efficient and mitigate the impact of greenhouse gases throughout the entire life cycle *(Montreal Declaration on the Responsible Development of AI, 2017).*

The importance of the Montreal Declaration lies in the fact that this document comprehensively describes and interprets the principles of AI development not only in the context of data processing risks and privacy guarantees but also draws attention to social problems arising from the "filter bubble" effect, discrimination in the digital employment market, sustainable development, and environmental protection issues.

In 2018, the Toronto Declaration was prepared: Protecting the Rights to Equality and Non-Discrimination in Machine Learning Systems *(Toronto Declaration, 2018).* The purpose of the Declaration is to draw attention to international legal standards for the protection of human rights in connection with the development of machine learning technologies.

In particular, governments should identify and investigate the risks of harm to human rights. Existing patterns of structural discrimination can be reproduced and reinforced in situations where "unrepresentative" or "biased" data sets are used. The Toronto Declaration contains recommendations for governments in decision-making by public authorities at all levels that affect the authorization and policy-making of AI technologies in the public sector. In particular:

1. States should introduce regulations consistent with human rights law to oversee the use of machine learning by the private sector through the introduction of technical standards.

2. Private sector actors have an obligation to respect human rights. Companies should take ongoing, active measures to ensure that human rights are

respected. This process is called human rights due diligence, which includes the following steps:

- identification of possible discriminatory risks;
- implementation of effective measures to prevent and mitigate discrimination;
- full disclosure of information on measures to identify, prevent, and mitigate discrimination in machine learning systems *(Toronto Declaration, 2018).*

While the previous principles contain recommendations for developers and programmers of artificial intelligence technologies, the Toronto Declaration sets out obligations for governments that intend to use ML systems. Such countries have to create an appropriate legal framework and define the scope of regulation if ML systems are to be used in the public sector. The principle that obliges governments to disclose and publicly announce information about the use of ML systems in automated decision-making processes in the public sector is particularly valuable.

In 2018, the Chinese digital giant Baidu released its Four principles of AI ethics *(Baidu AI ethics, 2018).*

This collection of ethical principles suggests shifting the focus from ethical problems to prospects. In particular, the formation of a vision that "The value of AI is to teach people to learn and make people grow, rather than to surpass and replace people" *(Baidu AI ethics, 2018).*

Other horizons in ethical principles for AI were outlined by IBM, Everyday Ethics for Artificial Intelligence: Five Areas of Ethical Focus (*IBM Ethical Focus, 2018).*

The ethical principles are formed as a guide to action:

1. Develop clear instructions and boundaries of responsibility in the technology development team.
2. Establish the boundary of responsibility – control over who, how, when, and under what conditions will use AI software.
3. Document in detail the development process and decision-making processes.
4. Define a record retention strategy to enable the selection of best practices and their dissemination.
5. Comply with national legislation where AI technology will be used.

To solve ethical problems, involve different specialists and use secondary research – sociologists, linguists, and behaviorists. A global company should take into account language barriers and cultural differences, as well as the political context (*IBM Ethical Focus, 2018).*

The analyzed principles are most similar to legal regulation, as they establish rules of interaction between people at different stages of AI development. However, unlike sanctions that contain legal norms, the above principles only describe the desired consequences of behavior resulting from compliance with recommended actions.

In order to minimize the consequences of ML use, ADP adheres to such basic principles as human oversight, confidentiality, data quality, clarity, and transparency in its Ethics in Artificial Intelligence guidelines, but the principle of audit is of particular interest. If an ML system proposes a solution, then, according to the principle of "human supervision," it is always checked and evaluated by a person. And the principle of "audit" requires that the assessment made by a specialist is also subject to verification by a panel of other specialists in this field *(ADP Ethics in AI, 2018).* This approach allows us to reduce the level of biased conclusions of ML systems and biased conclusions made by people in relation to the results generated by ML systems.

In addition, the company has a "culture of responsibility" principle, which includes the work of the AI and Data Ethics Committee, which advises on new industry trends and issues, provides guidance on the ethical principles that should be followed when developing products, systems, and programs that include AI and data *(ADP Ethics in AI, 2018).*

It is worth noting that a common drawback of corporate Ethics Committees is the non-transparent mechanism of their activities. Companies' websites have one-way communication forms, but no statistical summaries of the number of requests, the nature of the requests, and the decisions made by the Committee are published. That is why it is so difficult to establish whether a company adheres to its own ethical principles for the development of AI technologies and what forms of response it uses in the event of errors.

Samsung's 2019 ethical principles for AI describe the areas of research into the use of devices with AI technologies, especially in the home. In particular, the features of:

1. Modeling technologies for rapid testing of a close-to-real world.

2. Technologies for integrating learning and perception with high-level knowledge to learn more effectively using less data and reason more reliably, reflecting the user's context and knowledge of the subject area.

3. Technologies of visual perception and visual thinking through the use of a holistic vision pipeline.

Smart devices with cameras within the same house (apartment) are combined into a single visual network and provide low-level processing of images from cameras and sensors to high-level visual recognition and visual thinking. On the low-level side, developers focus on neural processing to improve image quality, and on the high-level side, they focus on visual understanding of various types of visual contexts, such as object status and human or pet activities (*Samsung AI Principles. 2018).*

Given the unprecedented scale of the invasion of personal and private life, also for the purpose of visual surveillance and active data analysis, the company declared only three principles: "fairness," "transparency," "accountability," which, in our opinion, is not enough to describe all the processes of processing this category of data.

In 2019, the G20 Principles on Artificial Intelligence were developed. These principles are divided into two sections. The first ones are the Principles for Responsible Governance of Trustworthy AI, which address the issues of inclusive growth, sustainable development, and well-being: human-centered values and justice; transparency and clarity; and robustness, reliability, security, and accountability. The second section includes issues of formation.

The section contains general recommendations for investing in AI research and development, creating a digital ecosystem for AI, and creating a favorable policy environment. It also addresses the issues of building human resources and preparing for the transformation of the labor market. Special attention is paid to international cooperation for reliable AI *(G20 Principles in AI, 2018).*

In April 2019, the European Commission's High Level Expert Group on Artificial Intelligence (AI HLEG) published the Ethics Guidelines for Trustworthy Artificial Intelligence (Ethical Guidelines for Trustworthy AI, 2019), and in June of the same year, the Policy and Investment Recommendations for Trustworthy Artificial Intelligence (Policy for Trustworthy AI, 2019). The June AI HLEG recommendations cover four main topics:

1. people and society as a whole;
2. research and academia;
3. private sector;
4. public sector.

The European Commission states that "the AI HLEG recommendations reflect an assessment of both the potential of artificial intelligence technologies to stimulate economic growth, prosperity, and innovation, and the potential risks." Organizations that develop artificial intelligence should play a central role in building and deploying reliable artificial intelligence. They must also take responsibility for mitigating risks and preventing potential harm.

In May 2019, the OECD Artificial Intelligence Council's Recommendations were published. Section 1 of these guidelines describes the "Principles for the Responsible Governance of Trustworthy AI Technologies" and covers the following: inclusive growth, sustainable development, and well-being; human-centered values and justice. This principle broadly emphasizes respect for the rule of law in the international sense and the fundamental rights of freedom, dignity, and autonomy; privacy and data protection; non-discrimination and equality; diversity; fairness; social justice and internationally recognized labor rights. The next principles are transparency and explanability; reliability and security; and responsibility.

Section 2 contains provisions on "National Policy and International Cooperation for Trustworthy AI." The clause on investment, research, and development points to the importance of long-term public investment and the creation of conditions for private investment in AI, as well as the development of a system of open data sets free from discriminatory bias. Clauses on the digital ecosystem and development of digital infrastructure on shaping the policy environment and adapting regulations; on preparing people for transformation in

labor markets through the development of lifelong learning programs, and international cooperation, from the popularization of principles to the creation of international expert groups and harmonization of global technical standards.

The peculiarity of these Recommendations is that they contain points for both technology developers and recommendations for governments in terms of the integrated development of digital infrastructure in the international context, taking into account the established principles.

In February 2020, the Pontifical Academy for Life, Microsoft, IBM, FAO, and the Italian Ministry of Innovation signed the Rome Call for AI Ethics document in Rome to promote an ethical approach to artificial intelligence.

The Rome Call for AI Ethics includes three spheres of influence:

the sphere of ethics – all people are born equal in dignity and rights;

education – transforming the world with the help of AI innovations will mean making a commitment to building the future for younger generations and working together on these issues;

the field of law – the development of artificial intelligence in the service of humanity and the planet should be reflected in the norms and principles that protect people, especially the weak and disadvantaged, as well as the protection of the natural environment *(Rome Call for Ethics of AI, 2020).*

The movement to promote and popularize the Rome Call for AI Ethics has gained an independent area of academic research called algor-ethics, which is a field of ethical reflection on the use of algorithms. "In the clash between different visions of the world, human rights are an important point of convergence in the search for common ground. Currently, there seems to be a need for a renewed understanding of rights and responsibilities in this area. The scale and acceleration of the digital era's transformations have in fact created previously unforeseen problems and situations that challenge our individual and collective spirit" (Pope Francis, 2020).

In 2023, Jewish and Islamic faiths united around the Rome Call for AI Ethics. This shows that the challenges faced by humanity in connection with the spread of AI technologies can no longer be based on traditional religious interpretations. The world's religions have had a long history of formation, more than 2,000 years, but in just a few decades, the world has changed so much that ethical and social answers cannot be found in traditional religious dogmas. That is why the consolidation of different religious denominations around the development of ethical principles for the development of artificial intelligence is so important.

It is important to emphasize that the problem is not the formation of a "new morality" or "new ethics for the digital society," but the solution to the dilemma of integrating new technologies and the problems they generate into modern society. This once again emphasizes the relevance of the problem under study because ethical issues are so complex in the context of technology application that neither philosophical, nor moral nor ethical, nor religious norms can provide an unambiguous answer.

In 2021, China adopted the Ethical Norms for the New Generation of AI *(Ethical Standards, 2021)*. This set of ethical norms includes general principles, ethical norms for specific activities, and instructions for organization and implementation.

Among the general principles, it is important to note the principle of increasing ethical literacy. This principle obliges us to actively study and popularize knowledge related to the ethics of artificial intelligence, to understand ethical issues objectively, not to exaggerate ethical risks, and not to avoid the risk of underestimating ethical issues.

Ethical standards to be followed in specific AI-related activities include governance standards, research and development standards, supply standards, and use standards.

Development management norms include ethical principles on agile management methodology, active practice, compliance with standards, and risk prevention.

The ethical norms on research and development emphasize self-discipline, improving data quality, enhancing transparency and security, and focusing on reducing bias and discrimination.

The section on supply describes the importance of market rules and fair competition, strengthening the protection of users' rights and interests, and increasing the demand for quality and safety.

The norms of use explain formative practices to prohibit misuse, abuse, and timely collection of proactive feedback *(Ethical Standards, 2021)*.

These principles most broadly describe ethical practices at successive stages of AI technology development and systematically formulate requirements and recommendations that developers should follow. This document is the largest collection of ethical rules and is a kind of "roadmap" for all AI developers.

In 2021, Adobe will present its AI Ethics Principles *(Adobe AI Ethics Principles, 2021)* and form a different horizon of problems in the field of AI technologies. In particular, it points to generative AI technologies as the next progressive step in the decade, as generative AI technologies now largely simplify creative processes, such as combining art styles, writing new original texts, and composing new music. Among the ethical guidelines described are the following:

1. each project should have its own set of verified data;

2. a combination of automated testing and human evaluation of the results.

Focusing on ethical risks by assessing in detail potentially harmful features or uses of technology directs efforts to focus on features and products with the greatest potential ethical impact without slowing the pace of innovation.

A cross-functional AI ethics council is in place. Diversity of personal and professional backgrounds and experiences is crucial to identifying potential issues from different perspectives. The development of AI technologies is a continuous journey, so it is necessary to work together with the community and provide feedback mechanisms *(Adobe AI Ethics Principles, 2021).*

In November 2021, UNESCO released the first global standard for artificial intelligence ethics, the Recommendation on the Ethics of Artificial Intelligence. The Recommendation on the Ethics of Artificial Intelligence *(UNESCO Ethics of AI, 2021)* This document has been adopted by all 193 member states.

The use of AI technologies has a dynamic, both positive and negative impact on society, the environment, ecosystems, and human lives. New ways of using AI are creating technologies to influence human thinking and decision-making, transforming education, humanities, social and natural sciences, culture, communication, and access to information.

AI technologies can exacerbate fundamental ethical issues of bias, potentially leading to discrimination, inequality, digital divide, exclusion, and threats to cultural, social, and biological diversity.

Artificial intelligence systems raise new types of ethical issues that include, but are not limited to, their impact on decision-making, employment and labor, political and cultural processes, social interaction, the digital divide, social, economic, scientific and engineering practices, healthcare, education, media, the environment, and ecosystems.

The use of AI technology can violate such fundamental human rights and freedoms as freedom of expression, privacy and non-discrimination, gender equality, democracy, access to information, personal data protection, consumer protection, democracy, rule of law, security, and law enforcement.

In addition, new ethical challenges are posed by the potential of AI algorithms to reproduce and reinforce prejudice and thus exacerbate existing forms of discrimination and stereotypes.

Some of these challenges are related to the ability of AI systems to perform tasks that previously could only be performed by humans and, in some cases, were even limited to humans. These characteristics give AI systems a profound, new role in human practices and society, as well as in their relationship with the environment and ecosystems, creating a new context for children and youth to grow up in, develop an understanding of the world and themselves, critically engage with media and information, and learn to make decisions.

In the long term, artificial intelligence systems may challenge the distinctive sense of human experience and freedom of action, raising additional concerns, in particular, about human self-understanding, social, cultural, and environmental interaction, autonomy, freedom of action, value, and dignity *(UNESCO Ethics of AI, 2021)*.

The use of AI technologies requires the world to comprehensively revise educational programs in order to increase information, media, and technological literacy, as well as access to independent, pluralistic, and reliable sources of information. On the other hand, the risks of disinformation, hate speech, and harm caused by the misuse of personal data must be reduced. New technologies should provide new means for upholding, protecting, and realizing human rights, not violate them.

The Recommendation sets out the actions required by Member States to ensure compliance with these principles in policy areas such as gender, environment, communication, and information. The Recommendation envisaged the development of two key tools: the Readiness Assessment Methodology (RAM) and the Ethical Impact Assessment (EIA). From the point of view of scientific, technological, economic, educational, legal, regulatory, infrastructural, social, cultural, and other dimensions, a country's readiness is a dynamic indicator. Therefore, RAM, as a macro-level tool, helps to determine the trajectory on the scale of readiness to implement AI ethically and responsibly for all its citizens.

In 2023, the Readiness Assessment Methodology (RAM) was published. This document includes an assessment of the legal dimension of the readiness of states to implement AI technologies. In particular, the legal dimension includes the following questions: whether the AI regulatory policy, data protection and privacy laws, data exchange and accessibility laws, freedom of information and access to knowledge laws, online security, and transparency in broadcasting are guaranteed.

Part 5. Ethical standards and the use of AI technologies in healthcare.

No specific ethical guidelines for the use of artificial intelligence in healthcare have been proposed worldwide. Before the formation of guidelines on the ethics and governance of AI in healthcare, the WHO Global Conference on Primary Healthcare published the Astana Declaration, which contains principles for the use of digital technologies.

The Declaration calls for promoting the rational and safe use of technology to improve access to health care, enrich health services, improve the quality of care, patient safety, and increase the efficiency of care.

UNESCO has documents describing the principles of using AI and big data in healthcare. UNESCO's work on the implications of AI technologies is supported by two standing committees of experts: The World Commission on Scientific Ethics and the International Bioethics Committee (*WHO Key ethical principles, 2021).*

The basic ethical principles of AI use in healthcare can be divided into general (principles of harmlessness, balance, fairness, and respect for autonomy) and special.

Specific ethical guidelines for the use of AI technologies in healthcare should be based on the understanding that health is the highest social value. Healthcare providers should recognize the central role of health in everyone's life. They should be especially aware of the dependence of patients on healthcare providers for information about their diagnosis, prognosis, and the relative merits of available treatment or prevention options, as well as the importance of free and open exchange of information for the doctor-patient relationship. If AI systems are used in the healthcare system and perform tasks that were once the exclusive prerogative of physicians, AI-enabled systems must adhere to all the ethical obligations that the public places on physicians.

While ethical principles are universal, their implementation may differ depending on cultural, religious, and other social contexts. Many of the ethical issues that arise when using AI and machine learning in healthcare are not unique to healthcare, compared to the general description of the challenges of using AI technologies in various fields. For the healthcare sector, these are common AI challenges, such as automated disease tracking, or diagnosis, or prognosis. Computers have been performing these tasks with the help of various programs long before the problem of using AI technologies appeared.

Due to the seriousness of the consequences that can have a global scale and impact on the healthcare sector, AI and machine learning technologies have received more attention from the global community and international organizations than any previous computer programs.

Part 6. General ethical principles for the use of AI in healthcare.

The ethical principles listed here have been identified by the WHO Expert Group as the most applicable to the use of AI for health (*WHO Key ethical principles, 2021).*

The principle of "respect for autonomy" requires developers to treat people in a way that respects their interests in making decisions about their lives and health, with an appropriate and informed understanding of the nature of the choice to be made, its significance, the person's interests, and the likely consequences of alternatives.

The principle of "safety and public interest" requires that the use of artificial intelligence technologies does not lead to any mental disorders or physical harm.

The principle of protecting people from stigmatization or discrimination based on their health status.

The principle of "transparency" Healthcare institutions, healthcare systems, and health authorities should regularly publish information on how decisions were made regarding the use of AI technologies and what the limits of the use of technologies in relation to patients are. Compliance with this principle will facilitate external audits and oversight.

The principle of "responsibility and accountability" implies that appropriate mechanisms should be put in place to ensure access and redress for individuals and groups affected by an algorithmically informed decision. This should include access to prompt, effective remedies and redress from governments and companies deploying AI technologies for health. Redress should include compensation, rehabilitation, restitution, sanctions where appropriate, and guarantees of non-recurrence.

Institutions should not only be legally liable but should also take responsibility for the decisions made by the algorithms they use, even if it is impossible to explain in detail how the algorithms provide the results of their analysis.

To avoid dispersion of responsibility, when "everyone's problem becomes no one's responsibility," a model of "collective responsibility" is proposed, in which all agents involved in the development and deployment of artificial intelligence technology are responsible, which can encourage all participants to act honestly and minimize harm.

The principle of "Inclusiveness and Equity" implies that all patients, healthcare providers, and healthcare systems should be able to benefit from AI technology, not just technology providers.

AI technologies should be accompanied by tools that provide patients with the knowledge and skills to better understand their health status and effectively maintain their health.

Future health literacy should include an element of information technology literacy.

The principle of "responsiveness and sustainability" requires that designers and developers of AI technologies systematically and transparently study the results of technology implementation in the healthcare sector. This will help to establish in a timely manner whether the technology and the solutions it predicts are being used adequately, appropriately, and in accordance with the established expectations and requirements (*WHO Key ethical principles, 2021).*

Research on each of these topics should include consideration of different countries, cultures, and types of healthcare systems.

Part 7. Description of ethical and data issues in healthcare.

Some technological solutions with AI systems have been introduced to counter the COVID-19 pandemic without proper legal justification for their use. The benefits of artificial intelligence may be overestimated, especially if false or overly optimistic assumptions are made about the infrastructure and institutional context in which these technologies will be used.

The problem of data quality.

There is a danger that poor-quality data will be collected to train AI, which could lead to models that are more about data interpretation than estimating actual clinical outcomes. There may also be missing data that, when combined with poor-quality data, can distort the performance of the algorithm. Significant investment may be required to make heterogeneous datasets usable. Data compilation in resource-limited settings is a complex and time-consuming process that does not take into account the workload of healthcare professionals.

Artificial intelligence technology that can predict which people are at risk for type 2 diabetes or HIV infection can, on the one hand, benefit those at risk, but on the other hand, can lead to unnecessary stigmatization of individuals.

Insufficiently grounded predictive decisions of AI technologies trained on incomplete and low-quality data sets can lead to overmedication of healthy people, create unnecessary stress and anxiety, and expose people to aggressive

pharmaceutical marketing and other manifestations of commercial healthcare sales strategies (*WHO Key ethical principles, 2021).*

The problem of funding disparity.

Overinvestment in the initial stages of developing solutions using AI technologies has an unknown result in advance since there are only desired requirements for the development results. Such overinvestment will create financial gaps in the industry. Robotic surgery may provide better outcomes, but the opportunity costs associated with investments in other areas of medical practice must also be taken into account. Therefore, overinvestment in AI technologies to obtain the latest methods of data analysis and interpretation and increase competitiveness may cause an imbalance in other areas of medical practice (*WHO Key ethical principles, 2021)*.

The problem of legal regulation of medical data protection.

This problem is described in terms of such categories as "data" in the broad sense of the word and the legal category of "personal data." In the field of medicine, there are various data sets that may contain both personal data about an individual's health and secondary data, the combination of which can provide additional insight into the health of an individual. Analyzing such sets of different data can help identify a person's medical problems and needs, even without their will or awareness. The results of such analysis can be used in the marketing strategies of medical companies.

"Biomedical big data" refers to various types of health data that form a medical data ecosystem. Such a system contains data from standard sources (e.g., medical care, clinical trials) and other sources (ecology, lifestyle, socioeconomic, behavioral, and social media data, mobile devices, fitness trackers, mobile applications for developing healthy habits, etc.).

The development of a successful AI system for use in healthcare depends on the high quality of the data used to train the algorithm and validate the algorithmic model.

The collection, use, analysis, and sharing of health data is an ongoing concern. Lack of confidentiality can cause harm to a person (e.g., discrimination in the future based on health status) or harm (e.g., risk of violation of honor and dignity if confidential health data is shared with others) (*WHO Key ethical principles, 2021)*.

The problem of medical data privacy.

To simplify the requirements for processing data that can be partially classified as personal data, data providers resort to various technical operations. For example, anonymization is the removal of a part of the data (e.g., name, age, time of data recording) to avoid the possibility of a specific identification of a person. Insufficient anonymization of records jeopardizes patient privacy. Large corporations such as Google can easily re-identify patients by combining records

with other available datasets, such as geolocation data from Google Maps (using triangulation techniques).

Machine learning technologies can identify confidential details from ordinary non-personal data and thus turn them into special categories of confidential medical data that require compliance with the procedures for processing personal data provided by law (*WHO Key ethical principles, 2021)*.

The problem of determining the purpose of biomedical big data processing.

The scale and complexity of biomedical big data make it impossible to track and make meaningful decisions about the use of personal data. All possible uses of health data may not be known, as they are used for purposes that are far from the purpose described in the consent to data processing. Patients may not consent to the current and future use of their health data. Even if the use of health data is authorized by consent, the procedures for processing such data may not be followed.

For example, individuals may not provide consent, but they will not know that their data is being processed because they do not have sufficient access to the health data system.

Part 8. Description of the legal problems of data collection.

The problem of changing the purpose of data processing.

In the process of processing and modeling AI algorithms, the results of the formation of such algorithms and their operation may exceed the purpose of data processing that was originally formulated with the patients' consent. This "excess," so-called "behavioral data," can be used for other purposes. For example, in early 2021, the Singapore government admitted that data obtained from a program to track COVID-19 patients was being used "for the purpose of criminal investigation," despite previous assurances that such use was not planned.

The problem of data management.

The peculiarity of some medical data is that they must be collected from one person at different periods of the disease course to form a complete patient profile. To ensure the clarity of the findings, they should not be anonymized, as it is the analysis of the patient's profile and related factors of the disease that allows for important conclusions. While anonymization can minimize the risks of (re)identification, it can also reduce the positive health benefits of data that are necessary for some forms of AI, such as predictive algorithms.

A separate problem is to determine the legal regime and grounds for processing the data of deceased persons, which can provide numerous benefits for medical research and improve understanding of the causes of the disease, the peculiarities of the disease, methods and protocols for its treatment (*WHO Key ethical principles, 2021)*.

The problem of access to data.

Different data providers and companies implementing projects using biomedical big data may have different opportunities to obtain datasets. This can create a significant gap between those who accumulate, receive, analyze, and control such data, as well as those who provide data but have little control over its use.

Those who support the growing role of AI in healthcare will be able to allocate their capital, expertise, computing resources, and data to create new programs to support healthcare providers and systems. At the same time, companies with fewer resources "reasonably expect" to have access to primary data to create their own products and solutions (*WHO Key ethical principles, 2021)*.

The problem of trust in predictions and diagnoses generated by AI technologies.

On the one hand, there is the ethical question of whether a doctor should inform a patient that AI technologies were used in the process of making a diagnosis. On the other hand, there is the question of whether a doctor can trust the algorithm's decisions if it is not known on the basis of which data and their combination the algorithm offers a solution (the so-called black box problem).

In situations where the data subject did not provide informed consent to the use of their data to form predictive models about their future health status or to form a "predictive diagnosis."

Such unlawful use without informed consent may include, for example, screening for mental disorders by analyzing language or images that are more likely to attract a user on social media (*WHO Key ethical principles, 2021)*.

The problem of using AI technologies to distribute limited medical resources.

In crisis situations, such as the Covid-19 pandemic, the task of distributing a limited batch of a newly invented vaccine may arise. When making such a decision, dozens or hundreds of parameters need to be taken into account, taking into account the trends of the "conceptual revolution" in medicine.

The ethical side of the problem of using AI to allocate resources and set priorities also includes managing conflicts between human and machine predictions.

At the population level, this can encourage the use of resources for people who will benefit the most, such as young, healthy people, and thus divert resources and time from expensive procedures intended for the elderly. Thus, if AI technology is trained to "maximize global health," it can do so by allocating more resources to healthy people to keep them healthy rather than to sick older patients who need more attention. This is due to a "conceptual revolution" in medicine. Twentieth-century medicine was aimed at treating the sick. Twenty-first century medicine is aimed at maintaining a healthy population. Presumably, by 2070, less affluent people, according to the concept of twentieth-century medicine, could

enjoy much better health care than today, but the gap separating them from the manifestations of the "conceptual revolution" will continue to grow (*WHO Key ethical principles, 2021)*

The use of AI tools for resource allocation is one of the most compelling reasons to ensure transparent and proper management and oversight in the healthcare sector.

The problem of data dependence.

New medicines, diagnostics, and other products and services developed with AI may depend on publicly available health data and other public sector investments in AI and healthcare infrastructure for identification, testing, and validation. The question arises as to whether the public will be rewarded by providing access to the developed product based on such data.

The problem of reconciling interests in technology development methods.

Some new methods of data processing can speed up drug development. If such new data processing methods are protected by intellectual property rights and are not available for licensing on a royalty-free or affordable basis, non-profit organizations and small companies will not be able to use them and speed up the development of new drugs. Thus, large pharmaceutical companies will maintain their monopoly positions, as they have enough resources to build IP portfolios in the field of data processing methods and technologies.

In turn, this is not fair, given that all science, including advances in artificial intelligence, is based on decades of public funding and academic research. Thus, as AI is used more frequently to develop new technologies to improve healthcare, including new medicines, the company must adapt new products to meet the global healthcare needs of the global public.

Part 9. The ethical dimension of solving the problems of using AI technologies in healthcare.

1. Widespread use of open source software in the development of AI technologies for healthcare. The results of adherence to most of the above principles can be enhanced by using open source software for the basic design of AI technology. Open-source software is available for use in modeling and deployment of AI technologies, independent analysis, and engaging a wide range of users, allowing all stakeholders to understand how the system works, how to identify potential problems, and how to extend and adapt the software.

The design of open source software should be accessible and pleasant, and the content should be transparent.

2. Increasing diversity. Often, to address the problem of data bias, the diversity of datasets used in AI technology is increased. However, identifying biases requires the involvement of people who are familiar with the nature of potential biases, contexts, and regulations throughout the entire software

development process, from design to stakeholder consultation, data labeling, testing, and deployment.

3. Increasing the number of data management tools. Toolkits can be useful for providing specific guidance to technology developers who wish to integrate ethical considerations into their work. Such toolkits can indicate, for example, how to manage data, including collection, de-identification, and aggregation methods, and how to protect the purpose of the data. They can also be useful for developing checklists for informed consent and data use in healthcare AI research and applications.

4. Use of non-commercial artificial intelligence for healthcare. It is expected that developers who do not pursue the goal of making a profit can more transparently adhere to ethical principles and values than commercial developers. Nonprofit developers could include treatment providers, hospital systems, and charitable organizations. They could emulate the many non-profit and product development partnerships that have emerged over the past two decades in the use of AI technologies to develop new medicines, diagnostics, and vaccines. A nonprofit developer can deal with all areas of healthcare rather than focusing only on commercially attractive projects.

Part 9.1 Correlation between medical ethics and AI development ethics.

Most codes of ethics for AI developers require that they consider the principles of respect for human autonomy, harm prevention, fairness, transparency, and accountability. These principles form the basis of the "Principalism" approach to applied ethics, which was developed within the framework of medical ethics. In general, the projection of medical ethics norms to AI ethics is successful, taking into account common problems:

- policy of making decisions that may affect a person's life,
- high requirements for the balance and accuracy of decisions.

However, it is problematic to mechanically copy the approach of medical ethics into AI codes of ethics. Compared to healthcare, the development of AI technologies lacks the following:

- common social goals and fiduciary responsibilities,
- history of the profession, its social significance, and social responsibility measures,
- proven methods of implementing principles in practice,
- reliable legal and professional mechanisms of responsibility *(Mittelstadt, 2019).*

Lack of common social goals. The general fiduciary duty in the healthcare sector is to act in the interests of the patient's health. In the development of AI technologies, the general interest is to increase company profits and compete in the market.

Thus, there is no common social goal in finding a balance between public and corporate interests in these two areas.

History of the profession and its social significance. A doctor is an official profession whose representatives have a number of fiduciary duties to patients, common social goals and values that are enforced by sanctions, and a system of self-governing institutions.

Artificial intelligence development is not an official profession. It is a process that brings together many specialists in the field of big data processing and analysis, including programmers, designers, and architects of intelligent systems. These specialists are guided by the terms of reference, not by the norms of social responsibility. They are guided by the interests of the company rather than the public or social interests. Their main fiduciary duties are to the company's shareholders.

AI development is not a focal profession with goals that are in the public interest. Developers do not have moral guidelines that have gone through their historical formation and are recognized and established for the profession. Apart from the academic context, AI principles have no methods of implementation or practice with appropriate empirical methods. Without sanctions and real mechanisms for redress, a violation of ethical requirements by a particular AI programmer will have no consequences for him or her.

The healthcare sector has a century-long history of developing ideas about the moral behavior of doctors. These values are described in the Hippocratic Oath and the Geneva and Helsinki Declarations. Technological progress, the emergence of new treatment methods, and changes in social values have changed traditional approaches from ethical ideas of "unacceptable professional morality" to the criteria of a "good doctor." Ethical codes were revised in connection with the emergence of new practices, such as modification of the human body through artificial implants – biohacking, cloning, sterilization, euthanasia, human experimentation.

The use of these practices has received its limits and prohibitions, and their critical understanding has been integrated into the profession through the system of education, training, and self-regulation based on ethical principles.

The development of artificial intelligence has no similar history of formation. The professional community has only been developing best practices and standards in the development of AI technologies over the past few decades. The codes of ethics developed by industry professional associations are brief, theoretical, and do not contain specific advice or standards of behavior. In addition, AI development teams are often interdisciplinary and multinational, as AI technologies can be deployed in any industry *(Mittelstadt, 2019).*

Part 9.2 The problem of implementing ethical recommendations in practice.

The risks that medical ethics address are mostly related to interventions performed on the human body. The risks that AI technology can cause are not directly obvious. For example, due to the use of datasets, a particular subject may not know that their data is being used or that the processing of this data is harmful

to them. No programmer can identify a specific error in AI training data. In particular, it is impossible to analyze the code in a decision tree because the neural network "learns" through a set of techniques, trials, errors, and verification. An identified problem cannot be traced to a single performer. Programming teams with distributed functions are working on the project, the combination of which provides a methodology for training AI. Unlike medicine, it is problematic to outline the features of a "good AI developer" and the boundaries of "unacceptable actions" in AI ethical standards *(Mittelstadt, 2019).*

The problem of transforming ethical principles and standards into legal obligations.

Ethical principles do not automatically become part of practice. During its formation, medicine has developed effective ways to transform high-level obligations and principles into practical requirements and norms.

These include professional societies and councils, ethics committees, accreditation and licensing schemes for healthcare facilities, collegial self-government, codes of conduct in doctors' job descriptions, practical precedents, treatment protocols, and regulatory frameworks for the industry as a whole.

Development of artificial intelligence technologies There are no empirically proven methods for implementing ethical principles in technological developments. This is partly due to the fact that methods of integrating ethical standards are researched in academic circles, while real developments take place behind closed doors. Therefore, engaging ethics experts to predict risks and resolve conflicts is contrary to the company's commercial incentives and interests. The existence of a code of ethics without control mechanisms and corporate responsibility, as well as an organizational culture in the company, does not deter developers from unethical behavior.

Regulatory acts do not provide for sanctions for representatives of information professions. Legislation regulates certain issues by bringing them to justice, for example, for violation of legislation in the field of personal data protection or the use of intellectual property without proper legal grounds *(Mittelstadt, 2019).*

Problems with the application of codes of ethics for corporate structures.

Firstly, the public usually plays no role in establishing such ethical principles.

Secondly, such guidelines are usually applied to the forward-looking behavior of companies and relate to the technologies they develop and implement (role responsibility).

This situation creates gaps, as it does not address legal liability or compensation for damages. In the absence of formal ethics qualifications in AI, it is not enough to simply call for personal adherence to values such as reproducibility, transparency, fairness, and respect for human dignity.

Third, many companies have established Ethics Committees, but independent audits and monitoring of whether companies are adhering to their

own ethical standards are needed to ensure that standards are being met and that corrective action is being taken when problems arise.

Part 10. Conclusions.

Most codes of ethics for the development of AI and robotics technologies contain recommendations for compliance with evaluative categories, such as fairness, responsibility, and accountability, which relate to theoretical issues of social ethics of technology implementation.

Codes of ethical principles also contain provisions that characterize interdisciplinary relations: freedom of decision-making, freedom of AI creativity, issues of anthropology, and eschatology (author's philosophical concept of the end of the world in the context of the use of AI technologies – the concept of technological singularity, when artificial superintelligence technologies self-identify as "persons").

For more than a decade, the subject of regulation in ethical codes has changed. Developers of these systems have moved from the principles of regulating robots as devices to the principles of regulating the development of algorithms, neural networks, the selection, and analysis of input and output data, which take into account the peculiarities of designing and developing such software.

The subject of regulation of ethical codes also takes into account not only recommendations and standards for developers. It declares the implementation of these principles and recommendations for governments to ensure that high human rights standards are met when making decisions on the introduction of AI technologies in the public sector.

The number of stakeholders in the field of technology ethics has expanded. It has gone beyond the ideas of science fiction writers and academic schools. It includes experts from special government groups, technology corporations, industry professional associations, and, starting in 2020, religious denominations. On the one hand, this means that the issue of ethical regulation of new technologies attracts the attention of a wide range of specialists from different fields of knowledge (programmers, engineers, data analysts, philosophers, sociologists, and lawyers), which allows us to find common points of convergence. On the other hand, the absence of binding norms and sanctions that can only be guaranteed by the legal regulation system emphasizes the problem of finding legal mechanisms for transforming ethical norms into legal regulation.

Codes of ethical principles for AI development by the scientific community, governmental groups, international organizations, and corporate entities.

1.1 Codes of ethical principles for AI development: the scientific community.

2016 — United States, *Partnership on AI: Tenets.*

2016 — Principles for Accountable Algorithms.

2017 — International, UNI Global Union, *Top 10 Principles For Ethical Artificial Intelligence*.

2017 — Japan, The Japanese Society for Artificial Intelligence (JSAI), *The Japanese Society for Artificial Intelligence Ethical Guidelines*.

2017 — ACM US Public Policy Council (USACM) *Principles for Algorithmic Transparency and Accountability*.

2017 — University of Montreal, *The Montreal Declaration for a Responsible Development of Artificial Intelligence*.

2017 — Internet Society, *Guiding Principles and Recommendations*.

2017 — United States, Information Technology Industry Council (ITI), *AI Policy Principles*.

2017 — United States, Future of Life Institute (FLI), *Asilomar AI Principles*.

2018 — The Stanford Human-Centered AI Initiative (HAI).

2018 — The Public Voice coalition, established by Electronic Privacy Information Center (EPIC), *Universal Guidelines for Artificial Intelligence*.

2018 — Canada, Centre for International Governance Innovation (CIGI).

Toward a G20 Framework for Artificial Intelligence in the Workplace.

2018 — China, HAIP Initiative, *Harmonious Artificial Intelligence Principles* (HAIP).

2019 — United Kingdom, The Alan Turing Institute, *The FAST Track Principles*.

2019 — China, Tsinghua University (Tsinghua CISS), *Six AI Principles proposed by Mme Fu Ying*.

2019 — China, Youth Work Committee of Shanghai Computer Society, Chinese Young Scientists' *Declaration on the Governance and Innovation of Artificial Intelligence*.

2019 — China, Shanghai Advisory Committee of Experts on Artificial Intelligence Industry Security, *Shanghai Initiative for the Safe Development of Artificial Intelligence.*

2019 — China, Beijing Academy of Artificial Intelligence (BAAI); Peking University; Tsinghua University; Institute of Automation, Chinese Academy of Sciences; Institute of Computing Technology, Chinese Academy of Sciences; Artifical Intelligence Industry Innovation Strategy Alliance (AITISA), *Beijing AI Principles*.

2020 — The Pontifical Academy for Life, Microsoft, IBM, FAO, the Italia

Government, *Rome Call for AI Ethics*.

2020 — New Zealand, the Law, Society and Ethics Working Group of the AI Forum, *Trustworthy AI in Aotearoa: The AI Principles.*

2019 — China, Artificial Intelligence Industry Alliance (AIIA), Joint Pledge on Artificial Intelligence Industry Self-Discipline (Draft for Comment).

2020 — China, Beijing Academy of Artificial Intelligence (BAAI), Peking University, Tsinghua University and the Chinese Academy of Sciences, together with enterprises that focus on AI development, *Artificial Intelligence for Children: Beijing Principles.*

1.2 Codes of ethical principles for AI development: government groups, international organizations.

2018 — Canada, The Treasury Board Secretariat of Canada (TBS). *Seven principles on the use of AI systems in government.*

2019 — United States, *US AI Initiative 2019*

2018 — United States, *Seeking Ground Rules for A.I.: The Recommendations.*

2018 — United Kingdom, House of Lords of United Kingdom, Select Committee on Artificial Intelligence, *AI Code.*

2018 — Japan, Ministry of Internal Affairs and Communications, *Draft AI Utilization Principles.*

2018 — Europe, The European Commission's High-Level Expert Group on Artificial Intelligence, *Draft Ethics Guidelines for Trustworthy AI.*

2018 — Europe, European Group on Ethics in Science and New Technologies, *European Group on Ethics in Science and New Technologies*.

2018 — Japan, *Social Principles of Human-centric AI.*

2019 — Canada, *Responsible use of artificial intelligence (AI): Our guiding principles.*

2019 — Germany, Data Ethics Commission, *Opinion of the Data Ethics Commission: General ethical and legal principles.*

2019 — International, The Extended Working Group on Ethics of Artificial Intelligence (AI) of the World Commission on the Ethics of Scientific Knowledge and Technology (COMEST), UNESCO, *Suggested generic principles for the development, implementation and use of AI.*

2019 — European Commission, *Key requirements for trustworthy AI.*

2019 — Australia, Department of Industry, Innovation and Science, *AI Ethics Principles.*

2019 — United Arab Emirates, *Dubai's AI Principles.*

2019 — International, *OECD Principles on Artificial Intelligence*

2019 — International, G20 Ministerial Meeting on Trade and Digital Economy, *G20 AI Principles.*

2020 — South Korea, The Ministry of Science and ICT (MSIT) and the Korea Information Society Development Institute (KISDI), *National AI Ethical Guidelines (draft).*

2020 — United States, The White House Office of Science and Technology Policy (OSTP), *Principles for the Stewardship of AI Applications.*

2020 — United States, *Principles of Artificial Intelligence Ethics for the Intelligence Community.*

2021 — International, The United Nations Educational, Scientific and Cultural Organization (UNESCO), *The Recommendation on the Ethics of Artificial Intelligence.*

2021 — China, National Governance Committee for the New Generation Artificial Intelligence, *Ethical Norms for the New Generation Artificial Intelligence.*

1.3 Codes of ethical principles for AI development: business and corporations.

2016 — Microsoft, *10 AI rules.*

2017 — IEEE, Ethically Aligned Design (v2): General Principles.

2017 — Intel, *AI public policy principles.*

2017 — IBM, *Principles for the Cognitive Era*

2017 — Sage, *The Ethics of Code: Developing AI for Business with Five Core Principles.*

2017 — DeepMind, *DeepMind Ethics & Society Principles.*

2018 — OP Financial Group, *OP Financial Group's ethical guidelines for artificial intelligence.*

2018 — Baidu, *Four principles of AI ethics*.

2018 (a) — IBM, *Principles for Trust and Transparency.*

2018 (b) — IBM, *Everyday Ethics for Artificial Intelligence: Five Areas of Ethical Focus.*

2018 — Unity's Guiding, *Principles for Ethical AI.*

2018 — ADP, *Ethics in Artificial Intelligence.*

2018 — OpenAI, *OpenAI Charter.*

2018 — Microsoft, *Microsoft AI Principles*

2018 — Tieto, *Tieto's AI ethics guidelines.*

2018 — SAP, SAP's *Guiding Principles for Artificial Intelligence.*

2018 — Deutsche Telekom, *Deutsche Telekom's guidelines for artificial intelligence.*

2018 — Google, *Artificial Intelligence at Google: Our Principles*

2018 — Sony Group, *Sony Group AI Ethics Guidelines*

2019 — IEEE, *Ethical Aspects of Autonomous and Intelligent Systems*

2019 — Vodafone Group, *Vodafone's AI Framework*

2019 — Samsung, *Principles for AI Ethics*

2019 — Megvii, *Artificial Intelligence Application Criteria*

2019 — Sweden, *Telia Company Guiding Principles on trusted AI ethics.*

2021 — Adobe, *AI Ethics Principles.*

1.4 Codes of ethical principles for AI development: specific areas (personal data, law, healthcare, democracy, military).

2017 — The Future Society, Science, Law and Society (SLS) *Initiative Principles for the Governance of AI.*

2018 — GE, *Healthcare AI principles.*

2018 — International, 40th International Conference of Data Protection and Privacy Commissioners (ICDPPC), *Declaration On Ethics And Data Protection In Artifical Intelligence.*

2019 — International, Technology Law Association (ITechLaw), T*he Eight Principles of Responsible AI.*

2019 — Germany, Data Ethics Commission, *Opinion of the Data Ethics Commission: General ethical and legal principles.*

2019 — United States, Department of Defense (DoD) *AI Ethics Principles for DoD.*

2019 — China, National Governance Committee for the New Generation Artificial Intelligence, *Governance Principles for the New Generation Artificial Intelligence-Developing Responsible Artificial Intelligence.*

2020 — Singapore, Personal Data Protection Commission (PDPC), *A compilation of existing AI ethical principles* (Annex A)

2020 — United States, Department of Defense (DoD), *DoD's AI ethical principles.*

2020 — International, United Nations Children's Fund (UNICEF) *Requirements for child-centred AI.*

2021 — The North Atlantic Treaty Organization (NATO), *NATO Principles of Responsible Use of Artificial Intelligence in Defence.*

2021 — International, World Health Organization (WHO), *Key ethical principles for use of artificial intelligence for health.*

2022 — United Kingdom, The Ministry of Defence (MOD), *Ethical Principles for AI in Defence.*

REFERENCES

1. Nikolaeva, O. V. (2022). Doctrinal approaches to the specifics of the civil law regime of works of architecture created using artificial intelligence. National Academy of Law Sciences of Ukraine, 466 p.
2. Perminova, S. O., Sikorsky, I., & Gerega, B. D. (2021). Legal regime of intellectual property objects created with the help of artificial intelligence. Sixtieth economic and legal discussions: materials of the international scientific and practical conference, 82.
3. Kapitsa, Y. M. (2021). Texts, music, images created by artificial intelligence: to determine the model of legal protection. Information and Law, (1 (36), 45-54.

4. Pavliuk, O. (2021). Criteria for the protection of copyright objects created using artificial intelligence technologies: international legal experience. Civil Law and Process, 59.
5. Dubniak, M. V. (2019). Problems of determining the legal regime of objects created using neural network technologies. Information and Law, (4 (31)), 45-53.
6. Kulchii, O. O. (2019). Legal regime of the results of "creative" activity obtained through the use of artificial intelligence. Doctoral dissertation, Ukoopspilka Poltava University of Economics and Trade.
7. Preisner, E.E., Yashina, O.M. (2020). Methods of artificial intelligence in the field of health care. Measuring and computing equipment in technological processes (1), 84-87.
8. Malysheva. N.R., Vinnik, O.M. (2022) Ecology, economy, digitalization: legal problems of interaction. Bulletin of the National Academy of Law Sciences of Ukraine Vol. (29, (2)), 238-260.
9. Markevich, K. (2021) Carbon trace of digitalization. *Razumkov center.Retrieved from* https://razumkov.org.ua/statti/vugletsevyi-slid-tsyfrovizatsii [in Ukrainian].
10. Zavadskyi, A. (2019). The use of artificial intelligence in judicial and law enforcement systems: Ethical Factors, World Experience Comparative and Analytical Law Electronic Scientific Professional Edition of the Law Faculty of the UzhNU, 232.
11. Bugera, O. I. (2021). Using artificial intelligence to prevent crime. Scientific notes of Vernadsky TNU, (6), 71.
12. Karpenko, Y. V. (2019). Ethical principles of artificial intelligence application in public administration. Visnyk of the National Academy of Public Administration. Public Administration Series, (4), 93-97.
13. Hrytsai, D. (2018). The development of artificial intelligence as a new challenge for humanity in the field of employment. Legal Bulletin, (3), 97-102.
14. Balabaniuk, Zh. M. (2021). Labor models of the XXI century: how the paradigm of labor relations will change in the age of digital technologies. Scientific Notes of the University "KROK", (1 (61)), 107-119.
15. Leverhulme Center for the Future of Intelligence (CFI) http://lcfi.ac.uk/about/
16. Institute for Ethics in Artificial Intelligence https://www.oxford-aiethics.ox.ac.uk/about-the-institute
17. Principles of Robotics (2010), EPSRC. https://webarchive.nationalarchives.gov.uk/ukgwa/20210701125353/https://epsrc.ukri.org/research/ourportfolio/themes/engineering/activities/principlesofrobotics/
18. Towards a Code of Ethics for AI (2017). Department of Computer Science, University of Oxford. https://www.cs.ox.ac.uk/efai/towards-a-code-of-ethics-for-artificial-intelligence/.
19. Mantini A. (2022) Technological sustainability and algorithmic ethics of artificial intelligence. Sustainability. 14 (6) https://doi.org/10.3390/su14063215
20. Ethical guidelines for artificial intelligence research. AI-Ethics: Law, Technology and Social Values. URL: https://ai-ethics.com/research-principles/.

21. Asilomar Principles of Artificial Intelligence (2017) https://futureoflife.org/open-letter/ai-principles/
22. Sage Code Ethics: Developing AI for business with five basic principles (2017). https://www.sage.com/investors/investor-downloads/press-releases/2017/06/27/sage-shares-core-principles-for-designing-ai-for-business/.
23. Google AI Principles (2018) https://ai.google/responsibilities/responsible-ai-practices/?category=general
24. Montreal Declaration on the Responsible Development of Artificial Intelligence (2017). https://www.canasean.com/the-montreal-declaration-for-the-responsible-development-of-artificial-intelligence-launched/.
25. Toronto Declaration: Protecting the rights to equality and non-discrimination in machine learning systems. (2018) https://www.accessnow.org/the-toronto-declaration-protecting-the-rights-to-equality-and-non-discrimination-in-machine-learning-systems/
26. Baidu Four Principles of Artificial Intelligence Ethics (2018) https://www.fonow.com/view/208592.html
27. IBM Everyday Ethics for Artificial Intelligence: Five Areas of Ethical Focus (2018). https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf
28. ADP Ethics in Artificial Intelligence (2018)
29. Samsung Artificial Intelligence Principles (2018) https://www.samsung.com/us/about-us/digital-responsibility/ai-ethics/
30. G20 Artificial Intelligence Principles. Annex 1 (based on OECD principles and recommendations)
31. Ethical Guidelines for Trustworthy AI (2019) https://web.archive.org/web/20200226023934/https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai.
32. Policy and Investment Recommendations for Trustworthy Artificial Intelligence (2019) https://web.archive.org/web/20200226023934/https://ec.europa.eu/digital-single-market/en/news/policy-and-investment-recommendations-trustworthy-artificial-intelligence
33. Rome Call for Ethics of AI, https://www.romecall.org/the-call/
34. Address prepared by Pope Francis, read by His Eminence Archbishop Paglia, President of the Pontifical Academy for Life (2020) https://www.vatican.va/content/francesco/en/speeches/2020/february/documents/papa-francesco_20200228_accademia-perlavita.html
35. Address of His Holiness Pope Francis to the participants of the meeting "The Roman Call", organized with the assistance of the International Renaissance Foundation (2023) https://www.vatican.va/content/francesco/en/speeches/2023/january/documents/20230110-incontro-romecall.html

36. Ethical Standards for Next-Generation Artificial Intelligence (2021) National Committee for the Management of Next-Generation Artificial Intelligence, China. https://ai-ethics-and-governance.institute/2021/09/27/the-ethical-norms-for-the-new-generation-artificial-intelligence-china/
37. Adobe AI Ethics Principles (2021) https://www.adobe.com/about-adobe/aiethics.html
38. UNESCO Recommendation on the Ethics of Artificial Intelligence. (2021) https://www.unesco.org/en/artificial-intelligence/recommendation-ethics
39. Key ethical principles for the use of artificial intelligence for health (2021) World Health Organization (WHO) https://www.who.int/publications/i/item/9789240029200
40. Mittelstadt B. (2019) Principles alone cannot guarantee the ethics of AI (2019) Nature Machine Intelligence/ DOI: 10.1038/s42256-019-0114-4

CHAPTER 4. INFORMATION PSYCHOLOGICAL THREATS AND ARTIFICIAL INTELLIGENCE: LEGAL ASPECTS

GOLOVKO Olha
PhD in Law, senior researcher, senior researcher of the laboratory of the theory of Digital Transformation and Law of the Scientific Center of Digital Transformation and Law State Scientific Institution «Institute of Information, Security and Law of the National Academy of Legal Sciences of Ukraine» senior lecturer of the Department of Intellectual Property and Private Law «Igor Sikorsky Kyiv Polytechnic Institute»
ORCID ID: 0000-0001-8963-6598

Information Psychological Threats and Artificial Intelligence: Legal Aspects.

Introduction.

The paper presents retrospective elements of Ukrainian legislation and a vision of the prospects of the law-making process regarding countering informational and psychological influences. A review of some international legal acts on information security was carried out. Conclusions are made, including taking into account international practice. It was established that the dynamism of the development of the latest technologies, including artificial intelligence, should be taken into account on the basis of the formation of legislation. The need for prevention of threats posed by deep fake technologies, in particular, for political elections and democratic institutions, is emphasized.

Part 1. General Approaches.

The events of recent years, especially after February 24, 2022, in the political and information spheres vividly demonstrate the exceptional significance of contemporary media in the domestic information space. The state's resilience against negative information influences becomes directly dependent on the country's media security, which plays a pivotal role in the information security system. Information resources dominate all components of national security, serving as crucial tactical and strategic assets that cannot be overlooked when making decisions in all areas of state governance (Dovhan 2015).

Some scholars appropriately point out that in matters of ensuring national security in the information sphere, it is essential to consider the need to delineate the information resource, define its legal status and exhaustive list, as well as address the issue of preventive measures in case of potential misuse for criminal or unlawful purposes.

For instance, some researchers note that "national information resources are intended to serve the national interests of Ukraine, protect the information rights of individuals and fundamental freedoms, the interests of society, state authorities, and local self-government bodies, and legal entities of all forms of

ownership. National information resources are the basis for ensuring the sovereignty and information security of the state, serving to address the tasks of Ukrainian economic, scientific, cultural, and other spheres of activity. Components of national information resources include information resources of various ownership and forms of ownership" (Dovhan 2015).

The establishment of legal foundations for information relations can be conditionally divided into three stages. The first stage (1991–1994) was characterized by the creation of normative legal foundations in the information sphere. The second stage witnessed a shift in priorities from informatization to the development of information policy (1994–1998). The third stage, ongoing to this day, involves the formation of policies in the field of building an information society (Bilenska 2016).

Discussions on information security in the Information Society started at the beginning of the 21st century, notably with reference to paragraph 36 of the Declaration of Principles on "Building the Information Society: A Global Challenge in the New Millennium" (also known as the Geneva Declaration) from 2003: "Efforts shall be made to prevent the use of information resources and technologies for criminal and terrorist purposes while respecting human rights." Additionally, emphasis is placed on ethical aspects of IS development, including the prevention of hate speech. According to paragraph 59 of the Declaration, all IS stakeholders should take appropriate actions and enact legislatively mandated measures to prevent the improper use of Information and Communication Technologies, such as unlawful and other acts based on racism, racial discrimination, xenophobia, and related forms of intolerance, hatred, violence, all forms of child maltreatment, including pedophilia and child pornography, as well as trafficking in human beings and their exploitation (Declaration of the Principles 2003).

This theme is also addressed in the Additional Protocol to the Council of Europe Convention on Cybercrime, concerning the criminalization of acts of a racist and xenophobic nature committed through computer systems since 2003 (hereinafter the Additional Protocol to the Convention on Cybercrime). The protocol specifies that national and international law should provide an adequate legal response to the dissemination of racist and xenophobic propaganda carried out through computer systems, and it underscores the need to strike the right balance between freedom of expression and effective measures against acts of a racist and xenophobic nature (Additional Protocol 2003).

Article 10 of the Convention for the Protection of Human Rights and Fundamental Freedoms (hereinafter referred to as the Convention) addresses freedom of expression and the necessity to ensure it in a civilized democratic society. However, the same article also mentions the possibility of limiting this right, especially in the interests of national security, territorial integrity, public safety, the prevention of disorder or crime, the protection of health or morals, etc. (Convention for the Protection of Human Rights 1950). These rights and freedoms take on new nuances in the context of shaping an information society, especially

when it comes to their abuse through information and communication technologies and the need to ensure media security for individuals.

When considering the issue of individual media security, it's worth mentioning the fundamental international document in this field, namely, the Declaration of the Council of Europe on Media and Human Rights (Declaration on Media and HR 1970), which outlines guiding principles for media activity and provides for certain exceptions. Restrictions can be imposed within the limits permitted by Article 10 of the European Convention on Human Rights, as mentioned earlier. Thus, the issue of information-psychological security for individuals falls squarely within the aim of protecting health and morals as objects of legal protection. The current question revolves not so much around the need to criminalize infringements on this object but rather on how to establish a legal mechanism that safeguards against abuse of freedom of speech limitation mechanisms by the state.

Recommendation 2006/962/EC of the European Parliament and the Council (EC) of December 18, 2006, defined, in particular, the ability to use TIC (hereinafter, information society technologies) as one of the important competencies for people in the modern world. It was noted that this skill requires a critical attitude toward information and the responsible use of interactive media (Recommendation on Key Competencies for Lifelong Learning 2006). Based on the mentioned Recommendation, the task of the state was to convey this information to the population in an accessible form.

Thus, to neutralize the effect of internal and external negative media influences, it is necessary to educate a media-literate population, who are taught from school not only how to behave in emergency cases that are dangerous to one's own life or health but also contribute to the formation of a competent user and consumer of information services.

The theoretical concept of information-psychological security in the state's provision of human security, in radically different conditions of the Information Society, should be based on an understanding of the values underlying the worldview of the modern Ukrainian community. Consequently, defining the values that require protection by the state will allow for the determination of further directions in developing the concept of human media security.

Information policy cannot be considered outside the context of information axiology since the hierarchy of values for individuals, society, and the state fills the state information policy with its meaning. Thus, ensuring human security in the information space, especially in the media space, through policy and legal mechanisms is indisputable.

It's worth highlighting the idea of distinguishing national information resources. It is agreed that they are "the cornerstone of information sovereignty, enabling the state to control and regulate information flows. This is the main resource of human activity. In modern scientific research, this resource is considered in two dimensions. In a broad sense, information resources are an important tool and source of social transformation. In a narrow sense, it is the

product of production and exchange, the object of confrontation and rivalry, the raw material for the purposeful (reasonable) socio-economic activity of a person, during which an information (intellectual) product is created and human needs and interests are satisfied" (Dovhan, 2015).

Social relations regarding the collection, processing, storage, transmission, and dissemination of information evolved into influential factors of economic, political, social, and others. Information and the utilization of information resources often serve as effective tools for achieving socially significant goals. However, the ongoing information technology revolution does not only contribute to positive societal transformations. Various forces, including destructive ones, benefit from the fruits of societal progress, leading to the emergence of fundamentally new threats to the existence of individuals, social groups, the functioning of states, and the global community as a whole.

Media resources have increasingly become a means of countering dominant world powers. In these conditions, individual, group, and mass consciousness are increasingly dependent on the activities of the media, the use of which, in the words of Krasnostup H., leads to the emergence of new forms of information dissemination (Krasnostup 2012). This, in turn, gives rise to both new opportunities and new threats in the information sphere.

The scientific value is represented by proposals regarding the expediency of "developing and implementing a new model for ensuring the information security of individuals as consumers of telecommunications services, which is based on the need to balance the interests of the state, society, and individuals in ensuring the information security of each of these entities, as well as the establishment of information law as a comprehensive branch of law" (Sulatskyi, 2011).

In the scientific work of Oliinyk O. titled "Information Security of Ukraine: the Doctrine of Administrative and Legal Regulation," the author, based on a thorough analysis of the Doctrine of Information Security of Ukraine, formulates the theoretical foundation for further systematic characterization of security-related factors such as "risk," "threat," "challenge," and "danger." At the same time, the scholar rightly points out the fundamental shortcomings of this document, as he believes that the Doctrine does not address important aspects of ensuring the information security of Ukraine (Oliinyk 2013).

Thus, the analysis of the cited publications provides grounds for the conclusion that the threat to the secure existence of individuals in the media space is a destructive factor that poses a danger to their existence, functioning, and development.

Real threats to an individual's media security are those that can be considered realistically possible and can occur at any moment. Potential threats, on the other hand, are those that can be realized under certain conditions. This is because the likelihood of an event occurring is determined not only by the fact that it can happen at any time but also by the probability of its occurrence. Threats and dangers to individuals in the media space have been the subject of research by

many scholars. However, the essence of this concept and its relationship with threats to the information security of the state has only been briefly considered by leading scientists.

In the Decision of the National Security and Defense Council of Ukraine (NSDC) dated April 28, 2014, titled "On Measures to Improve the Formation and Implementation of State Policy in the Field of Information Security of Ukraine," terminology related to cybersecurity is employed in the context of:

a) Enhancing control over compliance with legislation concerning information-psychological and cyber security.

b) The necessity of preparing a draft Strategy for Cybersecurity in Ukraine (Decree of the President of Ukraine 2014).

In our opinion, the use of military weaponry in the eastern part of our country has resulted from the utilization of, among other things, information-psychological warfare. Therefore, we believe that the state has now clearly seen the results of waging an information war (Golovko 2014). As a consequence, the full-scale invasion of the Russian Federation into Ukraine became possible because this state had done a lot to make most russians believe in the possibility of success and the expediency of this invasion.

Before the full-scale invasion, projects on Information Security Concepts were developed. Among the main threats to national security in the information sphere, informational and armed aggression by the Russian Federation against Ukraine was identified. In this project, it was noted that the challenges and threats to national security in Ukraine and the international security system stem from the extensive use of Russia's information space, media, and modern communication technologies to disseminate distorted and false information with manipulative and unlawful intent.

Information-psychological operations from the Russian Federation, notably in propaganda, utilize not only general socio-cultural components but also the linguistic factor—the fact that over 90% of Ukraine's population understands the Russian language, which opens practically unlimited possibilities for destructive influence.

In Russian-produced films, even before the full-scale invasion, Ukrainians were often portrayed negatively. In the film "Brother 2," characters repeatedly refer to Ukrainians as "khokhly" and use derogatory terms towards them. In the film "Match," negative characters inexplicably speak in the Ukrainian language and wear blue and yellow armbands. This concept of spreading a sense of inferiority among Ukrainians has been observed for quite some time and has become more active in recent years in Russian cinema, falling under the category of "gray" propaganda. Deliberate information-psychological operations of an anti-Ukrainian nature are carried out through the development, production, and dissemination of negative information and psychological influences. Special means and methods of this nature are capable of subconsciously limiting the freedom of choice for communities. Mass media influence on a broad audience is successfully achieved through the entertainment industry. Such productions block

the ability to analyze and think critically, vividly convey information through emotions, and make it easily digestible.

The wide use of Internet resources in the media space also contributed to destructive propaganda by the Russian Federation. At the same time, both existing and specially created Internet resources were and are being used. The vast majority of such resources are located outside of Ukraine on foreign servers, retaining only belonging to the Ukrainian segment of the global network.

In response to the purposeful and aggressive influence of Russian propaganda, Presidential Decree No. 133/2017 of May 15, 2017 enacted the National Security and Defense Council of Ukraine (the NSDC) decision of April 28, 2017 "On the application of personal special economic and other restrictive measures (sanctions)" regarding a number of companies of the Russian Federation (Decree of the President of Ukraine 2017).

According to the information contained in the annex to the NSDC decision, it is proposed to block the assets of the Russian sites "VKontakte," "Odnoklassniki," "Yandex" for a period of three years and to prohibit Internet providers from providing access to the specified resources.

As shown by the research on news consumption from 2017 and 2018, the dynamics of Ukrainians' use of pro-russian sources of information and trust in them decreased, and the Decree rather accelerated this process. Considering this and the destructive influence that Russian media has on users in the long term, it can be confidently stated that this decree was a strategically correct decision (Survey 2017; Survey 2018). It made it possible to disconnect the majority of the population of Ukraine from Russian disinformation in the media.

Furthermore, in order to protect its citizens from the negative impact of information-psychological operations and ensure national security, the state should be responsible for creating conditions (such as specialized courses and government programs in schools, colleges, and universities) that enable the population to acquire the skills to recognize and respond to such influence, particularly in the media space. It’s about well-known measures of media literacy education.

It is worth emphasizing that before the widespread use of AI, it was more about fact-checking skills. At present, the discussion appears in the plane of ethical and legal use of AI, which should ensure the law-makers.

Back in 2002, a well-known scientist in the field of information law, Baranov A., noted that the fusion of radio, television, and Internet technologies will allow consumers to satisfy their information requests at a higher level. This convergence will lead to the emergence of new types of mass communications (Baranov 2002). However, we can already see other processes, such as the use of artificial intelligence to generate information, images, and even videos. We propose to consider this aspect in more detail, for example, the use of artificial intelligence technologies to create disinformation, influence political processes and democracy in general.

Representatives of ESTF are working to counteract disinformation attacks from Russia and disseminate real facts among people in EU countries and Eastern Partnership countries. So, now they continue working with disinformation reviews and delivering professional journalistic materials about the war in Ukraine. I believe, this activity of strategic communication is highly important now. This European initiative helps to show the world how the Russians manipulate facts and try to deliver the wrong opinion about Ukraine.

Thanks to ESTF, examples of propaganda and disinformation are collected. This is the evidence of crimes that caused hate crimes against Ukrainians, first of all. Unfortunately, during this war, we've already seen the result of systematic hate speech in Russian media. So, hate crimes against the whole nation are caused, in most examples, by hate speech in Russian media.

European colleagues pay attention to this huge problem and try to prevent it before the active phase of the war in 2022. Now ESTF is working with russian content to reveal the lies in the media space of the aggressor. For example, they provide fact-check about russian disinformation about food insecurity. Russian media shows this problem not through the prism of this war and blocking Ukrainian ports in the Black Sea but through the sanctions against Russia. Of course, this is one of the numerous examples of how Russia tries to manipulate the minds of its citizens and people in the world in general. There is an awful situation with the free, independent media, so we can draw the conclusion that it's a straight way to be an ordinary dictatorship. Fact-checks from EU initiatives help to fix it so, hopefully, lawyers can use it in the future to make all people who deliver propaganda responsible for their actions.

The last legal news in this sphere from the EU is about the adoption of the strengthened Code of Practice on Disinformation. It has been signed and presented on June 16, 2022 (Code of Practice on Disinformation 2022). The new Code aims to achieve the objectives of the Commission's Guidance presented in May 2021 by setting a broader range of commitments and measures to counter online disinformation (Guidance 2021).

Part 2. EU legislation on artificial intelligence.

Provisions of this Guidance underline that "the strengthened Code should take into consideration the transparency obligations for AI systems that generate or manipulate content and the list of manipulative practices prohibited under the proposal for the Artificial Intelligence Act." For example, there are some views among academics who recommend adding a procedure that enables the Commission to broaden the list of prohibited AI systems and propose banning existing manipulative AI systems (e.g., deep fakes), social scoring, and some biometrics. Also, AI systems presenting 'limited risk', such as systems that interact with humans (i.e., chat bots), emotion recognition systems, biometric categorization systems, and AI systems that generate or manipulate image, audio, or video content (i.e., deep fakes), would be subject to a limited set of transparency obligations (Artificial Intelligence Act 2023).

There is no single EU legislative act that regulates all matters related to the use of artificial intelligence (AI). Currently, there are several regulatory acts related to AI. The main ones are the following acts:

1. General Data Protection Regulation (GDPR): While GDPR does not specifically address AI, it establishes rules for the collection, processing, and storage of personal data, which are relevant to AI systems that involve the collection of personal data (EU Regulation 2016).
2. Directive 2000/31/EC (E-Commerce Directive)
3. Regulation (EU) 2022/2065 on the Single Market for Digital Services and Amendments to Directive 2000/31/EC.
4. EU Regulation 2022/1925: This regulation, proposed by the European Commission in December 2020, was signed by the European Parliament and the Council of the EU in September 2022 and came into effect on November 1, 2022. These regulations provide the foundational principles for the design of AI systems and their operation. The creation of a separate law does not negate the need to rely on these legislative acts, as they lay the groundwork for the interaction of legal entities within the EU in the context of digital transformation.

In April 2021, the European Commission proposed a regulation that establishes rules for the development and deployment of AI in the EU. The proposal includes provisions regarding high-risk AI systems, transparency, accountability, and human control over such systems.

Of particular importance is the draft directive of the European Parliament regarding the adaptation of non-contractual civil liability rules to AI (AI Liability Directive 2022). Special attention is given to the issue of access to information about AI systems, especially those characterized as high-risk AI systems, which may pose a higher likelihood of causing harm. According to this draft, it is an important factor in determining the possibility of claiming compensation and justifying such claims. In addition, separate requirements are proposed for the registration and provision of additional documentation for such AI systems. However, this does not grant the injured party access to this information. Therefore, it is advisable to establish rules for disclosing relevant information by those who have such AI systems at their disposal in order to protect the rights of the affected individuals and establish liability.

It is evident that this Directive project reflects the proposed EU legislation on AI (Artificial Intelligence Act 2021). This legislative initiative requires a separate legal analysis, but it cannot be left unmentioned in the context of the overview section on EU legislation on AI.

In the legislative acts of the EU in 2022 and amendments to current laws, the use of AI systems is somehow foreseen. For example, according to Article 4 of the Digital Decade Policy Program by 2030 (EU Decision 2022/2481 of December 14, 2022), digital transformation of businesses envisions that at least 75% of EU enterprises should engage in one or more of the following areas or use them in their activities, in line with the purpose of their economic activity:

- Cloud computing services.

- Big data.
- Artificial intelligence (the Digital Decade Policy Programme 2022).

It is evident that by announcing such a percentage of involvement of these technologies, the active development of the legislative framework is anticipated. First and foremost, this concerns the protection of human rights and freedoms.

Overall, the EU legislative initiatives regarding AI systems focus on the implementation of the following ethical and legal restrictions.

Prohibition of using artificial intelligence to create systems that can harm humans. A separate issue is the prohibition of using AI systems for surveillance. Exceptions include cases where it is permissible and justified within the framework of ensuring security and combating crime in compliance with EU or national laws of member countries.

Prohibition of using artificial intelligence for discrimination based on race, gender, nationality, religion, disability, or age.

The obligation is to ensure the transparency of AI systems so that users can understand how these systems make decisions. This includes the obligation of developers or those implementing a specific AI development to disclose that it operates "based on artificial intelligence." Another aspect of this issue is the obligation to provide access to documentation related to the development and operation of such systems, as well as access to the data used for training a particular AI system. In our opinion, a separate challenge for legislators should be access to certain sources of information by AI, with subsequent marking as official, reliable, accurate, complete, and objective. In essence, AI algorithms should be capable of fact-checking.

This naturally leads to a separate set of mandatory rules for using AI systems regarding the clear definition of responsibility for their use (who, for what actions, what type of liability in terms of legal liability varieties, and whether this liability should be joint, subsidiary, or purely personal).

Establishing requirements for the quality and reliability of AI systems, as well as requirements for the qualifications and training of individuals involved in the development and use of these systems. In our opinion, this should also include the legal competence of employees within the necessary limits to support the operation of such systems.

It is worth noting that the above-mentioned AI projects may be supplemented and submitted for consideration and approval to the European Parliament in an even more modified form. However, even the study of the drafts of these acts lays the foundations for the development of a fundamentally new stage in national legislative systems.

Part 3. Deepfakes as a new threat to democracy.

All these measures and new legislative initiatives have become necessary in connection with the increase in the number of abuses of AI technologies in order to gain leverage over political processes or undermine democratic institutions in various countries. The most well-known example of deepfake is

related to COVID-19, or rather to a certain interpretation of this topic, with the disclosure of a video image of a public figure and the abuse of AI technologies. This refers to the example of the 2020 deepfake where former Belgian Prime Minister Sophie Wilmes gave a fake speech about the link between COVID-19 and climate change (XR Belgium posts deepfake of Belgian premier 2020). It was censored by Extinction Rebellion. This video was widely shared on social networks. Critically, at least some users were fooled into thinking the video was real. Some doubted the authenticity of this speech, however, the trust in the representatives of the authorities was somehow undermined, because it became clear that the state was not ready for new technological challenges. The effectiveness of debanking such videos does not solve the problem, because technologies are developing and over time such videos may become more and more.

Another vivid example of a deepfake is a video posted at the beginning of Russia's full-scale invasion of Ukraine (Deepfake Video of Volodymyr Zelensky 2022). The quality of this video immediately raised serious doubts about its realism, but still, it was in the history of this war. Previously, on March 2, 2022, the Ukrainian Center for Strategic Communications warned about the threat of a disinformation campaign with videos generated by neural networks, where it predicted that the enemy could publish a video in which a deepfake of President Volodymyr Zelensky recognizes the surrender of Ukraine (Center for Strategic Communications and Information Security 2022). We completely agree that "modern techniques such as deepfake are best suited for ... predictable moments of public uncertainty" as war or situation with COVID-19 (Watts & Hwang 2020).

It is important to note that posting deepfakes on YouTube is prohibited by YouTube rules. However, there are exceptions, provided that such content is posted for the purpose of exposing or disproving misleading information that violates the Community Guidelines. It was this deep fake of Zelensky that was published on the YouTube channel "The Telegraph", and it was accompanied by a disclaimer that this content was falsified. The disclaimer was in the description, and the video itself was labeled.

Another illustrative story of using automated systems and decision-making algorithms is the Australian case of the "Robodebt" program (BBC 2020). It automated the assessment and collection of debts by employing an algorithm that compared the data of welfare recipients with income information from the tax office. However, flaws in this algorithm led to a situation where citizens received debt notices they didn't actually owe. This situation damaged the government's reputation and eroded public trust in the state's social services management system.

Examples like this and others recently have many experts asking questions about how to ethically use artificial intelligence and algorithms in decision-making. Such issues require the complex interdisciplinary work of many specialists, based on the results of which new laws and ethical codes should be implemented, which will be able to prevent violations of human rights and the

foundations of national and international security in the conditions of the appearance of qualitatively new technologies that can generate their own decision-making algorithms.

Thus, it can be stated that the use of deep fake can be used to implement a criminal intent to change electoral preferences and the impact of deep fake on general trust in elections and democratic institutions. Such actions should be criminalized for the person or group of persons who create such content, and the use of deep fake technologies should be criminalized in doing so. At the same time, online platforms within which such content is distributed also require certain restrictions. As we can see, there are already examples when these rules are created within the rules of use of the online platforms themselves, in particular, Meta Company.

On the other hand, examples of deep fakes differ in the quality of execution, and accordingly can generate a different degree of trust in such content. Yes, there is an example of such a deep fake, where actor and director Jordan Peele created a video in which former US President Barack Obama discusses the risks associated with misinformation and fake news (ARS Electronica Center 2018). A 2020 study found that about 15% of viewers in a control experiment thought the Obama deep fake was real (Vaccari & Chadwick 2020).

Identification of such content may be difficult, given the possibilities of improving this technology and its availability. Deep fake technology is accessible and can be utilized by anyone with a personal computer or smartphone and internet access. This accessibility makes this threat particularly alarming because, after creating and disseminating video clips, they can be quickly re-uploaded. They are virtually impossible to remove from the Internet (even if they are false).

From a private law perspective, there are mechanisms that allow individuals affected by deep fakes to file personal complaints to have the deep fake removed and seek compensation for any damages or injuries they have suffered. These are, in particular, defamation cases. However, it is important to note the need for more specific legislative regulations (and fight against) deep fakes, including public figures.

Protection against deep fakes cannot be left solely to the social networks on which they spread. Although, as mentioned earlier, some platforms have developed policies to debunk deep fakes (Holmes 2020). However, even if a video is removed by a platform, this does not necessarily counteract the harm, and without legal grounds for social media coercion, the victim cannot demand a retraction or public acknowledgment that the video was fake. Moreover, the original source of placing a fake may not be a specific social network.

It is important to note that deep fakes can be used as a form of parody or satire or to educate the general public about the threat of fake news. In addition, politicians can use deep fakes to create videos of themselves speaking different languages in an attempt to attract more voters. Laws purporting to prohibit the creation or distribution of political deep fakes would affect these legitimate uses of the technology.

Therefore, laws that limit the publication and distribution of deep fakes can be interpreted as limiting the freedom to use modern technological solutions. Therefore, any laws that prohibit the creation or distribution of deep fakes must be compatible with and properly adapted to the legitimate purpose of such a restriction.

It should be noted that there is an urgent need to regulate disinformation and deep fake technologies. At the same time, it is extremely important to maintain a balanced approach so as not to limit freedom of speech and not to violate democratic institutions. There is a need for careful legal regulation of these technologies and ensuring a balance between the protection of democracy and freedom of speech, taking into account the impossibility of limiting access to the latest technologies in a modern democratic state.

Therefore, there is a need to respond to the threat posed by deep fake technologies, in particular, to democratic institutions, but it is important to maintain a balance in the regulation to avoid excessive restrictions on freedom of speech and to maintain trust in democratic processes.

REFERENCES

1. Dovhan, O. (2015). Information Resources: National and State, Content, Concepts. Information and Law, 3(15), http://ippi.org.ua/sites/default/files/dovgan.pdf [in Ukrainian].
2. Bilenska, D. (2016). Administrative-Legal Regulation of Information Relations in Ukraine (Doctoral dissertation, National University named after Yaroslav the Wise, Kharkiv). 201 pages [in Ukrainian].
3. Declaration of the Principles of "Building the Information Society: A Global Challenge in the New Millennium" (International Document, December 12, 2003, No. 995). Geneva, 2003, https://old.apitu.org.ua/wsis/dp.
4. Additional Protocol to the Council of Europe Convention on Cybercrime Concerning the Criminalization of Acts of a Racist and Xenophobic Nature Committed Through Computer Systems (International Document, January 28, 2003, No. 994_687). Official Gazette of Ukraine, 2010, No. 56, Art. 2202, http://zakon4.rada.gov.ua/laws/show/994_687
5. Convention for the Protection of Human Rights and Fundamental Freedoms (International Document, November 4, 1950, No. 995_004), http://zakon2.rada.gov.ua/laws/show/995_004
6. Declaration on Mass Communication Media and Human Rights (1970), http://assembly.coe.int/nw/xml/XRef/Xref-XML2HTML-en.asp?fileid=15842&lang=en
7. Recommendation of the European Parliament and of the Council on Key Competences for Lifelong Learning (EU Recommendation, December 18, 2006, No. 2006/962/EC), http://zakon5.rada.gov.ua/laws/show/994_975.

8. Krasnostup, G. (2012). New Media: Formation and Prospects of Legal Regulation. Information and Law, 2(5), http://ippi.org.ua/sites/default/files/12kgmppr.pdf [in Ukrainian].
9. Sulatskyi, D. (2011). Organizational-Legal Foundations of Ensuring Information Security of the Individual as a Consumer of Telecommunication Services (Doctoral dissertation, International University of Business and Law, Kherson). 290 pages [in Ukrainian].
10. Oliinyk, O. (2013). Information Security of Ukraine: Doctrine of Administrative-Legal Regulation (Doctoral dissertation, Institute of Legislation of the Verkhovna Rada of Ukraine, Kyiv). 34 pages [in Ukrainian].
11. Decree of the President of Ukraine "On Measures to Improve the Formation and Implementation of the State Policy in the Field of Information Security of Ukraine" (Official Document, May 1, 2014, No. 449/2014). Official Gazette of Ukraine, 2014, No. 37, Art. 28.
12. Govolko, O. (2014). The Right to a Safe Information Environment in the Context of Human Rights. Legal Informatics, 4(44), 79-85 [in Ukrainian].
13. Project of the Concept of Information Security of Ukraine (Ministry of Information Policy of Ukraine, June 9, 2015), http://mip.gov.ua/documents/30.html (Accessed: June 18, 2015).
14. Decree of the President of Ukraine "On the Application of Personal Special Economic and Other Restrictive Measures (Sanctions)" (Official Document, May 15, 2017, No. 133/2017), http://www.president.gov.ua/documents/1332017-21850 [in Ukrainian].
15. Survey: Attitude of the Population Towards Mass Media and Consumption of Different Types of Media in Ukraine (2017), https://internews.in.ua/wp-content/uploads/2017/09/USAID_Internews_2017MediaConsumSurvey_Full_UKR.pdf
16. Counteraction to Russian Propaganda and Media Literacy: Results of an All-Ukrainian Public Opinion Survey (2018), https://detector.media/infospace/article/136017/2018-03-27-protydiya-rosiyskiy-propagandi-ta-mediagramotnist-rezultaty-vseukrainskogo-opytuvannya-gromadskoi-dumky/ [in Ukrainian].
17. Baranov, A. (2002). Digital Legislation, https://zn.ua/ECONOMICS/tsifrovoe_zakonodatelstvo.html [in Ukrainian].
18. The Code of Practice on Disinformation (2022), https://digital-strategy.ec.europa.eu/en/policies/code-practice-disinformation
19. Guidance on Strengthening the Code of Practice on Disinformation (2021), https://digital-strategy.ec.europa.eu/en/library/guidance-strengthening-code-practice-disinformation
20. Artificial Intelligence Act (2023), https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf
21. Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the Protection of Natural Persons with Regard to the Processing of Personal Data and on the Free Movement of Such Data, and Repealing Directive 95/46/EC (General Data Protection Regulation), http://data.europa.eu/eli/reg/2016/679/2016-05-04

22. Regulation (EU) 2022/2065 of the European Parliament and of the Council of 19 October 2022 on a Single Market for Digital Services and Amending Directive 2000/31/EC (Digital Services Act), http://data.europa.eu/eli/reg/2022/2065/oj
23. Regulation (EU) 2022/1925 of the European Parliament and of the Council of 14 September 2022 on Contestable and Fair Markets in the Digital Sector and Amending Directives (EU) 2019/1937 and (EU) 2020/1828 (Digital Markets Act), http://data.europa.eu/eli/reg/2022/1925/oj
24. Directive of the European Parliament and of the Council on Adapting Non-Contractual Civil Liability Rules to Artificial Intelligence (AI Liability Directive) (2022), https://commission.europa.eu/system/files/2022-09/1_1_197605_prop_dir_ai_en.pdf
25. Regulation of the European Parliament and of the Council Laying Down Harmonized Rules on Artificial Intelligence (Artificial Intelligence Act) and Amending Certain Union Legislative Acts (2021), https://artificialintelligenceact.eu/the-act/
26. Decision (EU) 2022/2481 of the European Parliament and of the Council of 14 December 2022 Establishing the Digital Decade Policy Programme 2030, http://data.europa.eu/eli/dec/2022/2481/oj
27. XR Belgium Posts Deepfake of Belgian Premier Linking Covid-19 with Climate Crisis (2020), https://www.brusselstimes.com/106320/xr-belgium-posts-deepfake-of-belgian-premier-linking-covid-19-with-climate-crisis
28. Deepfake Video of Volodymyr Zelensky Surrendering Surfaces on Social Media (2022), https://www.youtube.com/watch?v=X17yrEV5sl4&ab_channel=TheTelegraph
29. Center for Strategic Communications and Information Security (2022), https://www.facebook.com/StratcomCentreUA/posts/pfbid02ddoeR3D5ktpfir3XWQLLa9MTC2XUmmh3MswpDEy15UwWoT7f6GNAVCqwxbBtRPwLl
30. Watts, C., & Hwang, T. (2020). Deepfakes Are Coming for American Democracy: Here's How We Can Prepare. The Washington Post, https://www.washingtonpost.com/opinions/2020/09/10/deepfakes-are-coming-american-democracy-heres-how-we-can-prepare
31. BBC (2020). Robodebt: Illegal Australian Welfare Hunt Drove People to Despair, https://www.bbc.com/news/world-australia-66130105
32. ARS Electronica Center (2018). Obama Deep Fake, https://ars.electronica.art/center/en/obama-deep-fake/
33. Vaccari, C., & Chadwick, A. (2020). Deepfakes and Disinformation: Exploring the Impact of Synthetic Political Video on Deception, Uncertainty, and Trust in News. Social Media and Society, 6 (1).
34. Holmes, A. (2020). Facebook Just Banned Deepfakes, but the Policy Has Loopholes – And a Widely Circulated Deepfake of Mark Zuckerberg Is Allowed to Stay Up. Business Insider, https://www.businessinsider.com/facebook-just-banned-deepfakes-but-the-policy-has-loopholes-2020-1

RS Global

DIGITAL TRANSFORMATIONS OF SOCIETY: PROBLEMS OF LAW

Monograph

Edited by
Oleksandr BARANOV, Oleksii KOSTENKO,
Mariia DUBNIAK, Olha GOLOVKO

Published 11.03.2024.
Typeface Times New Roman.
RS Global Sp. z O.O., Warsaw, Poland, 2024
Numer KRS: 0000672864
REGON: 367026200
NIP: 5213776394

DIGITAL TRANSFORMATIONS OF SOCIETY: PROBLEMS OF LAW

RS Global

Publisher:
RS Global
Dolna 17, Warsaw,
Poland 00-773
https://monographs.rsglobal.pl/
Tel: +48 226 0 227 03
Email: monographs@rsglobal.pl