The Transformation of Social Relationships in Industry 4.0

ECONOMIC SECURITY AND LEGAL PREVENTION

Agnessa O. Inshakova | Evgenia E. Frolova

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ECONOMIC AND LEGAL REGULATION OF TECHNOLOGICAL FORMATION OF THE INDUSTRY 4:0 AND INTERNATIONAL INTEGRATION OF THE RUSSIAN FEDERATION

PREFACE

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The dynamics of scientific and technological development of modern society is characterized by high development rate, is accompanied by digital economy algorithmization and acts as a trigger of the appearance of new relations and the transformation of existing public relations, in which borders between material, digital, biological worlds gradually disappear giving rise to the objective need for the complex social and economic and institutional transformations in the society requiring the respective legal basis. The modern communication and technical aspects of deep reconstruction of goods production, work implementation, service provision, that are, at the same time, challenges for investigators for various fields of science are called the fourth industrial revolution, or Industry 4.0. The modern scientific literature uses the term "fourth industrial revolution" for global processes of a radical change of conventional methods and forms of economic management related to mainstreaming of innovative technologies, such as artificial intelligence, Internet of things, unmanned transport vehicles, robotized systems, big data, etc. This term is not new, although it gained popularity in a slightly modified form in 2011 when it was called "Industry 4.0" at Hannover Industrial Fair. According to the World Economic Forum, Industry 4.0 unites digital, physical, and

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages xi–xix.

biological systems. The number of foreign countries (Germany, Japan, USA, the UK, France, etc.), striving to start work aimed at solving issues of the fourth industrial revolution, related to the wide commissioning of digital technologies and cyber-physical systems, took the respective strategic programs.

In 2017, in Russia, statutory documents establishing the prospects of this direction were also adopted: Action Plan ("road map") Technet (advanced manufacturing technologies) of the National Technical Initiative, Strategy of the Information Society Development, "Digital Economy in the Russian Federation" programme.

According to the report of World Economic Forum (WEF) on global competitive ability 2018, Russia held 43 position of 140. Attention should be paid to the fact that at the assessment of the specific country position, a new indicator was taken into account—Global Competitiveness Index 4.0 introduced in connection with the emergence of new growth indicators in conditions of the fourth industrial revolution. At this, according to these reports, the improvement of a position in a global rating is conditioned, inter alia, by the widespread introduction of information and communication technologies directly related to "Industry 4.0."

It is seen that the context of revolutionary transformation includes game-changing technologies the study of which is the subject matter of this book in terms of modern economic and legal sciences. In the process of the book section 1 preparation, the authors' team took into account the fact that the establishment of a new technology revolution (TR) defines an innovative vector of global economic development and dynamics and nature of structural shifts in the economics of countries and regions. The key factor of structural changes in the economy is technological shifts caused by the scientific and technical progress, the modern stage of which is related to the development of convergent technologies representing the mutual impact and mutual penetration of groups of nano-, bio-, info-, cognitive—(NBIC)—and socio-humanistic—(NBICS) technologies forming the core of a new TR and determining the structural and dynamic processed in economic systems appearing on any levels. For this reason, it is highly important to understand the essence of convergent technologies and the process of convergence of technologies, basic transformation processes accompanying the transition from the fifth to the sixth technology revolution (see Chapter 1).

The authors analyzed the main approaches to construction of the content structural shifts, gave the systematic representation of the mechanism of their formation in conditions of development of convergent technologies, supplemented the category apparatus of studying structural shifts with such characteristics as power, pulse, the voltage of structural shifts. Structural shifts in the study are grouped by the following criteria: object (changes in the branch structure, changes in the economic system in the whole) and factors contributing to structural shifts (change of technologies, consumer priorities, gain of knowledge volume).

Due to the study of the existing characteristic structural shifts in the economic science, such as weight, rate, index, intensity, rigidities, reflecting the dynamics of the element-specific weight in the structure, in the study conducted, the authors

managed to obtain the quantitative characteristic of structural shifts without the regard of the impact of the technological development factors determining the new conditions and trends of economic systems development. Conclusions were made on the reasonability of widening the composition of the structural shifts' features that were taken into account by the offered characteristics (see Chapter 2).

Systemic generalization and structurization of the methods assessing qualitative and quantitative features of structural shifts are carried out. Based on the vast methodic basis of assessing structural shifts in economic models, the authors differentiate them by the degree of diversity and vary the use in accordance with the study tasks. Advantages and disadvantages of the methods of structural shifts estimation are revealed. The use of the certain method is made dependent on the properties of the object studied and availability of the information about it (see Chapter 3).

The method of recording the impact of convergent technologies on structural shifts in economics and the system of indicators characterizing the transformation processes in conditions of developing technologies that formed a basis for the econometric analysis of the interaction of authors' characteristics of structural shift pulse and voltage are studied. The authors offered a system of indicators analyzing structural shifts in economics caused by the impact of convergent technologies (see Chapter 4).

The results of assessing structural shifts in the economics of developed and developing countries emerging in conditions of convergent technologies and innovative activity development are analyzed. Formation of convergent technologies is one of the conditions for the economy transition to the new technology revolution. It is justified that, influenced by scientific and technical progress, cyclical development of the economy and the line of other factors, branch structure undergoes qualitative and quantitative changes(see Chapter 5).

The special feature of deployment of the new industrial revolution in Russia is that the active implementation of Industry 4.0 technologies into the economic activity is carried out in conditions of the need for overcoming the consequences of technological multi-structurality of Russian economics and the complete absence of the respective regulation basis, including that taking into account their possible risks and needs connected with the specifics of production use of each separate technology. This circumstance is conditioned by the fact that the processes of modernization of legal regulation of public relations in Russia are considerably behind and demonstrate less dynamics in comparison to the development and implementation of 4.0 technologies 4.0 into the functional activity of entrepreneurial and public structures. Along with that, the provision of global economic competitive ability of Russia on the new technical and technological, informational and institutional basis causes the emergency to remove such disproportion because the gaps existing in the current Russian legislation act as negative institutional factors of inhibition of neo-industrialization processes in our country. In this re-

gard, studying the mechanism of economic and legal regulation of information and technical development at the stage of building Industry 4.0 carried out on the interdisciplinary basis is timely and allows obtaining the most reliable results due to the interdisciplinary complex approach to the implementation of research works belonging to different fields of scientific knowledge but having the common goal—maintenance and provision of scientific and technological initiative in the field of economic, first of all, entrepreneurial turnover. Such study is required to create an efficient system of business entities interaction in terms of sustainable functioning of the economic system of the Russian Federation and a set of preventive measures providing the minimization of infringement of their rights and legal interests, and, in the whole, meeting the objectively existing needs of economic and legal regulation of technologies in the fourth industrial revolution period.

Specialists in the field of international law pay attention to the issues of current legal basis of human rights, emerging as the result of the economy digitalization, including the use of crypto currencies. The need for creating a legal basis is considered with regard of the world experience, in particular, integration regional associations. Specialists in international affairs also pay attention to the danger of damaging the environment by using new technologies of the sixth technology revolution that, on the contrary, will be more oriented at the environment preservation. For this reason, the book provides an analysis of foreseeable changes in international mechanisms of human environmental rights protection in conditions of intensive development of the sixth technology revolution. Three directions of development of human environmental rights protection on the international level and various examples from the modern international and leal practices are given. The authors note the intensive coding and fast development of international law in the field of protection of human environmental rights, that both inspires and proves that the international community realizes the horrible level of environmental degradation. Moreover, international environmental law and international human rights are dynamically developing. However, on the other hand, there is an apprehension of fragmentation and contradiction appearing in construction of numerous agreements regulating (directly or indirectly) the protection of human environmental rights (see Chapter 21).

The Section II, with regard to the complexity and novelty of the subject area set, the issues of top priority for legal science that should be solved during the studies are the determination of leading principles, the subject, the object and the methodology of legal regulation (see Chapters 6, 7, 10, 11, 15, 19). An issue connected with formation, specification and supplement to the category apparatus of legal regulation of Industry 4.0 technologies, is related to these issues. In addition, in terms of legislation, each technology of Industry 4.0 can be considered a new object of civil rights requiring legislative regulatory actions (see Chapter 19). With that, relations appearing with their implementation and functioning cannot objectively develop without conflicts that is respectively reflected on the rights and obligations of the entities the economic activity of which has them involved

(see Chapters 6, 7, 12, 13, 14, 17, 29, 30). Issues of interaction of new technologies and global trade globalization, the effect of these processes on national court systems and conventional principles of court proceedings in national courts are studied (see Chapters 6, 7).

The complex issue established by the scientific team cannot be studied exclusively by specialists of one field of humanities. The break and lack of a dialogue between the scientific teams of interindustry and interdisciplinary attribute within humanities studying information and technical processes of development of public relations in the field of economic turnover and its institutional provision, and ways and means of creating an infrastructure required for this cause the lack of mutual understanding between scientists whose work has the same direction in global terms and prevent from reaching the maximal effect from the results obtained. In part, the lack of mutually agreed actions of scientific teams is an arresting factor of scientific and technological development. For this reason, the main objective of an interdisciplinary and interindustry project is developing the conceptual basis of economic-legal regulation of entities' economic activity that is carried out through the use of innovative information and communication means and digital technologies, or is implemented due to these. Inter alia, the task is set to develop the range of the specific preventive measures of legal pressure for public relations being formed in the new economic conditions and emerging from the use or through the innovative technological developments and characterized by the increased proneness to conflict.

On the level of monograph, education, teaching and guiding papers in Russia and abroad, no joint interdisciplinary studies of economic and legal regulation public relations in conditions of Industry 4.0 in terms of economic safety, legal prevention and information and technical development have been carried out. Contrary to the separate scientific studies of national and foreign authors in which the aspects of pass-through technologies, digitalization, Internet of things, robot techniques regulation ("robot law") are considered in narrow and fragmentary terms, the complex interdisciplinary approach of the scientific team to the study set is innovative. The scientific novelty of the subject and the methodology approach declared are confirmed by the results of monitoring carried out by the members of the authors' teams of the degree of the issue development based on publications made both by Russian scientists and quotation bases and foreign abstract and citation databases of peer-reviewed literature, Scopus / Web of Science Core Collection.

In terms of this project, justification of optimal algorithms of economic and legal regulation with regard to possibilities and potential of convergent, first of all, information technologies, public relations in the period of neo-industrialization and the fourth industrial revolution will become a scientific result of a high degree of novelty. The complex interdisciplinary approach of the scientific team will allow revealing the ways of forming efficient economic models of business entities interaction in conditions of the fourth industrial revolution and developing prior-

ity fields of study and directions of the improvement of the respective legislation at the intense use of possible types and mechanisms of pass-through technologies by business entities in the course of their entrepreneurial activity.

Typical features characteristic for absolutely all Industry 4.0 technologies substantiate their complex influence at modern society development and providing their regulation mechanisms. The dynamics of Industry 4.0 public relations development is necessarily accompanied by forming new social institutes with the unavoidable appearance of failures of various nature that, in their turn, can have a negative impact on rights and obligations of entities the business activity of which is directly related to Industry 4.0 technologies. In connection with this, this project is aimed at solving an issue represented by the lack of conceptual fundamentals of legal regulation of business entities' economic activities in the period of neo-industrialization. In addition, the appearance of new public relations which, by their nature, imminently promote conflicts, also need game-changing approaches to their settlement, in particular, by creating ways of protecting the rights of entities based on Industry 4.0 technologies (see Chapters 14, 25). Along with that, with the purpose to prevent the occurrence of possible conflicts and infringement of rights of business entities in conditions of Industry 4.0, there is a need for creating the preventive measures of legal pressure, that are absent so far (see Chapters 6, 17, 27, 30).

Comparative law is also present in the book. For example, the features of legal regulation of digital technologies for financial service provision in the European Union, USA, China, and Russia are also considered. It is noted that e-banking development brings both benefits (innovations) and challenges (risks of uncontrolled complexity, data leakage and threats to consumer rights), the ways to resolve these issues with regard of the experience of various national jurisdictions are offered (see Chapter 24).

The processes described are also studied in Section III in terms of international economic integration which, in particular, can become a basis for creating an online trade platform in the BRIC countries in the framework of which it is reasonable to include all possible services, including those for dispute resolution. The development of information and communication technologies, the digitalization of relations irreversibly bring the economic interaction in the external turnover to the new level of relations. The objective of cooperation of BRICS countries is, inter alia, the business volume growth. At this, the most deals are concluded on information platforms causing the necessity of creating the uniform legal regulation of such legal relations. Such transformations can considerably increase the stock movement in these countries and increase their investment attractiveness (see Chapters 28, 29).

In addition, the monograph authors disclose the main directions of regulating the protection of the rights of BRICS jurisdictions business entities for the means of their individualization in modern conditions. It is emphasized that neo-industrialization characterized by the sufficient simplification of access of all Internet

users to the information aggravated a problem of original awareness of for-profit organizations. However, in modern conditions, the unique nature of trademarks is essential for the successful entrepreneurial activity conduct. It is noted that the BRICS association legislation that should regulate the relations specified has not been completely formed yet but, according to the experts' estimates, the volumes of trade deals between business entities of the association member states exceed 120 billion USD per year. In connection with this, the main attention is paid to the allocation and disclosure of the main directions of the development of regulation of the protection of rights to the means of business entities individualization in BRIC association. The authors try to resolve this issue based on the use of modern information technologies (see Chapter 22).

The book also highlights some aspects of the problem of regulatory establishment of guarantees on investors' rights and their protection in the regulation of ICO (Initial Coin Offering) as a way to attract investment. Given the supranational nature of the Industry 4.0 model, it is important to create appropriate conditions for investments in the territory of the Eurasian Economic Union (EAEU) and approximation of the laws of the Member States in this area (see Chapter 30).

The aim of this project is filling the existing gaps, both in legal regulation and in theoretical and legal comprehension of processes of transforming public relations in conditions of Industry 4.0. In addition, in our opinion, the issue that is planned to be resolved with the help of this project is of complex theoretical and applied nature, and this will allow us analyzing both the specifics of legal development in conditions of Industry 4.0 and determining positive and negative factors of the fourth industrial revolution influencing the modernization of preventive mechanisms and remedies for business entities in the new economic conditions, determining legal ways and methods of this modernization and formulating the certain offers for improving the existing legislation.

The scientific importance and relevance of solving the issue set is conditioned by the almost full absence of complex economic and legal studies dedicated to the transformation of social relations conditioned by the vast expansion of the fourth industrial revolution, through the spectacle of adaptation to new conditions of the national legislation.

For the time being, the scientific doctrine has no fundamental study dedicated to the analysis of key subjects fields covered by the term "Industry 4.0," that is objectively conditioned by the novelty of relations emerging during the last several years. Today, the subject area considered, due to its novelty, multi-sided nature and width, is of research interest not only to representatives of technical sciences but also to scientists providing the creation of technical development infrastructure, i.e., economists and lawyers. Issues related to the transformation of economic processes in conditions of Industry 4.0 and the economic potential of the latter became the subject of analysis in monographic studies of national economists: Ye.I. Shumskaya, A.V. Trachuk, N.V. Linder, I.V. Tarasov, Ye. V. Rastyannikova, Ye. Lipkin, V. Ya. Belobragin, A.V. Zazhigalkin, T. I. Zvorykina et al. Key challenges

for Russia in connection with the transition to the new technology revolution, possible risk assessment, determination of priority directions of economic policy the implementation of which will allow accelerating the processes of technology transformation, possible consequences of the fourth industrial revolution in the social and humanities area are considered in economic studies published in periodic scientific issues as scientific papers, the authors of which are, in particular: K.A. Gulin, V.V Isaychenkova., G.I. Idrisov, V.N. Knyaginin, N. A. Kosheleva, A.L. Kudrin, A.A. Petrov, A.R. Safilullin, O.A. Romanova, Ye. V. Seryodkina, I.V. Tarasov, V.S. Uskov, N.Yu. Shchetinina, Ye.A. Yumayev et al. The representatives of economic science (L.N. Ivanova, G.A. Tyorskaya, K.B. Kostin) study the rest of interrelated issues, including those of definitive and categorial nature ("growth point," "growth driver"). Monographic studies dedicated to the analysis of possibilities and prospects of development of the fourth industrial revolution in the national and global realia of industrial production: Ye.V. Rastyannikova "BRIC countries on the threshold of the fourth industrial revolution. Mining industry" (Moscow: Institute of Oriental Studies of the Russian Academy of Sciences, 2019), Yevgeniy Lipkin "Industry 4.0: Smart technologies as a key element in the industrial competition" (Moscow: Ostek-SMT, 2017), V.Ya. Belobragin, A.V. Zazhigalkin, T.I. Zvorykina "Technical regulation at the turn of Industry 4.0" (Moscow: Nauchny Konsultant, 2019). In addition, the formation of the project participants' scientific positions in terms of applicable approaches to the essential features of the fourth industrial revolution was especially influenced by papers of foreign economists, doctrinal approaches and opinions of which were reflected in the following scientific papers: K. Schwab, N. Davis "Technologies of the Fourth Industrial Revolution" . Transl. from Eng. M.: Eksmo, 2018 (Top Business Awards). "The fourth industrial revolution and business: competition in singularity." Tjeu Blommaert, Stephan van den Broek; with the participation of Erik Koltof; Transl. from Eng. (Z. Mamedyarova). Moscow: Alpina Publisher, 2019. The legal doctrine has few studies related to the consideration of legal relations transformation in conditions of the shift to Industry 4.0. In particular, there is a line of papers describing the individual aspects of the subject area under consideration. For example, the insights of trends of law transformation in the new conditions, projection of its future state are revealed in the paper by T. Ya. Khabriyeva, N.N. Chernogor "Features of implementing the separate Industry 4.0 technologies into legal practice" are reflected in scientific papers of N.A. Kulikov, L.N. Maslennikova, Neznamov A.V., V.B. Naumov, S.A. Chekhovskaya, A.A. Kartzkhiy Monograph studies analyzing the line of issues directly related to the subject area of this project include:—"Legal regulation of economic relations in modern conditions of e-economy development": monograph. A.V. Belitskaya, V.S. Belikh, O.A. Belyayeva et al.; ed. in chief V.A. Vaipan, M.A. Yegorova. Moscow: Yustitzinform, 2019, 376 p. V.A.Vaipan "Equity theory: Law and economy": monograph. Moscow: Yustitzinform, 2017. 280 p. "Antimonopoly regulation in the digital era. Ways to protect competition in conditions of globalization

and the fourth industrial revolution: digital identity, network effects, digital platforms, big data, multi-sided markets." A. Yu. Tsarikovsky (scientific editor), N. F. Galimkhanova, A. P. Tenishev et al.; ed. by A. Yu. Tsarikovsky, A. Yu. Ivanov and Ye. A. Voinikainis; "Federal Antimonopoly Service, Institute of Law and Development of HSE"—Skolkovo.—Moscow: Higher School of Economics Publishing House, 2018. For recent years, the separate aspects of the subject studied had theses presented for a doctor's degree by occupation 12.00.03.—civil law; business law; family law; international private law: Nesterova N.V. "Features of the know-how legal regimen in terms of Russian, foreign, and international experience" (Moscow, 2018); Khrustaleva A.V. "Electronic money as the civil matter" (St. Petersburg, 2018); Kozinets N.V. "Features of transborder e-trade legal regulation" (Moscow, 2017); in addition, by occupation 08.00.05.—economy and management of the national economy: Archakova S.V. "Innovative environment management in conditions of digital economics" (Voronezh, 2019); Shcherbakov A.G. "Development of the organization and economic mechanism of functioning of high tech enterprises at the implementation of digital technologies" (Moscow, 2019), 08.00.01—economic theory: Ye. I. Shumskaya "Economic potential of the fourth industrial revolution" (Moscow, 2018). Along with that, it should be stated that the studies being carried out in the national and world legal and economic science cover only particular sides of the issue selected by the authors' team. No specific scientific competitors dealing with the development of an issue that, by its content, is identical, or intersects the scientific issue set in this study, were revealed. Along with that, the global science does not exclude the possibility of the appearance of related and sometimes even similar ideas and concepts in various research and scientific teams having no scientific interrelations. In connection with this, precedence in solving the specific scientific issue will depend both on understanding its relevance and the need for development and the rate of certain scientific teamwork.

In connection with this, according to the editors, a study dedicated to the creation of a legal concept of neo-industrial modernization and, in particular, directions and mechanisms of Industry 4.0 technologies development, including preventative measures of collision avoidance due to the use of all types of convergent technologies, is of great scientific and practical importance because it provides the formation of game-changing legislative approaches to solving fundamental and applied tasks in the field under consideration for the next 10 years.

PART I

ECONOMIC STABILITY AND THROUGH TECHNOLOGIES: MONITORING OF STRUCTURAL SHIFTS IN THE PROCESS OF NEO-INDUSTRIALIZATION OF ECOSYSTEMS

CHAPTER 1

CONVERGENT TECHNOLOGIES AS A FACTOR OF STRUCTURAL CHANGES AND THE DEVELOPMENT OF ECONOMIC SYSTEMS WITHIN THE FORMATION OF A NEW TECHNOLOGICAL PARADIGM

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The relevance of this research is explained by the formation of a new technological paradigm which determines the innovative direction of global economic development as well as the dynamics and nature of structural changes in the economies of countries and their regions.

The leading factor in structural changes in the economy involves technological changes caused by scientific and technological progress, with its current stage related to the development of convergent technologies that represent the interaction and interpenetration of nano-, bio-, info-, cognitive—(NBIC) and socio-humanitari-

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 3–14.

an—(NBICS) technologies forming the core of the new technological paradigm and specifying the structural and dynamic processes of any level in economic systems.

This chapter describes convergent technologies and the technological convergence process. It also identifies the main transformation processes, which provide the transition from the 5th to the 6th technological paradigm.

The authors propose a structure of convergent technologies with specified level and areas of NBIC technologies basing on development features of each convergent technologies cluster.

Keywords: Structural Changes in the Economy; Structural Changes in Economic Systems; Structural Transformations; Technological Paradigm; Convergent Technologies; NBIC Technologies; Convergence of Nanotechnology, Biotechnology, Information Technology, and Cognitive Science.

JEL Code: E32, O14, O31, O32, O47

MATERIALS

The main conceptual ideas of a techno-economic paradigm shift are studied basing on works by T. Kuhn, K. Perez, K. Freeman and others. Various aspects of the technological paradigms theory, the relation between technological development and structural transformations were researched following the ideas of F. Perroux, J. Schumpeter, L. Abalkin, J. Vertakova, M. Gasanov, S. Glazyev, R. Greenberg, P. Druzhinin, O. Inshakov, D. Lvov, L. Klimenko, V. Maevsky, S. Menshikov, G. Mensha, T. Selishcheva, A. Tatarkin, J. Yakovets, Y. Yaremenko, etc.

The analysis of information support of management mechanisms and its influence on the development of macro—and meso-level economic systems is based on the ideas of M. Attinger, E. Brooking, V. Drozhzhinov, D. Gallyamova, P. Lemanova, A. Kalinina, P. Terlyansky, A. Shtrik, K. Arrow, etc.

The works of V. Alexandrov, W. Bainbridge, E. Dotsenko, M. Kovalchuk, M. Castells, V. Lukyanets, O. Oleynik, M. Roco, D. Sporer and others have contributed to specification of the economic convergence phenomenon and estimation of the NBIC development.

METHODS

The research methodology is based on a systemic approach and includes general scientific and specific methods of cognition: induction and deduction, subject—object, structural and functional, descriptive and comparative analyses.

INTRODUCTION

Convergence comes from Latin *"convergo"* and means "incline together." In relation to technologies it refers to confluence (merging) and interpenetration (diffusion) of technologies when the boundaries between technologies are erased and new results arise at the intersection of sciences.

In the mid-1990s, the phenomenon of "growing convergence of specific technologies into a highly integrated system, within which old, separate technological trajectories become literally indistinguishable" (Castells, 2000), was noted by the sociologist M. Castells who stressed that "technological convergence increasingly extends to growing interdependence between the biological and microelectronics revolutions, both materially and methodologically" (Castells, 2000). By stipulating this phenomenon, the new concept significantly expands its content, focusing on the synergistic interaction between various disciplines, such as nanoscience and nanotechnology, biotechnology and life sciences, information and communication technologies as well as cognitive sciences. However, this should not be limited to such statements.

The intense debate in the Western scientific community over convergent technologies has become a platform for exploring the future in terms of development of modern nanotechnology. A new, post-Castells interpretation of convergent technologies has started to form rapidly since 2001 when the so-called NBIC initiative (nanotechnology, biotechnology, information technology and cognitive science) was launched under the auspices of the US National Science Foundation. The initiative implies that nowadays a convergent unity comprised of the abovementioned sciences these days has the potential to transform the entire human life in the next decades (Vetlugi, 2010).

The development and formation of new technologies affect all areas of the socioeconomic system and consequently lead to structural changes. Studies on the integration of analysis of technological and structural changes were carried out by F. Perroux, who integrated the role of technological changes in the Growth Poles Theory (Perroux, 1983), which follows the research of J. Schumpeter, in particular, "creative destruction" aspect (Schumpeter, 2012). The main driver of this expansion is the technical efficiency accumulated through innovative activities.

RESULTS

Convergent Technologies: Nanotechnology, Biotechnology, Information Technology, and Cognitive Science

The term "convergent technologies" was introduced by M. Roco, the chairman of the US National Science and Technology Council subcommittee on Nanoscale Science, Engineering and Technology (NSET), and W. Bainbridge, the famous sociologist. Convergent technologies are a synergistic combination of four major fast-growing areas of science and technology: (a) nanoscience and nanotechnology; (b) biotechnology and biomedicine, including genetic engineer-

ing; (c) information technology, including advanced computing technology and communications; (d) cognitive sciences, including cognitive neuroscience (Roco & Bainbridge, 2003).

The initiative mentioned above clearly distinguishes the two externally different, but internally connected, targeted attractor focuses (Arshinov, 2013).

The first one is concentrated on the synergistic integration of NBICs and the nano-level developments implying a chain reaction of a wide variety of technological innovations that together lead to a global transformation of the way of human civilization evolves. This can be called the economic and technological focus.

The second is focused on *improving human performance* or *human enhancement*.

It is challenging to determine the dominant technology among those united into a general category of convergent technologies. Due to the "convergence" phenomenon, technologies actively use one another to create products and means of implementing NBIC technologies; this is confirmed by the formation of adjacent clusters such as nano-bio, info-cognitive ones, etc. Several authors (Tarakanov et al., 2019; Trofimov & Trofimova, 2014) consider information technologies to be "the main catalysts of all convergence processes." The predominant nature of information technologies is also pointed out by Kovalchuk (2007a) as they are used in all areas of science and industry. Information technologies (IT) have acted as a unifier for all interdisciplinary sciences and created the basis for the scientific and technological development. IT convergence contributes to development of existing technologies and other areas as well as to creation of new ones based on IT achievements (Trofimov, 2011). The merging of IT with other technologies has overcome the limitations of each separate technology and has become an impulse for development of industries. In addition, the role of IT is gradually expanding in such key industries as automobile manufacturing, shipbuilding, construction, etc. The importance of IT as a means of added value increase is rising (Yoo & Chang, 2013).

However, nanotechnologies are meant to combine the existing interdisciplinary sciences and technologies into a single picture of natural science on a new, atomic level. They can also change the ways of data storage and transmission. The specifics of nanotechnologies and their all-encompassing nature allows them to converge with other technologies. National and foreign researchers discuss the development of medical (Drexler & Minsky, 1986), information (Bezzubtseva & Volkov, 2012; Robert, 2005), industrial (in construction, transport, light, food and processing industries), agricultural (Fedorenko, 2011) and other nanotechnologies, thereby validating their status of the global technology. Kovalchuk (2007b), the President of Kurchatov Institute NRC, underlines that nanotechnologies cause not only the development of new technological approaches, materials, systems, but also changes in the methodology of scenic development and paradigms.

Despite the interdependent development of NBIC technologies, their uneven nature should not be ignored. Cognitive- and biocomponents are still at the initial stage while "the nano-segment forms the technology trend for the NBIC complex development, with the info-segment as its communication core. Nevertheless, the level of technological convergence is so high that it is often impossible to refer a particular technological solution to a specific section of the NBIC, especially in multifaceted tasks, for example, the ones concerning expansion of human abilities" (Leshchev & Mironova, 2014).

Thus, as part of the present research, the authors propose the following structure of convergent technologies: the development level—nanotechnologies, the development core—information technology and development spheres—bio-, cognitive-, social technologies (Figure 1.1).

S.F. Sergeev indicates that NBIC convergence is not a synergistic combination of rapidly developing areas of knowledge but the creation of dynamic interdisciplinary boundaries that have the properties of local interfaces connecting and forming branches of science and technology without losing their self-organizing nature. Convergent processes level out the uneven cognition field arising in specialized communicative communities, that, to a certain extent, leads to a general decrease in the quality of cognition circulating in scientific discourse.

In contrast to these tendencies, it is necessary to raise the question on creating mechanisms that generate divergent processes and cause heterogeneity of disciplinary fields. That is important for new cognition development that could arise only under scientific specialization and interaction between scientific groups actively partaking in research activity. The merging of science and technology requires new forms of integration in which they become two poles of a scientific and technological complex that create and consume knowledge. This is the essence of the development processes for both the technogenic environment and the humanity symbiotically connected to it (Sergeev, 2013).

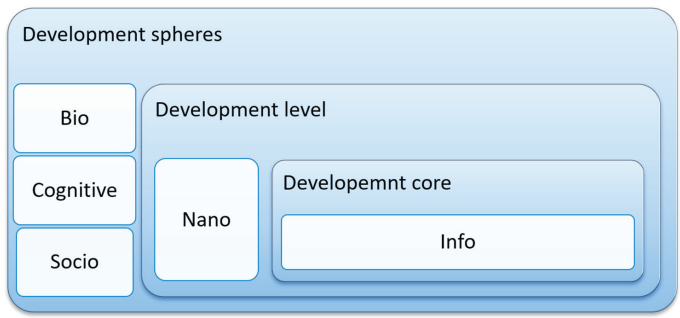

FIGURE 1.1. Structure of NBIC-Technologies. Source: designed by the authors.

Convergent Technologies as a Factor of Structural Changes and the Development of Economic Systems Within the Formation of a New Technological Paradigm

The development of convergent technologies determines the formation of a new technological paradigm (TP). Glazyev defines the term "technological structure" as "a large complex of technologically interrelated manufacturing," "groups of technological complexes connected by the same technological chains and forming reproducing integrities." The technological paradigm is characterized by a single technical level of production, linked by vertical and horizontal flows of similar resources based on common labor resources and general scientific and technical potential (Glazyev, 2012).

By now there are five fully formed technological paradigms according to Glazyev (2009):

- 1st technological paradigm (1770–1830) is characterized by the textile industry development. Its key driving forces are textile machines and the water engine. Its core comprises the textile industry, textile machinery, iron smelting, iron processing, construction of canals.
- 2nd technological paradigm (1830–1880), the core of which is the steam engine, railway construction, transport, automobile industry and shipbuilding, coal, machine tool manufacturing industry, ferrous metallurgy. The key factor of development is a steam engine and machine tools.
- 3rd technological paradigm (1880–1930) is based on the use of electricity, the development of heavy industry, power lines. The core of this paradigm is the production and rolling of steel, inorganic chemistry. The key factors are the electric motor and steel.
- 4th technological paradigm (1930–1970) is based on the development of energy, the use of oil and gas, synthetic materials. The core is automobile and tractor industry, non-ferrous metallurgy and the production of durable goods. The key factors are the internal combustion engine, petrochemistry.
- - 5th technological paradigm (1970–2010) is characterized by gas production and processing, electronics industry, computer and fiberoptic technologies, the development and implementation of information and communication technologies in all spheres of human life. The key factor in the formation and development of this paradigm is microelectronic components.

Glazyev (2009), Inshakov (2011), Kablov (2010), Kazantsev et al. (2012), Akayev and Rudskoy (2014) and others point out formation of the 6th technological paradigm, consistent with the "long wave" theory by Kondratyev (2002). The contemporary economy is at the stage of formation of a new technological paradigm that will be based on robotics, bioengineering, nanotechnology, creation of materials with preset properties, genetic engineering. Its key factors will be nanotechnology and space technology, while nuclear industry, air transportation, and

flexible automation of production will be further developed. Thus, we can say that the basis of the 6th technological paradigm will be NBIC technologies with synergistic potential that can significantly accelerate technical progress in the future.

Prerequisites for a new technological paradigm emerge during the dominance of the existing one and start to take shape as a result of the displacement of the existing paradigm due to objectively emerging limitations of and subsequent economic crisis which, in turn, confirms the replacement of the dominant parading.

The change of technological paradigm requires, as a rule, respective changes in social and institutional systems which not only relieve social tensions, but also contribute to the mass technologies implementation of a new paradigm and an appropriate type of consumption and lifestyle as well. In the "growth" phase of the new technological paradigm, most technological chains of the previous one are rebuilding themselves in accordance with its needs. As the next paradigm develops, a new type of infrastructure overcoming the limitations of the previous one, is created coupled with a transition to new energy types that become the basis for the formation of the next paradigm (Glazyev, 2009).

There is a succession between the 5th and 6th technological paradigms. Their key factor is information technology based on the knowledge about elementary structures of the matter as well as algorithms for processing and transmitting information obtained by the fundamental science. The border between them lies in the depth with which technology penetrates the structure of matter and the scale of information processing. Along with qualitatively bigger power of computer technology, nanotechnologies allow to create new structures of living and non-living matter, growing them via self-reproduction algorithms.

The formation of the 6th paradigm is the result of the interaction between technologies and informatization processes in response to the "social order" for more advanced technologies. The paradigm transition is accomplished through another technological revolution dramatically increasing the efficiency of the main directions of economic development which is a consequence of a qualitative change in the structure and culture of management.

Basing on the key factors and the core structure of the forming paradigm, we can make a conclusion that the features of the 6th technological paradigm will include interconnection and confluence of developing technologies, which, in regard to structural changes, should lead to a qualitatively new functioning system, the construction of new communication channels and new relationships between subjects. Structural changes will be represented both quantitatively (the ratio of system elements) and qualitatively.

Taking into account the structure of the currently developing 6th technological paradigm, namely, the technologies comprising its core and industries that actively use the key development factor, it means that convergent technologies are the factor forming and developing the 6th technological paradigm.

The main criteria that enable us to identify the transition to the new paradigm include the following: exploring and development of alternative energy sources

and technologies with great potential for increasing energy efficiency (Discenzo et al., 2009), including increasing energy efficiency of new concepts, such as the "Internet of Things" (IoT) (Ramachandran et al., 2016), as well as environmentally friendly and zero-waste production (Glazyev, 2009).

Changes in the Management Paradigm as a Result of Technological Development

Qualitative changes which have affected the management structure, its goals, mechanisms, principles and caused a qualitative change and reorientation of the operational economy to the network one, can be observed on the example of the 5th technological paradigm,

It is obvious that the development of such cluster of convergent technologies as information technologies and telecommunications has had a significant impact on the production, economic, social, cultural spheres and needs of society as well as led to the necessity to adapt functioning of socio-economic systems to the new conditions. We can indicate the formation of a new management paradigm in the terms of informatization of economic processes and the transition to the digital economy and the knowledge economy.

In the context of the technological paradigm formation, the following major directions of changes can be identified in the management paradigm:

- Modification of ownership and management relations: intellectualization of production; the phenomenon of intellectual capital qualitatively transforms the ownership system of a company, i.e. employees sell the organization not only their labor, competence or knowledge, but also attitude, trust and loyalty;
- A whole business process aimed at results and creating value becomes the object of management;
- Resources (assets) of an organization are changing: knowledge becomes the most important resource and any organization is considered as a set of knowledge. The integration and combination of knowledge and other strategic resources allow to strengthen the organization's competencies in comparison with its competitors. The significance of knowledge in the 6th technological paradigm will continue to increase;
- The organizational structure is changing: management that previously focused on the operational economy is gradually shifting to management focused on the network economy. First of all, network management is aimed at high-level results in the field of extended production of network knowledge and then at market modification and respective demand for products manufactured on the basis of the latest knowledge (Salikhov & Neymatova, 2009);
- Increasing complexity of the management process: today's management is a discipline closely related to other sciences such as marketing, math-

ematical modelling, probability theory, psychology, etc. In the light of the new paradigm formation, current management should be supplemented and coordinated by scientific and forecasting activities. Successful implementation of scientific and technical forecasts will allow to develop and implement social ones for the national development (Averbukh, 2010); and

- The scientific development, with increasing volume of accumulated knowledge becoming the main imperative for allocating separate branches in management (strategic, innovative, investment, information) that leads to the creation of new workplaces, changes in the organizational structure. For instance, IT departments, audit and outsourcing branches are created at enterprises. In addition, given the high external environment dynamic, an instant reaction to events is necessary, requiring dynamic operational management. Such dynamism is provided by information systems, which are the basis for the development of the industries of the 6th technological paradigm. Besides, for several years, the one tendency has persisted: the demand for IT specialists is growing exponentially all over the world (and in Russia, in particular) (Chepur, 2019). The active development of the IT-industry is confirmed by the development of new specialties and positions in the field of Data Science and IT: Machine Learning Engineer, QA Engineer, Data Engineer, Data Analyst, AI Engineer, DevOps Engineer. The process of digitalization of the economy confirms the development of the concepts of "Internet of things" (IoT) and "smart city" (Frolova et al., 2018; Jawhar et al., 2018), based on the principles of system integration.

Thus, all elements of the control system are subject to adaptation and modification. It is obvious that the leadership in the world economy is given to the country that is developing technologies of the current technological paradigm most intensively and can quickly adjust the economic situation in accordance with the needs of modern development, correctly predict the new era-defining and basic innovations and start moving in this direction in advance.

Nanoindustry will become the dominant industry of the 6th technological paradigm in the economy. The current nanoindustrialization causes significant changes in the social content and forms, quality and quantity, level and lifestyle of people at all levels of the global economic system. The necessary conditions for the existence of the industry are the following: the system of necessary institutions, organizations and standards, mass and scale production, the inclusion of its products and services in various activity (Inshakov & Fesyun, 2014).

According to Krichevsky (2015), it is necessary to focus not only on innovations and the development of the latest convergent nano-bio-info-cognitive-socio- (NBICS) technologies, but also "to take into account the full range of real multitechnology structure and the interaction of technologies and equipment with the environment over a full life cycle."

CONCLUSION

The process of technological convergence is one of the major conditions for the neo-industrialization of the economy and plays a key role in the initiation of innovative structural changes which necessitates their analysis, evaluation and monitoring.

As a result of the transformation of the economy and the creation of new technologies, structural changes occur. They, in turn, cause a number of new industries, structural relations between elements of the system leading to new qualities and management methods, goals and functions of management and development that results in structural changes in the economy development at the macro and micro levels.

The formation of a new technical and economic paradigm, as well as the problems of the development and implementation of new technologies, determine the need for setting the task of assessing the development of modern technologies, their impact on the existing structure of the economy with the aim of predicting the state of socioeconomic systems, new trends and patterns of their development indicating conditions and factors of the functioning of economic systems in new conditions and the creation of scenarios for the development of economic activity.

All contradictions and the underlying potential of the existing system functioning initiate the creation of a new paradigm. The core of the 6th technological paradigm will be NBIC technologies, i.e. the interpenetration of nano-, bio-, info- and cognitive technologies.

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CHAPTER 2

CONTENT OF STRUCTURAL SHIFT

New Approaches to Definition, Characteristics, Mechanism and Features in Terms of New Technologies Development

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This Chapter analyzes the main approaches to the interpretation of the content of structural shift, systematically presents the mechanism of their formation in terms of convergent technologies development and also supplements the categorical apparatus for the study of structural shift with such characteristics as force, impulse and potential of structural changes.

The diversity of interpretations of structural shift in economic research (O. Krasilnikov, N. Barteneva, S. Smith, etc.) allows grouping them according to the criteria: the object (changes in the industry structure, changes in the economic system as a whole) and factors that contribute to structural shifts (changes in technology, consumer preferences, increasing knowledge).

Existing characteristics of structural economic shift such as mass, speed, index, intensity and inertia that reflect the dynamics of the specific weight of an element in the structure, allow us to obtain a quantitative characteristic of structural changes

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 15–26.

regardless of technological development factors that determine new conditions and trends in the development of economic systems. It is advisable to expand the list of the considered properties of structural shifts with the following characteristics: the structural change force—the direct or indirect impact on the existing management structure as the product of structural change impulse and potential; the structural shift impulse –a set of resources, required for the formation of an innovative-technological platform developing and creating structural changes; the structural shift potential—a measure of the internal forces that characterize the response of the system to emerging challenges, and determines the impulse conversion result.

Keywords: Economic Structure; Economic Structural Shifts; Structural Shifts; Structural Shift Mechanism; Structural Shift Impulse; Structural Shift Force; Structural Shift Potential; Convergent Technologies.

JEL Code: O10, O14, O33

MATERIALS

The theoretical basis of the research includes scientific and practical approaches of domestic and foreign scientists in the field of structural shifts and their dynamics. The development of theoretical models of the economic structure, issues of cyclical development of structural changes, as well as theoretical aspects of the transformation of the economic systems were studied by the following authors: L. Abalkin, D. Bell, S. Zhironkin, K. Juglar, C. Clark, I. Komar, N. Kondratev, M. Ksenofontov, O. Krasilnikov, O. Ilyina, V. Inozemtsev, V. Leontiev, S. Lyubimtsev, A. Mokronosov, A. The Notkin, A. Sukharev, F. Perroux, R. Reich, And R. Foster, J. Schumpeter, Yu. Yakovets, Yu. Yaremenko et al.

A significant part of the research was based on the theory of technological structures in order to substantiate the influence of convergent technologies on structural shifts in regional economic systems (Glaziev, 2009).

METHODS

The scientific research conducted in this Chapter is based on the scientific methods of subject-object, structural-functional, descriptive and comparative analysis. Introduction

The development of convergent technologies that form the core of the new technological paradigm, has an impact on the existing economic system, relationship between its elements, principles of existence and functioning, thus causing structural changes and shifts and leading to the need for restructuring both within the system and with systems outside.

The evolution of the modern economic system, especially since the industrial revolution (Inshakova et al., 2019), shows that over time changes in the absolute values of the main macroeconomic variables (such as gross national product, total

consumption, total investment, employment, etc.) are inevitably associated with changes in their composition, that is, with the dynamics of their structure.

RESULTS

Approaches to Determining Structural Changes in the Economy

According to the traditional approach, structural changes are understood as changes in national and regional industrial structures in the process of economic development. The founders of this approach are S. Kuznets (Kuznets, 1930) and A. Burns (Burns, 1934).

The approach of S. Kuznets is based on the slowing growth hypothesis claiming that the growth rate of industry decreases over time eventually causing changes of leading industries, as well as leading countries. The industrial diversity generates a process of change in the economic production structure from the viewpoint of economic activities.

P. Downes, A. Stoeckel identified that structural changes occur because companies react on price changes, as well as due to opportunities and threats created by technology and globalization. They identified three levels of structural changes (Downes & Stoeckel, 2006):

- Within companies, as they apply new technologies and management methods and react on changes in relative prices, capital, labor, and other resources, as confirmed in other studies (Romano, 2019);
- In industry, due to competitive pressure in favor of structures of some companies over others and the operating environment development; and
- In various industries or sectors of the economy, due to shifts in demand on both global and domestic levels with changes in consumption structure and comparative advantages.

Change of leading industries is the driving force of structural changes. S. Kuznets notes that the main aspects of structural changes include the transition from agricultural to non-agricultural activities and trending movement from industry to services; changes in production scale and transition from personal to impersonal organization of companies (Kuznets, 1930).

A. Fisher and C. Clark noted that resource and production changes are an integral part of development. This fact is confirmed by the change in technological paradigms that occur when new production factors and energy sources appear (Clark, 1940; Fisher, 1939). The role of technological progress is crucial in the process of structural shifts, as P. Leon (Leon, 1967) and L. Pasinetti (Pasinetti, 1981). believed. The synergistic effect of the convergence of nano-, bio-, info-, and cognitive technologies is supposed to accelerate the technological progress and increase the pace of transition to a new technological paradigm, with innovation and technological development at the heart of the economic growth process, signaling the evolution of the industrial structure of countries (Coad et al., 2019).

Structural changes, therefore, are interlinked with institutional and economic changes, changes in the social, financial, and industrial spheres, which, in turn, form technological change models (Quatraro, 2012).

Analyzing the approaches to defining the term "structural changes," we can note that there is no clear distinction between the concepts of structural changes and shifts. In this study, the term "structural shifts" refers to transformations in the structure that lead to a qualitative change in the system.

Structural shifts occurring in any system can be considered from the standpoint of movement and development philosophical categories. The movement of a system can reveal both its ability to be stable or resist affecting factors, as well as demonstrate the qualitative change, flexibility and adaptation of the object to the specific conditions of its functioning, i.e., the transfer to a new qualitative state.

There is a large number of definitions of the term "structural shift" in Russian and foreign scientific literature. Based on it, it is possible to group approaches to the structural shift interpretation in two groups according to specific criteria:

1. By objects:
   - Changes in the industry structure;
   - Changes in the economic system as a whole;
2. For reasons or factors that contribute to changes:
   - Change in technologies;
   - Change in consumer preferences; and
   - Increase in knowledge.

From the point of view of the structural shift object there are different approaches based on the understanding of structural shifts as changes in the totality of industries and as a transformation of the economic system as a whole.

The approach of defining structural shifts as changes in the industry totality considers only one component of structural transformations.

The second approach is systemic. According to it, a structural shift is an integral indicator that includes not only changes in industry indicators, but also the transformation of socioeconomic relations, organizational and legal forms of economic activity, economic mechanisms, and economic relations between subjects. Among the representatives of this approach, we can distinguish such authors as Krasilnikov (2000), Kozenyasheva (2010), Downes and Stoeckel (2006).

In the systemic approach we can identify the main directions of changes:

1. In the proportions of industry shares in the overall structure of the economy (Bessonov, 2005; Burns, 1934; Downes & Stoeckel, 2006; Krasilnikov, 2000; Kuznets, 1973; Lopatnikov, 2003; Perstenyova, 2012);
2. The relationships between the elements of the system (Abuzyarova, 2011; Spasskaya, 2003) eventually leading to changes in System qualities (Krasilnikov, 2001; Tereshkina & Degtyareva, 2012).

According to the factors that contribute to the initiation of structural changes, approaches highlighting changes in technology, consumer preferences, and knowledge increase can be grouped into a broad category that treats structural changes in the context of technological paradigms. V. Makoveeva and G. Mayer consider structural changes as a result of the transition to a knowledge economy, an innovative economy and intellectual activity (Makoveeva, 2012; Mayer & Makoveeva, 2009). M. Kozenyasheva notes changes in the economic structure associated with an increasing share of non-material industries (Kozenyasheva, 2010), in addition, in terms of the development of convergent technologies and the formation of a new technological mode, there is a change in organizational structures, and, as a result, in the management process. Foreign researchers A. Nassif, K. Feijo, and E. Araujo note that economic development with deep structural changes means that the production structure of the economy and net exports is mainly dominated by production segments derived from science, technology, and high-tech products (Nassif, 2012). *D. Schiliro stresses the relationship between* qualitative transformation and evolution of the economic system with technological progress and organizational changes (Schiliro, 2012).

Having analyzed a number of definitions of structural shifts by national and foreign authors and highlighting their characteristics, the authors propose the following structural shift definition. A structural shift is the result of qualitative and quantitative transformations in the economic system, leading to changes in the allocation of economic resources, modification of industry proportions, organizational structures and market relations.

In the context of structural changes, one problem remains unsolved: what can be considered a significant change in system qualities and how to determine the boundary between quantitative changes in industry proportions than can indicate qualitative structural changes.

In general, the boundary that turns structural changes into a structural shift can be defined as a limit when changes in the key industry of the emerging technological paradigm reach a critical mass, leading to the need for restructuring of related industries and qualitative changes in building relationships between economic entities. Changing of quality of relations between economic entities is a necessary condition for the development of convergent technologies that have a mutual impact on the jointly developing industries of nano-, bio-, info- and cognitive technologies.

Categorical Apparatus for Studying Structural Changes in the Development of Convergent Technologies

For the transition to a new state, the system must receive a certain impulse consisting of characteristics: resources and readiness for transformation, development and acceptance of targeted programs for the development of both technological platforms and economic systems as a whole, as well as accumulate a critical mass of changes that can lead to structural shifts.

The impulse transmitted to the system is nothing more than the provision of certain resources necessary for the formation of an innovative development platform and the creation of structural changes (Formula 1).

$$I = f(Res) \tag{1}$$

where I is the structural shift impulse and Res is the resource availability of structural shifts.

Resource availability of structural shifts can be expressed as a function describing the funding of the priority technologies forming the core of the technological system and the availability of the resource base and infrastructure for the training of qualified personnel, scientific personnel, implementation of innovative projects and programs for their development (Formula 2).

$$Res = f(Inv; K; T; Infr; Ins; TP) \tag{2}$$

where Inv; K; T; $Infr$; Ins; TP are investments, initial knowledge that characterizes human potential, human resources, scientific potential, technology, infrastructure and institutional factors, respectively. TP is the number of targeted programs, strategies, and development scenarios.

Meanwhile, the financing of the technological base is characterized not only by cash flows for the development of technologies, but also by fixed assets investments, expansion and renewal, etc.

Another characteristic of structural shifts is potential. If an impulse is a quantity given to a system from the outside to initiate structural shifts, then potential is a measure of internal forces that characterize its response to occurring changes. It determines the result of converting the transmitted impulse as an implementation of investments, targeted programs and development measures that lead to the activation of structural shifts. Thus, the impulse and potential of structure shifts are interrelated, since the financing and resource support of economic activities are also aimed at creating factors of shift potential, such as investment in human resources, infrastructure of industries and creation of technological platforms. The potential can be expressed as a function of the dependence on the results of converting the system elements (Formula 3):

$$P = f(I) \text{ or } P = f(Res'), \tag{3}$$

where converted resources will be used as function variables Res' (Formula 4).

$$Res' = f(Inv'; K'; T'; Infr'; Ins'; TP'), \tag{4}$$

with K' for transformed knowledge T' for transformed equipment and technologies, $Infr'$ for transformed infrastructure, Ins' for transformed institutional factor,

TP′ for the number of implemented target programs for the development of the economic system (Formula 5),

$$\mathrm{K}' = f(K)$$

$$\mathrm{T}' = f(T)$$

$$\mathrm{Infr}' = f(Infr)$$

$$\mathrm{Ins}' = f(Ins)$$

$$\mathrm{TP}' = f(TP) \tag{5}$$

Basing on this function, potential is characterized by four main imperatives of technological paradigms and structural shifts: knowledge, technology, infrastructure, and institutional factors, which form the basis for building innovative capacity.

The impulse transmitted to the system and the potential arising in it are aimed to creating conditions for initiating structural shifts. This allows us to speak about the equal importance of impulse and potential of the system and of structural shifts in this context.

O. Krasilnikov characterizes shifts by physical properties, such as mass, speed, intensity, inertia, potential (Krasilnikov, 2000). Using the categorical apparatus of physical quantities in this study is advisable, according to the authors, in order to supplement the definition of the structural shift characteristic—the shift strength. In the simplest case, strength is the effect of the subject on the object of action. In the context of structural shift, the strength is an impact, direct or indirect, on the existing economic structure. In other words, the shift strength is a value that characterizes the intensity of the impact of system elements on the structure, leading to a change in the vector and/or speed of development of the system.

It is advisable to determine the shift strength as a value equal to the ratio of potential emerging in the development process of the system, the resistance, expressed in the degrees of availability and provision of means contributing to the structural shift initiation, is inversely proportional to the resources (Formula 6):

$$S_s = \frac{P}{1/f(Res)} = P \times I, \tag{6}$$

where S_s is the structural shift strength P is the structural shift potential, *Res* is the structural shift resource availability, I is the structural shift impulse.

Resource provision includes financial resources, qualified workforce and knowledge, developed and implemented innovative technologies, government support, support from business structures, development of public-private partnerships, provision of appropriate organizational structures, quality management. The lack of these resources leads to greater resistance and, as a result, to the

inhibition of the process of forming new technological structures and structural changes.

Applying the authors' concepts of structural shift impulse and potential proposed in the paper, it is possible to determine the effectiveness of measures aimed at initiating structural shifts. Based on the impulse that characterizes the resource availability of the process of structural shifts, and the potential that determines the results of changes in the conditions of technological development, efficiency is defined as the ratio of potential to impulse:

$$E_{S_s} = \frac{P}{I}, \tag{7}$$

where E_{S_s} is the effectiveness of measures aimed at initiating of structural changes, P is the structural shift potential, I is the structural shift impulse.

Based on the concept of economic efficiency, we obtain the following relationships characterizing the effectiveness of measures to initiate structural changes in the development of convergent technologies:

If $E_{S_s} > 1$—measures to initiate structural shifts are effective, there is a technological development of economic systems.

If $E_{S_s} \leq 1$—measures aimed at technological development of economic systems are ineffective, or did not cause structural shifts in the current period.

Thus, we can draw a conclusion about the controllability of the shift strength, or its development vector, which can eventually lead to the achievement of the target state of economic entities.

Mechanism of Structural Shifts in the Economy

Structural shifts happen as a result of the system's response to internal and external factors. At the same time, as it was noted by S. Glazyev and O. Morgenstern, there is a core structure that is a system-forming factor. In accordance with the theory of technological paradigms by S. Glazyev, the core of the paradigm is a complex of basic aggregates of technologically connected productions. The core of the paradigm, according to O. Morgenstern, is a structural unit, the destruction of which will lead to a change in the functions of the system (Morgenstern, 1937). Thus, in the process of replacing technological paradigms, there is a change in the core of the paradigm, which thereby causes the transformation of the functional relationships of the system and its transition to a qualitatively new state.

According to the chart (Figure 2.1), during the process of forming a new technological paradigm, the paradigm of the previous technological order, characterized by its proportional composition of elements and their relationships, enters the process.

The transition to a new technological paradigm is coordinated by existing legal and regulatory frameworks, institutional organizations, as well as innovations in management that are necessary in modern conditions. Mechanisms identify the tools that support the transition process. When forming a new technological para-

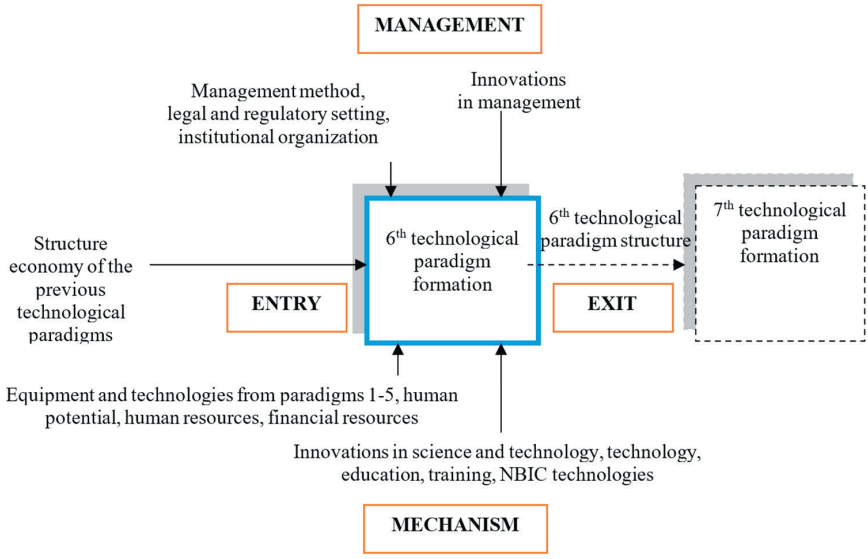

FIGURE 2.1. Functional Cell Chart of the Process of Forming the Technological Paradigms. Source: compiled by the authors.

digm, such tools include the developed technologies of the previous technological paradigm, human resources, human resources potential, knowledge accumulated over previous periods, management methods, to which new developments, innovative methods and tools are added.

A complex of processes that contribute to the modification of the system state, the relationships of its elements, and the initiation of structural changes is a mechanism for structural shifts. This mechanism includes all spheres of activity of the economic system in their interrelation, inconsistency and interdependence and can be represented as a function of elements of political, economic, financial, information, technical and technological, social and cultural spheres of activity.

As any mechanism, the mechanism of structural shifts involves objects, subjects and their interaction. By projecting the definition of the concept of a mechanism onto the process of structural shift, the state of the subjects of the economic system can be defined as contradictory. The contradictory state of subjects in the economy is in the distribution of resources between subjects and objects of the system. The subjects of the system are in a contradictory state and restrict each other's freedom by mutual resistance, which consists in the presence or absence of resources of the system (financial, technological, information, personnel) so that all points of such a system are able to describe only well-defined trajectories of movement. Consequently, the mechanism of structural changes in the economy is a mechanism for resolving the contradiction between the interests and needs

of subjects of structural changes at different levels and the distribution of capital resources between subjects and objects of structural changes (Krasilnikov, 2001). *The implementation of structural shift mechanisms in t*he specific conditions of the development of the socioeconomic system can be traced in the context of technological structures associated with the definition of imperative industries for economic system development. In the context of the formation of the 6th technological paradigm, this is the NBIC technology. Then the contradiction of the system's subjects is resolved in favor of allocating resources to the key objects of the system and the branches that are the main branches of the emerging paradigm and form the core of development in a specific time period.

CONCLUSION

The main approaches to the interpretation of the content of structural shifts are analyzed, the mechanism of their formation under the conditions of the development of convergent technologies is systematically presented, the categorical apparatus for studying structural changes is supplemented with characteristics such as structural shift strength, impulse, potential, the main transformation processes accompanying the transition to a new technological structure are identified.

The structural shift mechanism is the complex of processes that contribute to modifying the system status, relationships between its elements, initiate structural changes and involves the resolution of contradictions between the interests and needs of the subjects of structural shifts of different levels and distribution of capital resources between the subjects and objects of structural shifts. Within the framework of the emerging technological paradigm, the contradiction between the system's subjects is resolved in favor of the distribution of resources across the key system objects and main industries of technological mode that make up the development core in a specific time period.

The accumulated contradictions and potential of the system functioning within the existing technological paradigm initiate the emergence of a new technical paradigm.

The system's ability to initiate structural shifts in the context of convergent technologies development is proposed to be evaluated by their strength, impulse and potential.

For the transition to a new state, the system must receive a certain impulse, consisting of such characteristics as: resources and readiness for transformation, development and implementation of targeted development programs of both technological platforms and regional systems in general, the availability of a resource base and infrastructure for training highly qualified personnel, scientific personnel and the implementation of innovative projects (Frolova et al., 2018).

Another characteristic of structural changes is potential that determines the result of converting the transmitted impulse as an implementation of investments, carrying-out of targeted programs and development measures that lead to the activation of structural changes.

The categorical apparatus for studying structural changes is supplemented by the concept of strength, which is characterized by the intensity of the impact of system elements on the structure, leading to changes in the vector and/or speed of system development.

Applying the author's concepts of structural shift impulse and potential, the effectiveness of measures aimed at initiating positive structural changes is determined as the ratio of potential to impulse.

The addition of dynamic characteristics—the strength, impulse and potential of structural shifts—to the categorical apparatus for studying structural shifts allows us to reveal an ontological model of the influence of convergent technologies on structural shifts in the economic systems.

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CHAPTER 3

COMPARATIVE ANALYSIS OF METHODS FOR STRUCTURAL SHIFT RESEARCH IN THE ECONOMY

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This paper deals with the systemic generalization and structuring of methods for assessing the quantitative and qualitative characteristics of structural shifts. A significant methodological basis of structural shift assessment in economic models allows us to differentiate them by degree of complexity and vary their application in accordance with the objectives of the study.

Along with methods for assessing structural shift based on statistical, econometric, mathematical, and simulation modeling, analysts widely use integral indicators and indices of structural shifts developed by L. S. Kazinets, K. Gatev, A. Salai and V M. Ryabtsev.

Each of the assessment methods for structural changes and structural shifts has its advantages or disadvantages. We use one or another depending on the characteristics of the research object and available information about it. As for economic interpretation, the most preferable index is the V. M. Ryabtsev index, which has a scale of values and does not exceed structural changes like the Salai index. The advantage

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 27–37.

of the Ryabtsev integral coefficient of structural difference is its independence from the number of gradations in the structure.

Keywords: Structural Shifts; Structural Changes; Structural Shift Research Methods; Assessment Methods For Structural Shift, Structural Shift Indices.

JEL Code: C10, C13, O10

MATERIALS

The monitoring of structural shift in econometric models started in the late 1990s. For the first time the problem of sequential detection of structural shifts in a multivariate linear regression model was considered by Ch. Chu, M. Stinchcombe, H. White (Chu et al., 1996). To detect structural shifts, a sequential version of the fluctuation test of W. Ploberger was used (Ploberger & Cramer, 1992).

Modifications of sequential tests of cumulative sums of regression residues to detect structural shifts were discussed in the works by F. Leisch, K. Hornik, C. Kuan (Leisch et al., 2000). A generalization of these results for regression models with stationary stochastic predictors was examined by L. Horvath, M. Huskova, P. Kokoszka, J. Steinebach (Horvath et al., 2004). Dynamic regression models with structural shifts were analyzed in the papers of A. Zeileis, F. Leisch, C. Kleiber, K. Hornik (Zeileis et al., 2005).

A number of indicators and graphical methods for measuring structural shift, the intensity of changes in the structure and levels of specialization and diversification of the economy are presented in the works of Russian and foreign economists (T. Agapova, M. Yuzbashev, U. Isard, S. Kazantsev, B. Sedeleev, L. Kazinets, A. Salai, K. Hornik and others) (Korobova et al., 2002).

The works of O. Krasilnikov also contributed to the study of quantitative and qualitative properties of structural shift (Krasilnikov, 2000, 2017).

Monitoring of structural shift in econometric models is based on the research of B. Brodsky (Brodsky, 2006), Ryabtsev V. M. (Ryabtsev & Chudilin, 2001), etc.

METHODS

The scientific research conducted in this part of the monograph was based on the general scientific method of comparative analysis. In addition, other general scientific methods applied in this work: descriptive analysis, generalization, synthesis.

INTRODUCTION

Qualitative properties of structural shift are evaluated from the perspective of correlation between system elements, actions of subjects, the construction of new communication channels and the modification or reduction of existing ones. There are properties that characterize the effectiveness of changes and bring the

system to a new state. The most important characteristics of the system are the completeness and sufficiency of the interconnections of the new system structure, the efficiency of resource-transmission channels of resources (information, financial, intellectual), the effectiveness of the new control system, and the system's resistance to internal and external factors, the trajectory of the system in relation to a given development vector.

The quantitative properties of structural shift determine the formal correspondence of the economic system parts, their properties, relation: growth rates, intensity and indices of structural shifts, indicators of optimality of the structure, mass and speed of structural shifts, as well as the characteristics of structural shift strength, impulse and potential, specified by the authors.

RESULTS

In Russian and foreign scientific literature there is a large number of methods for assessing structural changes and structural shifts in the economy. Among the methods of analysis and assessment of structural shifts we can distinguish such methods as:

- Multidimensional analysis;
- Shift-share analysis;
- Simulation modelling;
- Econometric modeling;
- Input-output analysis;
- Time series model;
- Matrix methods;
- Direct comparison;
- Comparison of normalization coefficients; and
- Nonparametric estimators (including for smooth structural shift in panel data models).

Despite a significant number of studies on methods for detecting structural shifts in stochastic dynamical systems (Ayvazyav & Brodsky, 2018; Chen & Huang, 2018; Horvath et al., 2004; Leisch et al., 2000; Zeileis et al., 2005), there are many unanswered question remaining in this area, among which B. Brodsky notes the problem of the a priori information on observations and the specification of a dynamical system.

Between the poles of "complete knowledge" (both the distribution function of the observations and the specification of the dynamical system are known) and "complete ignorance" (neither the probabilistic law of generation of the observations nor the specification of the dynamical system is known) there exists a practically significant area of semi-parameter models when the specification of the dynamic systems, but the distribution function of the observations is unknown.

The most important examples of such semi-parametric tasks include:

1. Models of multivariate regression and systems of simultaneous equations in econometrics, in which, as a rule, the specification of the model is known (for example, linear regression and autoregressive dependencies), but the distribution function of the sequences of "noise" is unknown. The task is to consistently detect structural shifts in these models, which include both sharp changes in the coefficients of equations and the appearance of new elements of the specification of the model (for example, new additive terms in equations);
2. Models of dynamic systems "input-output" in control theory. Here, the "transfer function" of the system is given accurate to its parameter values, however, the distribution law of the sequence of stochastic "noise" is unknown. The task consists in sequentially detecting spontaneous changes in the parameters of the transfer function of the system; and
3. Models of multifactor dynamic systems in the state space. The equations of vector state variables and observations of the system are known, but the distribution law of stochastic noise is unknown. An additional complication is that the state vector in this system is not observable. The task is to sequentially detect structural shifts in the equations for the state vector and observations of this system. Moreover, for the estimation method we can only use observable system variables.

The disadvantage of methods based on the construction of fluctuation tests, cumulative sums of regression residuals, is that the quality of the tests is analyzed exclusively from the point of view of the limiting distributions of the proposed statistics. Moreover, the properties of methods for finite samples are studied mainly empirically. At the same time, the analysis of the properties of methods for finite data samples is an extremely urgent practical task.

Another disadvantage of existing methods for detecting structural shifts in econometric models is the complete lack of studies on the optimality and asymptotic optimality of these methods. In fact, methodological approaches to the study of the properties of the optimality of methods and their comparative analysis have not been developed yet, which significantly complicates the use of these methods in the practice of econometric analysis.

It is assumed that, the basic indicator of structural shifts is the mass of the structural shift, which represents a change in the elements of the system in the current period relative to the base (Krasilnikov, 2017).

$$M_i = P_i^1 - P_i^0 \tag{1}$$

where M_i is mass of the structural shift of i-th economical system element; P_i^1 is the value of the quantitative indicator of the i-th element of the economic system in the current period, P_i^0 is the value of the quantitative indicator of the i-th element of the economic system in the base period.

The economic system is dynamic. For studying structural shift, it is necessary to compare them using the structural shift index. The structural shift index is the ratio of the mass of the structural shift to the base value of the economic indicator achieved in a certain period of time, expressed in fractions or percent.

$$I = \frac{P - P_0}{P_0} \times 100\% = \frac{M}{P_0} \times 100\% \tag{2}$$

I_i is structural shift index of the *i*-th element of the economic system.

The next characteristic of structural shift in the economy is their speed, which reflects a change in the structural indicator per time unit. It is calculated as the ratio of the mass (1) or index (2) of the structural shift to the time interval of its occurrence and shows the change in the structural indicator per time unit, for example, for a year.

$$V_i = \frac{M_i}{T} \tag{3}$$

$$V_i = \frac{I_i}{T} \tag{4}$$

where V_i is rate of structural shift of the *i*-th element of the economic system; M_i is the mass of the structural shift of the *i*-th element of the economic system for the studied period of time; I_i is structural shift index of the *i*-th element of the economic system; and T is time of structural shift.

The indicators used in economic research, such as national income, gross national product, accumulation and consumption fund, investments and others, are structural indicators which characterize the economic system and reflect at the macro level not only the narrow technological aspects of reproduction, but also efficiency of socio-economic mechanism and the system of industrial relations (Krasilnikov, 2000).

The next indicator, indicator of the structural shift intensity characterizes the dynamics of structural shift. It can be determined by the formula

$$E = M \times V, \tag{5}$$

where M is mass of structural shift, V is rate of structural shift. The more the structural shift intensity indicator is, the more influence it has on the structure.

The structural shift quality index is determined by the formula:

$$K = I \times N, \tag{6}$$

where I is a structural shift index of a certain direction, and N is the structural shift direction. Direction is determined depending on compliance with economic interests. When assessing shifts in the context of technology development, a shift

towards an increase in high-tech science-intensive industries can be assessed as positive, i.e. N = 1, and a shift in the direction of increasing industries of raw materials is represented as N = –1 (Shevchenko & Razvadovskaya, 2013).

When the direction of the structural shift is positive as part of the growth of positive structural shift in high-tech industries, progressive trends in the structure transformation arise (Inshakova & Rizhenkov, 2015).

Another quantitative characteristic of structural shifts is the indicator of the linear coefficient of absolute structural shifts:

$$Labc = \frac{\sum | d_2 - d_1 |}{n} \quad (7)$$

where *Labc* is indicator of the linear coefficient of absolute structural shifts; $|d_2 - d_2|$ ia the absolute growth rate of shares (specific gravities) in the current period compared to the base; n is the number of gradations.

Statistically, its meaning lies in the fact that it is the arithmetic average of the absolute growth units of the shares (specific gravities) of all parts of the compared integers.

This coefficient characterizes the average value of deviations from specific gravities. Thus, it shows how many percentage points on average the specific gravities of the parts in the compared sum total deviate from each other.

Therefore, the larger the linear coefficient of absolute structural shifts, the more on average the specific gravities of the individual parts deviate from each other during the compared periods, the stronger the absolute structural shifts.

Along with methods for assessing structural shifts and basic indicators, analytics widely use integral indicators and structural shift indices. The most common are the following (Kazinets, 1981; Ryabtsev & Chudilin, 2001):

- The Kazinets index named after L. S. Kazinets;
- The Gatev index named after K. Gatev;
- The Salai index named after A. Salai; and
- The Ryabtsev index named after V. M. Ryabtsev.

The methods and indicators for assessing structural shift differ in the research tasks and in the complexity degree of the tools for carrying out calculations. At the same time, there are no criteria for applying the particular method in accordance with particular goals, which makes it difficult to choose tools for analyzing the structural transformations of economic systems (Frolova et al., 2018).

The concentration indicators and indicators of structural differences assessment can be useful for studying diversificaton. For example, the Herfindahl-Hirschman index, the entropy index, the dispersion index of market shares, the relative concentration index, the Gatev integral coefficient, the Salai structural shift index, Ryabtsev index.

Each of the above mentioned diversification indicators has its advantages and disadvantages. The Herfindahl-Hirschman index is traditionally used to estimate

diversification, but it is not applicable to structures with different numbers of elements. The entropy index is used less often; in addition, it contains a division operation, which means that it is not applicable for assessing diversification if one of the elements is zero.

The dispersion of market shares is an alternative to the above mentioned indices and is rarely used to measure diversification. The relative concentration index is difficult to interpret. The integral coefficient of K. Gatev, the index of structural shifts of A. Salai and the index of V. Ryabtsev are the most accurate and practical tools for studying structural shift.

The Gatev index:

$$K_d = \sqrt{\frac{\sum_{i=1}^{n}(d_i^1 - d_i^0)^2}{\sum_{i=1}^{n}(d_i^1)^2 + \sum_{i=1}^{n}(d_i^0)^2}} \quad (8)$$

where K_d is the Gatev index; d_i^0 is a weight (share) of a part of the sum-total for the period under review; d_i^1 is the specific weight (share) of a part of the sum-total for the period under review, i is the number of gradations in the structures.

This coefficient is based on the differences in specific weights; however, it takes into account the specific weights of both periods themselves. No real meaning of the denominator can be noted as a drawback.

The Salai index:

$$K_d = \sqrt{\frac{\sum_{i=1}^{n}\left(\frac{d_i^1 - d_i^0}{d_i^1 + d_i^0}\right)^2}{n}} \quad (9)$$

where I_S is the Salai index; d_i^0 is a weight (share) of a part of the sum-total for the period under review; d_i^1 is the specific weight (share) of a part of the sum-total for the period under review, i is the number of gradations in the structures.

The advantage of the given indices is the availability of an upper and lower limit of values equal to 1 and 0, respectively, which allows us to use these indices to estimate the significance of quantitative differences in the structure according to two individual characteristics (Vecherova, 2014).

There is one disadvantage: the values of the index depend on the number of gradations. It cannot be calculated if the shares in each period of any group are equal to 0. In this case, the rules of elementary arithmetic will be violated: in the numerator of the radicand fraction, division by 0 will be obtained. In addition, if at least one share in one of the periods is equal to 0 (even if all the others are identical), then the value of this coefficient increases sharply and almost reaches 1 (Ashmarina & Fomin, 2009).

In order to improve the considered criteria and eliminate the shortcomings, the index of V. M. Ryabtsev was developed.

The Ryabtsev index:

$$I_R = \sqrt{\frac{\sum_{i=1}^{n}(d_i^1 - d_i^0)^2}{\sum_{i=1}^{n}(d_i^1 + d_i^0)^2}} \tag{10}$$

where I_R is Ryabtsev-index; d_i^0 is a weight (share) of a part of the sum-total for the period under review; d_i^1 is the specific weight (share) of a part of the sum-total for the period under review, i is the number of gradations in the structures.

The meaning of the Ryabtsev index is reduced to the ratio of the actual measure of the discrepancy between the values of the components of the two structures with their maximum possible value.

The main problem of using indices from socio-economic statistics is the lack of intuitive understanding and, as a consequence, the difficulty to choose one of them. The Ryabtsev and Gatev indices differ only in the denominator, but the lack of a clear interpretation does not allow us to give prominence to the one.

The calculation of the Salai index has a distinctive feature that can be seen as a disadvantage—its value varies greatly with the change of elements into which the total-sum is divided.

The most preferable with regard to the economic interpretation is the Ryabtsev index, which has a scale of values and does not overestimate structural shift, like the Salai index. One more advantage of the Ryabtsev integral coefficient of structural differences is, it does not depend on the number of gradations of the structure of the population.

To interpret the results, we use the scale for assessing the significance of structural differences proposed by V. M. Ryabtsev (Table 3.1, Ryabtsev & Chudilin, 2001).

Table 3.2 shows a summary analysis of the considered methods for assessing structural shift.

TABLE 3.1. The Scale for Assessing the Significance of Structural Differences by Ryabtsev-index

Range of Values IR	Measure Characteristic of Structural Differences
0.000–0.030	The identity of the structures
0.031–0.070	Very low level of structural differences
0.071–0.150	Low level of structural differences
0.151–0.3	A substantial level of difference of structures
0.301–0.5	A significant level of difference of structures
0.501–0.7	A very significant level of difference of structures
0.701–0.9	Opposite type of structures
0.901 and more	The complete opposition of structures

TABLE 3.2. Summary Analysis of the Considered Methods for Assessing Structural Shift

Methodology of Structural Shifts Assessment	Method Description	Advantages	Disadvantages
Calculation of basic indicators of structural shift: mass, speed, index, growth rate	Determination of the formal ratio of the economic system elements of, their properties, their correlation	Easy calculation, it reflects the dynamics of structural phenomena, the spreading speed of changes.	Determines the actual state of the economic system without identifying cause-effect relation.
Econometric models	Consecutive identification of structural shift using multivariate assessment, econometric models and tests.	It is possible to build forecast models, to determine to what extent structural shifts are based on a tendency, and to what extent they are only the result of irregular fluctuations.	The properties of methods for finite samples are examined mainly empirically. There are no studies on the optimality and asymptotic optimality of these methods, which complicates their use in econometric analysis.
Integral indicators and structural shift indices: • the Kazine+	The methods and indicators for assessing structural shift differ in the research tasks and in the complexity degree of the tools for carrying out calculations. The idea of the indices calculation is reduced to assessing the measure of divergence of structures in the period under review compared to the base.	The Ryabtsev index has a scale for assessing the significance of structural differences for interpreting the results. It does not depend on the gradation of the sum-total structure.	The indices of Kazinets, Gatev, Salai do not have a rating scale. There are no criteria for using the particular index.

CONCLUSION

Each of the methods for assessing structural shift and structural shifts has its upsides and downsides. The complexity of the analysis of changes in the economic systems structure lies in the lack of criteria and principles for the application of any of the methods. Each of the research methods should be applied in accordance with the goals, depending on the properties of the researched object and the available information about it. For conducting a comprehensive analysis of structural shift in the context of convergent technologies development, it is worthwhile to

use a set of methods based on assessing the structure of the main activities of economic systems, econometric analysis, calculating integral indicators and structural shift indices.

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CHAPTER 4

THE SYSTEM FOR MULTIPARAMETER ASSESSMENT OF STRUCTURAL SHIFTS UNDER THE DEVELOPMENT OF CONVERGENT TECHNOLOGIES

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This chapter offers methods that assess impact of convergent technologies on economic structural shifts and the system of indicators for transformational changes under the technological development condition. The system became the basis for an econometric analysis of interactions between structural shift impulse and potential.

The authors proposed a system for analyzing indicators of economic structural shifts caused by convergent technologies; it comprises two assessment units: impulse and potential of structural shifts. Both units are characterized by subsystems of multiparameter indicator sets that reflect the specifics of related structural and dynamic processes. In comparison to generalizing statistical indicators (indexes of structural differences, integral coefficients of structural shifts), this system includes indicators of convergent technologies' development efficiency and resources availability, cumulative effect level, implementation performance and activity as well as intensity of technological platform formation and demand for innovations.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 39–50.

Keywords: Structural Shifts; Assessment of Economic Structural Shifts; Multiparameter Assessment of Structural Shifts; Structural Shift Impulse; Structural Shift Potential.

JEL Code: C10, O10, O30

MATERIALS

The informational and empirical research basis defining structure and quality of indicators that are used for assessing structural shifts under the technological development condition includes data provided by the Federal Service for Intellectual Property, World Intellectual Property Organization, multiple Internet resources, statistical information of Russian and foreign informational agencies, reports and materials by auditing and consulting companies, World Economic Forum reports, Organisation for Economic Co-operation and Development data, scientific report abstracts (Fursov, 2012), expert reports ("Russia: Course to Innovation. Open Expert Analytical Report on the Progress in Implementing the "Strategy for Innovative Development of the Russian Federation for the period to 2020"; scenarios of innovational development and globalization of Russian and global economy published in print and online of the following materials: "Strategy for Innovative Development of the Russian Federation for the period to 2020", "Federal Targeted Program for Research and Development in Priority Areas of the Russian Scientific and Technological Complex for 2014–2020", "Russia 2030: Science and Technology Foresight"; state programs such as: "Economic Development and Innovative Economy", "Digital Economy of the Russian Federation", "Development of Science and Technologies for 2013–2020", "Information Society (2011–2020) national program", "Development of Pharmaceutical and Medical Industry for 2013–2020", "Development of Electronics and Radioelectronics Industry for 2013–2025", "Healthcare Development state program", "Education Development for 2013–2020", "Agricultural Development and Regulation of Agricultural Markets, Raw Materials and Products", "Development of Shipbuilding Industry for 2013–2030", "Development of Aviation Industry for 2013-2025", Russian Space Activity for 2013–2020 state program'; statistical data of the Federal State Statistics Service; documents on national and regional strategic development: "2020 Complex Program of Biotechnological Development in the Russian Federation", Council of Ministers Resolution No. 649 of August 2018, "On Establishing Nanoindustrial Development of the Republic of Tatarstan for 2018–2021", Resolution of the Cabinet of Ministers No. 241 of 04.09.2013 On approval of the long-term target program "Development of the nanoindustry in the Republic of Tatarstan for 2013–2016", The action plan ("roadmap") "Development of biotechnology and genetic engineering" for 2018–2020, Regional Program "Development of Biotechnologies in the Altai Territory for the period until 2020", Strategy "Chuvashia - Bioregion" until 2020).

METHODS

The reasoning of theoretical notions and conclusions was based on systemic approach and general scientific methods, structural-functional, subject-object, logical, statistical, comparative, quantitate and qualitative analysis. Analytical calculation methods, statistical and econometrical analysis methods, factor, regression and canonical correlation methods as well as graphical analysis methods of information analysis and visual representation were applied as research tools.

INTRODUCTION

Convergent technologies as a new technological development dominant make it necessary to apply specific indicators for assessing structural changes that characterize direct development of nanotechnology, biotechnology, information technology, and cognitive science (NBIC technologies) and enable to assess development level of technological clusters. Establishing such system of indicators has certain difficulties caused by lack of methodological reasoning of convergent technologies production content and sufficient time and space selection of indicators characterizing convergence and structural changes, thus determining variability of assessment scheme that depends on authorial concept and research aims.

Meanwhile, it seems reasonable to outline a group of basic technology development indicators. They include indicators of human resources formation, finances, infrastructure availability and development corresponding to the new technological paradigm and convergent technologies.

RESULTS

Sheer existence of structural shifts—and development of convergent technologies—determines the presence of specific indicators in the system that assesses structural changes in economic systems. These indicators demonstrate direct development on NBIC technologies and enable to assess development of particular convergent technology clusters.

Nowadays, Russia has several programs related to general scientific and technological development on national and regional levels as well as to development of specific industries, in particular breakthrough technology clusters. The analysis of innovational and technological development pointed out key indicators that enable to assess development level of convergent technologies and their impact on structural shifts.

Russian Science and Technology Development 2030 project (Russia 2030: Science and Technology Foresight, Jan. 3. 2014) was formed focusing on priority technologies and divides scientific research, markets, products and services by groups that include NBIC technologies.

The Innovative Development Strategy 2020 (of December 8, 2011, No. 2227-r) stipulates key indicators of Russian innovative development that clearly demonstrate two directions similar to the concept of structural shifts represented in

this research: the first group includes indicators characterizing economic system development impulse and conditions for establishing a platform developing innovations and promoting latest Russian scientific achievement worldwide; the indicators from the second group characterize results of innovation and innovational technologies development and implementation, i.e. structural shift potential.

The Federal Targeted Program for Research and Development in Priority Areas of Russian Scientific and Technological Complex for 2014–2020, adopted by Resolution No. 426 of May 21, 2013, of the Russian Federation Government, outlines key indicators characterizing publishing and patenting activity that show scientific potential development, growth of new workplaces that shows the demand for personnel skilled in new technologies, including interdisciplinary ones; as well as financial R&D expenses that demonstrate scientific activity intensity and development tendencies.

Programs for development of specific industries[1] provide the following indicators of new technological paradigm and NBIC development: aircraft production, including space vehicles; biofuel production (fuel granules and briquettes) from wood processing residues; transporting space objects into space; scientific testing and analysis (microbiology, biochemistry, bacteriology etc.); creation and application of databases and information resources including Internet resources; R&D activities in natural and technical sciences; share of scientific and technical products in the total production volume of space and rocket industries.

Alongside complex innovation development programs there are programs focusing on development of specific technologies. For instance, the Resolution on Nanoindustrial Development of the Republic of Tatarstan contains the objectives of nanoindustrial development in the region and indicators for result assessment, including: consumption and production volumes for innovative products, including nanotechnological products; the number of new nanoindustrial companies and infrastructural objects; the number of new nanoindustrial educational programs and trained specialists (Inshakova & Inshakova, 2020).

Biotechnology is one of the main trendsetters for the worldwide civilizational development. Application of biotechnologies solves the global geopolitical task of switching from non-renewable energy sources to renewable ones (Regional Program “Development of Biotechnologies in the Altai Territory for the period until 2020”, 2014). In addition to the main tools for Program implementation that provide “horizontal” measures for biotechnology development, other events (The action plan (“roadmap”) “Development of biotechnology and genetic engineering” for 2018–2020, 2018) focusing on leading biotechnology development directions provide “vertical” measures, with common goal of applying respective biotechnology.

[1] Development of Nuclear Energy Complex; State Program for Agricultural Development and Regulation of Agricultural Markets, Raw Materials and Products; Education Development; Development of Science and Technologies; Development of Pharmaceutical and Medical Industry; Development of Electronics and Radioelectronics Industry Healthcare Development; Development of Ship-building Industry; Development of Aviation Industry; Russian Space Activity etc.

The next set of indicators that must be taken into consideration while studying structural shifts and convergent technologies development is related to information technologies. Foreign researchers (Bahrini & Qaffas, 2019) assessed influence of information and communication technologies (ICT) and their specific components on work performance increase. An empirical analysis was conducted involving a sampling of 42 developed and developing countries for 2007–2016 period. Positive and significant impact of ICT growth is found in both samplings, with developed countries demonstrating a greater increase.

McKinsey Global Institute report (Manyuka et al., 2013) singled out 12 technologies that can cause large-scale economic changes in the nearest future. According to the report, application of 12 technologies in total can have a potential economic impact of 20–33 trillion USD in 2025 already (Figure 4.1).

Among targeted indicators of implementing Information Society state program (adopted by resolution No. 313 of April 15, 2014) it is worth pointing out the following: Russia's rank in the international IT development index; the share of population that uses digital state and municipal services; differentiation of Russian subjects by informational development internal index; share of population that does not use the Internet network for safety reasons and its decrease rate; specific weight of households having home access to the Internet in the total number of households; the number of highly productive workplaces in communication area.

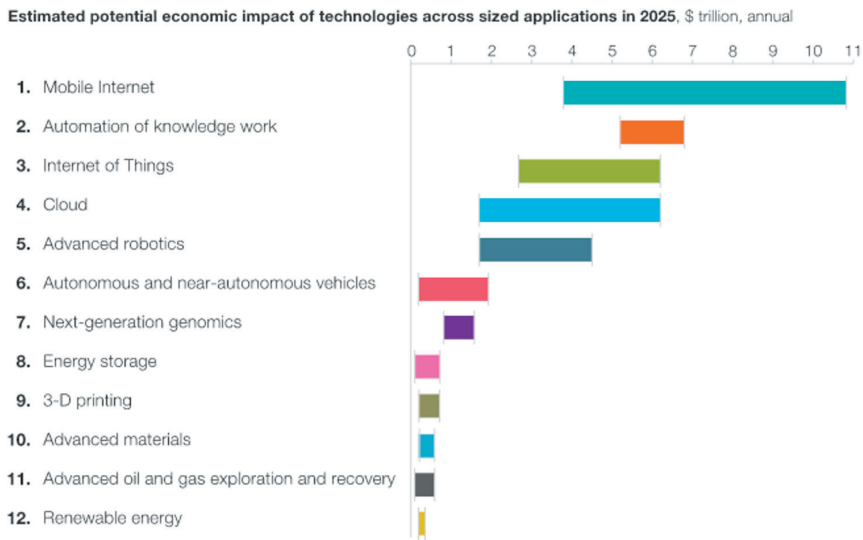

FIGURE 4.1. Estimated Potential Economic Impact of Technologies from Sized Applications in 2025. Resource: McKinsey Global Institute. Disruptive technologies: Advances that will transform life, business, and the global economy, 2013.

While the first three indicators relate to IT implementation efficiency, the others characterize structural shift impulse caused by IT development and spreading.

Despite a large number of targeted programs and strategies for innovational and industrial economic development (Frolova et al., 2018), establishing a system of indicators for convergent technologies' development has the following difficulties:

1. Establishing a conceptual scheme of indicators—it is hard to make a hierarchy of convergent technologies and put one of them on the highest level. Convergence itself involves active mutual interaction of technologies for making products and implementing NBIC technologies. This fact can be proved by formation of nano-bio, info-cognitive and various other interdisciplinary clusters (Furman, 2018; Shultz et al., 2018);
2. Difficulties of methodical analysis of convergent technologies, in particular related to defining nanotechnological products. It is obvious that inclusion of only "pure" nanoproducts would make production volumes in this area seem significantly lower than their actual values. Thus, it seems necessary to analyze products and services made using nanotechnologies and products including nanocomponents as an integral component (Fursov, 2012). This idea corresponds to the authors' concept of distinguishing resource support and implementation efficiency as separate indicator sets; and
3. The process of searching and selecting statistical data for assessing structural shifts, given the development of convergent technologies, requires a lot of time and financial resources. Statistical data collections provide relatively small data sets for NBIC technologies, in particular cross-industrial data. Some OECD countries are forming specialized clusters, e.g. a cluster of biological companies. The data on these clusters are regularly updated and amended but still do not guarantee complexity, relevance and representation of statistical observation. One of alternative approaches is the patent analysis enabling to assess current status of biotechnologies in Russia and their development tendencies (Streltsova, 2014).

Basing on the data provided by the Russian Federal State Statistics Service, Federal Service for Intellectual Property, World Intellectual Property Organization, Organization for Economic Co-operation and Development, national Programs and Development Strategies, the authors propose the following system for assessing indicators of structural shifts in the development of convergent technologies (Figure 4.2; Sukharev, 2012, 2019).

Indicators for structural shift impulse are characterized by two sets 1) indicators showing formation of a technology platform and demand and 2) indicators of resource support for technological development. The former set includes indicators demonstrating the need for acquiring and applying means of technological development and technological achievements in economic systems. The set of resource support indicators contains indicators demonstrating resources that

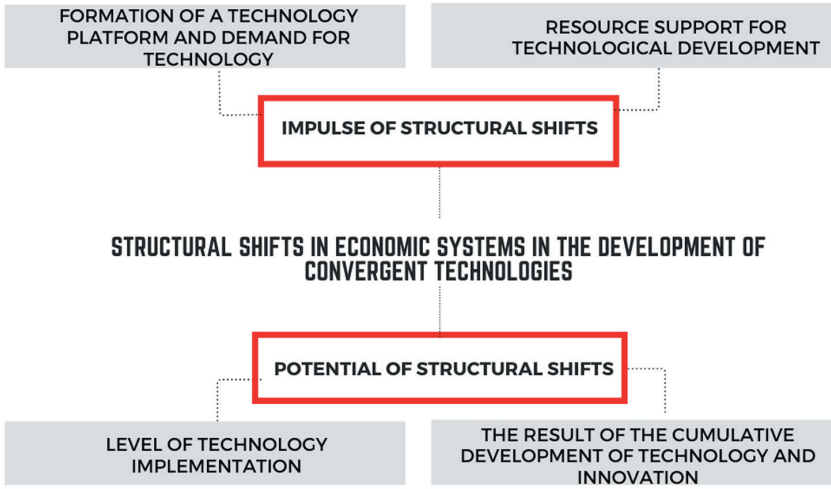

FIGURE 4.2. The System of Indicators Initiating Structural Shifts in Economic Systems in the Development of Convergent Technologies.

form technological platforms in the economy and includes intellect and knowledge resources, technological development funding, infrastructural support and indicators showing technological capacities of economic activity types. The main indicators belonging to this set are: total volume of orders for nanoindustrial production supply; ICT and tech innovation expenses; share of companies' expenses on technological innovations by activity type (Schwab, 2019).

The set of indicators for structural shift potential includes indicators demonstrating immanent application efficiency results for intellect and knowledge resources, human resources potential, cognitive management performance, results of NBIC development including cumulative development, as well as level of convergent technologies application and production represented by: specific weight of companies using special software, the number of applied and developed nanotechnologies, shipment volumes of innovative products, nanoindustry production by category etc.

Among statistical indicators enabling qualitative assessment of convergent technologies' development we underline the following: the number of developed nanotechnologies; the number of applied nanotechnologies; production of composite materials, biotechnological products, immunobiological medicines, optoelectronic (photonic) technologies; software development; specific weight of companies using specialized software including companies analyzed in the study.

It seems reasonable to use indicators of modernization potential (Kalinina et al., 2012) and technological basis development in general and for particular industries as indicators for assessing impulse and potential of structural shifts, de-

fining impact of subjects on socioeconomic system development and abilities to shift to new technological paradigms and initiate structural shifts to reasonably use modernization potential indicators. Such indicators demonstrate innovational development tendencies that characterize creation of convergent technologies, establishment of the fifth and formation of the sixth technological paradigm, with NBIC technologies as its key factors.

For assessing interaction of abovementioned indicator sets for structural shift impulse and potential we have performed a canonical analysis of indicators belonging to two sets for a sample of average Russian values. At the first stage we analyzed interrelation of indicators in order to revel multicollinearity. The results of correlation matrixes' analysis were used for performing a canonical correlation analysis for time-and-space sampling data involving indicators that characterize impulse and potential of structural shifts.

Obtained canonical value R is sufficiently large (0.96) and highly significant ($p<0.001$) (Table 4.1).

Values in Variance extracted line are equal to average variance extracted from variables in respective set that is averaged by all canonical roots. All 15 roots extract 100% variance from the left set (structural shift impulse) and 77.8% variance of the right set because the program extracts the number of roots exactly equal to the number of variables in the lesser set. This is why for one of the two analyzed sets there are as many canonical variables as there are initial variables in the set.

Estimated total redundancy values can be explained the following way: using the values of all canonical roots and estimating the values in the right set, it is possible to explain, in average, 54.1% of the left set redundancy. Likewise, it is possible to explain 37.5% of the right set redundancy using the left set values. These results demonstrate a strong interdependency between the two sets.

The system of indicators assessing structural shifts enables to assess structure of economic systems on any level. However, it does not reveal reasons and factors influencing this structure. Such reasons and factors are so vast that they require further development of theoretical and methodological basis for structural shift analysis (Korobova et al., 2002).

TABLE 4.1. Canonical Analysis Results

	Canonical Analysis Summary **Canonical R: .95744** **Chi?(315)=632.41 p=0.0000**	
	Left Set	**Right Set**
No. of variables	15	21
Variance extracted	100.000%	77.5854%
Total redundancy	54.1077%	37.4860%

CONCLUSION

The established system of indicators assessing structural shifts under the development of convergent technologies is based on applying innovational and technical potential, integrating parameters of convergent NBIC technologies formation; this enables an aggregated assessment of force, impulse and potential of structural shift as well as the cumulative effect of technology and innovation application.

According to the methods developed by the authors, the set of indicators for structural shift impulse is characterized by two subsystems:

1. Formation of a technology platform and demand for technology; and
2. Resource support for technological development.

The set of indicators for structural shift potential also has two subsystems:

1. Level of technology implementation; and
2. The result of cumulative development of technologies and innovations.

The relevance of methodology development for assessing structural shifts under the development of convergent technologies is determined by the economic necessity for switching to innovational development that inevitably causes structural transformations. According to requirements for complex assessment of Russian economic development, the list of indicators for structural shift impulse and potential includes indicators showing technology application level, innovational infrastructure condition, human resources provision, efficiency and promotion of scientific developments, innovation expenses volumes as well as indicators demonstrating nanoindustrial activity resists. The main factors showing impulse and potential of structural shifts that drive efficient development include the number of R&D organizations; the number of researchers with scientific degree; ICT expenses; internal R&D expenses; share of restructuring and modernization investments in the total capital investment volume; the total number of orders (contracts) for nanoindustrial products supply; the number of state-of-art production technologies applied; the share of shipped innovational products in the total volume of shipped products; the number of completed R&D, experimental design and experimental technological works related to nanotechnology, etc.

For assessing interrelation of impulse and potential indicator sets of indicators for structural shifts, the authors performed a canonical analysis. Its results demonstrate a relative strong mutual dependency between variables of two sets and confirm the relevance of including these selected indicators for assessing impulse and potential of structural shifts.

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CHAPTER 5

ANALYZING STRUCTURAL SHIFTS AND ASSESSING STRUCTURAL DIFFERENCES IN ECONOMIES OF DEVELOPED AND DEVELOPING COUNTRIES

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The article provides results of structural shift assessment for economies of developed and developing countries in terms of convergent technology and innovational activity development. Formation of convergent technologies is a prerequisite for economic shift towards a new technological paradigm. Influenced by scientific and technological progress, cyclic economic development and other factors, industrial structure undergoes quantitative and qualitative changes eventually leading to structural shifts. The article describes main structural shift processes that happen in developed and developing countries in terms of technological development. The significance of structural shift for Russia was estimated using the Ryabtsev index with a structural shift scale. The monitoring Russian economic structural shifts in 1990–2016 was provided involving such indicators as gross valued added, employment rate of economically active population and fixed assets investments by economic activity type.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 51–63.

The dynamics of economic systems' extended typology based on structural changes by indicators like gross valued added, employment rate of economically active population and fixed assets investments by economic activity type enables to identify structural changes caused by technological development of economic systems.

These structural shift characteristics demonstrate a negative dynamic for agricultural and processing industries. Indices of structural changes in Russian economic system estimated for a longer period of 1990–2011 that includes rise and decline phases of the fifth long wave of economic cycles confirm the presence of structural shifts in Russian economy.

Keywords: Structural Shifts; Economic Structure; Structural Differences of Economic Systems; Structural Shift Analysis; Structural Economic Transformation.

JEL Code: O10, O11, O14, O40, O50, P23, P52

MATERIALS

Economic and statistical approaches to production dynamic and structure analysis are provided by A. Nechaev and Y. Yaremenko.

Attention to structural problems intensified in Russian economic science in the transformational period spanning recent decades. The fundamental works include studies of technological paradigms by S. Glazyev, D. Lvov and microgeneration evolution research by V. Mayevsky. Besides, a large contribution to theory and methodology of structural shift research has been made by E. Balatsky, O. Belokrylova, V. Bessonov, I. Botkin, K. Gizatullin, L. Dedov, O. Izryadnova, O. Inshakov, O. Krasilnikov, S. Lyubimtseva, V. Lyalin, A. Notkin, L. Strizhkova, V. Kapustin, P. Usaty, G. Chitaya, I. Sharkevich, O. Etkalo.

The influence of structural policy on economic growth rate is analyzed by D. Rodrik, M. McMillan, V. Mironov, L. Konovalova.

An attempt to assess structural changes and their direction in developed economies (the USA, Canada, Japan, S. Korea, Finland) has been made by A. Akayev, A. Sarygulov, V. Sokolov.

Issues of structural policy methodological reasoning, as well as its development and implementation principles, can be found in studies by M. Ksenofontov, D. Lvov, A. Martynov, A. Mokronosov, V. Smirnov, N. Chernenko, O. Etkalo, Y. Yaremenko.

Estimation of indicators for assessing structural shift in Russian economy is based on primary Russian statistical data, collection of statistical data for Russian territorial subjects, periodical and methodical literature, online resources. Also, this research uses information from HSE University and UNIDO analytical reports.

METHODS

The research methodology involves qualitative analysis, statistical, graphical and tabular methods. Besides, among specific scientific methods applied for this research, special attention is given to comparative analysis and structural shift assessment methods: multidimensional analysis, mathematical and imitation modeling, econometric modeling, input and output data analysis, nonparametric estimation, time series models, direct comparison etc.

INTRODUCTION

One of the main factors of economic system development from the structural shift initiation standpoint is technological development (Inshakova et al., 2019). For instance, Robert Solow proved that technical progress implemented though innovations is the main source for economic growth that provides over ¾ of modern economy growth rate (Akayev & Rudskoy, 2014).

Convergent technologies influence market conditions and business development opportunities, thus they must be included in innovation policy of economic subjects.

Meanwhile, for achieving economic development, even in case of rapidly changing conditions and technology implementation, two development challenges must be overcome (McMillan et al., 2017):

- The "structural transformation" challenge of ensuring that resources flow rapidly to the modern economic activities that operate at higher levels of economic productivity; and
- The "fundamentals" challenge of accumulating the skills and broad institutional capabilities needed to generate sustained productivity growth, not just in a few modern industrial sectors but also across the entire range of services and other activities.

Researchers note (McMillan et al., 2017; Rodrik, 2003) that many countries focusing primarily on structural policy (while ignoring institutional development and other basics), demonstrate an unstable economic growth; however, in certain periods their growth was relatively fast (in particular in Vietnam). The countries that concentrated on long-term development fundamentals (human capital investments, development of market institutions and infrastructure) and macroeconomic stabilization succeeded in certain aspects but were unable to achieve high growth rates (some Latin American countries). South Korea, Singapore, Hong Kong (and Japan before that) managed to reach a balance between development of basic and ensuring macroeconomic stabilization one the one side and structural policing on the other (Mironov & Konovalova, 2019).

The necessity for changing the model of economy functioning through a system of structural reforms is declared in documents of many economic groups attempting to shape the "architecture" of Russian long-term economic policy.

Development of Russian economy in the last quarter of the century was determined significantly by scope and speed of transformations in industrial production structure and related changes in proportions of incomes and prices (Frolova et al., 2019).

As a result of such changes, Russian economy became a unique system that relies heavily on the capital formed in the Soviet era but is functioning primarily by market economy principles (Shirova, 2018).

The technical determinant of structural changes makes it necessary to establish the methods of their monitoring in economic systems in terms of convergent technologies development, with a specific feature of consolidating general and specific approaches to assessing structural shifts and changes (Trade and Development Report, 2016).

RESULTS

Structural Shifts in Economies of Developing and Developed Countries

Global economy is undergoing a transformational process due to multiple diverse factors and conditions: economic and political, institutional and spatial, technological and financial, organizational and managemental. Their simultaneous effect is reflected in macroeconomic development indicators, primarily in gross domestic product and its derivatives (Zeileis et al., 2005).

UNCTAD outlines three main tendencies related to economic growth and GDP increase that enabled to transform global production since late 1980s (Trade and Development Report, 2018):

- Steady slowdown of GDP dynamic in developed countries;
- High economic development indicators in several Asian countries; and
- Uneven (in terms of time and territory) economic growth in other developing countries.

For three decades, global industrial development has been demonstrating certain tendencies determining main directions and depth of structural shifts in production and its location (Varnavsky, 2019):

- Reduced protectionism, elimination of foreign trade obstacles;
- Increasing output coupled with decreasing number of enterprises;
- High performance growth rate;
- Reduced employment rate in developed countries;
- Reduced production cost, transaction, logistics and other expenses; and
- Relocation of capital and production from developed economies to developing ones.

Formation of these tendencies was influenced by several production factors including large-scale ICT application; global automation and robotization; nanoindustrialization; advanced growth of services.

All these tendencies and factors combined led to deindustrialization of developed countries and significant decrease (almost by ¼) of processing industry share in in the world economy—from 20.1% in 1990 to 15.6% in 2015 (by value added) as well as to an increase of role and influence of developing countries in industrial development (Varnavsky, 2019).

The most important structural shifts in global industrial production and its location in the analyzed period can be considered the following:

1. Emergence of ICT industries as a new statistically relevant and powerful in its general economic and social influence complex.
2. Shift of industrial companies in developed and developing countries to new technologies, business models, management mechanisms and production systems that involve ICT, electronic control systems, logistics, automated lines, industrial robotics.
3. Changes in spatial structure, i.e. location of centers of global industrial production and production powers. Deindustrialization of developed economies. Liquidation of insufficiently competitive companies. Partial relocation of costly heavy industry, light industry and knowledge-based companies from developed counties to developing ones.
4. International fragmentation of production, outsourcing, formation of global value chains with active inclusion of developing countries.
5. Loss of leading positions in global industrial production by the US, Japan and the EU, with China becoming the world leader in terms of processing industry production and export rates.

According to UNIDO, in 2016 the main regions having the share in the global processing industry production were the following (%): developing and newly industrialized countries (NICs) of Asia Pacific region—33.9, Europe—25.1, North America—17.4, Latin America—6.2. Advanced development of processing industry is typical only for a relatively small group of countries that have emerging industrial economies. These countries are mostly responsible for processing industry production growth: if in 1991–1995 NICs made 20.3% of the world's processing industry products, in 2011–2015 their share rose up to 37.6%.

Global value added for processing industry reached 11.9 trillion USD in 2015 (as of 2010 fixed prices). Its biggest share still belongs to industrially developed countries (including Russia, according to UNIDO classification); however, the center of global processing industry keeps shifting towards NICs. Specific weight of developed countries in global processing industry decreased from 76% in 1991–1995 to 56.4% in 2015.

Processing industry remains an important driver for economic growth due to its high absolute performance level, cost-saving production scope, innovativeness,

direct and reverse cross-industrial relations, opportunities for easy integration into global production systems (providing transfer and absorption of breakthrough technologies) and positive effect on social (in particular in terms of income inequality) and environmental production friendliness (Szirmai, 2012). A developed processing sector supports general economic growth by extending growth episodes and reducing general volatility (United Nations Industrial Development Organization, 2015). Besides, empirical data demonstrate importance of sectoral export structure and its complexity level for stimulating economic growth in general (Hausmann & Hidalgo, 2011), emphasizing the necessity for a developed processing industry and complementary services for maintaining its complexity.

Thus, a common tendency of global economy structural changes in recent decades is growth of services industry coupled with relative stability (due to the situation in China) of processing industry that together with complementing industry of highly productive services remains a vital driver for economic growth. Meanwhile, diversification of national economies, although pursued as a desirable target by many economic regulators, is not viewed by the new structural economy concept as a process that must be imposed by any means necessary. Diversification is less of a goal than an effect of economic growth and its initiators, i.e. structural changes that occur basing on state-supported creative destruction involving modern structural policy tools.

An important new factor concerning economic regulators' activities in developing countries is that any analyses of changes in industrial economic structure and structural policy are now perceived as approaches supplementing traditional analysis and economic support (based on diverse endogenic growth and Solow) (Mironov & Konovalova, 2019).

According to the HSE University Analytical Report (HSE University, 2018, I, p. 27) and the econometrical analysis data it provides, the main drivers for economic growth in developing countries are (in descending order of significance according to regression coefficients) processing industry, state services and trade, while in developed countries leading drivers are trade, processing productions and, to a lesser extent, transport.

Analyzing Structural Shifts and Structural Differences in the Russian Economy

Changes in Russian economic system structure and their structural differences were distinguished and assessed using three indicators: gross value added (GVA), employment rate and fixed asset investments by economic activity type.

Structural GVA shifts were estimated by economic activity type using the Ryabtsev index for several reasons: 1) the Salai index cannot be calculated for some sets due to impossibility of division by zero; 2) the Ryabtsev index has a scale assessing significance of structural shifts.

In order to define industries which changes cause transformations in the GVA industrial structure, we calculated structural shift indices, mass and speed in Rus-

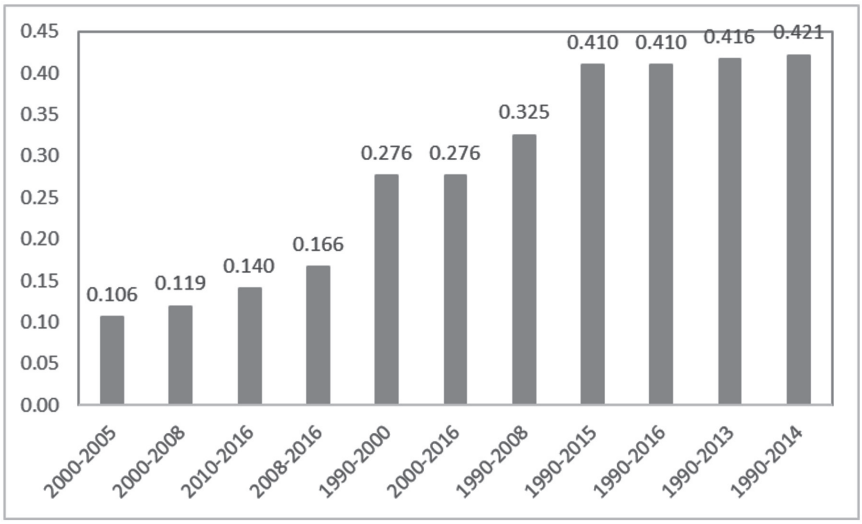

FIGURE 5.1. The Ryabstev Index Dynamic for Russian GVA Indicator by Economic Activity Type (2000–2016). Source: prepared by the authors using Federal State Statistics Service data (2018).

sia in general and by federal district for 2004–2016 period (GRP by economic activity type, 2018).

Estimation of the GVA structural shift mass by federal district industries demonstrates that the shift mass of agricultural industry is negative for all federal districts and for the whole country in average. This means the share of this industry in the GRP structure is decreasing, just like the share of processing industry. As a result, these two industries have the lowest structural shift speed. Reduction of structural shift index and speed in agricultural and processing industries confirms their stagnation and reduced share in industrial structure of regional economic systems.

Positive dynamic is demonstrated by such industries as construction, real estate operations, state management, military defense, education, healthcare, provision of utility, social and personal services.

The analysis of Russian industrial economic structure in 1990–2016 (Table 5.1) that covers several technological paradigms shows that structural change coefficient for 2016 (by the Ryabtsev index) is 0.410 in relation to 1990 data (Figure 5.1). This demonstrates a significant difference between these structures. (Russian Regions. Socio-Economic Indicators, 2007; Russian Regions. Socio-Economic Indicators, 2008; Russian Regions. Socio-Economic Indicators, 2009; Russian Regions. Socio-Economic Indicators, 2010; Russian Regions. Socio-Economic Indicators, 2011; Russian Regions. Socio-Economic Indicators, 2012; Russian Regions. Socio-Economic Indica-

TABLE 5.1. Russian GVA Structure by Economic Activity Type (1990–2016)

Activity	1990	2000	2005	2008	2011	2014	2015	2016
Agriculture, hunting, gathering, fishing	17.8	6.8	5.0	4.4	4.3	5.0	4.7	4.8
Construction	10.2	6.6	5.3	6.3	6.5	7.0	5.9	6.2
Processing industry	26.5	22.3	18.3	17.5	16.0	14.4	14.1	13.7
Natural resources	13.3	10.5	14.5	12.3	14.4	10.6	9.8	9.4
Transport and communication	10.4	9.1	10.2	9.3	8.9	9.3	7.3	7.8
Wholesale and retail trade	6.6	23.9	20.4	21.3	20.0	19.0	15.8	15.9
Other	15.2	20.9	26.3	28.9	29.9	34.7	42.4	42.2

Source: prepared by the authors using Federal State Statistics Service data (2018).

tors, 2013; Russian Regions. Socio-Economic Indicators, 2014; Russian Regions. Socio-Economic Indicators, 2015; Russian Regions. Socio-Economic Indicators, 2016).

Figure 5.2 shows Russian industrial structure for 1990–2016 period, during which the share of wholesale and retail trade increased in 2.5 times while the share of agriculture decreased in almost 3 times. Also, within this period the processing industry share sank by 51%. Judging by statistical data and structural differences dynamic of Russian economy (as shown by Figure 5.1), we can estimate that the most significant changes in industrial structure happened in 1990–2014, i.e. during the transitional period of Russian economy.

Such significant structural differences in economy within the analyzed 20-year period can be explained by comparing structures belonging to rising and declining phases of the fifth "post-Kondratyev" long wave (Sadovnichy et al., 2012). In 2016 economy was entering the declining phase while in 1990 it was rising—this causes significant level of structural differences between economic systems as well as their belonging to different economic cycle phases. This confirms the impact of new key development factor on existing economic structure.

When distinguishing structural transformation, we need to analyze employment structure, because employment issues have always been a key component of economic policy (Kolesnikov & Darmilova, 2014). Transformational processes of Russian economy in the 1990s caused adjustment of state priorities related to employment, with their focus shifting towards criteria like efficiency and structural rationality. This circumstance is especially significant for economic systems with a deformed economic structure. It is no coincidence Russian federal targeted programs for employment support systematically underline that "state policy aimed at efficiency growth and acceleration of structural shifts in employment must ensure that executive authorities take active measures for overcoming… economic crisis and preparing respective development programs" (Milyaeva, 2012).

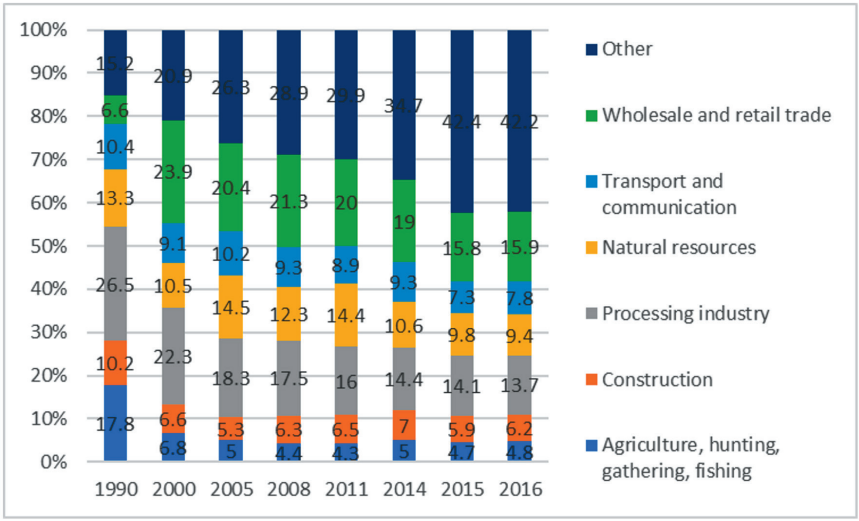

FIGURE 5.2. Industrial Structure of Russian Economy (1990–2016). Source: prepared by the authors using Federal State Statistics Service data (2018).

Evidently, an efficient employment policy should consider shifts in employment structure by activity type.

Figure 5.3 demonstrates that employment rate among economically active population is decreasing in agricultural and processing industries, with employment rate respectively rising for trade and real estate operations. This corresponds to structural GVA shifts for the analyzed period.

Figure 5.4 provides estimation results of structural economic changes by employment indicator for 1990–2016 period. A significant difference level can be explained by growing structural shift mass in such industries as trade, real estate operations, financial activities.

The structural shift analysis would be incomplete without estimation of investment changes by economic activity type. Figure 5.5 provides the generalized diagram of Russian economy structural shifts basing on the Ryabtsev index estimations for GVA, employment and investment by activity type for 1990–2016 period. Judging by statistical evidence and industrial structure dynamic for analyzed indicators, we can conclude that every year structural changes are growing compared to 1990 and this growth reflects changes in industrial economic structure.

Employment indicators have the smallest structural shifts—this can be explained by smaller mass and speed of employment structural shifts. On the contrary, investment indicator demonstrates the biggest structural shifts because it provides the fastest response to changes.

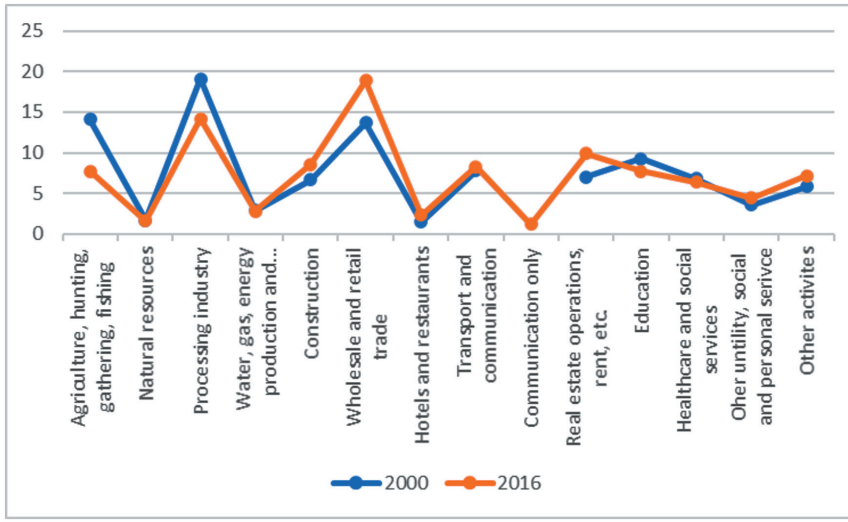

FIGURE 5.3. Average Annual Employment Rare in Russia by Economic Activity Type in 2000 and 2016. Source: prepared by the authors using Federal State Statistics Service data (2018).

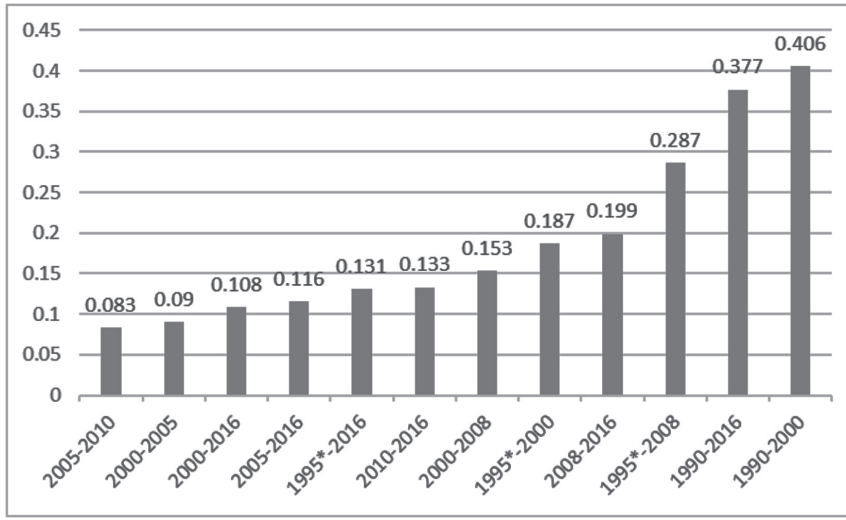

FIGURE 5.4. The Ryabstev Index Dynamic for Russian Employment Indicator by Economic Activity Type (1990–2016). Note: *the FSSS data for 1995 does not provide information for all industries. Source: prepared by the authors using Federal State Statistics Service data (2018).

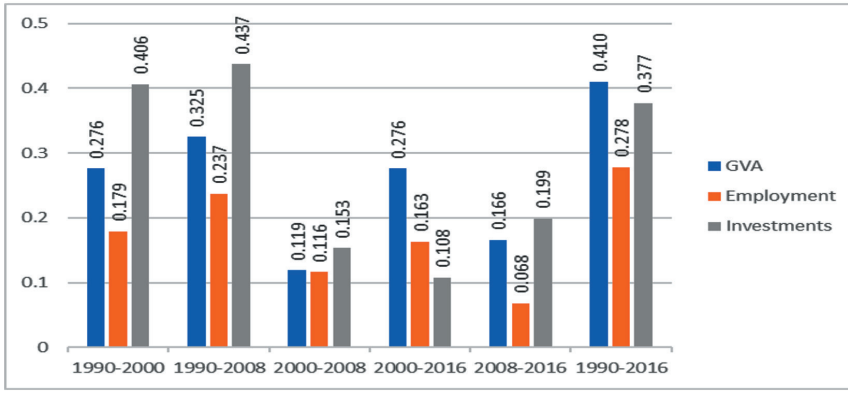

FIGURE 5.5. The Ryabstev Index for Russian GVA, Employment Rate and Investment Indicators by Economic Activity Type (1990–2016). Source: prepared by the authors using Federal State Statistics Service data (2018).

CONCLUSION

Given the global experience and diversification of Russian regions, we may note that the national economy can develop its structural policy measures using either new structural economy methods (Berglof et al., 2015; Lin & Rosenblatt, 2012) (for federal-level projects, underdeveloped regions or regions with monoindustrial economy, primarily related to raw materials) or "smart specialization" approaches (Berglof et al., 2015) for regions meeting requirements for basic sectors that could become primary links of cluster formation (HSE University, 2018; Mironov & Konovalova, 2019).

The analysis of structural changes enables to assess structural shifts and economic structures in relation to processes in other economic regions or economic subjects in general and to reveal specifics of economic structure and its changes. However, such an analysis does not demonstrate causal relations that could explain changes in economic structures. This makes it necessary to provide further development of theoretical and methodological basis for transformational process analysis.

The assessment and analysis of national and regional economic structures are essential for a balanced reduction of inequalities in economic development and technological structural changes. The qualitative analysis and assessment of national and regional economic differentiation and technological development are prerequisites for providing effective recommendations to state management agencies on flattening disproportions and inequalities and on sustainable usage of innovational and technical potential for achieving positive structural processes and shifts.

ACKNOWLEDGMENT

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CHAPTER 6

DEVELOPMENT OF DIGITAL TECHNOLOGIES FOR DISPUTE RESOLUTION OF ECONOMIC ENTITIES AS A MEANS OF INCREASING ECONOMIC STABILITY

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Peoples' Friendship University of Russia

The research goal of this scientific work is to identify trends related to the use of digital technologies in the process of resolving disputes between business entities. Trade cooperation between countries is the first to feel the changes associated with the transition to an electronic form of interaction, and therefore needs a clear and predictable mechanism for protecting the interests of the subjects involved in this process.

It is proved that: 1) legal regulation of the use of technical means in methods of protection of rights and legitimate interests, often does not correspond to modern realities; 2) it is necessary to regulate the process of dispute resolution using digital technologies by law; 3) the creation of a single information space where market participants would be connected, as well as mechanisms for resolving commercial and

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 65–73.

other disputes related to business activities, can significantly increase the growth of economic cooperation; 4) it is necessary to create a transparent method for resolving commercial disputes; 5) the introduction of new modern technologies increases the efficiency of the dispute resolution process; 6) the global trend in reforming the dispute resolution process is the transition to the use of artificial intelligence, as well as" smart " technologies; 7) there is a gravitation not only to online (Internet, electronic) alternative methods of dispute resolution, but online (Internet, electronic) judicial form of legal protection.

International trade cooperation within the framework of the associations of States of the EAEU, BRICS, APEC, and SCO countries is aimed at moving to advanced digital, intelligent manufacturing technologies, robotic systems, new materials and methods of construction, creating systems for processing large amounts of data, and implementing artificial intelligence. For successful economic cooperation, it is necessary to create a single digital space, however, this goal affects not only the private interests of investors, but also the public interests of these States, so achieving a balance is extremely difficult. Close economic cooperation should also be provided with modern innovative mechanisms for dispute resolution.

Keywords: Internet Court; Alternative Dispute Resolution Methods; Financial Disputes; Digital Space; Online Dispute Resolution; Internet Platform; Cloud Technologies; Information Security; Russia, EU, China, Australia.

JEL Code: K40, K41, D18, A14, K24

MATERIALS

The basis of the regulatory framework of the study is the Russian Legislation Concern.

The doctrinal positions that formed the theoretical basis of the study were studied thanks to scientific works devoted to the phenomena of digital (electronic, virtual, network) development, which has become a part of everyday life, which is reflected in the legal consolidation: Tarakanov et al. (2019), Rusakova et al. (2019a), Rusakova et al. (2019b), Akhyadov et al. (2019), Shartava et al. (2019).

The impact of the digital economy on the state of civil society has been reflected in the works of such authors as: Shakhova et al. (2019), Giriuniene et al. (2019), Inshakova et al. (2020).

The procedural basis for using alternative methods was studied by the authors, in the works of the authors: Rusakova et al. (2019a), Rusakova et al. (2019b), Gaivoronskaya and Miroshnichenko (2019).

METHODS

The study used: a method of analyzing retrospective data describing the development of the information economy and electronic payments, a method of statistical observations, as well as comparative analysis, which was used to study the use of Internet platforms for dispute resolution, as well as Internet courts in Australia, China and other countries, as well as methods of cause-and-effect and system analysis, which allowed to highlight the main positive and negative aspects of the use of digital technologies in judicial form and alternative dispute resolution methods (Frolova et al., 2019). On the basis of dialectical methods of learning online, Internet and electronic dispute resolution procedures, directions for the introduction of such mechanisms in Russia were formulated.

INTRODUCTION

Today, digitalization has transformed from one narrow area to a large-scale change in traditional economic models, which affects both the development of integration and the macroeconomic stability of the interstate associations in which the Russian Federation participates: the EEU, BRICS, APEC, SCO, and a number of others (Akhyadov et al., 2019).

The search for new investment sources and the active development of digital startups, many of which require initial fundraising for development, have led to the emergence of new models of relationships that now function outside the legal framework ((Gaivoronskaya & Miroshnichenko, 2019). This fact, in turn, is a rather serious problem, since the absence of a legal corridor, on the one hand, prevents the free development of private legal relations related to attracting investments, on the other hand, allows using elements of the digital environment as mechanisms for withdrawing funds, blurring the tax base, carrying out fraudulent actions and other criminal acts (money laundering, sponsoring terrorism) , etc. For the Russian Federation, as well as for many partner countries, these problems are particularly relevant since they are an obstacle to achieving the goal of bringing economies closer together and ensuring the freedom of movement of capital across the territories of these associations.

The report "Cryptocurrencies and blockchain as attributes of the new economy," published on 22.07.2019 by the Eurasian economic Commission on the official website, identifies two possible approaches to regulating digital assets within the framework of cooperation between the EAEU countries. The first is to develop a fundamentally new legislation that is close to the requirements of the new digital economy. In this scenario, cryptocurrencies and blockchain will only be part of a system of more global regulation of the digital sphere (Fomicheva et al., 2019). In accordance with the second approach, it is proposed to introduce the regulation of new institutions into existing legislation of countries. Thus, each

of the regulatory models carries a possible balance of interests with respect to guarantees of the rights of individuals, on the one hand, and protection of public interests, on the other (Frolova et al., 2019).

RESULTS

Cloud Technology: Application Prospects

One of the priorities of the Russian Government is the topic of high technologies, including cloud technologies, which are beginning to penetrate both business structures and the state sphere. This process is already very active in the world-in the United States of America, China, Japan and the European Union. That is, in fact, it is already a phenomenon of the modern world. The development of such technologies makes it possible to accumulate and analyze huge amounts of information, and cloud storage allows you to save resources significantly at the same time.

Currently, there are no clear indications in the legislation on the legal nature of contracts for the provision of "cloud" services, in this connection, neither in judicial practice nor in the doctrine has been developed a single opinion on this issue. Consensus-building is also difficult due to the lack of a generally accepted definition of "cloud" services, as well as the diversity of their types and models.

As the development of cloud technologies, there is a fairly large number of ways to use them (using cloud technologies to provide banking services, spot-cloud-creating a spot market for cloud resources, creating and using cloud operating systems, cloud outsourcing of business applications, etc.).

The advantages of using cloud technologies are: 1. Security—this technology allows you to provide a high level of control over information when it is transferred to the cloud compared to traditional methods of storing it; 2. Low cost—the user of cloud services pays only for using the cloud itself, but do not pay for its IT support; 3. Availability of information-by placing information in the cloud, the user can use it anywhere in the world, if they have access to the Internet (Fomicheva et al., 2019).

In addition to the advantages, the emergence of these technologies entails some threats to society: 1. The emergence of ("cloud") monopolists—providers of cloud resources; 2. Dependence of the security of information and services used with the help of cloud technologies on provider companies; 3. The presence of foreign elements (the provider; the owner of the equipment; the operator, engaged in personal data processing) in the integration and use of cloud technologies; 4. Security of data placed on the public cloud and responsibility of the owners of public clouds.

The transition of all spheres of public relations to a figure is one of the most important tasks facing all countries of the world. Resolving issues of legal support for the digital transformation of international relations within the framework

of economic integration is a necessary factor for the progressive development of cross-border trade, services and capital flows (Giriuniene et al., 2019).

Successful foreign experience in applying digital technologies shows that all participants in this process are successfully connected on one trading platform. This approach has proven effective by increasing market growth, increasing competition and attracting a huge number of players (Rusakova et al., 2019a).

Chinese Experience: Member States Interstate Economic Associations

China is a leader in digital transformation, but in order to achieve more successful cooperation, it is necessary to develop a special mechanism that would resolve disputes arising from such transactions. A common trend for resolving commercial, financial and other disputes is the introduction of high technologies in the dispute resolution procedure.

As one of the world's leaders in dispute resolution, China continues to set the tone in dispute resolution trends, and this time it has taken a different path than neighboring countries.

But the most innovative step was the creation of Internet courts (there are already three of them), where legal proceedings are completely conducted in a digital format. We are talking not only about video conferencing and the possibility of submitting procedural documents to the court in electronic form, as is currently the case in the Russian Federation, but also using specific means of proof, as well as making an electronic court decision.

Internet courts in Hangzhou, Beijing, and Guangzhou are competent to handle civil and administrative cases as a first-instance court at the level of city courts that arise as a result of Internet use, namely, disputes:

1. From online sales contracts, online services, and small financial loans;
2. Related to copyright infringement on the Internet;
3. Violations of personal rights on the Internet;
4. Related to the liability of the manufacturer of goods under online sales contracts;
5. Disputes about domain names on the Internet; and
6. Administrative disputes arising in connection with the management of the Internet.

Regarding to the procedure, the Hangzhou Internet court has created a special platform for online dispute resolution, which uses digital technologies, so that several actions can be carried out online court proceedings. This includes filing a complaint, making a statement of claim, managing the process, conducting mediation, presenting evidence, conducting direct and / or cross-examination, pre-trial preparation of the case, trial, adjudication and enforcement, and others (Rusakova et al., 2019b). Through the Internet, the parties directly present their

claims to each other, as well as exercise other rights, such as making petitions. Moreover, the process itself is conducted at a remote distance, the main condition is the availability of high-speed Internet and technical means (Tarakanov et al., 2019). The court's decision is also sent in electronic form.

Currently, a mobile version of Internet courts is launched for the convenience of users, which is available 24 hours 7 days a week. Such a regime has a serious advantage over legal proceedings, which are conducted in the normal mode. In addition, it is designed to reduce the workload of businesspeople and improve the efficiency and speed of legal proceedings.

The main concept of creating digital justice is the creation of a mechanism in which a person who has applied to the court can receive judicial protection "without leaving home."

According to statistics from March to October 2019, more than three million users took legal action in the Hangzhou Internet court, which once again proves the popularity of this method of dispute resolution compared to others.

The creation of Internet courts is associated with a sharp increase in mobile payments, the growth of online Commerce and the number of Internet users (currently about 850 million).

In addition to procedural advantages, Internet courts are created on a single information platform based on blockchain technology. as a result, all user actions performed are saved in a certain sequence and belong to the same group (Shakhova et al., 2019). The technology allows you to check and store transaction records safely, and for the judicial system to reduce paperwork and make the process transparent.

A single information space also involves connecting all business activities on which transactions are made, for example: with legal proceedings or financial institutions, this makes it possible to track all actions performed by users registered on this platform, which greatly facilitates the dispute settlement procedure.

Currently, in China, there is an approach according to which, if judicial protection was delayed, then justice was denied. Therefore, for people who are engaged in business, this approach is more acceptable, since the terms of all procedural actions are clearly defined, and the so-called "human factor" is minimized.

It should be noted that alternative ways of resolving disputes also remain popular in the era of the 4th industrial revolution. For example, the Internet court in Beijing offers users not only an online trial, but also a mediation procedure. The essence of this procedure is to find a mechanism for resolving a dispute, rather than making a binding decision by its parties. The main goal here is a peaceful resolution of the dispute, the conclusion of an agreement, at least on certain requirements. The entire mediation procedure is also carried out using digital means.

It should be noted that most of the actions performed do not involve a human judge, but a special program, that is, artificial intelligence prevails. The next step will be the creation of "smart ships" that will not have a person, but only work, and here China already claims that such technologies have been created.

Referring to foreign experience, many countries are actively implementing digital technologies in the field of dispute resolution, this is due to economic reasons. Businesses need fast and adequate ways to resolve disputes, so there is a tendency to use high technologies in this process.

Foreign Experience

There is eCourtroom online (courtroom) for registered users, which is used by judges and court registrars to assist in the management and review of cases in the Federal court of Australia or the Federal circuit court of Australia, for example, giving verbal orders and orders at common law, moreover, this online hall provides the parties with the possibility of electronic filing of documents, records of all communications between the presiding judicial officer and the parties, which can then be listened to by the parties. Conducting cases in a virtual courtroom is equivalent to a normal case review.

In countries such as Japan and Singapore, there have been state programs for creating a digital state for many years, and China and South Korea have adopted their own programs for introducing digital technologies into many social institutions: the state and the family, culture and science, law and education, and others. Japan has followed the path of adopting the basic principles of society based on information and communication, and it has also taken steps to build a digital society and a digital state.

Singapore has established online litigation platforms where registered organizations or individuals have access to online proceedings in courts of General jurisdiction, family courts, and Higher courts, as well as other online services.

CONCLUSION

In the Russian Federation, according to the Decree of the President of the Russian Federation dated May 7, 2018 No. 204 "on national goals and strategic objectives for the development of the Russian Federation for the period up to 2024," the national program "Digital economy of the Russian Federation" has been approved, which provides for universal digitalization, including legal proceedings. The stages of this process are extremely slow, and may not be noticeable to citizens and organizations, however, the introduction of digital technologies in legal proceedings should be a deliberate and verified step. In addition, social guarantees must be provided and secured for citizens to implement the principle of access to digital justice, otherwise, the effectiveness of this process will remain only on paper (Inshakova et al., 2020).

Achieving the set goals and objectives is possible with close collaboration of representatives of the legislative, judicial and Executive authorities to find the most effective approach.

The active introduction of digital technologies in legal proceedings and other ways of resolving disputes is a balance between the interests of business entities and the state. Otherwise, the parties to foreign trade transactions will choose the country and the dispute resolution mechanism that will be more in line with international experience, and the global trend is the transition of this process to a digital form.

The goals and objectives of the dispute resolution process are changing by creating electronic platforms where the process of proving and reviewing disputes is significantly reduced due to transparency and simplification of this process.

Through the adoption of strategic programs and their implementation, the state can attract huge investments to its economy and move from one stage of development to another—innovative and effective.

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CHAPTER 7

ENSURING ECONOMICAL RESILIENCE IN THE CONDITIONS OF DEVELOPING PENETRATIVE (DIGITAL) TECHNOLOGIES

Mechanisms for Protecting Rights and Legitimate Interests of Economic Subjects

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The modern era of economic development features active implementation of digital and penetrative technologies, which alter social relationships greatly. They include blockchain, Big Data, quantum technologies, neurotechnologies, AI and robotics, augmented reality, etc.

The synthesis of digital and penetrative technologies provides for the formation of new digital economy and for the related transition to a new technological behavior, which shall theoretically have a positive impact on the welfare of the society in general. At the same time the mentioned process begets certain risks and threats for

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 75–84.

the legal sphere. Firstly, new relationships arise, which are not covered by effective legal provisions yet, and that causes multiple legal gaps. Also, new technologies penetrate the legal sphere, changing its formal parameters. Many legal processes are being automated, which raises a question about the emergence of machine-readable and algorithm-driven law.

The question about effective application of such law in the field of economic relationships still remains open. In certain cases we may talk about the new subjects of law—robots. The use of such subjects brings up indefinite and unpredictable status which may affect economical resilience. Moreover, the development of digital technologies in a number of cases allows the participants of economic relationships to act beyond existing legal regulation. The conclusion of smart-contracts via blockchain technologies allows securing obligations without using any legal capabilities.

As a result, a whole economy sector, not covered by legal regulation, may emerge. Practically this will be a new model of regulating economic relationships, based on new technological and non-legal regulators. Such change of the role of law in social relationships entails certain risks for economical resilience. These processes demand further sophisticated research from the viewpoint of modern scientific methodology.

Keywords: Digital Technologies, Digitalization, Social Relationships, Economical Resilience, Penetrative Technologies, Legal Regulation, Blockchain, Smart-Contracts, Digital Economy, Economic Entities.

JEL Code: K15, K24, L14, O14, O15, O33

MATERIALS

The grounds for the present research of the legal base include the effective Russian legislation in the field of relationships in the economic sector and other relationships, connected directly with the modern penetrative technologies: the Civil Code of the Russian Federation, the Civil Procedure Code, and the Federal law "On information, information technologies, and protection of information."

As an example of program documents of strategic and recommendation nature, devoted to the matters of legal development as a necessary condition of economic resilience in the frames of modern technological development, the following acts have been taken and evaluated: the Doctrine of Information Security of the Russian Federation (2016), the Strategy of Information Society Development in the Russian Federation for 2017–2030 (2016), the State Program of the Russian Federation "Information Society (2011–2020)" (2012), the Program "Digital Economy of the Russian Federation" (2017) and other documents.

The doctrinal positions of the theoretical basis for the current research have been analyzed owing to Russian and foreign scientists, who have devoted their research to new technologies and their influence over the legal regulation of economic relationships.

The methodological grounds for researching the mentioned processes are disclosed in works of RAS academician V .S. Stepin (2003), Isaev and Chestnov (2015), and I. L. Chestnov (2012). The influence of digital economy on the Russian law in general and its development vectors have been evaluated in the works of the following authors: Zaloilo (2019), Khabrieva (2018), Khabrieva and Chernogor (2018), Tikhomirov and Nanba (2019), Putilo et al. (2020).

METHODS

The grounds of the research made include traditional legal scientific methods (formal-legal, system-structural) as well as certain new methodological approaches typical for post-classical science—i.e. constructivism and anthropocentrism. By the means of these methods it was possible to analyze the dynamics of the legal normative system, which regulates the use of penetrative technologies in the economic social sphere as well as peculiarities of their implementation on the way to the new technological behavior in complex and in detail.

INTRODUCTION

The history of human civilization shows clearly that one of the factors of social development is the certain technological behavior. New technologies are altering economical basis of the society and influence greatly social development and legal regulation as well. While being a regulator of social relationships, the law on one hand is changing alongside too and on another hand it calls for their stabilization. In this regard legal regulation may manifest itself as an important factor for reaching economical resilience (Dudin et al., 2016; Pashentsev, 2019).

In modern conditions we may see a transition from the fifth to the sixth technological behavior. The modern economic development is characterized by the robust penetration into all possible economic activities of new-generation digital technologies and by the emergence of so-called penetrative technologies, intended for connecting the real world with the digital one and for creating basis of the uniform digital economy (Frolova et al., 2018).

Actually digital and penetrative technologies compose a whole entity; their synthesis is able to ensure adequate economic development in conditions of moving towards the new technological behavior.

The list of penetrative technologies is defined by the Russian government and is legally binding. They include blockchain, Big Data, quantum technologies, neurotechnologies, AI, augmented reality, etc. The development of these technologies is provided by the government program “Digital Economy” (The Digitalization of Law-making Process: the Search for New Solutions, 2019). Its implementation is oriented towards improving labor efficiency and forming new economic branches along with ensuring social economic breakthrough, intended to enhance country’s population well-being.

The solution of the mentioned issues would be impossible without moderate upgrade of legal system and existing mechanism of legal regulation.

The matters of upgrading legal regulation of using digital and penetrative technologies in economic sphere have been researched by such Russian authors as Zaloilo M. V. (2019), Khabrieva T. Y. (2018), Chernogor N. N. (Khabrieva & Chernogor, 2018; Tarakanov et al., 2019).

RESULTS

The question concerning the role of law in supporting digital economy has two basic aspects. The first of them presumes that the implementation of new technologies into economic life will demand relevant legal support (Eidenmueller, 2017; Hawken et al., 2013). Digital and penetrative technologies beget new forms of social relationships in the economic sphere—yet these relationships are not covered by law nor do they have sufficient legal coverage (Inshakova & Goncharov, 2019). Therefore certain legal gaps appear which may be eliminated by legislative means. This is about adopting separate norms and legal acts, which would regulate relationships in the field of new, forming digital economy.

The second aspect presumes that new technologies, running deeper into all spheres of social life, influence the law itself by changing its form, by defining new requirements for legal tech (Pashentsev, 2019, p. 115), by giving technological opportunities for modernizing rulemaking and application processes..

As a result the way towards reaching economical resilience in conditions of the development of new technologies demands certain actions over the implementation of these technologies into the legal sphere in order to create a new effective model of legal regulation (*Legal Concept of Robotization, 2019, pp. 11–21*).

The use of digital and penetrative technologies in economy is connected with the necessary solution of several legal issues. Without it economical resilience may suffer, as the new relationships, affected by penetrative technologies, would not get adequate legal regulation.

An important influence vector of digital technologies over legal aspects of economic activities is connected with automation and algorithmization of the legal sphere (Don & Tapscott, 2016; Klaus & Nicholas, 2018; Schwab & Davis, 2018). The implementation of penetrative technologies into social and economic processes of legal application implies the use of robots and AI, which raises the question about algorithms and algorithmization. This question has been raised for the first time long ago—before the time when the lines and the capabilities of new technologies and relevant Implementation processes started revealing. In particular, an American sociologist D. Bell, who has formulated and explained the definition of the postindustrial era, deemed “the replacement of intuitive speculations with algorithms” as one of its key features (Bell, 1973). In the sphere of law along with the development of digital technologies the algorithmization has transformed from a forecast into reality. Robots now are able not only to perform industrial tasks, they also succeed in important activities, which were typical for

humans earlier: in making court claims and other legal documents; in judging. Thus they actually become subjects of legal application.

The relevant experience can be found in China and Latvia, while in Latvia legal application activities of robots are covered by legislation. Without corresponding algorithms such activities would be impossible. The need to refer to effective legislation in legal application processes demands creation and implementation of machine-readable legal texts (Khabrieva & Chernogor, 2018).

Yet still such texts will require "digitalization," as a machine only "understands" information, recorded in a binary code. Therefore, if nowadays legal norms are recorded by the means of letters, then their algorithmization and transformation into machine-readable format implies replacement with digital symbols or digits. This will facilitate the legal application for robots, but it may also hinder traditional legal application activities of humans as main subjects of legal application, because a human being actually recognizes letters in legal texts, not digits.

Finally we may state that the emergence of robots as new legal application subjects may in future severely hinder human legal application activities, which shall imminently affect economy and its resilience.

In general the emergence of penetrative technologies, allowing us to use robots as legal application subjects begets a number of issues connected with legal regulation of economy (Dudin et al., 2017).

First of all, legal application processes (including the ones, connected with economic relationships) cannot be algorithmized totally, because written law never has "a full load of information to resolve a certain case or situation" (Isaev & Chestnov, 2015). Thus it is absolutely impossible to exclude a human being, able to interpret legal norms in order to eliminate gaps and adapt abstract norms to certain situations, from legal application processes. Therefore it will be necessary to ensure the organization of cooperation between robots and human beings not only in industry, but also in legal application activities, which implies combining algorithmized AI and creative intuition basics..

Secondly, a human being as a legal application subject has certain legal status and can be held responsible in certain cases. The status of a legal application robot has not been defined yet. Furthermore, the definition of its status provides some principal problems, because it means endowing robots with legal capacity. There are certain legislative initiatives, aimed at recognizing special registered agent robots as subjects of civil law (Khabrieva, 2018). But for the moment these initiatives face well-reasoned criticism—especially due to the fact that robots have no psyche and therefore they have no guilt as an attitude towards their own actions either. Without guilt there is no delictual capacity as an essential part of legal capacity. The question about holding a legal application robot responsible along with providing it with legal capacity is still open. However, the clear and precise solution of a question concerning responsibility and liability in civil relationships directly affects economic resilient development.

Among the penetrative technologies, able to promote flexible mechanisms and means of legal regulation we should mention blockchain and smart-contracts, concluded on its basis.

Blockchain being a distributed database, existing as a sequent chain of blocks, may greatly change the banking and insurance systems. Moreover, this technology may in future promote changes in political spheres, such as elections and existing political decision-making technologies.

The blockchain technology allows automating various legally significant activities i.e. conclusion and attestation of transactions and it also provides for data confidentiality. Foreign lawyers deem that owing to blockchain the law will experience ample changes. Traditional institutions, such as notaries and registration chambers, banks or even the state as a controlling instance will pass away (Barraud, 2018). Researchers think that blockchain technologies will lower "corruption risks, administrative abuse and legal collisions" (Ivanov et al., 2017). Apart from that blockchain alters the structure of relationships around digital property. With the help of smart-contracts this technology allows exchanging goods and services of all sorts, securing contractual validity, which may entail a new type of economic relationships (Frolova et al., 2018; Zaloilo, 2019). Finally blockchain will in perspective be able to successfully compete with law, promoting for alternative mechanisms of dispute resolution and their prevention in economic turnover. Decentralized property turnover (including digital property), based on blockchain technologies may in most cases go on without law.

Being a system for distributing data, the validity of which is guaranteed by the structure itself, blockchain allows concluding smart-contracts. The first steps taken in this direction by the participants of social relationships show great perspectives of smart-contracts through the scope of taking an important place in legal application, especially in the economic sphere. Smart-contracts allow contracting parties to establish commercial relationships without state supervision or without even knowing each other. The electronic system itself guarantees transaction validity and fairness with no risks of forging and resending, which gives birth to the "Internet of values" (Tapscott & Tapscott, 2016). All this finally means the formation of a new group of social relationships in economy, which exist beyond legal regulation.

For the society, which got used to see the law as a universal regulator, the emergence of the mentioned relationship style is like a global revolution. We may assume that the appearance of economic relationships beyond legal regulation can significantly affect the resilience of economic turnover. It is still very early to talk about getting partially rid of the law as of an economic regulator, but we cannot deny that the model of legal regulation of economic relationships has perspectives for serious changes.

Wide capabilities, connected with the use of blockchain technologies may be applied not only among business entities—individuals and companies, but they also have perspectives in the field of public procurement.

We also consider implementing these technologies into judicial systems. In general quite soon penetrative technologies will be able to fasten and enhance court procedures, to provide effective litigation in Russia, which shall affect economic resilience in a positive manner. New penetrative technologies will allow us to form and implement into the economic sphere principles of self-regulation, choice of prudent arbiters by economic entities, independence of activities.

The "Internet of values," born by new penetrative technologies, especially blockchain and distributed registers (Tapscott & Tapscott, 2016) appears before society in its greatest scale from the viewpoint of valid unique digital objects, no risks of doubling and unauthorized reproduction, which secures their transparency, verification, permanence and indispensability in future. The sought system is based upon "technologies of trust."

At the same time, foreign researchers (Schwab & Davis, 2018) point out that the benefits from using penetrative technologies (especially blockchain) are incomplete and imperfect for potential participants (economic entities) without due consensus over a number of questions:

- The parameters of value (calculation units);
- Technical architecture (private or public basis, which confirms transactions, formation and generation of new value markers); and
- Interconnection and mutual provision of material objects and digital transactions, implying precise identification of material objects in digital spheres, etc.

The new world of penetrative technologies would be beneficial for the following subjects:

- Manufacturers of goods and service providers in countries of poor legislation and weak protection of intellectual property, as blockchain serves as a shield for economic entities in cases of absent reliable government institutions;
- Small-sized manufacture designers, providers of raw materials and services, who are not ready to compensate losses connected with establishing trustful relationships, necessary for large, geographically scattered consumers;
- Aggregators and sellers of data, protected by blockchain;
- Providers of services for decentralized autonomous manufactures, operating on blockchain technologies (robotized production, supply and financing); and
- Micro manufacturers, who specialize in products of high value, crafted upon a pre-made order.

We should not deny that still many subjects will suffer serious expenses e.g.:

- Participants of supply chains, which have high latent expenses; work ineffectively; produce low-quality goods; use non-transparent trust mechanisms, unable to compete with blockchain technologies;
- Agents of trade and services (electronic market aggregators);
- Low-qualified workers in offices and facilities (mostly because new technologies such as smart robots and 3d printing easily manage routine tasks of supporting products and contracts);
- High-qualified specialists (bookkeepers, managers, guarantee maintenance specialists, etc.), as blockchain technologies are able to automatize such processes as negotiations, goods escorting and checks; and
- Financial, controlling and other organizations, which lose their casual course of business due to new technologies (payment operations, risk management and quality control—all these activities are to be covered by blockchain).

In other words the protection of rights and legitimate interests of economic entities in the process of implementing penetrative technologies would be impossible without a detailed assessment of all possible risks, connected with adaptation to a radical technological shift and the development of a new "decentralized technology of trust."

CONCLUSION

The research made shows that active implementation of penetrative technologies into economic relationships significantly affects law as the basic modern regulator of these relationships.

Such technologies change multiple basic law parameters; expand the circle of legal application subjects; may alter the role of the law itself in regulating economic social relationships.

Blockchain technologies, providing for smart-contracting allows economic subjects to manage without law in making transactions.

The ability to secure obligations fulfillment beyond the legal sphere begets economic relationships, able to exist and develop apart from the relevant legal regulation and brings economic risks, which are hard to predict and investigate.

All this allows us saying that the process of economic digitalization and the relevant development of penetrative technologies entails not only new opportunities for economic growth, but also brings up certain risks for economical resilience due to the possible change of regulatory role of law in social relationships.

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CHAPTER 8

INSTITUTIONAL BASIS FOR DIGITAL TRANSFORMATION AND ECONOMIC STABILITY ENHANCEMENT IN THE EAEU COUNTRIES

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Purpose: The paper deals with assessment of the current state and modeling the institutional environment for the digital transformation of the Eurasian Economic Union (EAEU) economies in the context of accelerating digitalization and megaregional integration, and enhancing economic stability.

Design/methodology/approach: Based on methodology of the evolutionary and institutional approach the paper substantiates the need for institutional ecosystem creation in the framework of forming the socio-economic mode relevant to the sixth technological mode. The authors argue that the structure of the key institutional actors' relationships in the digital scenario implementation determines directions of the institutional ecosystem development in the EAEU countries.

Findings: In the course of the study, the authors have revealed a system of the institutional environment properties of the EAEU digital economy; identified key direc-

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 85–97.

tions of formation of the G2B, G2G and G2C institutions, which are responsible for creation of legal and regulatory, organizational and social basis for the economy digitalization, transaction and network effects generation, and provision of effective and safe performance of the digital economy of the Union.

Originality/value: The study findings can be applied by the EAEU interstate and state development institutions and organizations that provide formation of the digital economy institutional ecosystem to facilitate digital transformation and economic integration aimed at strengthening competitiveness and economic stability of the EAEU members.

Keywords: Digital Economy, Eurasian Economic Union, Institutions, Institutional Ecosystem, Economic Integration, Economic Stability.

JEL Code: B52, D02, E02, F15, F55, O43

INTRODUCTION

Under transition to the sixth technological mode and in the face of growing global challenges and threats, the increasing importance of competitiveness enhancement in the Eurasian Economic Union (EAEU) countries via neo-industrialization of the economies that should be carried out among other ways through convergent and end-to-end technologies development and digitalization acceleration in all economic activities is becoming more and more evident.

It should be pointed out that the neo-industrialization policy sets goals for the development of innovative industrial-technological (Sushkova, 2017) and institutional economy structure, ensuring economic and social stability and sustainable growth for the countries of the Eurasian foundation.

To date, digitalization of economic and production processes is rapidly becoming the key factor in the competitiveness enhancement of the EAEU countries in the intra-EAEU and world markets. Due to this fact the main strategic goals set on the EAEU 2025 digital agenda are defined as follows (Diatlov, 2018; EAEU 2025 Digital Agenda, 2016): digital transformation of the economic sectors and cross-industry transformation; digital transformation of the markets for goods and services, capital and labour markets; digital transformation of integration process management; development of digital infrastructure and ensuring digital security.

It is worth noting that the efficiency of neo-industrialization policy and digitalization implementation in the EAEU countries is closely related with the awareness of the fact that the technological modes emerge, function and change not by themselves but within the system of socio-economic relations. As O.V. Inshakov rightly pointed out “basic production technologies cannot be replaced without profound changes in the related institutional, organizational and informational foundations, i.e. each technological mode requires the relevant socio-economic

structure (production relations, which form at large the economic structure, the basis of society)" (Inshakov & Fesyun, 2014, p. 45).

The cardinal shifts in the technological basis of the economy that arise from the emergence of the new technological mode generate transformation of institutions that takes place due to changes in the economic activity, behaviour, and motivation of economic entities (Suharev, 2005). Indeed, the digital economy does not only have impact on the evolution of human civilization and changes the habitual way of living but also generates radically new rules and principles for economic activity, entailing transformation of the institutional environment (Digilina et al., 2018; Inshakov & Fesyun, 2014). Conversely, the emergence of the digital economy requires the existence of relevant institutions, "the rules and laws, both formal and informal, and the enforcement mechanisms that make up a given institutional matrix or environment," as to J. Nye (Nye, 2008), as well as "the consequent organizational structure," in D. North's opinion (North, 1991).

MATERIALS AND METHODS

The works of foreign and Russian scholars concerning the essence and transaction effects of formal and informal institutions functioning (e.g. Dalman, 1979; Eggertsson, 1990; Inshakov, 2003; Kleiner, 2003; Kluchevsky, 1914; North, 1991; Nye, 2008; Williamson, 1998); mechanisms of institutional change and economic performance, and factors causing institutional traps in the national economy (Inshakov & Fesyun, 2014; North, 1990; Polterovich, 1998, 2008; Sukharev, 2005; Sannikova, 2019; Stepanova & Polyakov, 2020); modeling institutional structure under transition to the new technological mode and implementation of neo-industrialization and digital economy formation in the Russian Federation and other EAEU countries (Diatlov, 2018; Digilina et al., 2018; Gasanov & Zhironkin, 2014; Inshakov & Inshakova, 2015; Popov & Semyachkov, 2018; Sushkova, 2017; etc.) shaped the conceptual framework of the research.

Statistical data, analytical, legal and regulatory documentation of the Eurasian Economic Commission, Russian and Eurasian state development institutions, World Economic Forum, International Telecommunication Union, the Fletcher School at Tufts University, Mastercard, PricewaterhouseCoopers, etc. have provided the empirical basis of the study.

Methodologically the research is based on the systems evolutionary and institutional approach accompanied by structural and functional, temporal and spatial, comparative and documentary analyses that allow us a better understanding of fundamental development trends of the digital economy institutional environment in the EAEU countries.

RESULTS

It has been found that the readiness of the institutional environment in the EAEU countries to embrace digitalization in the economic sector, the adequacy and pace

of its adaptation to the changing conditions of economic activity in the context of emergence of the innovative system of economic, social and cultural relations based on the use of digital information and communication technologies is determined by the quality and effectiveness of the institutions that regulate the economy in the countries of the Eurasian Economic Union. Table 8.1 represents several important indicators of the current institutional environment state in the EAEU economies digitalization.

The targeted characteristics of the digital economy institutional environment in the EAEU countries are identified as follows:

- Stability in the short-term perspective as institutions, which have been devised "to create order and reduce uncertainty in exchange," along with the standard constraints of economics "define the choice set and therefore determine transaction and production costs and hence the profitability and feasibility of engaging in economic activity" (North, 1991, p. 97). By providing stable exchange between the economic actors, digital economy institutions reduce market uncertainty, and thus "shape the direction of

TABLE 8.1. Selected Indicators of the EAEU Member-countries Institutional Environment for the Digital Economy Development

Indicator	Armenia	Belarus	Kazakhstan	Kyrgyzstan	Russia
Government's responsiveness to change, 1–7	4.0	n/a	4.2	3.1	3.8
Government long-term vision, 1–7	4.1	n/a	4.4	3.0	4.1
E-Participation, 0–1	0.57	n/a	0.84	0.69	0.92
Incidence of corruption, 0–100	35.0	n/a	31.0	29.0	28.0
Efficiency of legal framework in challenging regulations, 1–7	3.9	n/a	3.5	2.9	3.1
Legal framework's adaptability to digital business models, 1–7	4.0	n/a	4.0	3.0	3.9
Social capital, 0–100	43.0	n/a	47.7	51.5	45.3
Internet users, % of adult population	64.7	74.8	78.9	38.0	80.9
Digital skills among active population, 1–7	4.5	n/a	4.7	3.9	4.9
Global Cybersecurity Index (GCI)*, rank 2018 out of 175 states	79	69	40	111	26
Freedom on the Net (FONT) 2019, score/ status**	76/F	35/NF	32/NF	61/PF	31/NF

Note: (*) data available as of 2018; (**) Internet freedom rating values: scores 100-70 = free, scores 69–40 = partly free, scores 39-0 = not free.
Source: compiled by the authors based on data presented in (FONT, 2019; GCI, 2019; GCR, 2019; Ministry of Communications and Informatisation of the Republic of Belarus, 2019).

economic change" (North, 1990), being as a result the crucial factor that ensures the stable functioning of the economic system;

- Systematicity—the system of institutions of the digital economy should develop harmoniously in all directions, creating holistic institutional environment for its development and functioning; since institutions reflect the prevailing social forms (relations) of the functions of the subjects of a particular system, it is advisable to use the structure of relations between the main institutional actors: state (G), business (B) and consumers (C) when forming, improving and updating the system (Inshakov & Inshakova, 2015);
- Sufficiency of institutions (Digilina et al., 2018), availability and quality of the created and functioning institutions that efficiently regulate exchange between the economic subjects under conditions of digital transformation thus providing economic stability; and
- Dynamics and changeability of institutions in the long-term perspective as they either evolve incrementally with new institutions gradually replacing out-of-date structures, or take a revolutionary path when old institutions, regarded as inefficient and ineffective, are rapidly substituted by new organizational forms (Inshakov, 2003; Kleiner, 2003; North, 1990; Suharev, 2005; Williamson, 1998).

In the EAEU countries the ability of digital economy institutions to reduce transaction costs related to exchange transactions on the open market, collection and processing of information, control and legal protection of contract execution (Dalman, 1979; Eggertsson, 1990) should be considered as the main indicator of the favorable and sufficient institutional environment.

If institutions function inefficiently this would lead to imbalance in the economic system, and consequently entail the emergence of institutional traps that would hinder the processes of digital transformation in the EAEU countries economy, affecting the maintenance of socio-economic stability.

In the digital economy, the lack of effective new formal institutions as well as the enforcement of norms and rules of the economic behavior without appropriate control mechanisms would contribute to the sporadic emergence of alternative informal institutions that would guarantee the execution of contract terms, often in the interests of individual groups of actors or one party to the contract to the detriment of the interests of partners, as well as behavioural patterns (e.g. opportunism, dishonest behavior, the crumbling condition of the transaction, corruption) (Polterovich, 1998), which would come into conflict with the new formal institutions. Therefore, in the absence of the relevant state institutions, which should ensure the operation of the mechanism that enforces economic actors to comply with formal and informal rules (Digilina et al., 2018; North, 1991), the digital transformation of the economic structure in the EAEU countries will only remain a theoretical model (Gasanov & Zhironkin, 2014). Therefore, D. North's

statement sounds as justifiable: "In fact the state can never be treated as an exogenous actor in development policy" (North, 1990).

In this regard, it is vital that the state as an active participant in contractual relations in the economic system should effectively fulfill its functions. The disastrous consequences of this principle violation were observed in the period of early market reforms in Russia and in the other EAEU countries. The lack of clear understanding of the interplay between macroeconomic impacts and significant changes in the institutional structure entailed institutional traps that emerged as an unpredicted result of macroeconomic management errors in the reform process (Polterovich, 1998). This conclusion is of particular importance in the current conditions of transition to the new technological mode and formation of adequate socio-economic structure that are accompanied by radical transformations of the technological, economic and institutional structure of the economies in the post-Soviet countries.

The institutional traps that arise from a pronounced conflict between formal and informal institutions that hampers the digital transformation of the EAEU economies would be identified as follows:

- Lack of homogeneity of the institutional environment that governs the digitalization processes; low efficiency or lack of mechanisms that are used to monitor the enforcement of laws regulating the digital environment (Stepanova & Polyakov, 2020);
- Digital divide and low digital literacy which is confirmed by the low percentage of citizens with digital skills sufficient to effectively maintain digital consumption and provide digital security (see Table 8.1); this inevitably generates conflicts between the state declared goals to implement the policy of economy digitalization, on the one hand, and the digital literacy level of entrepreneurs and citizens, the availability of the trained personnel in the EAEU countries, on the other hand;
- Opportunistic behavior in the digital environment on behalf of the part of society with low digital literacy that is skeptical of new technologies; the emerging illegitimate rules of conduct in electronic interaction (fraud, intentional fraud with violation of criminal law or non-compliance with business agreements, failure to fulfill contractual obligations violating business law—in business communication; use of profanity, rudeness, bullying, etc.—in personal communication) (Sannikova, 2019).

It is considered that in order to eliminate institutional traps and create effective institutional environment for the digital economy in the EAEU countries it is also advisable to overcome widely adopted by modern science "interpretation of institutions as an external "framework" that constrains the actions of entities and their agents through various norms, rules, customs, contracts, etc." (Inshakov, 2003, p. 43). We share the view that institutions by their nature are not only constraints, frameworks, but also a means of pushing the boundaries of the subject's

capabilities (Inshakov, 2003, as was said in late 19th century by the outstanding Russian historian V.O. Klyuchevsky (Klyuchevsky, 1914). Adequate understanding of substantial potential of institutions is considered especially important for the formation of institutional mechanisms designed for the large-scale implementation of new opportunities provided by the use of digital technologies by society and individuals in the context of the digital transformation of the economies in the EAEU countries.

Taking into account the increased role of institutions of state in implementing the goals of the economy digitalization it is proposed to develop the institutional basis for digital transformation of the EAEU economies in the following main areas.

1. *Institutions that comprise G2B group*: evolution of state institutions (initiatives and decisions, strategies and programs, corporations and funds, subsidies and investments, preferences and sanctions, information systems and databases, etc.) that are aimed at creation and support of national firms and organizations, clusters and technological platforms based on digital technologies (Inshakov et al., 2015) as well as formation of integrated business communication area in the EAEU.

   Measures for the development of institutions of this group should include:

   – Design and harmonization of the legislative and regulatory framework for digital interaction between state and businesses; convergence of the regulatory framework for the ICT sector activities in order to form an integrated market for telecommunications services and ensure fair competitive conditions for the EAEU members; development of regulatory framework that would reduce constraints and barriers and facilitate conclusion of public-private agreements in the field of digital technologies; harmonization of personal data protection legislation, including cross-border transfer of personal data within the boundaries of the integration association;
   – Participation of development institutions, state and non-state, financial and non-financial, as important elements of the interactive system for managing structural development and economic growth, in the implementation of national programs designed for creation of the digital economy in the countries of Eurasian Union can have significant impact on the intensification of digitalization processes (Polterovich, 2008).

   It is worthwhile mentioning that a similar process has been launched in Russia, where state development institutions, namely the Russian Venture Company (RVC), Skolkovo Foundation, and RUSNANO Management Company (Russian Development Institutions, 2019) are involved

in the implementation of the National Digital Economy of the Russian Federation program.

RVC will contribute to the development of digital technologies through the use of financial, organizational and information support tools taken from leading research centers and leading digital transformation companies in the economic and social sectors. The Skolkovo Foundation, as part of the Cross-cutting Technologies federal project of the National Digital Economy Program, is to provide special support for digital technology companies in implementation of pilot projects. These are projects that are associated with the first implementation of integrated digital technology, which allows for the digital transformation of the entire business or its branch in the key sectors of the economy. The foundation is to subsidy pilot projects implementation sharing expenses with the customer company. As much as 5 billion rubles per year will be allocated for the implementation of this support measure, which will be targeted spending—for the implementation of pilot projects and the subsequent replication of digital solutions worked out under these projects.

As part of the National Program, it is also planned to form a system of investment foundations in the field of digital technologies under the management of RUSNANO. These foundations will invest in the capital of promising technological projects that are on the late stages of venture investment and the growth stage. These supportive tools will complement those ones that have been already developed and implemented for the earlier stages by other development institutes and will increase the effectiveness of the "innovative elevator," which ensures that promising projects in the field of digital technologies receive sufficient resources.

2. Institutions that belong to the G2G and G2B groups: formation of state and interstate institutions that would regulate economy digitalization and coordinate policies conducted in this area, as well as provide secure functioning of the new digital ecosystem. Measures for the development of this group include:
   - Creation of institutions performing functions similar to the Center for the EAEU Digital Transformation Competencies (formed in December 2019 on the basis of the Analytical Center under the Government of the Russian Federation to provide the expert, analytical and methodological support for the implementation of the EAEU 2025 Digital Agenda activities) that would facilitate the formation of interstate mechanisms for the coordinated policy of the EAEU countries in implementing programs and projects for the development of the digital economy. This measure would accelerate the convergence of national policies in this area, enhance integration processes, strengthen and maintain social and economic stability in the EAEU countries. The implementation of this measure is considered as vital as the Russian

Center for the EAEU Digital Transformation Competencies objectively cannot replace the Eurasian Center for Digital Transformation that has been conceived within the framework of the EAEU 2025 Digital Agenda as a cross-state institution responsible for the design, implementation, monitoring and coordination of industry and cross-country digital transformation and integration as well as the development of data protection law (EAEU 2025 Digital Agenda, 2016);

- Design and adoption of the EAEU common strategy for the digital economy development that should be specified in programs and plans with clearly defined tasks, timelines, sources of financing and control mechanisms since the proposed strategic directions for the formation and development of the EAEU digital environment in the EAEU 2025 Digital Agenda, which has been developed by the Eurasian Economic Commission, are of a framework nature and require further substantive specificity;
- Designing national strategies and the EAEU common strategy for the development of secure digital environment (Popov & Semyachkov, 2018), whose goals should be as follows: preventing, detecting and responding to emerging challenges and threats, stimulating the design and promotion of reliable digital products and services for government structures and business; supporting public and private organizations and enterprises involved into the digital economy infrastructure; developing international security cooperation in the digital economy; creating the system of effective state and interstate institutions to coordinate activities that are focused on information security in the EAEU, taking into account the fact that information risks and threats are acquiring global character;
- Developing state institutions in the EAEU countries that would be aimed at providing conditions for the enhancement of international public, public-private and private joint ventures in the field of digital technologies based on mega-collaboration (Inshakov, 2013) mechanisms (funds, centers, networks, firms, etc.). International cooperation between The Foundation for the Digital Economy Trust Support and Development (Uzbekistan) and The Foundation for assistance to small innovative enterprises (Russia) based on the memorandum on cooperation signed in December 2018 is a good example for the EAEU countries. The objectives for cooperation that the foundations set include promoting of the digital economy development, sharing experiences, holding forums, seminars, and various educational events; and
- Creating the centralized (in the EAEU format) system of digital technologies standardization, certification of goods and services in the digital economy, adopting international technical standards related to

digital equipment and digital services. It is obvious that the Eurasian Institute of Standardization would not solve complex and challenging tasks in this area even if the national authorized bodies and organizations in the field of standardization based in the EAEU countries would actively participate in its activities. It is necessary to create specialized interstate institutions that would ensure coordination and unification of the national structures activities in this area.

3. *Institutions of the G2B and G2C groups:*
   - Developing institutions that would promote the development of digital skills of entrepreneurs and individuals in the EAEU countries. As the rate of learning determines the speed of economic change; while the kind of learning determines the direction of economic change (Henisz & Delios, 2000; North, 1990), forming digital culture and bridging the digital divide between the countries can rightly be assigned to the number of major factors that could stimulate large-scale demand for new digital technologies, and, respectively, the development of the digital economy to an extent that is declared by the state, as well as they would provide the social basis necessary for the implementation and support of reforms to digitalize the economy by involving citizens in decision-making and e-government services (Agbabiaka & Ojo, 2014);
   - Developing state and non-state institutions that would provide the digital trust environment progression in the EAEU, since digital trust is "central to digital evolution" (Digital Evolution Index, 2017, p. 4). Besides the institutions that ensure the trustworthiness of the digital environment and the quality of the digital technology users' experience for each EAEU country, the role of the positive public attitudes towards digital economy key institutions and organizations as well as of the individuals' behavior in the digital interactions performance is constantly growing in the formation of the digital trust environment. The main goal of these institutions is creating an institutional environment, which would provide the level of confidence in people, processes and technologies that is necessary to build secure digital world (PwC, 2019); and
   - Developing institutions that would provide large-scale targeted training and retraining that would be conducted in the institutions of higher education in the EAEU countries and would prepare qualified personnel for the digital economy who would have competencies to carry out economic activity in the conditions of digital transformation regardless of the phase of the reproduction process in the economy, and would also implement programs to increase digital literacy of the citizens; development of institutions that would promote an increase

in employment within the framework of international cooperation in the digital technologies sphere.

CONCLUSION

Digital transformation of the socio-economic processes and creation of the competitive digital economy is one of the strategic goals of the economies in the EAEU countries. Besides the creation of the necessary technological and organizational basis for the new digital economy, the priorities include the formation of adequate institutional environment, formal and informal institutions and institutional mechanisms for controlling economic behavior of economic actors in the digital environment, without which it would be impossible to achieve transactional and network effects in the emerging system of mega-regional and global value added chains.

The institutional environment of the EAEU digital economy should have the properties of systematicity, stability, sufficiency, and dynamism in order to provide timely institutional "response" to the challenges that will arise in the process of formation of the socio-economic structure that would match the sixth technological paradigm and implementation of the digital development scenario in the EAEU member countries

When determining the goals for formation and improvement of the effective system of institutions of the digital economy in the EAEU countries, it is necessary to proceed from the structure of relations between the main institutional actors: state, business and consumers. Given the increasing role of the institutions of state in achieving goals and objectives of the economy digital transformation, it is necessary to systematically form and develop the institutions of G2B, G2G and G2C groups, which would ensure the creation of regulatory, organizational and social basis for digital transformation and stable functioning of the economies of the EAEU countries.

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CHAPTER 9

THE DIGITAL ECONOMY IN ACTION

Integration of Institutional Economy Paradigms and Law in the Neo-industrialization Period

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The article provides an overview of the impact of Industry 4.0 on changes in the institutional environment of economy and law through the introduction of modern technologies, including artificial intelligence technologies. A number of challenges for business in general and small and medium-sized enterprises in particular are highlighted in the period of neoindustrialization. The article describes the specifics of the theory of individualism as a methodological starting point for the analysis of an economic subject in the digital environment. The influence of artificial intelligence agents on society is also highlighted. The article describes the importance of the company's external knowledge in the innovation implementation and examples of successful convergence as a process of institutional changes based on the application of the blue ocean strategy, including removal, reduction, growth and creation. Institutional problems of developing countries are highlighted and the role of the state in the neoindustrialization period is defined. Institutional paradigms of economic and legal transformation that arise in the neoindustrialization period are highlighted.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 99–116.

Keywords: Digital Economy, Neoindustrialization, The Fourth Industrial Revolution, Institutional Economics, Institutions, Industry 4.0

JEL Code: O14, O43, F43, L88, F63, K15

INTRODUCTION

It is significant to study the introduction of socially sustainable practices in the digital economy in the neoindustrialization period under difficult institutional conditions through using institutional theory, firstly, in terms of how institutional pressure affects the implementation of transformation programs, and, secondly, in terms of legal changes that are taking place in society (Inshakova et al., 2019).

In recent years, the industrial environment has undergone radical changes with the introduction of concepts and technologies based on the Fourth Industrial Revolution (Sendler, 2013). Industry 4.0 focuses on integrating production, information technology and the Internet. Thus, the latest information and communication technologies are combined in Industry 4.0 with traditional manufacturing processes.

The economic, political and social problems facing developing countries today contain many elements that are qualitatively different from old problems. This is because the nature of economic development and political coordination has changed considerably as a result of the neo-industrialization process underway, as well as the tremendous advances in communications technologies, and the unprecedented increase in global transactions of goods, services and financial resources. To maintain catch-up speed, developing countries today need to compete and find segments of value chains with higher added value, high qualification and technology within their borders. Some developing countries, especially with abundant natural resources, can expect the downstream industries to continue catching up in the short term. Nevertheless, given the limitations of added value in the resource-processing industries and the high likelihood of emulators, developing countries will have to get into the high-tech sector eventually. In addition, they need to link the viability of leading firms/sectors to relevant local industries and services. To do so, they need to strengthen the technological capabilities of local firms and labour which are a complex task requiring coordination of the interests of many market participants.

Today, the technological modernization of the national economy is an urgent issue for many middle-income developing countries. They fear that a failure in technological modernization could lead them to fall into the middle-income trap. This situation is defined as a phenomenon in which a country (or economy), having experienced years of high growth, faces long-term stagnation at the middle-income stage. Such a country is sandwiched between countries whose growth still depends on an increase in production factors and countries whose growth is due to technological modernization (Gill & Kharas, 2007, p. 5)

Since the 1990s, the main problem of economic development was not the possibility of capitalist development but the effectiveness of integration with the world economy. By that time, not only the newly industrialized countries but also many other developing countries (especially in East Asia) had experienced very high rates of economic growth. NICs such as Singapore, Taiwan and South Korea have even gained the status of high-income countries. According to Yeung (2016), this success is due to strategic interaction with leading global companies, a strategy followed by large local companies such as Hon Hai Precision Industry from Taiwan and Samsung Electronics from South Korea. The possibilities of such global integration in the segments of advanced technologies expanded due to the spread of organizationally fragmented and spatially distributed production networks, which, in turn, was due to the standardization and modularity of a wide range of products. Needless to say, the development of communication and transportation technologies has contributed to the simultaneous fragmentation and reintegration of global value chains.

The development of Industry 4.0 should contribute to solving global problems such as sustainability, resource and energy efficiency, and increase competitiveness (Kagermann et al., 2013). The production based on the principle of Industry 4.0 creates the conditions for the replacement of traditional structures, which are based on centralized decision-making mechanisms and the strict limits of individual value-added steps. Flexible reconfigurable production and logistics systems offering interactive and collaborative decision-making mechanisms replace these structures (Spath et al., 2013).

The purpose of this study is to outline the relevant economic models during the fourth industrial revolution using an analytical perspective based on institutional economics. The main idea of the study is to use an interdisciplinary approach for examining the impact of institutional changes during the period of neo-industrialization and the transformation of the economy into a digital one. In this sense, an interdisciplinary approach brings together such subject areas as computer sciences, informatics, electrical engineering, robotics, management science, organizational sciences, law, sociology, psychology, ethics and philosophy from the point of view of institutional changes and, therefore, a common understanding of the impact Fourth industrial revolution on the economy and society.

MATERIALS AND METHODS

The basis of this study is the use of elements of an innovative methodology of post-institutional analysis based on the interdisciplinary synthesis, which involves overcoming the monodimensionality, dichotomization and dogmatism of many concepts of orthodox neo-institutionalism. The authors also used general scientific methods, including dialectic, inductive, deductive, prognostic and private scientific methods, such as formal-legal, the method of legal interpretation, the principle of assessing legal processes, etc.

RESEARCH AND DEVELOPMENT

The fourth industrial revolution is defined as a technological revolution that combines digital technologies based on the third industrial revolution, as well as the physical and biological domains.

In this sense, the advanced technologies of the Fourth Industrial Revolution, such as autonomous vehicles, 3-D printing, the Internet of Things (IoT) and genetic engineering, lead to breakthrough innovations, bringing together selected technologies in the field of information and communication technologies (ICT) as well as scientific methods.

Recent advances in computer hardware and software have spawned the Second Age of Machines (Brynjolfsson & McAfee, 2016), which is increasingly based on what is commonly called artificial intelligence (AI). Artificial common intelligence (Goertzel & Pennachin, 2007), comparable to or superior to human intelligence, will remain unattainable for some time, but the so-called narrow AI (Goertzel & Pennachin, 2007) is fast and widespread in most industries. The current AI relies on technologies such as machine learning, deep neural networks, big data, the Internet of things and cloud computing. Thus, modern AI can be perceived as a general-purpose technology (Trajtenberg, 2019) and has the potential for radical economic change (Furman & Seamans, 2019). Pursue their objectives through AI, there are limited experience and knowledge of the impact of AI on the economy and society as a whole. As AI further complicates an already complex world, the economic and legal studies that contribute to understanding the impact of AI technologies are urgently needed but still insufficient (Agrawal et al., 2019a).

In terms of institutional economics, enterprises are a set of formal and informal rules, including their enforcement mechanisms (Furubotn & Richter, 2005). Institutionalists perceive the institution as an important variable explaining social, political and economic life, or the result of social, political and economic life, which itself requires explanation (Lowndes & Roberts, 2013). At the present stage, the fourth industrial revolution is at the beginning of a dynamic path. The key technology in the modern neo-industrialization process is artificial intelligence, which uses machine learning that performs tasks with algorithms and without using explicit instructions and relying on templates and inferences (Russell et al., 2016). From institutionalism, it is necessary to distinguish between controlled and uncontrolled machine learning, which involves a different degree of autonomy in institutions. More generally, human-agency collections arise within and between existing institutions, such as states, markets, communities, firms, non-profit organizations, governmental and non-governmental organizations and others.

When artificial intelligence is in play, the question arises, how will this technology affect existing institutions and how will it affect social, political and economic life? How will AI form important economic models?

Fundamental economic theory suggests that social outcomes result from the interaction of people maximizing utility, who make more or less rational de-

cisions. Over the years, the basic human model of homo Economicus (Kirchgässner, 2013) has faced significant criticism, and it has proposed more flexible perspectives (Tomizuka, 2015). But, given the impact of neoclassical economics on management science, and therefore, decades of business and management education, its practical significance seems more significant than ever (Gintis & Khurana, 2016).

In economic theory, individualism is a methodological starting point for analysis, but it is also a normative reference point for many scientists (Buchanan, 1975; Parisi, 2004). Normative individualism means that only individuals can be the endpoint of reference for moral obligations (Von der Pfordten, 2012) or, in a narrower economic terminology, the endpoint of reference for the internalization of external effects. The second consequence of artificial intelligence as an economic actor is that it interferes with individualism as a norm. It seems that there are two main reasons for such interference: properties of the digital environment and properties of the digital object itself. On the one hand, artificial intelligence operates in a digital environment, and "the merger of artificial intelligence and cyberspace ... will potentially lead to entities that will have the capabilities of an intelligence personality ... without any legal connection to physical space and, therefore, to states. Consequently, entities with a real identity will be beyond the reach of the legal powers of states" (Puaschunder, 2018). This leads to the need to find ways to clarify the legal status of artificial agents and digital identity (Bryson et al., 2017). On the other hand, the digital object itself poses new challenges when it comes to moral obligations and the internalization of externalities. Artificial intelligence agents are becoming more and more autonomous, but compared with people they miss an important property that can be considered as a sufficient condition to qualify it as the final normative reference point: they have nothing to lose. In the context of the emerging artificial intelligence agent, the problem has both practical significance and a philosophical question. For example, it became possible to have driverless cars. But in critical traffic situations with inevitable compromises, "should a car without a driver decide who lives or dies?" (Naughton, 2015). Responsible algorithms have become a domain of interest in artificial intelligence (Boddington, 2017; Kroll et al., 2016). This fact and the fact that individual artificial intelligence agents do not have "skins in the game" (Taleb, 2018) suggest that normative individualism needs to be critically reviewed as the basis for economic and social institutions.

As an intermediate conclusion, we can note that in a world with artificial intelligence, a separate subject is not only an element of analysis (homo economus), but also a design element (machina economica). Also, the review shows that the fundamental assumption of methodological individualism made by institutional economists can create problems for economic analysis and design in the world of artificial intelligence, where human and artificial subjects are closely linked. The analysis found that the emergence of artificial intelligence agents and their

distinctive properties can undermine the economic and institutional order based on normative individualism.

The immediate effect of introducing artificial intelligence agents into society is that they strengthen and accelerate the economic model that Adam Smith once described in his famous pin factory example (Smith, 1999), and which has since fundamentally shaped economic development, creating unprecedented complexity (Beinhocker, 2007; Hausmann et al., 2014) division of labour and specialization.

Before industrialization, human groups consisted of a limited number of specialized roles. Over the past centuries, the division of labour and specialization has increased significantly. For example, the number of jobs available in the United States has increased by about 300 times. The impact of labour market differentiation and growth in economic exchange can be seen in the sharp growth of GDP, along with the differentiation of markets for goods and services. The tribal society had several hundred products at its disposal representing less than 1% of the 70,000 products that a leading supermarket can offer (Beinhocker, 2007; Scrapehero, 2019). Human-agent teams, including artificial intelligence agents, are discovering a new dynamic of specialization and differentiation, as evidenced by more than 500 million products available on only one leading e-commerce platform (Scrapehero, 2018). In this context and in a world where new knowledge results from combining existing knowledge, the important role of a specialist for artificial intelligence assistants is to alleviate "problems with finding a needle in a haystack" (Agrawal et al., 2019b). But they also take on broader cognitive tasks and generate new knowledge by combining conceptual materials that lead to new opportunities for exchange, division of labour, and specialization (Koppl et al., 2015). Thus, artificial intelligence is increasingly acting as the basis of the economic model that Adam Smith has described as "the invention of all those machines by which labour is so much facilitated and abridged seems to have been originally owing to the division of labour" (Smith, 1999).

Open innovation emphasizes the importance of the company's external knowledge activities in the innovation process to cope with a rapidly changing environment since the use of only internal corporate knowledge has limitations, external knowledge can be used to improve the company's innovative activities (Chesbrough, 2003). A constant search for openness in acquiring new knowledge can lead to creativity (Yun et al., 2016a).

Firms are increasingly using not only their technologies but also external knowledge and other technologies. In addition, the phenomenon of open innovation is rapidly spreading in many industries, across the country and around the world, as firms provide their unused technology to others. A dynamic model of open innovation has linked the logic and concepts associated with open innovation, integrated adaptive systems, and evolutionary change (Yun et al., 2016b).

For the values created through the information and communication network, the "Metcalf Law," which was proposed by Robert Metcalf, the founder of Ethernet, is a notable principle. Since the values increase exponentially depending

on the number of users on the network, the values of billions of people connected via the Internet are significantly higher than the values provided through the local network. As more and more people become connected, network members have more and more values (Laursen & Salter, 2006).

Coase's theorem can also describe the impact of technological development on economic players. According to Ronald H. Coase, a Nobel laureate, an economist from England, the reduced transaction leads to simplification of the complexity of the organization. Thus, companies tend to increase their size until the transaction costs arising from the domestic production of additional units of production become equal to those arising from the external outsourcing of the production process (Coase, 1937).

In other words, if the cost of production in the company increases, which reduces economic efficiency compared with the situation in which products are purchased from outside, or if transaction costs are generated to provide the necessary resources from outside as a result of the development of information, a communication network is sharply reduced and lower than the cost of production in company, the company must choose outsourcing.

Since the beginning of history, there was a compromise between the range of information dissemination and the quality of information. However, the Internet network successfully fixes this problem. The Internet has no restrictions on the quality of information disseminated, which makes a huge contribution to the creation of global networks (Lee et al., 2011).

Regarding the economics of the network, Kevin Kelly (1997), CEO of the headhunting company, said the following:

1. A vibrant network economy creates wealth through innovation rather than optimization.
2. Creating an unknown value creates a network environment that provides fast access to information.
3. You must give up the known thing to occupy the unknown thing in advance.
4. As the network economy develops, the development-maturation-destruction cycle becomes faster (Kelly, 1997).

One instance of this principle is Amazon.com. Amazon.com, which has been in the red for a long time, struggled to overcome the situation and quickly reached its size after reaching a tipping point. Finally, it managed to make a profit. Now it helps to form a new network, for example, unmanned package delivery services. Creating a network can also be connected with the law of increasing profits. Furthermore, it is similar to the "economic development through creative destruction" mentioned by Schumpeter.

Other examples are IBM and Apple. More recently, biological areas such as molecular biology and new medicine have begun to address this principle.

A typology of the changes caused by the activation of outsourcing due to the development of digital technologies is described as follows (Lee et al., 2011):

1. Population migration: high-quality human resources are moving to developed countries.
2. Changes in the structure of the industry: Automation and knowledge-intensive industries (e.g., BT, pharmaceuticals, information and communications, education, financial services) are growing and creating new values or wealth.
3. Deregulation: The aviation and telecommunications industries provide significantly improved services and economic benefits to consumers.
4. Generalization / standardization of processes. By creating a platform that integrates e-commerce solutions, customers can receive workflow and customer satisfaction services without even having to contact them personally, for example, as part of India's tax reporting program or Nighthawk X-ray reading work.
5. Creation of new value chains: By connecting with global partners through a variety of supply chains through e-commerce, buyers can be provided with cheap but high-quality products for a greater value (e.g., Walmart).

   Besides, it is possible to add the changes brought about by the Fourth Industrial Revolution, which will lead to a dynamic economy.
6. The fourth industrial revolution (model of a new economy): this revolution leads to a convergence revolution outside of areas, so the convergence of two different areas leads to innovation in a new business (for example, AI, web technology).

Many experts argue that the source of competitive advantage has moved from "economies of scale" to "economies of scale" to "economies of experience" to "economies of convergence" (Lee et al., 2011). To realize a dynamic economy, the digital, physical and biological sectors, which are the characteristics of the fourth industrial revolution, must be actively combined. Convergence will open up the possibility of creating new values. In the past, digital technology was the goal of convergence. However, in the future, technology will serve as a catalyst to stimulate creative convergence.

We look at some successful cases of convergence in the past.

Nike, famous for sports shoes, does not produce shoes. It creates demand by promoting its brands for major sales involving star players and provides its markets through global suppliers connected via the Internet. This case shows that the Internet environment is important (Ghemawat, 2007).

Walmart forms supply chains with global suppliers and uses big data for data mining similar to Carrefour. By connecting to a decision support system, Walmart acquires high-quality products at the lowest cost to ensure their competitiveness (Ghemawat, 2007).

These cases show that the creative destruction mentioned by Schumpeter takes place. Genetic manipulations with the body allow the development of antibiotics and drugs for genetic diseases, as well as the combination of nanotechnology and biotechnology, which leads to the creation of electronic nanocomputers.

In the Fourth Industrial Revolution, we can be customers, even if we do not actually use the product or service and have no physical experience using the product or service. A person who may be a client in the future, even if he/she is not a client now, should be included in the scope of the client. We need to create demand by combining technology and new methods, as well as exploring new markets. A new innovative convergence strategy is the combination of using a known thing and exploring an unknown thing.

We can classify examples of successful convergence into three types (Lee et al., 2011) as follows:

1. Convergence of products. New consumer values are provided, such as additional functionality, convenience, cost savings, space efficiency, pleasure and comfort, and safety. Examples include a camera and a mobile phone, a vehicle and a navigation system, as well as a washing machine and dryer.
2. Convergence of product and service. Examples include the Apple iPod and the music download service exclusively for iPod users.
3. Convergence of services. Examples include complex services, including entertainment parks, hotels, resorts and golf courses such as Disney World, as well as combinations of residential, leisure, shopping, schools and restaurants based on Unit-Community.

Thus, convergence is a process of institutional change based on the application of the Blue Ocean Strategy, including removal, reduction, growth and creation. Removal is the elimination of the institutions of the system that cannot produce positive effects in the current state of digital transformation. Reduction reduces the provision of only limited resources and relationships. Growth is aimed at increasing customer focus. And the creation focuses on using a creative approach that provides customers with the values that they need or creates demand for them and thereby expands the customer base.

The analysis also revealed the importance of sensitivity training since Schumpeter's creative destruction or the needs of new customers are not based on the use of existing knowledge but the use of creativity and newly arising needs are not created naturally but must be created.

After the world recognizes data and machine labour as relevant factors of production, it will be necessary to consider another economic model: Economics of networking.

It is important to note that network effects stem from the positive feedback that causes the strong to get stronger and the weak to get weaker (Shapiro & Varian, 2008). There are significant economies of data scaling in the artificial intelligence

world. They arise mainly from direct network effects (Goldfarb & Trefler, 2018), so-called demand from economies of scale (Varian, 2017). As in the case of artificial intelligence agents who can process more data, get more accurate results and increase the demand for services and improve their quality. This model leads to competition for data where positive feedback ensures further data collection (Goldfarb & Trefler, 2018). Varian (2017) argues that data tends to show decreasing returns to scale. However, Agrawal et al. (2018) argue that this is not necessarily the case and that there really can be an increase in profits. The behaviour of artificial intelligence providers confirms that following the so-called platform strategy (Gawer & Cusumano, 2008), large artificial intelligence providers have learned to develop two-way markets (Rochet & Tirole, 2003) where platforms sell lower or free for a more price-sensitive side with the goal of network expansion while charging on the other hand for the cost of the resulting external effect (Biancotti, 2018; Rysman, 2009). This approach leads to the acquisition of exclusive ownership of large user datasets.

In practice, the economies of scale on the demand side can be aggregated based on the division of labour and in the form of layers. For example, if a user chooses to interact with a specific AI agent (for example, Uber for transport), while the other user prefers a competing AI agent (for example, Lyft), but both use the same AI agent for orientation (Google Maps), then the Internal Artificial Intelligence Provider benefits from economies of scale.

The economies of scale on the demand side based on AI agent-level data are consistent with the economies of scale on the supply side at the AI supplier level. As already noted, AI is a general-purpose technology that means that useful algorithms and data can mutually enrich various applications and can operate in different areas (Goldfarb & Trefler, 2018). The combination of the two effects feeds the collective mind (Malone & Berstein, 2015) resulting from the intercompany collaboration between people and AI agents. The development of such supermind is increasingly accelerating the increase in the number of AI agents, complementing them with the ability to organize themselves and directly collaborate without human intervention, which effectively leads to the so-called swarm intelligence (Bonabeau et al., 1999; Kennedy, 2011).

The combination of economies of scale on the demand side and economies of scale increases competition on the platform rather than traditional competition (Gawer & Cusumano, 2008). The combination of economies of scale on the demand side and economies of scale increases competition on the platform rather than traditional competition (Gawer & Cusumano, 2008).

This contribution has some limitations. He entered new territory-wide with the risk of insufficient depth in covered areas. However, the discussion showed that Machina economica, the microdivision of labour and specialization, tripartite agent relations with information asymmetry of the next level, as well as network effects based on the properties of data and machine labour, as new factors of production are not only relevant but also interdependent institutional issues in a

world with artificial intelligence. The assumption that artificial intelligence gives new meaning to these issues can be strengthened.

As the previous financial crisis showed, small and medium-sized enterprises due to their flexibility, entrepreneurial spirit and innovative opportunities show more sustainable growth compared to large and multinational enterprises. Therefore, the study of Industry 4.0 for small and medium enterprises issue is relevant in our opinion at the stage of studying institutional changes associated with the process of neo-industrialization in the digital economy. According to experts of the scientific community in this field (Bär et al., 2018; Matt et al., 2016; Türkes et al., 2019) small and medium-sized enterprises are not only adaptive and innovative in terms of their products but also terms of production practices. Recognizing ongoing competitive pressures, small organizations are becoming increasingly active in improving their business processes (Boughton & Arokiam, 2000) which is a good starting point for introducing new concepts such as Industry 4.0. Various studies indicate corresponding changes and potential for small and medium-sized enterprises in the context of Industry 4.0 (Rickmann, 2014). Experts predict that small and medium-sized enterprises will be able to achieve digital transformation much faster than large ones. It is primarily because it is easier for them to develop and implement new IT structures from scratch (Deloitte, 2015). Many small and medium-sized companies are already focusing on digital products to stand out in the market. The integration of information and communication technologies (ICTs) and modern technologies of Industry 4.0 will turn today's small and medium-sized enterprises into intelligent factories with significant economic potential (Gualtieri et al., 2018; Lee & Lapira, 2013). Industry 4.0 technologies offer small companies a great opportunity to improve their competitiveness.

Industry 4.0 also presents a number of challenges for business in general and small and medium-sized enterprises in particular. The organizational capabilities of small and medium-sized enterprises, as well as the willingness to adapt the Industry 4.0 concept, exist only partially. The smaller the enterprise, the greater the risk that it will not benefit from this revolution. Therefore, for the widespread introduction of technologies and concepts of Industry 4.0 in small and medium-sized enterprises, it is necessary to conduct separate studies and give recommendations on the formation of individually developed strategies and approaches to the introduction and implementation of concepts and technological solutions adapted for small companies. Otherwise, actual efforts to raise awareness among small and medium-sized enterprises for Industry 4.0 will not show the expected success and results. Accordingly, it is necessary to examine separately the specific requirements of the small and medium-sized sector of the economy that introduce Industry 4.0 and to consider the opportunities and challenges for the digital transformation of production, logistics and organizational processes in small and medium-sized enterprises.

RESULTS

Opportunities for the government to play a role in the light of the complexity of the identified institutional problems and the increasingly liberal international trade and investment regimes are becoming more complex each year. However, it can provide public goods, such as improved technological education and assistance in research and development. This type of intermediation can also be supported by non-governmental institutions such as business associations and, more broadly, social networks. However, as the issue of social justice is becoming increasingly important in developing countries, the role of government in coordinating different social and economic interests seems to be increasing. The state can also help employers and employees, upper and lower-level companies, firms and local research institutes, and even domestic and foreign firms, thereby ultimately helping the country's technological upgrading. If it can successfully build a satisfactory and sustainable social security/assistance system for its population, it will have greater political stability, which in turn will enhance predictability and facilitate negotiations and consensus-building among market participants. However, as the world moves toward a more open political environment, the governments of developing countries should play the role of coordinating, persuading rather than suppressing.

Of course, in recent years, an increasing number of developing countries have experienced the democratization of their political regime. However, in some cases, higher requirements for distribution and redistribution resulted from democracy and hindered sound intelligent and coordination of interests in technological renewal. In another case, democracy did not function as expected to correct social inequalities. In the worst case, democracy can degenerate into a xenophobic populist regime or outright autocracy.

The economic, political and social problems of developing countries converge into a whole that requires simultaneous attention.

Since the Fourth Industrial Revolution leads to breakthrough innovations, there is a need for openness by converging digital, physical and biological fields. In addition, it has been revealed that open innovation is the key to smoothing out the innovations that the market craves. As for business, the use of external knowledge is important due to the limited internal corporate knowledge and results in the growth of open innovation.

Methodologically, the advent of artificial intelligence has promising and complex consequences for the economic system. Artificial intelligence agents are new research objects that are having an increasing impact on the economy as a whole. On the one hand, it seems that economics offers only the right theories for analysis since Machina Economica promises to be more rational than ever people. On the other hand, economics is methodologically based on individualism. This is caused by the emergent inseparability of man and machine where human choice can no longer be perceived as independent. It is an aspect that will require further research and development and which is further complicated by the economic scheme of micro-division of labour and specialization. There is good reason to

believe that the widespread use of artificial intelligence will further enhance this model. The further division of labour and specialization will continue in mixed institutional structures human-agent where people and artificial intelligence develop together. People will have to cope with the conglomerate effects of various artificial intelligence agents that process information automatically, which implies limitations for direct institutional design.

Problems at the methodological level supplemented the problem at the normative level of perception of artificial intelligence agents as a starting point for moral obligations and the internationalization of external effects. Thus, increasing rationality, increasing autonomy, along with the growing inseparability built into the structure of the division of labour and specialization, require new research on the methodological and regulatory foundations of the institutional economy.

The above will be important in trying to overcome the asymmetry of next-level information caused by the massive introduction of artificial intelligence. In the past, economists have determined that such asymmetries have to do with relationships of principal-agent that are ubiquitous in the economy. With the introduction of artificial intelligence in the game, a pattern changes when relations between agents become relevant both in the private sphere of the market and in the public domain of the state. It requires research that will help to better understand such tripartite problems of the agency to analyze emerging phenomena and identify and develop suitable institutional conditions.

The need to develop institutional economic theory is further confirmed by the fact that an economy with artificial intelligence uses data and machine work based on artificial intelligence as new factors of production. The properties of these factors not only reinforce the pattern of the microdivision of labour and specialization. They are also a source of potential negative external factors and are the basis for a scheme to increase network profitability.

The institutional paradigms that arise during the period of neo-industrialization include:

1. Deregulation of new businesses. In general, companies compete most effectively in free markets without artificial restrictions. Although they can compete, they can also work together to create something commercially beneficial for society.
2. Expansion of new human resources (human equation). In management in the 20th century, labour was seen as a cost reduction. People focused on replacing labour with simple and effective computer technologies. However, in the 21st century, human resources are expected to become a key factor. Future management needs to understand and study the strengths, interest, and knowledge of members of the organization. To ensure the examination of knowledge of labour, it is necessary to obtain the latest information and business knowledge, as well as devote oneself to work to increase the value of the organization. Knowledge workers and

managers should fulfil their overall mission of satisfying customer needs by ending conflicts between work and management (dichotomy). There is indeed a growing concern about employment in the fourth industrial revolution. However, the contraction of the labour market in the information era of the Third Industrial Revolution was not a big problem. Bank employees rarely worked with the introduction of ATMs (ATMs). In Silicon Valley, the employment of skilled workers using new technologies has increased depending on the region. However, it is expected that mid-level workforce will significantly switch to low or high-skilled jobs.

3. Support for new convergence technologies. The convergence technology, which will be developed based on digital technologies, should not be supported as in the past. As breakthrough innovations are needed, technology must be developed but led by the private sector. Besides, the government should strengthen support for technologies that cannot be supported by the private sector, since there is no underlying technology or profit.
4. Triangular agent relations and information asymmetry. The emergence of human-agent teams with artificial economic agents and an accelerating micro-division of labour and specialization scheme puts another well-known institutional problem in the spotlight: principal-agent problem. The problem of the principal-agent arises if the interests of the agent and the principal do not coincide, and the agent uses the existing information asymmetry.

In conclusion, it should be noted that the introduction of the concept of Industry 4.0. and, in particular, technological progress in artificial intelligence, is changing the institutional structure of institutions that regulate tripartite relations between agents and the problems resulting from information asymmetry, problems associated with market and political dominance and, consequently, general economic and political dynamics Development during the period of neo-industrialization in the digital economy will determine the future dependence on artificial intelligence.

CONCLUSION

The global economy is trying to recover in a new dynamic economy, creating new requirements and a new labour market for the younger generation. These attempts are called the fourth industrial revolution.

The ongoing market economic model of the division of labour, specialization and differentiation is currently accelerating. The number of jobs adopted by autonomous artificial agents is unknown, but it can be expected to be exponentially higher than the number of professions available to people in the economy. With the improvement and massive introduction of artificial intelligence, enterprises must adjust the institutional structure of the division of labour between people and machines. In the end, new technologies (IoT, AI, AR) will create a blue ocean with a combination of removal, reduction, growth and creativity, as well as innovative openness and convergence initiatives to open a new ecosystem.

Due to the growing division of labour and specialization, today's economy has become so complex that no one, whether a client, senior manager, specialist or another participant, can already know exactly how a large organization creates value with its products and services. They all rely on institutional mechanisms to support them for a profitable exchange with organizations or parts of them. To the extent that learning algorithms autonomously continue to follow this pattern, a comparable situation will arise for people as a whole. The goal of micro-division of labour and micro-specialization is simple from an economic point of view: benefit from specialization and exchange. The first is the deregulation of new enterprises that compete most effectively in free markets without artificial limitation. Secondly, it is necessary to provide expertise on knowledge-based labour by obtaining the latest information and knowledge about business, as well as devote oneself to work to add value to the organization. Third, it intended to help empower new converged technologies to increase the efficiency of new industries.

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CHAPTER 10

THE LEGAL MATRIX OF CROSS-CUTTING TECHNOLOGIES OF THE NATIONAL TECHNOLOGICAL INITIATIVE (NTI)

Methodology of Formation

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The emergence of new social relations, as well as the emergence of previously nonexistent objects of legal influence, necessitate the reform of the existing system of legal regulation. It is essential to consider factors that negatively affect the development of a new order. The most crucial task contributing to the goal of creating specific

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 117–127.

rules of conduct governing the creation and effective implementation of end-to-end technologies in various areas of the Russian economy is the removal of administrative barriers. In this case, it is necessary to develop a conceptual apparatus that allows a uniform interpretation of the norms and rules of behaviour; to formulate the rights and obligations of participants in legal relations; solve the problems of setting limits and legal restrictions. However, for the formation of the legal matrix of cross-cutting technologies of the national technological initiative, first of all, it is necessary to solve the problems of the methodology and methods of legal regulation.

Currently, the legislator does not offer guidelines that would serve as a starting point for the creation of new legal norms. Often, legal acts indicate possible methods (the foresight method, the leading (proactive) method, et al.), but they have nothing to do with legal regulation methods.

In work, using the methods of scientific analysis (formal-legal method, the way of comparative law, sociological methods), the use of which is determined by the goals and objectives of the study substantiates the conclusion about the need for a combination of civil and administrative methods in constructing a legal matrix of cross-cutting technologies of cross-cutting technologies of the national technological initiative. The necessity of using both methods of direct and indirect regulation of emerging legal relations is proved. The need of eliminating theoretical errors in the construction of judicial management of experimental regimes, as well as the impossibility of negative regulation (regulation by establishing prohibitions and restrictions) of relations for which the state sets the task of dynamic, accelerated development, is indicated. A distinction is made between the concepts of administrative and legal barriers. The use of project management methods and permissive-stimulating method is substantiated

Keywords: End-To-End Technologies; Methods of Legal Regulation; Administrative Barriers; Legal Barriers; Restrictions Legal Means; Self-Regulation

JEL Code: K15, K20, K23

MATERIALS

The doctrinal basis of this study on the method of legal regulation of public relations was the work of S. S. Alekseev, D. A. Gavrina, A. V. Gubarev, V. F. Yakovleva, and others. In the analysis of factors affecting the development of cross-cutting legal matrix technology of the national technological initiative, the works of Russian and foreign authors (Vasily V. Tarakanov, Agnessa O. Inshakova, Vladimira V. Dolinskaya, J.Waters, B.P. Cozzarin, B. Koo, W. Kim and others) were used. When solving the problems of eliminating administrative barriers during the reform of the current legislation, the authors relied on the research of G. B. Kazachenko, E. V. Samoilenko, B. P. Noskov, E. V. Simonova, S. M. Zubareva.

The normative basis of the study was the Decree of the Government of the Russian Federation (2016), the Decree of the Government of the Russian Federation (2017) to improve legislation and remove administrative barriers to ensure

the implementation of the National technological initiative and amending individual acts of the Government of the Russian Federation," Draft Federal Law (2020), Decree of the Government of the Russian Federation (2018).

METHODOLOGY

Jurisprudence, as well as any other science, has a set of historically established methods, incorporating general scientific, philosophical, and unique experimental techniques. These methods have a standard research toolkit that allows you to achieve the goals set by modern challenges. It should be noted that the purpose of legal science cannot be characterized statically; it is a dynamic process that mediates the emergence of new methods of scientific knowledge, reflecting changing social relations. Nevertheless, the basis of any experience is analysis, synthesis, deduction, induction. In the study of the regulatory framework, the formation of the conceptual apparatus, the identification of signs, methods of comparison and generalization, analogy and typology were used.

Based on the goal set during the presented study aimed at clarifying the fundamental reasons for the transformation of legal regulation and the emergence of new lawful means and methods of legal response, as well as the justification of the impossibility of using traditional methods of judicial management of relations of a national technological initiative, philosophical methods of cognition (system approach, comparative analysis).

Considering the method as the researcher's activity to a cognitive object, one should pay attention to their interconnection, since the properties of the studied object mediate the use of specific means, methods of cognition. Taking into account the fact that in the presented scientific work, not only a study of legal norms and changing legal regulation is carried out, but also an analysis of the economic and social prerequisites of such dynamics, along with the formal-legal method and the method of comparative law, the sociological method is used to identify the main factors affecting the change in the existing economic and social structure.

When analyzing the legal nature of the emerging legal relations, identifying their legal environment, the ontological approach is used.

INTRODUCTION

Adopted in 2014, the state program of the Russian Federation "Decree of Governments, 2014." One of the main tasks is the development of new technologies and processes for integrating the Russian Federation into the global innovation system. Decisions are designated as binding, urgent and changing social relations.

Governing powers and authorities should be established to create systems of legal regulation, goals and objectives (Tarakanov et al., 2019).

It is as a basis for the creation and interaction of all elements of the future system.

In this regard, it is necessary to understand that the general rules of legal regulation are hardly applicable if we expect from them a breakthrough in one or another sphere. It is needed to develop new special regimes aimed at creating the most favorable conditions for their development—factors determining the introduction and intensification of technology (Waters, 2017).

The complexity of creating and constructing a system of normal relations, first of all, lies in the impossibility of applying already complex methods of legal regulation, which are caused by changes in the objects of relationships and the emergence of new ways of entry and interaction in legal relations. This circumstance, in turn, is the main message for the development of a new methodology of legal regulation that can solve the legal problems of the new economic structure.

Moreover, based on the specifics of warehouse law, it is impossible to regulate. A combination of administrative mechanisms based on the dispositive method is necessary. Thus, the question of the formation of legal regulation. When forming patterns, it is needed to use all the means required to combat violence (permissions, prohibitions, incentives, restrictions, et al.), and also rely on the fundamental canons of typical education (law-making) (Trofimov & Samorodov, 2017).

RESULTS

Review of Current Legal Regulation From the Perspective of the Methods and Legal Means Used

An analysis of the adopted normative acts aimed at creating the legal basis of a national technological initiative reveals two main problems of current legal regulation. The first is the use of outdated rules; the second—is in the absence of new techniques and methods of legal control. In the latter case, we are talking not only about the development of a new way of legal regulation, but also the insufficient use of the existing ones (method of self-regulation).

Besides, a review of normative acts aimed at creating the legal basis of a national technological initiative shows that, as a rule, they contain declarative norms. In contrast, the normative acts themselves are administrative in nature and are not aimed at regulating legal relations. Nevertheless, from the content of some legal bills, it can be concluded that the main trends in changes in legal regulation.

In particular, the Decree of the Government of the Russian Federation of April 18, 2016, N 317 (as amended on August 31, 2019) "On the implementation of the National Technological Initiative" indicates the necessity of using the foresight method. Of course, the foresight method is a system of modern tools aimed at achieving specific results. With it, you can assess the prospects for the development of technology, economics and law. However, in general, such a method is more applicable for developing priorities and strategic directions in the formation of programs for the development of the economy, law, and other branches of science. As a rule, as a result of using this method, state programs are formed, "road maps" are accepted, et al.). Essential mechanisms and essential characteristics

remain outside the boundaries of this method. Nevertheless, its use has its prospects because the goals here are achieved using a constant dialogue between the subjects of the most important strategic directions.

In the same normative act, as one of the directions for improving the legislation, it is pointed out that it is necessary to use incentives and restrictions when constructing a system of legal regulation (Malko, 2003), which consist of creating a network of external factors that encourage an entity to act in a certain way and fixing a system of restrictions in order not to violate rights and the freedoms of other entities, including the state. However, this method is formulated differently. The RF Government's decree deals with the elimination of restrictions and the creation of a system of incentives, which at the present stage to the development of advanced technologies and their promotion on the market, of course, makes sense. Thus, the method of legal and economic incentives is of primary importance. Although, of course, it is impossible to say that this is a full-fledged method of legal regulation, it is instead a question of lawful means.

To develop the idea of the need to change the legal regulation, the Decree of the Government of the Russian Federation (2017), which formulates the main directions for improving legislation to administrative barriers and creating conditions and incentives for promoting new technologies (Cozzarin et al., 2017). Moreover, develop a system of impulses, it is proposed to use, among other things, such a legal remedy as to a ban. According to the legislator, the prohibitions should be aimed at limiting the use of outdated technologies (subparagraph "v," paragraph 10 of Decree of the Government of the Russian Federation (2017)). With this approach, the logic of establishing incentives is violated since it is impossible to stimulate any activity using instituting bans.

It is proposed to evaluate the results of rule-making using the foresight method and the expert-analytical assessment method (paragraph 27 of Decree of the Government of the Russian Federation (2017)), which also raises some questions. So, expert assessment is applied when there is no necessary and reliable statistics on the application of a normative legal act, and there is a lack of time, or force majeure situations, et al. Of course, in conditions of accelerated development of new technologies, a temporary shortage is felt; however, the introduction of unreasoned legal norms that have not been sufficiently tested can lead to even more significant problems, and as an option will create more administrative barriers. Therefore, along with the use of the foresight method and the method of expert-analytical assessment, it is necessary to use the modelling and forecasting method, which will allow us to evaluate the possible results of the adoption of legal norms at the stage of lawmaking and eliminate negative consequences when they arise. It is indisputable that testing the results in several organizations participating in the activities of the national technological initiative would be the optimal solution, but the lack of time does not allow the use of this method.

When analyzing the specified normative legal act, one more important point should be paid attention to; it indicates the introduction of new legal regulation of

the anticipatory (proactive) nature (paragraph 27 of Decree of the Government of the Russian Federation N 1184). However, what is the content of this concept is still difficult to conclude.

Other normative legal acts devoted to the improvement of legal regulation in the field of cross-cutting technologies within the framework of the national technological initiative also emphasize the elimination of existing restrictions (Decree of the Government of the Russian Federation (2018c)). In this case, restrictions mean the absence or the presence of outdated legal regulation of legal relations, which is not right for the theory of law and the theory of civil law.

From these positions, the Decree of the Government of the Russian Federation (2018a) more clearly formulates the provision on legal restrictions, indicating the absence of statutory regulation that ensures the removal of barriers.

Among the directions for improving legislation, the need for the introduction of preferential tax regimes is indicated; elimination of discrimination in gaining access to information; development of the legal government of information systems; the excellence of some civil law institutions (transportation, chartering, et al.), et al. (Decree of the Government of the Russian Federation (2018b), Decree of the Government of the Russian Federation (2018c)). The indicated directions are undoubtedly right and will allow achieving the tasks outlined for the formation of legal regulation of the national technological initiative. However, it is impossible to say that the legislator uses new methods of judicial control, or proposes any new law of a proactive nature.

Here, one should also pay attention to the moment that not in all cases, the legislator correctly uses the concept of the method of legal regulation. This important aspect should be highlighted separately.

Methods of Legal Regulation

In the general theory of law, as, however, in individual branches of law, there are various approaches to understanding the method of legal regulation. Techniques are considered as the main, uniting principles, structuring own institutions in the branch of law (Alekseev, 1981). In other studies, the method of legal regulation is understood as the method of influencing regulated legal relations (Yakovlev, 1972); third, approaching more broadly to the problem, believing that the technique is a combination of techniques and methods of influence (Gavrin, 2019); fourthly, we are talking about a unified system of legal means of influencing public relations (Gubarev, 2014). Without delving into the essence of theories about the method of legal regulation, we dwell only on specific techniques, methods and means that make up the method of legal control. The most popular technologies and practices in science are tying, prohibition, permission, authority (Gubarev, 2014).

The current economic and legal situation looks so that, perhaps, the central importance is intersectoral relations, which, of course, entails a departure from the existing dogma about the possibility of using for each industry only its unique

method of legal regulation (Alekseev, 1981). At the same time, we are in the position that the lawful means are the same for all branches of law (principles and presumptions, incentives and restrictions, prohibitions, et al.). They are not united in the sense that different branches of law have, for example, the same principles and presumptions, but they are joined in the mind that all these principles and assumptions are legal means for any branch of law.

As for the imperative and dispositive method of legal regulation, they are inherent in all branches of law. Only the percentage of imperatives and transparencies changes. For example, civil law that traditionally uses the dispositive method of legal regulation, however, at the same time uses imperative management. Moreover, recent changes to the Civil Code of the Russian Federation show an increase in the share of peremptory norms; this is very well traced on the example of chapter four of the Civil Code of the Russian Federation.

About New Methods of Legal Regulation and Experimental Legal Regimes

We can talk about the latest legal mechanisms and legal means when considering the draft Federal Law "On experimental legal regimes in the field of digital innovations in the Russian Federation and on amendments to certain legislative acts of the Russian Federation," developed by the Ministry of Economic Development of the Russian Federation (Draft Federal Law, 2020). To accelerate the implementation of digital innovations, the legislator allows the possibility to establish special regulation for certain entities, which consists of the hope of non-application of some regulatory legal acts, or individual legal norms. In connection with the establishment of such a regime, accelerated implementation and testing of new technologies are expected.

It should be noted that the authors rely mainly on the experimental method analyzing the primary way laid down in the framework of this project. Eliminating the impact of certain legal norms on relations arising from the development and implementation of new technologies, the legislator thereby tests the possibilities of removing excessive requirements and restrictions, and at the same time checks the effectiveness of such regulation. If the result is positive, the law can be used within the framework of the general legal regime. Moreover, already in the process of experimenting, the possibility of correcting legal norms is allowed to achieve the most effective legal regulation.

Of course, the experimental method in constructing a system for regulating new relations is one of the most effective, since it is rather difficult to predict the development of the object of legal influence in the era of new technologies. However, it is possible to directly simulate the conditions and test the experimental model in them. Therefore, modelling and experimentation are two methods by which it is possible to talk about testing the construction of a new legal system. But, they are not a means of legal regulation.

Considering the provisions of this draft federal law, one cannot but point out some, in our opinion, negative aspects. In particular, paragraph 4 of Art. 2 of the draft, describing permissible exemptions from general regulation due to the non-application of several legal norms, indicates the possibility of non-application of administrative and civil law. And if one cannot argue with the removal of regulatory standards (licensing, certification, accreditation), then with the possible non-application of civil law norms, some problems arise.

Firstly, from the position of the dispositive method of civil law regulation used in civil law, the parties themselves decide on the application or non-application of one or another norm (dispositive norm). Consequently, the inclusion in the draft law of the possibility of legislative exclusion of the use of the standard does not seem at least logical. Secondly, the elimination of the rules on compliance with civil law norms can disrupt the whole process of public circulation. So, the authors of the law propose, as possible exemptions, not to use identification methods, which is impossible in the context of digitalization and the development of civil turnover on the Internet; or not use the rules on sending legally essential messages. It raises the question: what obstacles does the obligation to submit a lawfully meaningful message create? Probably, the legislator does not understand the essence of the legally important note—this is not an administrative barrier; it is a means of conducting average civil circulation.

The establishment of a special regime should be aimed at eliminating precisely administrative barriers, which logically leads to the withdrawal of the application of regulatory norms, but not civil law.

If we consider the provisions of the draft law from the standpoint of legal theory, this, however, applies to the entire block of normative legal acts aimed at regulating cross-cutting technologies of the national technological initiative, it should be noted that the legislator mixes the concepts of "administrative barrier" and "legal barrier." One of the main goals of creating special legal regulation is the elimination of administrative barriers, that is, redundancy of governmental influence (Kazachenko & Samoylenko, 2007), which can be expressed both in action and inaction of authorities (Noskov & Simonova, 2005). The administrative barriers in science include deficiencies in legal regulation; subjective administrative discretion; administrative arbitrariness (Zubarev, 2018).

In turn, a legal barrier is a system of restrictions laid down at the stage of formation of a legal norm. The possibility of establishing such limitations is set in the Constitution of the Russian Federation and is justified by issues of state security, respect for the rights and interests of subjects of law, et al. (Frolova et al., 2018).

Moreover, the main difference between administrative and legal barriers is that the latter play a more decisive role, ensuring the stability and security of society and the state, while regulatory barriers are negative.

CONCLUSIONS/RECOMMENDATIONS

Factors that negatively affect the adequate and systematic legal regulation of cross-cutting technologies of the national technological initiative are both the use of outdated regulatory standards and the lack of new techniques and methods of judicial management. However, speaking about the ways of legal regulation, the legislator refers us to the foresight method, the purpose of modelling and experiment, which are more methods of testing the results, including future ones, but are not methods of legal regulation.

It is proved that to develop end-to-end technologies of the national technological initiative, the legislator should, first of all, direct his efforts to remove administrative barriers. At the same time, a clear legislative distinction should be made between the concept of a regulatory boundary as redundancy of regulatory influence and a legal wall as a system of legal restrictions.

It is proved that the use of the method of prohibitions and restrictions to develop a legal matrix of cross-cutting technologies of the national technological initiative is impossible.

Important when building a system of legal regulation is to go beyond the framework of one branch of law and, accordingly, the use of methods of legal control inherent in different branches of law. The most optimal combination of administrative and civil purposes, which are based on the compelling and dispositive way of legal regulation. We believe that when forming the legal matrix of end-to-end technologies of the national technological initiative, it is necessary to use the project management method, which will allow combining a set of interrelated programs and activities aimed at achieving one goal in one project, which will reduce time and resource costs. Of particular importance is the use of permissive-stimulating agents.

It should be borne in mind that the emerging legal relations on the creation and use of end-to-end technologies of the national technological initiative at this stage cannot well be settled by direct methods of state influence due to the unique object of the legal relationship. It's content, which is quite challenging to predict, again based on the novelty of the purpose. Therefore, it is necessary to use the possibilities of indirect regulation. First of all, we are talking about the method of self-regulation (however, the state must create the required prerequisites for this), the technique of contractual regulation and the project management method.

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PART II

PREVENTIVE AND PROPHYLACTIC MEANS OF PROTECTING THE RIGHTS AND LEGAL INTERESTS OF SUBJECTS OF NEOINDUSTRIALIZATION

CHAPTER 11

THE DYNAMICS OF CIVIL LAW DEVELOPMENT UNDER CONDITIONS OF INTENSIFYING DIGITAL TECHNOLOGIES

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The research goal of this chapter is to identify, disclose and justify the main trends in the development of civil legislation in the context of increasing digitalization, and to analyse the dynamics of development of modern civil law institutions in a digital society.

This study raises the question of the relationship between law and economy as the basis of legal regulation, shows the dynamics of civil law regulation in conditions of a transformation of economic relations, growth and intensification of digital technologies, and it identifies and reveals the directions of development of civil law under conditions of digitalization of technologies and markets. The chapter focuses on the legal risks associated with global restructuring of the method and system of private law under conditions of intensification of digitalization. It shows segments of developing economic relations that require special regulation and do not fit into the existing legal regulation that provides for the needs of material production.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 131–146.

Keywords: Trends in the Development of Civil Legislation; the Digital Economy and Civil Law; Private Law and Scientific and Technological Progress; Technology Development and Legal Regulation

JEL Code: K15, K24, K41, O14, O33

MATERIALS

The basis of the regulatory framework of this study was the norms of Russian civil legislation—the Civil Code of the Russian Federation (hereinafter—the Civil Code of the Russian Federation) and individual federal laws adopted in accordance with it. The subject of this study is the norms of Russian civil legislation on subjects of civil relations, transactions, intellectual rights, obligations, and the objects of civil rights.

As policy documents of a strategic and recommendatory nature devoted to civil law in the digital economy, we have studied: Doctrine of Information Security of the Russian Federation (2016), the Strategy of Information Society Development in the Russian Federation for 2017–2030 (2016), the State Program of the Russian Federation "Information Society 2011–2020" (2012), and the Program "Digital Economy of the Russian Federation" (2017).

In the context of global trends in the development of digital technologies, current integration and harmonization processes that are necessary for the globalization of markets and eliminate incompatible differences and insurmountable barriers between the legal systems of our time, the author states that it is not advisable to study the development of civil legislation in a digital society only on the example of one jurisdiction (Russian law). In this regard, the subject of this study includes not only Russian but also foreign legal doctrine, which allows us to expand our understanding of the prospects for scientific research and the actual state of development of the issues under consideration in the scientific community.

METHODS

This prepared research is based on general (deductions, dialectical analysis) and specific (comparative-legal, economic-legal, historical) methods of scientific knowledge, the use of which allowed us to propose for discussion and present the author's vision of the development of civil law in a digital society.

INTRODUCTION

The irreversible, rapid and exponential growth of digital technologies and robotics in production, commodity exchange, and consumption was an objective factor in the reorientation of the organisation and structuring of economic activity. Due to this factor, the modification of economic relations gave rise to the need to revise legislation and assess its adequacy (Tarakanov et al., 2019). In combination with these circumstances, the question of the ratio of law and economy, the ability

of dynamic development of legal institutions to meet the needs of the market, is enhanced.

In the prevailing legal consciousness, the scale of the ongoing transformations applies equally to both national and international law, whose norms, both in terms of evolution and content, are focused primarily on the conditions of material production and exchange, and largely do not take into account the needs of the digital economy.

Neither Russian nor foreign legal literature can reveal uniform or universal approaches to the future of private law based on convincing evidence and argumentation. An analysis of Russian and foreign legal doctrine shows a difference of views on the development and future of law: if Russian scientists—in the main, abstractly—predict the obsolescence of existing legal regulations with the unquenchable prospect of its imminent death, or, at least, the weakening of imperative norms, by strengthening self-regulation and dispositivity (Dolinskaya et al., 2019; Egorova, 2018; Kartskhiya, 2019; Talapina, 2018; Zorkin, 2018), then foreign researchers have been focusing on the danger of lawyers exploiting inaccurate ideas about the scale and significance of the development of digital technologies, expressing doubts about the need for a radical change in the existing means and methods of legal regulation, and confirming the need to create legal conditions for the globalization of markets by harmonizing sub-sectoral national legislation in modern jurisdictions (Alpa & Andenas, 2010; Keller, 1998). In any case, a one-time and categorical rejection of existing regulations by revising the scope for applying mandatory rules of law or allocating digital law to an independent sphere of legal regulation ignores the adaptive properties of law as a universal regulator of socio-economic relations, and allows the narrow interests of lobbying forces selectively to overcome prohibitions and restrictions of economic activity. This vector of development creates a risk of losing the values and principles of private law as an achievement of evolutionary development of civilisation.

It is possible to offer a different way of understanding the issue of the development of civil law in a digital society, based on an economic and legal analysis of civil law developing and regulated by economic relations under conditions of intensifying digitalization. First of all, it is necessary to take into account the uncertainty of the relationship between traditional and digital economies in different phases of their development, and, in particular, in relation to the possibility of their coexistence at certain stages of social development. The same circumstance should be linked to the lack of clarity in understanding the prerequisites for changing the economic order and the digital revolution as stages of scientific and technological progress and stages of social development. In such circumstances, the need for a radical change in the existing legal regulation of civil relations is not justified. At the same time, current transformations of economic reality require local correction and institutional development of existing legal regulations in relation to changing living conditions and the transformation of economic relations as an object of civil law regulation.

RESULTS

The development of civil legislation in order to adapt it to the digital economy involves the formulation and resolution of issues that include:

- Sufficiency of established regulation of the list and legal regime of objects of civil rights;
- Regulation of e-Commerce, forms of transactions concluded using digital and Internet resources, with an assessment of the admissibility of applying general rules on the conclusion, validity and proper performance of obligations to them;
- Legal regulation of constituent documents of legal entities under conditions of the digital economy and development of supranational integration;
- Prospects for expanding the functions of public registers of legal entities;
- Improving the legal regulation of copyright and patent rights in the context of the development of digital communications;
- Legal regulation of the form and content for making use of artificial intelligence technologies.

1. Electronic Transactions as a Condition for the Development of Digital Commerce. Provisions of the Russian Federation Civil Code and federal laws adopted in accordance therewith set forth the requirements for the commission, execution, and validity of transactions under conditions of material production without accounting development and application in practice of the volume of digital technology, which in itself implies the question of the independence of the electronic form of the transaction.

The appropriateness of adapting legislation to digital reality is determined by the objective needs of modern open market commerce in connection with the constantly expanding sphere of use for the digital environment. Under such conditions, the issues of ensuring the preferential use of digital communication channels by participants in open market commerce, civil authorities and management for all possible areas of legally significant interaction of legal entities, including for contractual legal relations, are on the agenda for legislative development. In this regard, the development of digital infrastructure and the use of information and telecommunication technologies imply the formation of a new technological basis for the conclusion of transactions by open market participants, which would be recognized as duly concluded and generate the expected legal consequences for the parties.

Prevailing European experience does not reflect uniformity in resolving the issue of the need and expediency of fixing a special electronic form of transaction, even in legal systems traditionally related to the Continental European family: in some legal systems, their law enforcement and commentary practice equates electronic transactions with in-person transactions (Switzerland); in other legal systems, electronic and in-person transactions are equalized and special rules on

consumer protection for transactions are provided, and completed by making use of the Internet and telecommunications (Austria) (Koziol et al., 2017); German law explicitly provides for special rules for electronic forms of transactions, existing on par with in-person and traditional non-cash transactions, which is criticized both as doctrine and in law enforcement practice (Schmoeckel et al., 2007).

With relation to Russian conditions, there is no reason to make proposals for a radical change in the vector of regulating transactions in electronic forms in terms of giving electronic forms of transaction an independent value as an alternative to more traditional forms of transaction; we should consider only the type of transactions concluded in writing. The development of technologies used in communications by participants in open-market commerce implies an expansion of the features of the written form of transaction.

It follows that the traditional written form of a transaction cannot be replaced by an electronic form or considered as an alternative thereto. That is, for the purposes of open-market commerce, the allocation of a special electronic form of transaction is not required due to the fact that it is fully subject to the rules and regulations on the traditional forms of transaction. Potentially, and in future, the development of e-Commerce practices may lead to the expediency of allocating electronic transactions as a special form; but for this purpose, objective grounds for their allocation must be formed with cardinal distinctive features that will not be characteristic of the written form of the transaction.

With the development of digital relationships, the first paragraph of Clause 1 of Article 160 of the Russian Federation Civil Code: the rule that the written form of a transaction is complied with also in cases of expressing a person's (or persons') will with a digital, electronic or other similar technical means (e.g., by transmitting a signal, including when completing a form in an Internet network). The introduction of such a rule in civil legislation provided an opportunity and created conditions for more active use of digital technologies and funds by participants in free-market commerce when concluding transactions.

The introduction of such a rule in civil legislation provided an opportunity and created conditions for more active use of digital technologies and funds by participants in free-market commerce when concluding transactions. Also, the Russian legislator has implemented the assignment of electronic exchange of will to the written form of the transaction (Federal Law No. 34-FZ, 2019); in this regard, there are no grounds for any further study of the issue of transaction forms or the allocation of the electronic form in an independent form of the transaction at the current moment of development of the open-market commerce.

2. Legal Regulation of Online Platforms Used for Interaction Between Sellers and Buyers. In the context of rapid development of digital technologies, Russian legislation on trade activity does not contain sufficient regulation of the relations that develop in the market regarding the exchange of rights, material and virtual objects. The need for uniform regulation of relations arising in this area is explained by ensuring the security and guarantees of the interests of participants

in trading activities, which cannot be provided by methods and means of self-regulation of digital trading activities. When calculating and distributing risks among participants-subjects, the regulation of digital commerce should take into account the peculiarities of markets: professional entrepreneurship, including its individual segments and specializations, as well as consumer relations.

However, it is necessary, first of all, to regulate the use of online platforms that develop in the digital space as special trade relations, which requires determining the position and bases of responsibility of online platforms used for interaction between sellers, buyers and their intermediaries. The network principle of the online platform is that its operator provides all interested parties with online communication services, by ranking or indexing through computer algorithms, content, goods or services offered or sold online by third parties; or combining several persons for the purpose of selling goods, providing services or sharing content, goods or services.

In essence, the online platform is a new channel of sales and distribution, the behaviour of interested participants in the framework of which requires special regulation. For this purpose, special permissions, restrictions and prohibitions are required, and the latter are not limited only by civil law. Competition law is designed to address issues of healthy competition on online platforms in terms of ensuring free market access and non-discrimination of trading participants, preventing control and monopolization of the e-Commerce market by economically strong participants. There are no legal grounds for identifying digital platforms and market participants who control certain segments of the market in the production and sale of goods. Legislation must ensure the authentication of the seller and the product (requirements of identity, quality, and security).

The goals of legal regulation of online platforms are not limited to solving the problem of providing mediation in trade transactions of participants in free-market commerce (in principle, models of agency contracts and commissions can be used). This narrowly focused approach limits the regulatory potential of online platforms as a tool for organizing and monitoring the activities of market participants, and as an indicator of market conditions (analysis of supply and demand, quality and volume of services provided), as well as a tool for evaluating the effectiveness of current legislation (sufficiency, relevance of legal regulation, regulatory and administrative barriers). Given these circumstances, it is important to develop regulatory models for the distribution of responsibility between digital market participants, including digital platforms and transaction participants.

Organisations that create and operate digital platforms are a modern type of deal intermediary that, by automating the process of communication between seller and buyer, provide the convenience of remote selection of goods and tracking of the delivery process, have become a *de facto* major player in the remote sales market, including international trade in standard goods and services.

In fact, the rules of operation for the largest digital platforms—regarding, namely, what can be done on them technically—begin to displace national regu-

lation and create parallel mechanisms for protecting the rights of consumers and manufacturers in disputes related to low-quality or non-identical goods, delays or breakdowns in delivery. At the same time, there are regular incidents related to the delivery of goods the commerce in which is limited under current Russian legislation, but neither buyer nor seller is aware of this. In order to protect the consumer and supplier from illegal actions, the capabilities of digital platforms could be used—not because of malicious intent, but because of ignorance, especially if the regulator could relay in machine-readable form the existing regulatory restrictions to the digital platform, which in turn could limit the possibility of making relevant transactions.

3. Regulation of the Registered Address of a Legal Entity Under Conditions of Digitalization. Civil law does not establish as requirements or disclose the concept of the registered address of a legal entity, using only the concept of the location of the legal entity. Paragraph 2 of Art. 54 of the Russian Federation Civil Code stipulates that the place of residence of a legal entity is determined by the place of its state registration in the Russian Federation by specifying the name of the settlement (municipality); state registration of the legal entity is carried out at the location of its permanent executive body, and in the absence of a permanent executive body—any other body or person authorized to act on behalf of said legal entity by virtue of a law, other legal act or constituent document, unless otherwise provided by the Law on State Registration of Legal Entities.

According to the essence and meaning of the above-referenced legal norms, the location of a legal entity fulfils its identification and material-resources security function as a legal subject for the purposes and needs of open-market commerce and state administration of economic activity. In practice, the place of actual economic activity of a legal entity often does not coincide with the registered address of its location and business activities.

In the context of the development of e-Commerce, globalization and the internationalization of product and capital markets, the initial value of a legal address and location of the legal entity changes. On the agenda is the issue of introducing the e-addresses of a legal entity into practice, which could guarantee the identification of its management and supervisory function. The total elimination of requiring specification of the address of a legal entity's location or form of legal incorporation and operation is prevented by the need to identify the place of implementation of statutory activity in cases where the latter is related to the conditions of material production and exchange.

4. Objects of Civil Rights Under Conditions of Digitalization. Russian legislation does not establish a special subject-specific section of regulation for the legal regime of free-market commerce of virtual objects in the digital space.

Regulation of digital objects and rights has also proved to be meaningless. Federal Law No. 34-FZ "On Amendments to Parts One, Two, and Article 1124 of Part Three of the Russian Federation Civil Code," 18.03.2019, amended and supplemented the wording of Article 128 of the Civil Code, which establishes

a list of objects of civil rights: the concept of digital rights, which are classified as property rights, was introduced. It seems that the novelties proposed by the given law are not successful and are caused by the real necessity and need for the development of commodity relations in free-market commerce, differing in their substantive content, since the special norm introduced on digital rights does not essentially establish their individual legal regime, which is expected and required of any object of civil rights.

The result was a mixed form of rendering the essential contents of the object of civil rights; finally, the wording of Article 141.1 of the Civil Code says nothing about the specifics of digital rights as a commodity, but only about the form of its existence; it is impossible to distinguish from other objects of civil rights expressly listed by law, bearer securities and other property rights. The legal definition of digital rights proposed by the law does not give clarity to the content of this term, which will not acquire certain and sufficient criteria in the system of objects of civil law and free-market commerce, while maintaining a purely declarative and inaccurate meaning, orientated not to the content, but to the form of existence of the object of civil rights.

Open lists of objects of civil law rights (Article 128 of the Civil Code), the grounds for their civil relations (Article 8 of the Civil Code), and forms of transactions settlement (Art. 862 of the Civil Code) allow contractors acting in particular, and in the digital space, in one's interest at one's own risk and responsibility as conferred on them, to implement civil law autonomy and freedom of self-determination in the visualized expression (legal, available and valid) to determine the form, content, subject and method of performing obligation in connection with the definition of the resulting commitments, including the rights and obligations of the parties, the procedures and methods of protection are determined by the subject of proof; this in itself does not require changes to the legislation in terms of establishing special and separate regulations for the free-market circulation of virtual objects and the use of cryptocurrencies as alternative forms and units of calculation.

However, with the development of the market and to ensure its stability, the free-market circulation of such objects requires regulatory specification and uniformity in legal regulation, which makes it necessary to improve civil legislation in terms of regulating the legal status and free-market circulation of new objects of civil rights. The quality of any subject of civil rights was characterized by its relative state of demand and supply in the market, directly with domestic law, and not situational will in the transaction must be determined by its legal regime and embodied the peculiarities of its civil rights.

However, with the development of the market and ensuring its stability, commercial trade in such objects requires regulatory specification and uniformity in legal regulation, which makes it necessary to improve civil legislation in terms of regulating the legal status and open-market commerce in new objects of civil rights. The quality of the subject of such civil rights was characterized by the rela-

tive state of supply and demand in the market, directly with the internal law, and not situational will in the transaction, must be determined by its legal regime and embodied by the peculiarities of its civil rights.

5. Domain Names. The development of digital technologies causes the spread of new methods of marketing and information promotion for objects of intellectual property in the field of digital telecommunications, which actualizes the need to develop legislation in terms of regulating the legal regime of a domain name. The lack of a developed regulation of these objects in Russian legislation reduces the attractiveness of the Russian jurisdiction in the eyes of foreign investors who structure business projects using digital technologies.

Domain names are not specified among independent intellectual property rights; this order was a result of the adoption by the legislator of a conceptual framework in Part IV of the Civil Code; in current legal practice, toward the resolution of cases the courts have actually formed a position, which did not add to the certainty of identifying the rights to domain names in the system of objects of civil rights: first, it was stated only on the technical function of a domain—"a set of symbols for identifying a resource on the Internet"—indicating that "domain names containing trade names and trademarks have a commercial value," and the domain names themselves have actually been transformed into a tool that performs the function of a trademark.

Meanwhile, in social commerce, domain names have a very specific and independent purpose—i.e., "identification of businesses and individuals," the use of which generates supply and demand in the market and, therefore, grounds for assigning rights in them to the number of property rights that require special regulation. However, rights in a domain name cannot be identified with exclusive rights, since the exclusive right regime presupposes urgency and territoriality, which is not typical for domain name rights. These circumstances explain the need for a special regulatory consolidation of the property right to a domain name.

6. Public Registers of Legal Entities and Individual Entrepreneurs. Russian legislation does not provide for the administration and operating data of the Unified State Register of Legal Entities (herein—the Register), only in digital form, with no duplication of the bases and acts of registration in documentary form, as well as in the provision of title and right supporting documents on the data to the Register's stakeholders.

Converting the maintenance and registration activities in the Register of Legal Entities into a digital form of data circulation without duplication in the documentary circulation will help to reduce significant transaction costs for documentary preparation, registration, state expertise, and archiving of registration documents for individuals and the state, represented by its competent authorities, simplifying the procedures and timing of the relevant registration actions.

Also, digitization of the Register of Legal Entities will help minimize duplication of mandatory legal norms by constituent documents by giving the law the value of a publicly reliable state information resource. The legislator has taken

certain steps in this direction. So, today there is no need to indicate data on representative offices or branches in the charters of legal entities. According to Paragraph 3, Clause 3, of Article 55 of the Civil Code, branches and representative offices of legal entities must be specified in the Unified State Register of Legal Entities. The same applies to the types and goals of activities. It is enough to include information about licenses received by a legal entity in the Register. However, such steps are *ad hoc*, without changing the current state of legal regulation.

A detailed and rigid regulation of constituent documents in Russian corporate legislation, instigating a technical repetition in corporate acts of legal norms, does not take into account the potential of digital technologies and functions of the public Register—i.e., developing traditional but practically outdated approaches toward the constituent documents of a legal entity that developed at the turn of the 19th—20th centuries, and identifying the constituent documents of a legal entity exclusively with the documentary form of statutory documents of corporations.

The development of digital technologies and solutions currently allows us to revise regulatory approaches to regulating the meaning, place and form of constituent documents in Russian corporate law, which implies:

- Further development and implementation of the structure of incorporation and corporate practice of standard forms of incorporation documents (currently available only for limited liability companies (LLCs), on the contrary, in respect of professional enterprises with the highest capital index international involvement and connection capital—the joint-stock company—standard forms of charters has not yet been developed);
- Sequential transition to a digital form of registration and turnover of constituent documents without duplication in hard-copy documentary formats; and
- Inclusion in the constituent documents only the specifics of the organisation and activities of specific corporations in the amounts allowed by the dispositive rules of corporate legislation, excluding the possibility and necessity of duplication of mandatory rules of corporate legislation.

Digitalization of the Register significantly optimizes registration actions: terms and procedures. Taking such measures will also facilitate:

- Optimizing the algorithm of work of registration authorities in terms of examining and archiving constituent documents of legal entities; and
- Reducing budget expenses for providing the specified competence powers—functions of registration authorities for archiving, examining and organizing the exchange of constituent documents of legal entities.

Under conditions of the Register's existence as well as the possibility of its transition into a digital form, any possible regulatory model of corporate governance is provided for by dispositive rules; it is advisable to type in the relevant

digital forms registry key, which will be different variants of the model charters of joint-stock companies. At the same time, participants (shareholders) should be allowed to choose other corporate governance models within the limits permissible by law, which, in turn, can either be typed and provided as options in the relevant sections of the Register, or not typed. for this purpose, the register should contain forms that allow for their free filling at the discretion of participants (shareholders), taking into account the individual characteristics and interests of a particular incorporated business.

With this approach, the charter in the modern sense will be transformed from a paper document requiring the involvement of qualified lawyers in its preparation, into digital formalized modules of the Register, which will be selected and filled in by participants (shareholders) when registering a legal entity or making changes to it. In cases where the regulatory model is mandatory and does not allow deviations from it, the corresponding modules should not be variable in nature and would be included along with the optional modules automatically. Participants (shareholders) in this approach would only have to choose a particular model for each module of questions when registering the Charter or making changes to it, or fill out special conditions in cases where this is allowed by law and there is a need for such special conditions. As such, a corporation's charter (in the usual sense) would not be drawn up at all, but would be formed automatically as a result of the selection and completion of the appropriate modules by participants (shareholders).

7. Development of Intellectual Rights in the Context of Digitalization. The speed of technological development and the consequent need to correct legislation cannot be considered as the basis for restructuring the existing intellectual property regulation in Russian law by transferring it to a subordinate level. Otherwise, there is an unjustified global risk of diminishing the results of the codification of Russian civil legislation and violating its system and structure. Let's look at the specific challenges facing copyright and patent law in the context of digitalization.

Copyright. Objective market trends in the digital space (instant exchange of virtual goods—e-books, applications, online games, music files, the growth of public Internet platforms-social networks, messengers, media platforms, stores, etc.) pose new challenges in the development of legislation on the rights of authors, because in such conditions, the need to find effective protection from unauthorized copying by transferring clones of a digital product via the Internet, the volume of which will steadily increase as technical means improve. However, the development of technologies cannot mean the termination of the copyright protection regime or the exhaustion of exclusive rights to works, but only the specification of legal regulations in changing conditions.

The use of technologies that provide free and at the same time fixed distribution of digitized works in a secure (encrypted) form with the provision of keys exclusively to legal buyers is seen as being effective. Placement and circulation of works

on the Internet using software that allows one to save, copy and distribute them, presuppose the rights of the subject of the exclusive right to control such actions by allowing and prohibiting the creation and use of appropriate computer programs and tools that allow unauthorized copying, use and distribution of works.

The growth of Internet resources implies an ever-increasing active placement, copying, and paid distribution of works protected by copyright on the Internet, which in most cases is not even known by the author, let alone his consent to such legally significant actions in relation to the object of the right that belongs to him. In order to prevent violations and abuse of exclusive rights, it seems appropriate to fix the status of a bona fide user in legislation, granting the author whose rights were violated using computer technologies the right to recover damages from users of software whose operation led to copyright infringement.

Patent Rights. The specifics of the subject and objectives of patent law presuppose their own development vectors in the context of the growth of the digital economy, while existing regulatory and law enforcement practices are mainly focused on material production and commodity exchange. It is obvious that the development of technologies can significantly limit the scope of patent protection (for example, in the future, and if the current regulation on the free use of patent-protected objects for personal purposes remains unchanged (Article 4, Para. 1359 of the Russian Federation Civil Code), using a 3D printer for personal purposes with the continuing difficulty of identifying cases of non-entrepreneurial use of objects of exclusive rights will cause massive use of objects protected by the patent, which will affect the rights of patentholders. In essence, 3D technologies and printing cause new alternative models and options for using protected objects, the implementation of which violates the rights and legitimate interests of copyright holders.

The very principle of territorial validity of patent protection with the active development of Internet technologies will permit copying and reproduction of patent-protected objects in production cycles in any other jurisdiction without remuneration or obtaining consent of the patent holder and, in some cases, actually to the detriment of its interests, to introduce patented objects (technologies, methods of production) into social commerce with the receipt of income, which is difficult to qualify as having been received in the course of ordinary business activities, excluding indicia of unjustified enrichment.

The above-indicated, firstly, raises the question of the necessity and feasibility of conservation in international and national law of the territoriality of exclusive rights of the patentee in the context of globalization of markets, expansion of computer and 3D technology, and, secondly, permits extending and specifying the rights of the patentee in terms of prohibiting the use of 3D technologies and programs, including their establishment and dissemination, which allows for unauthorized copying, utilization and reproduction of intellectual property results protected by patent law in the absence of the patent holder's consent.

3D-technology provides the possibility of transnational reproduction and replication of patent protected objects in different parts of the world at the same time by an unlimited number of individuals without the consent or notification of the patentee under the territorial principle of patent protection (patent protected in the jurisdiction of the state that issued it). This allows, virtually unhindered and to the detriment of lawful interests, the production and commercial use (distribution) of patented solutions in their own interest. This unlimited possibility raises the question of improving patent protection and upgrading the design of the exclusive right itself by including in its structure a ban or permission to create programs for reproducing the patented object using 3D printing technologies, followed by the extension of civil liability between the manufacturer and the corresponding software and its user.

8. Legal Regulation of Artificial Intelligence and Robotics. Regardless of the complexity of the organisation and its versatility, the operation of any robotic system, including machine learning options, is based on software codes and algorithms. The robot's manufacturers and operators are responsible for its operation.

Any robotics products and/or artificial intelligence technologies embodied in them are products of human labour and serve to meet human needs. In itself, the speed of their work, the ability of a machine to process information and choose an optimal solution for the task at hand are not an indicator or sign that provides grounds for classifying robots with "strong artificial intelligence" as a special class of legal entities. Accordingly, the results of the work of robots and artificial intelligence belong to their developers, and the possible responsibility for causing harm to machines should be defined and delineated between their developers and operators.

To date, global legal doctrine and legislation have not developed universal approaches to the definition of artificial intelligence that would allow us to consider AI as a quasi-legal entity capable of creativity. However, current discussions on this issue do not seem to take into account a major consideration—i.e., the lack of personal creative participation in creating the results of the object of intellectual creativity of the author's personality, and therefore any analogies with a legal entity as a fiction are inappropriate when justifying the potential for developing artificial intelligence in the law (Rusakova et al., 2020). Even when determining the coordinates of law for a strong artificial intelligence attributed to certain properties of a "humanoid mind carrier," not to mention technical support devices (voice assistants on smartphones, solutions in the field of legal tech), its operability cannot be clearly separated from the action of program codes in programming algorithms, which is not initially the creative work of an individual, and therefore the representation of musical and poetic works synthesized by robotics, no evidence in favor of giving the robot as an entity, respectively, and the author of the relevant result of intellectual activity will be the author of the program or the owner of its IT power.

Accordingly, the mistaken approach of Russian legislation on standardization of robotics products in determining the elements of Artificial Intelligence—i.e.,

autonomy, which is understood as the ability to perform tasks depending on the current state and perception of the environment without human intervention (Para. 3.4 of the National Standard of the Russian Federation GOST R 60.0.0.2-2016 "Robots and Robotics Devices. Classification," approved by RosStandart Order No. 1842-St, 29 November 2016). This calls into question the call for establishing special legal regulation of the rights to objects created with the help of Artificial Intelligence in order to avoid "legalizing theft" as objects created without the participation of a "living author"—the development of such views leads to legal uncertainty.

CONCLUSION

1. The ongoing transformations of economic relations under conditions of intensifying digitalization do not provide sufficient grounds for drawing conclusions about a radical change in the economic structure: a complete and one-time transition to a new type of digital economy, and the obsolescence of current legal regulation. Methods and means of civil law regulation have a significant regulatory potential that allows ensuring the stability of legislation as economic relations regulated by civil law develop. At the same time, the digitalization of markets for the production, exchange, and consumption of goods necessitates legal regulation of new segments of economic relations (for example, the legal regime of electronic commerce and domain names), as well as the modernization of existing regulation of the protection of personal non-property, intellectual property rights, rules for administration and digitalization of public registers of legal entities, rights to objects of civil rights.
2. Permanent and exponential growth in the productive capacity of robotics and Artificial Intelligence, regardless of the level of complexity of their tasks, shows the development of the level of technology as tools of human labour as of a specific period of societal development and cannot be considered as a sign of the allocation of machines to a special group of subjects of rights. The law should address the issue of delineation of liability for damage caused by activities involving machines between their developers and operators. Any results of work created by the creative labour of machine algorithms and program codes cannot be qualified as a special type of independent creativity, but belong to the developers of the corresponding software.
3. The development of e-Commerce requires clarity of legal regulation of the legal status of electronic platforms with a normative definition of interaction models and responsibility of its participants. There are no grounds for normative consolidation in Russian law of electronic contracts in the meaning of an independent form of transaction.
4. The list of objects of civil rights is open, which implies that as new objects are included in circulation, their regulation and the definition of a

special regime for their free-market circulation, the consolidation of special rules for the implementation and protection of objects of civil rights in their respect in the legislation. The uniformity and clarity of the legal status of new objects of civil rights presuppose a normative consolidation of the features of their legal status, which initially cannot be ensured by the transaction regime.

5. Forming a digital register of state and municipal registries of rights in objects of civil transactions and legal entities, in addition to technical features, enable new options for the administration, recording and disclosure of the data contained therein in electronic form; this assumes legal responsibility for incorrect data in public registers before the participants in free-market commerce, in good faith reliance on the accuracy of the relevant information.

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CHAPTER 12

JUDICIAL RECONCILIATION AS A WAY TO POPULARIZE THE JURISDICTIONAL FORM OF PROTECTION OF RIGHTS AND LEGITIMATE INTERESTS IN MODERN RUSSIA

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The research goal of this scientific research is to identify the patterns associated with the introduction of judicial reconciliation (judicial mediation) in civil proceedings in order to increase the effectiveness and attractiveness of the judicial form of protection of the rights and legitimate interests of citizens and organizations.

It is proved that: 1) Judicial reconciliation should improve the efficiency of legal proceedings; 2) The economic attractiveness of the procedure; 3) Changing the basic principles of civil proceedings in connection with the consolidation of conciliation procedures; 4) it Is necessary to regulate the activities of the judicial mediator in order to achieve a successful result; 5) the Possibility of introducing digital technologies in judicial reconciliation or switching completely to online mode. It is

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 147–156.

concluded that judicial reconciliation as one of the conciliation procedures should relieve the courts and provide a more professional approach to each specific case.

Foreign experience in applying such a procedure proved its effectiveness due to its economic attractiveness, and the parties could seriously save on court costs. The active position of the judicial conciliator and his interest in the positive result of this procedure is a guarantee of efficiency.

It is necessary to seriously transform this procedure from a regular procedure to a digital one, by introducing advanced information and communication technologies that have long been used in other countries.
It is proved that the introduction of conciliatory procedures in legal proceedings radically changes the principles of justice, there is a transition from transparency to confidentiality, competitiveness to cooperation, as well as the goals and objectives pursued in the process of dispute settlement.

Keywords: Judicial Conciliation; Judicial Mediation; Judicial Conciliator; Settlement Agreement; Civil Proceedings, Confidentiality, Voluntary Nature, Cooperation, Digital Technologies.

JEL Code: K40, K41, K38, D18

MATERIALS

The basis of the regulatory framework of the research is the Civil procedure code of the Russian Federation (2002), Arbitration procedure code of the Russian Federation, Federal law No. 191-FZ (2019), Federal law No. 3132-1 (1992), the Plenum of the Supreme Court of the Russian Federation No. 41 (2019).

Doctrinal positions that formed the theoretical basis of the study were studied thanks to scientific papers on alternative methods of dispute resolution and mediation: Inshakova and Kazachenok, (2018); Gaivoronskaya et al. (2019); comparative legal aspect regarded to the scientific works: Fedorenko et al. (2017); Rusakova et al. (2019a). The impact of the digital economy on the state of civil society has been reflected in the works of such authors as: Khabrieva (2018); Tarakanov et al. (2019); Rusakova et al. (2019b); Shakhova et al. (2019).

METHODS

The study used a comparative analysis method, which compared the experience of applying judicial reconciliation in the proceedings of the Russian Federation and the Federal Republic of Brazil, as well as methods of cause-and-effect and system analysis, which allowed us to identify the main patterns and practical results of the implementation of this procedure, and also identified common and different features with other conciliation procedures. On the basis of dialectical methods of understanding the procedure of judicial reconciliation in the Russian Federation, directions were formulated for improving legislation in this area, as well as the

process itself through the introduction of modern digital technologies. Based on the results of the analysis, an assessment of the prospects for the introduction of judicial reconciliation in legal proceedings is given, and practical recommendations are given to improve the effectiveness of this procedure.

INTRODUCTION

Currently, a procedural reform of civil proceedings is being implemented. The goal is to unify the three types of legal proceedings: civil, arbitration, and administrative, in which both common and distinctive features can be identified. A common feature is the active introduction of conciliation procedures in legal proceedings, as it is often an expensive, long and complex process, so its reform is a necessary condition for improving the effectiveness of the judicial form of protection of rights. Moreover, the legislator deliberately left an extended list of these procedures, since they can be fixed not only in procedural legal acts, but also in special industry laws (Rusakova et al., 2019a).

A new procedure for resolving disputes meanly judicial reconciliation, which is similar to mediation, that can be used in both civil and other types of legal proceedings. This procedure should solve a number of problems, primarily reducing the burden on judges who consider disputes that could be resolved through the use of conciliation procedures or alternative dispute resolution methods. Secondly, a more attentive attitude to the parties to the dispute should lead to reconciliation of the parties, if not on the whole dispute, then at least on some controversial issues.

The procedural peculiarities of the procedure fixed in procedural law: the Civil procedure code of the Russian Federation (2002), Arbitration procedure code of the Russian Federation, Federal law No. 191-FZ (2019), Federal law No. 3132-1 (1992), the Plenum of the Supreme Court of the Russian Federation No. 41 (2019).

RESULTS

Concept and Basic Principles of Judicial Reconciliation

Judicial reconciliation is carried out by the judicial conciliator on the basis of the principles of voluntariness, cooperation, equality of the parties, confidentiality, independence and impartiality of the judicial conciliator, as well as good faith (Khabrieva, 2018).

The legal framework of this procedure guarantees that the parties can choose the method and method of dispute resolution that best suits the complexity and nature of the dispute. The court can only recommend that the parties contact a judicial conciliator, but it cannot oblige them. This approach reduces the effectiveness of this procedure, since the parties are often unaware of the benefits of this procedure. According to Russian law, the parties have the right to defend themselves in court, without recourse to a professional representative who could offer the parties to choose a way to resolve the dispute.

The law stipulates two situations when it is possible to conduct a judicial reconciliation procedure at the request of the parties to the proceedings and on the recommendation of the judge who accepted the claim for production. The consent or refusal of the parties to conduct judicial reconciliation depends on the actions of the judge, namely, on the legal justification for the need to apply for judicial reconciliation.

World experience in achieving the effectiveness of this procedure is carried out at the expense of the economic component, namely the return of part of the legal costs associated with filing a claim, and the high cost of the trial itself, are the main factors of the popularity of any conciliation procedures (Fedorenko et al., 2017). For example, the Brazilian code of Civil procedure adopted in 2016 establishes conciliation procedures as an alternative means, but as a mandatory stage of civil proceedings. The purpose of such changes in the civil process is to unload ships by implementing these procedures. In addition, each court creates centers for reconciliation of the parties, the purpose of which is to implement mediation and judicial reconciliation, which makes these methods promising for their use in practice.

The judicial form of protection of rights is still the only procedure for many citizens to protect legitimate interests and violated or disputed rights in the Russian Federation (Gaivoronskaya et al., 2019). The workload of the courts often does not meet the expectations of citizens, which reduces the importance and social role of the judiciary. The introduction of new methods and mechanisms in the judicial form of protection of rights will help make it more effective and competitive compared to alternative methods.

In addition, the law provides for the right of the parties to refuse judicial reconciliation at any time, notifying all participants in this procedure.

The success of this procedure depends on the willingness of the parties to participate in this procedure, since only the parties can make certain concessions to each other in order to resolve the dispute peacefully. It is very important for a judicial conciliator to find and ensure a balance of interests of the parties based on mutual trust and respect, otherwise, this method will be impractical. The task of the judicial conciliator is to reach a consensus: 1. Conclusion of a settlement agreement in respect of all or part of the claims; 2. Partial or complete rejection of the claim; 3. Partial or full recognition of the claim; 4. Full or partial rejection of an appeal, cassation complaint, or Supervisory complaint (submission); 5. Recognition of the circumstances on which the other party bases its claims or objections; 6. Agreement on the circumstances of the case; 7. Signing a letter of consent for state registration of a trademark and others, depending on the nature of the dispute.

The course of the procedure is based on the equality of persons participating in the process. The parties have the right to choose the candidate of the judicial conciliator, the rules and procedure for judicial reconciliation, access to informa-

tion, development, evaluation of the acceptability and feasibility of proposals for settlement of the dispute.

The freedom to choose the procedure guarantees the parties a more comfortable atmosphere for settling the dispute. The conciliator's actions are important in allowing the parties to determine the course of the procedure, perhaps the most appropriate is to conduct it online. The judicial conciliator has no right to put any of the parties in a pre-emptive position by his actions.

A significant change in the basic principles of legal proceedings is the establishment of a new principle of confidentiality for the judicial form of protection of the right, which contradicts the principles of transparency and openness of the judicial process. In the course of judicial reconciliation, the parties themselves have the right to determine restrictions on the dissemination of information received in connection with this procedure. This principle was first established in an alternative dispute resolution procedure, such as arbitration.

It is not clear yet how this principle will be implemented in the course of judicial reconciliation. However, for the first time, the presumption of confidentiality of the process is fixed. The advantage is that all information disclosed during the process is not available for disclosure in subsequent court proceedings, which means that the facts established during the process will not be proven, unless otherwise established by the parties to the process. Disclosure of any information is possible only with the written consent of all persons involved in judicial reconciliation.

The rules allow the parties not to disclose all information related to the dispute, but only that which is necessary for the successful completion of the reconciliation process. Therefore, the parties may limit themselves to the information that has already been provided, so the effect of this procedure may be reduced. It is possible to use information about reconciliation only for research, educational or informational purposes on the condition of anonymity of the parties. However, in an era of openness and digitalization of judicial proceedings, achieving this provision will be difficult (Tarakanov et al., 2019).

Nominee of a Judicial Conciliator

Importance of this procedure is the candidacy of a judicial conciliator, who is responsible to reach an agreement between the parties. How competent will be the actions of the judicial conciliator, how much more successful will be the reconciliation procedure. The main principles of the judicial conciliator are independence and impartiality. Independence is achieved by clearly separating this procedure from the trial, since the judge who accepted the case has no right to influence the course and actions of the judicial conciliator. In addition, he must be free from any influence of the parties to the dispute, and if there are any circumstances that may call into question his actions, he must immediately inform the court and the parties about them.

The judicial conciliator may be a retired as a judge who has expressed a desire to do so. The list of judicial conciliators is approved by the Plenum of the Supreme Court of the Russian Federation. In addition, this person cannot combine this activity with the implementation of public service, work in local governments, municipal institutions, trade unions or public associations, and cannot be an assistant to the Deputy of the State Duma or other legislative body of the subject of the Russian Federation, a member of the Federation Council of the Federal Assembly of the Russian Federation or the Commissioner for consumer rights of financial services (Burkaltseva et al., 2017).

According to Federal law No. 123-FZ (2018), a new method of out-of-court settlement of financial disputes between consumers of financial services and financial organizations, which is carried out by the financial Commissioner. Financial Ombudsman ensures satisfaction of property character of the individuals who are party to the contract, or a person in whose favor the contract is concluded, any person who has provided financial service for purposes not connected with entrepreneurial activities to financial companies. Moreover, this procedure is a mandatory pre-trial procedure for settling these types of disputes.

Special attention will be paid to the experience of working as a judge, scientific activity, specialization and region of residence (Shakhova et al., 2019). Taking into account that only retired judges can be a judicial conciliator, the question of specialization of judges is open, since it is not officially available. In the Russian Federation there is only one specialized court in the system of arbitration courts this court for intellectual property rights, perhaps we are talking about the judges of this court and the allocation of expertise between judges of courts of General jurisdiction and arbitration.

The list of judicial conciliators is published on the official website of the Supreme court of the Russian Federation in the Internet information and telecommunications network. For each of the candidates, brief information will be provided on the type of activity performed after leaving for an honorable rest or removal from the position of a judge.

The parties choose a judicial conciliator themselves from this list and are approved by the judge by a ruling. The duties of the judicial conciliator include explaining to the parties the validity of the stated claims and objections during negotiations with persons involved in the case, researching the case materials with the consent of the court for a successful settlement of the dispute, giving the parties recommendations for maintaining business relations and resolving the conflict.

The judicial conciliator is not a participant in the court proceedings and may not perform actions that entail the emergence, change or termination of the rights or obligations of persons participating in the case and other participants in the process. The procedure of judicial reconciliation takes place in a strictly set time under the control of the judge, so the judge has the right to make a request about the progress of this procedure no more than once every fourteen calendar days. This is done in order to control the process of the procedure.

The parties to judicial reconciliation play an active role in this process. The legislator has given them a fairly large amount of rights: to declare the need to involve other persons in judicial reconciliation, to request a personal interview with the judicial conciliator, to request an increase in the duration of this procedure, and others, even the execution of the result of this procedure is based on the principles of voluntariness and good faith.

Stages of Judicial Reconciliation

Judicial conciliation is generally a negotiation that can be divided into stages, but the final procedure depends on the will of the parties and the nature of the dispute.

First stage: Opening of judicial reconciliation. Begins with the presentation of the parties and verification of the parties' identity and credentials, if any. At this stage, all the circumstances that may become an obstacle to this procedure are checked. The judicial conciliator explains to the parties the meaning, goals, legal consequences of the results and their role in this process, as well as the rights and obligations of the parties. In addition, the procedure for conducting this procedure is agreed upon: the course of negotiations, their frequency, and the composition of participants.

Second stage: Statement of the circumstances of the dispute and determination of the interests of the parties. At this stage the parties are obliged to define their position in the dispute what is the dispute and acceptable version of his resolution, the judicial mediator is obliged to investigate all the evidence, discuss their assessment with the parties to clarify requirements and resolve them.

The third stage: the parties formulate questions for discussion. At this stage, each of the parties makes a list of questions to which the parties prepare their answers in order to identify acute and significant points. The judicial conciliator may call a break in the negotiation process to conduct individual conversations with the parties in order to work out a way to resolve the conflict.

The fourth stage: Individual conversation of the judicial conciliator with the parties and their representatives. The meeting with the party takes place with the notification of the other party and usually begins with the initiative of the judicial conciliator or at the request of the party. The main issue is the limits of disclosure of information, the possibility of changing the position of the party, as well as options for resolving the dispute.

Fifth stage: Development of proposals by the parties to resolve the dispute and achieve the results of reconciliation. At this stage, the judicial conciliator with each of the parties develops options for resolving the dispute, as well as the procedure for the parties to achieve successful implementation of this procedure. Performing their duties as a conciliator should contribute to reaching agreement by clearly recording the proposals of the parties and clarifying the requirements, additional discussion of disputed points. The result of this procedure must be constructive, acceptable, and enforceable. If by the end of this stage the parties have

not yet worked out an acceptable solution to the dispute, the judicial conciliator may call a break for additional individual negotiations with the parties.

The sixth stage: Processing the results (drawing up an agreement, drawing up a waiver of the claim or recognition of the claim). The law establishes all the possible options for the end of the procedure: achieving results reconciliation of non-achievement of conciliation and termination of the procedure, of failing result and the direction the application for the renewal of proceedings prior to the expiration, termination judicial conciliation court mediator prior to the expiration of the reconciliation.

Stage seven: Completion of judicial reconciliation. The effective work of the judicial conciliator will be considered the conclusion of a settlement agreement by the parties. The correctness of its conclusion and explanation of the terms on which the parties reached a settlement agreement rests with the judicial conciliator. No later than the day after the agreement is reached, the judicial conciliator addresses the judge to approve the results of the reconciliation procedure.

CONCLUSION

The attractiveness of using conciliation procedures is planned to be achieved by returning part of the state fee, the amount of which will depend on the stage of the judicial process at which the parties, for example, reached a settlement agreement, in accordance with the Tax code of the Russian Federation: 70 percent for a settlement agreement, refusal or recognition of the claim before the decision is made in the first instance; 50 percent at the stage of appeal, 30 percent at the stage of cassation appeal. Economic efficiency can be achieved only in those disputes where the amount of the claim is large. in other cases, other forms of encouragement of the parties or imposition of additional costs should be fixed by law if the judge does not follow the recommendation to apply for judicial reconciliation.

Currently, the legal community is ambivalent about this procedure, as there is still no practice of its application. The appearance of the figure of a judicial conciliator is estimated as another additional stage of the judicial process, which will increase the duration and complexity of the judicial form of protection of rights.

In addition, some lawyers are afraid of the appearance of a corruption problem in this institution, since the judicial conciliator has the opportunity to influence the opinion of the judge or judicial proceedings in the future, if a positive result is not achieved during the judicial reconciliation procedure.

Moreover, the payment of the judicial mediator will be made for payment of the state fee and, therefore, there can be a situation when the court mediator will be paid, not corresponding to the obtained result and the complexity of the process.

The introduction of conciliation procedures and the consolidation of alternative dispute resolution methods in procedural legislation increases the effectiveness, quality and relevance of these mechanisms in the dispute resolution process (Inshakova & Kazachenok, 2018). State support and enforcement of the decisions

reached based on the results of the conducted procedures increases their significance for the entire civil society.

The emergence of a new judicial reconciliation (mediation) procedure will only increase the effectiveness and attractiveness of this method, preserve the partnership between the disputing parties, and achieve a balance between the interests of the judicial community and society.

However, the changes in procedural legislation will require further reform of the legislation: increasing the role of the court, represented by judges who consider a dispute; fixing the mandatory use of conciliatory or other methods of dispute resolution before filing a claim to the court, so we can say that this is only the beginning of future legislative changes.

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CHAPTER 13

CONSUMER PROTECTION FOR DIGITAL FINANCIAL SERVICES

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The aim of the study is the features of the legal regulation of consumer protection of digital banking in the European Union, USA, China, and Russia. In the course of the work, it was revealed that 1) the regulation of consumer protection should not be too strict and excessive, i.e., too strict regulation leads suppliers to go to other countries where the regulation is softer or lacks. This situation had a place in the USA when in 2018 the government needed to repeal some of the too harsh provisions of the 2010 Dodd-Frank Act; 2) on the other hand, too loose regulation of the distribution of digital banking services, as, for example, in China, has led to the emergence of several fraudulent schemes in the field of Internet banking; 3) consumer confidence in a well-functioning financial services market contributes to financial stability, growth, efficiency, and innovation in the long run. Therefore consumer protection is increasingly becoming one of the main tasks that go beyond the financial stability of supervisory institutions; 4) the Russian legislator should take into account the above points when developing a new legislative act—the "Code on Consumer Protection," which is planned to be adopted in 2023.

Keywords: Digital Financial Services, Consumer Protection, Digital Banking, European Union Law, Us Law, China Law, Russian Law.

JEL Code: F36, G15, G21, K24, O16

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 157–168.

MATERIALS

The scientific ground of this scientific work is based on the relevant works of Russian and foreign scientists. Among the works of the Russian authors, investigating the protection of the rights of consumers of financial services in the Asia-Pacific countries, we should mention the monograph "Resolution of financial disputes in the APR countries (Australia, Hong Kong, India, Indonesia, China, Malaysia, New Zealand, Singapore, USA, Thailand, Japan)" by Artemyeva et al. (2019) and scientific articles by Buzko (2019); Ermakova et al. (2018); Saveliev (2016). The protection of the rights of consumers of digital financial services in the EU, the USA and China received coverage in the works of domestic and foreign authors: Frolova et al. (2019); Altman and Kenton (2019); Altman and Sahni (2019); Berger et al. (2019); Hong (2017); Jourová (2019); Kenton (2019); Berger and Kustermans (2019); Loubere (2017); Sahni (2019); Stamegna and Karakas (2019); Thomas (2018); Tobin and Volz (2018); Tsai (2017); Wang (2018); Wenhao (2018). In this scientific work, the authors studied and analyzed the provisions of the legislation of the European Union, USA, China, and the Russian Federation.

METHODS

The scientific development of the content of this chapter of the monograph is carried out on the basis of the general scientific method of historical materialism. General scientific methods of cognition are used: dialectical, hypothetical-deductive method, generalization, induction, and deduction, analysis and synthesis, empirical description. The study also used private science methods: juridical-dogmatic, statistical method, method of comparative legal analysis, other.

INTRODUCTION

The digitalization of retail financial services is rapidly evolving and transforming this market. Consumers are increasingly buying credit, banking, investment, insurance, and other financial products on the Internet, mainly from local suppliers, as well as across the border (Ermakova & Frolova, 2019). The continuous development in fintech is fundamentally changing the financial services industry (Inshakova & Goncharov, 2017). Fintech uses technology to provide products and services in the financial sector and changes the structure of these products and services, their provision and consumption. Fintech suggests many advantages: it improves the quality of customer service (faster, better, cheaper); it introduces new ways of providing and using financial products and services (for example, mobile payments, online lending platforms and automated consultations); increases the availability and accessibility of financial products and services (around the clock, over the Internet, in the cloud). In turn, it increases efficiency and alike. (Berger & Kustermans, 2019).

Digitalization has affected retail financial service providers and their business model: as a result of digitalization, new retail financial service providers have emerged that sell their products almost exclusively via the Internet. As cybersecu-

rity threats increase the risks of financial crime and fraud, regulators all over the world cross the borders to provide joint resistance (Hasham et al., 2019).

The choice of countries for the study is due to: firstly, the importance of the United States, China, and the European Union in the development of legislative regulation of consumer protection of digital financial services; and secondly, the volume of digital financial services provided to the population of these countries. The FinTech market has developed rapidly over the past few years: the total value of transactions in the FinTech sector in the European Union currently stands at 682 billion euros, compared to 1,415 billion euros in China and 1,146 billion euros in the United States in 2018. The increase in transaction value until 2022 is 13.3%, so the total transaction value in the FinTech sector in Europe in 2022 will be 1,082 billion euros (Statista, 2019).

European Union. From 2014 to 2018, the total volume of transactions with electronic money in the EU doubled. 61 percent of Europeans used the Internet for online banking (Statista, 2019). Consumer protection issues have been dealt with by the EU authorities since the 1970s. Although today the level of protection is considered one of the highest in the world, consumers in the EU still face some challenges.

Consumer Lending and Deposits. Since June 2010, the EU Directive No. 2008/48/EC (2008), on credit agreements for consumers has established general rules for EU member states regarding consumer loans. The directive was amended in 2014. The directive applies to personal loans in the amount of 200 to 75,000 euros, repayable in more than a month. The EU also has a "Deposit Guarantee System," introduced by the EU Regulation (1995), which reimburses consumers for money lost from current and deposit accounts when a financial institution cannot return money due to financial difficulties. The The EU Regulation (2015) replaced the EU Regulation (1995). Besides, the FIN-NET platform has been operating in the EU, which is a pan-European network of out-of-court complaints about financial services. The platform was designed specifically to facilitate out-of-court settlement of consumer disputes when a service provider is established in an EU Member State other than where the consumer resides (Citizens Information Board, 2019).

The New EU Consumer Protection Directive (EU Directive No.2019/2161, 2019). In 2017, the EU Parliament introduced the "New Consumer Deal," which aims to strengthen consumer protection in the EU in the face of the growing risk of violations throughout the EU. Fulfilling this obligation, on April 11, 2018, the EU Commission adopted a package of documents called the "New Agreement for Consumers," which included three draft directives: 1) on the modernization of consumer protection rules, 2) on digital contracts, and 3) on contracts of sales. The draft on "Directive on better enforcement and modernization of EU consumer protection rules" was adopted by the European Parliament in November 2019. The new directive is designed to a) modernize the existing consumer protection rules under digital developments; b) ensure transparency in the Internet market; c) guarantee equal rights of consumers to "free" digital services and others. (Jourová, 2019).

Digital Contracts for Europe. In 2015, the European Commission proposed the draft on "Directive on contracts for the supply of digital content and digital

services" and the draft "Directive on contracts for the sale of goods." Both directives were adopted by the European Parliament on March 26, 2019, and entered into force on June 11, 2019. The directives harmonize essential norms of legislation on consumer contracts in the EU. Pursuant to Art. 24 of the EU Directive 2019/770 (2019) on digital contracts, by July 1, 2021, Member States must take measures necessary to comply with the directive. The directive will be applied in the EU from January 1, 2022.

Consumer Data Protection—GDPR Regulation. The first directive in this area was the EC Directive 95/46/EC. It was repealed by Regulation EU 2016/679 of April 27, 2016, on the protection of natural persons—GDPR. The said Regulation began to apply from May 25, 2018. However, it does not contain the definition of "Big Data," which creates a blind zone that needs to be eliminated. Therefore, European supervisory authorities—the European Banking Authority (EBA), The European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA)—have prepared some draft amendments to the GDPR and other general consumer protection rules (Stamegna & Karakas, 2019).

Regulation (EU) 2019/881 (2019), on ENISA (the European Union Agency for Cybersecurity) and information and communications technology cybersecurity certification and repealing Regulation (EU) No 526/2013 (Cybersecurity Act) entered into force on June 28, 2019). The regulation contains new provisions on cybercrime and information security.

The current EU consumer protection program has been discontinued in following the proposal of the Multiannual Financial Framework 2021–2027 (MFF, 2020). Consumer protection measures are included in the new single market program under the heading "Single market, innovation and digital." The EU Commission argues that combining different protection areas into one program will minimize duplication, stimulate interaction, and improve cooperation among EU member states (EU policies, 2019, p. 165).

The USA. The global financial crisis has shown the governments of all countries of the world the need for more effective consumer protection and increased financial literacy of the population. Following the Dodd-Frank Act (2010), the United States created the Federal Deposit Insurance Corporation (FDIC). This law enshrined "financial instruments to protect the rights of consumers, financial institutions and systemic protections: according to the law, the Bureau of Financial Consumer Protection was established" (Ermakova et al., 2018). However, on May 22, 2018, the House of Representatives voted to waive significant parts of this law, which was enshrined in the new US federal law of the new US Federal Law EGRRCPA (2018) (Kenton, 2019). The laws mentioned above contain general consumer protection issues: Certain financial protection issues are regulated in the United States by specific regulations.

Confidentiality, Disclosure, Fraud Prevention, Anti-Money Laundering. There is no national data protection law in the United States. The United States has adopted a sectoral approach with various applicable federal and state laws, and nu-

merous federal and state agencies have the authority to develop and enforce rules in this area, depending on the industry and context. For Fintech firms, applicable federal laws include the Graham-Lich-Bliley Act (GLBA), Fair Credit Reporting Act (FCRA), Federal Trade Commission Act (FTC), and Electronic Communications Confidentiality Act (ECPA). Obligations under such laws range from obligations to provide adequate notice of the use of data by a firm to maintain appropriate security measures for the financial information of individuals and to specific requirements for the use of consumer credit reports (Altman & Sahni, 2019).

The Financial Privacy Act (1974) contains a Privacy Rule for the use of customer personal data, which requires banks and other financial institutions to inform consumers of their personal information policies and to refuse to provide customer data to third parties.

The Bank Secrecy Act (BSA, 1970) requires financial institutions to assist the US government in detecting and preventing money laundering. In particular, the law requires financial institutions to keep records, record reports if the total daily amount exceeds $ 10,000, and report suspicious activity, which could mean money laundering, tax evasion, or other criminal activity. Firms must also comply with the executive provisions of the Anti-Money Laundering (1970) rules.

Cash Deposits and Lending. Cash deposits of financial services federal laws protect consumers: Truth in Savings Act (TISA, 1991), The Electronic Fund Transfer Act (EFTA, 1978), and The Expedited Funds Availability Act (EFAA, 1987). The Truth in Savings Act (TISA, 1991) sets out uniform requirements for disclosing the terms and conditions regarding interest and fees when providing information and when opening a new savings account (Artemieva et al., 2019). The Electronic Fund Transfer Act (EFTA, 1978 established the rights and obligations of consumers, as well as the obligations of all participants in an electronic funds transfer. The Expedited Funds Availability Act (EFAA, 1987) determines when standard checks can be deposited in check accounts and provide for a maximum storage period. Laws protect consumer rights in lending: Home Mortgage Disclosure Act (HMDA, 1975), Equal Credit Opportunity Act (ECOA, 1974), and The Truth in Lending Act (TILA, 1968).

International Money Transfers. CFPB's mission is to make financial markets fairer for consumers, ensure that they comply with relevant rules, and provide consumers with more control over their economic lives. The CFPB is responsible for overseeing all US international transfers of more than $15. The IRS of the US Department of the Treasury primarily collects reports on international bank transfers of $10,000 or more.

China. According to the latest statistics, 40% of the Chinese population use exclusively mobile payments with less than 100 yuan in cash on them ($15). In 2016, PRC consumers spent 157.55 trillion RMB (US $22.8 trillion) through mobile payment platforms, compared with US $ 112 billion in the US (Tobin & Volz, 2018). Unlike the United States, where credit cards issued by a traditional bank are behind the majority of non-cash transactions, Internet giants such as Tencent and Ant Financial, supported by Alibaba, according to iResearch, occupy respectively 40% and

54% of the mobile market and predominate in mobile payment services in China. China's financial regulators are trying to catch up to cope with this unprecedented industry (Hong, 2017). Digital loans are mainly provided by two types of online financial institutions: online banks and P2P platforms. Online banks, such as WeBank (Tencent) and MyBank (Alibaba Group), are intended for those who participate in e-commerce platforms, including Taobao owners and customers (Loubere, 2017).

The protection of the rights of consumers of digital financial services in China is regulated, first of all, by the general regulatory acts related to this area: the Law on the Protection of the Rights and Interests of Consumers of 1993 (as amended in 2009 and 2013); The Law on Cybersecurity (2016). The norms of a general nature also include Art. 127 of the "General Rules of Civil Law of China" (Civil Code of the People's Republic of China, 2017): "if the laws contain provisions for the protection of data and virtual property on the Internet, such laws must be respected" (Wenhao, 2018).

Besides, consumer protection standards were included in by-laws governing digital banking in China: 1) Guiding Opinions on Promoting the Healthy Development of Internet Finance (Guiding Opinions, 2015); 2) Interim Measures on Administration of the Business Activities of Peer-to-Peer Lending Information Intermediaries (the Interim Measures of P2P, 2016).

The Chinese P2P Market is the largest in the world: in 2016, nearly 6,000 P2P platforms provided transactions worth about one trillion RMB. In 2017, the volume of P2P lending transactions reached 2.8 trillion RMB (Tobin & Volz, 2018). Some large platforms, such as Paipaidai, have served more than two million active borrowers and lenders (Loubere, 2017). The 2016 "Interim Measures" was introduced amid exponential growth in the P2P lending industry. This growth was partly driven by the relatively weak regulation of Internet finance in China in order to stimulate creativity among market participants and help small, and micro-startups raise funds. However, over the past two years, several fraudulent platforms have been discovered whose actions caused substantial financial losses to creditors and the general public and led to social unrest in some parts of China (Linklaters, 2016). Until recently, in China, almost anyone could launch a website and start raising funds from active investors. In the absence of adequate regulation, nearly 65% of P2P platforms in China no longer work due to bankruptcy or fraudulent activities. The collapse of Ezubao in 2015 was a prime example of the risk associated with free fintech (Tsai, 2017).

Chinese regulators recently took several measures to limit the fast pace of company expansion: on December 30, 2018, the People's Bank of China imposed restrictions on payment using a QR code, which users can scan using Alipay or Ten Pay to make purchases or order services (Wang, 2018).

Protection of Personal Data of Consumers Of Financial Services. In China, compared with Europe and the United States, the rules for confidentiality of personal data is not so strict, which gives Chinese companies enough opportunities to collect, monitor, and analyze user data for their growth. Recently, the Chinese public has been increasingly discussing this issue. The Chinese giant Alipay which in 2017

collected data on the total expenses of people and classified their shopping habits for interactive viewing inside their application, apologized for this in its official Weibo microblog after users complained in social networks that they did not receive proper notice of the confidentiality agreement from the company, which allows Alipay to exchange a wide range of user data with other agencies (Wang, 2018).

Russia. By the beginning of 2019, the Internet user audience in Russia amounted to 90 million people (+3 million people by 2018) and reached 75.4% of the country's adult population. The primary trend of recent years is the growth of the mobile Internet. By the beginning of 2019, the share of Internet users on mobile devices reached 61%.

Meanwhile, in Russia, the protection of the rights of consumers of digital financial services is not adequately regulated at the legislative level. The protection of the rights of consumers of digital services is based on the provisions of the Law of the Russian Federation of 07.02.1992 No 2300-1 (as amended on 03/18/2019) "On the Protection of Consumer Rights." The chief financial regulator, the Bank of Russia, defined Internet banking as a way of remote banking services for clients carried out by credit institutions on the Internet (including through the website(s) on the Internet) and including information and operational interaction with them. Therefore, in a broad sense, in order to protect Internet banking customers, the general provisions applicable to consumers of traditional banking services, concentrated in banking regulations, are also applicable (Frolova et al., 2018).

In 77% of the agreements, scrutinized by the banks, contain provisions that allow knowingly removing the responsibility from the bank for the correct functioning of the Internet service (KonfOP, 2016). Moreover, paragraph 3 of Art. 847 of the Civil Code of the Russian Federation, courts are sometimes interpreted as the right of a bank to transfer in an agreement all the risks of using digital means of identification to the customers. In support of this position, the courts also use references to various bank rules containing restrictions on their responsibility for the execution of orders issued by unauthorized persons but using customer identification tools (Saveliev, 2016).

In 2018, the Federal Service for Supervision of Consumer Rights Protection and Human Well-Being of the Russian Federation (Rosporebnadzor) presented a report "On the status of consumer protection in the financial sector in 2017," which noted that in 2017 the courts of general jurisdiction of the Russian Federation received 83,277 civil cases on protecting the rights of consumers of financial services, which is 23.4% of the total number of civil cases (355,385). The report emphasized that the critical activities in the field of improving the regulatory framework in the sphere of consumer protection are the development and approval of the "Concept of codification of the legislation of the Russian Federation on consumer protection" (March 2019), then a broad public discussion of this concept with the participation of scientific and expert communities, public organizations and the business community (November 2019) and the development of

a new legislative act of the Russian Federation—the "Code on the Protection of Consumer Rights" (November 2023) (Rospotrebnadzor, 2018).

Data Protection of Consumers of Digital Financial Services. In general, the Russian data protection legislation complies with international standards. The 1981 Strasbourg Convention (ratified by Russia in 2005) laid the foundations of the Russian legislation on the protection of personal data. The primary laws in this area are the 2006 Federal Law on Personal Data and the 2006 Federal Law on Information, Information Technologies, and Data Protection. Unlike some other jurisdictions, there is currently no general obligation to report cybercrime, although such legislation was proposed in 2017 and may be adopted in the near future. (Buzko, 2019).

CONCLUSION

The authors of this scientific work conclude that the regulation of consumer protection should not be too strict and excessive. Excessive regulation causes digital financial service providers to go to other countries where regulation is looser or absent, which happened in the United States when in 2018, the government needed to repeal some of the too harsh provisions of the 2010 Dodd-Frank Act. On the other hand, too loose regulation of the distribution of digital banking services, as, for example, in China, has led to the emergence of several fraudulent schemes in the field of Internet banking. The Chinese government had to take urgent measures to rectify the situation. Consumer confidence in a well-functioning financial services market contributes to long-term financial stability, growth, efficiency, and innovation. Consumer protection is increasingly becoming one of the main tasks that go beyond the financial stability of supervisory institutions. The Russian legislator should take into account the above points when developing a new legislative act—the "Code on the Protection of Consumer Rights," which is planned to be adopted in 2023.

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CHAPTER 14

PROCEDURAL LAW AND SCIENTIFIC-TECHNICAL PROGRESS

New Opportunities for Pre-Trial Electronic and Remote Interaction of the Parties

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The research goal of this chapter is to analyse the forms and methods of using information technologies in out-of-court dispute resolution, in the framework of online arbitration, as well as the impact of digitalization on legal proceedings in state courts in order to predict the prospects for using Information Technologies and Artificial Intelligence technologies in the field of dispute settlement and resolution.

In future, it is expected that the scope of online dispute resolution procedures will be expanded; but even in such case, the guarantee of unhindered access to justice implies active judicial control and regulation of the issue of mandatory online dispute resolution by "soft" law. In this regard, it has been proven that the substitution of Artificial Intelligence technologies for human beings in the framework of the administration of justice repudiates the very meaning of any proceedings based on guarantees of implementing procedural rights, and the legality and fairness of hu-

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man rights and law enforcement activities carried out by the court, and not by a machine.

Keywords: Civil Procedure; Procedural Law; Legal Proceedings; Alternative Dispute Resolution; Online Dispute Resolution; Online Arbitration

JEL Code: K41, K12, K38, O30, O33

MATERIALS

The basis of the regulatory framework study was the Civil Procedural Code of the Russian Federation (2002), (hereinafter—GPK); the Arbitration Procedural Code of the Russian Federation (2002), (hereinafter—the APC RF); the Code of Administrative Procedures of the Russian Federation (2015), (hereinafter—CAP); the Federal Law No. 382-FZ (2015), Federal Law No. 193-FZ (2010), Draft Federal Law "On Amendments to the Law of the Russian Federation "On Consumer Protection" and the Federal Law "On Alternative Dispute Settlement Procedure Involving a Mediator (Mediation Procedures)" in Terms of Creating a Legal Basis for the Development of a System of Alternative Online Dispute Settlement Mechanisms;"and Draft Federal Law "On Amendments to the Arbitration Procedural Code of the Russian Federation, Civil Procedural Code of the Russian Federation, Code of Administrative Procedures of the Russian Federation and other Legislative Acts of the Russian Federation", as developed by the Ministry of Justice of the Russian Federation.

The following documents were studied as policy documents of a strategic and advisory nature on alternative dispute resolution and civil procedure in the digital economy: UN General Assembly Resolution (2016), Regulation (EU) (2013), European Charter on the Ethical Use of Artificial Intelligence in Judicial Systems and Their Environment (2018); the program "Digital Economy of the Russian Federation" (2017).

The theoretical basis of the study was scientific articles on the digitalization of the civil process and out-of-court settlement of disputes, including the works of Andreeva et al. (2019); Inshakova and Kazachenok (2018); Argunov (2018); Kurochkin (2018); Reshetnyak and Smagina (2017); Katsh and Rifkin (2001); Ashley (2017); and others.

METHODS

This research is based on general scientific methods (comparison, analysis and synthesis, induction and deduction), as well as methods of legal science, including methods of formal, literal, systematic and historical analysis of law, and the method of comparative law.

INTRODUCTION

The sharp increase in the number of transactions concluded online has led to a need to find optimal approaches to resolving disputes arising from such transactions. One such mechanism is online dispute resolution, which reduces the costs that inevitably accompany face-to-face conduct and participation in an out-of-court or court hearing. Awareness of the advantages of Online Dispute Resolution (hereinafter—ODR), a wide range of forms and approaches to such settlement, the potential of hybrid processes that include both online and offline elements, have led to the spread of ODR, especially in the areas of cross-border commercial transactions, transactions concluded online, and consumer disputes.

As is well-known, the range of options for resolving conflicts without applying to a state jurisdictional body and without obtaining a final decision of a state court is extremely wide and is united by the term Alternative Dispute Resolution (hereinafter—ADR). All procedures covered by this concept can be divided into two main types:

1. Settlement of the dispute by the parties to the dispute themselves (independently, or with the involvement of a conciliator); and
2. Dispute resolution in arbitration (arbitration court) (Inshakova & Kazachenok, 2018).

Both types of ADR can be carried out using information technologies to varying degrees, and the range of "depth" of ADR digitalization varies from the use of electronic means of communication only as a way to simplify and speed up the conflict resolution process to the use of artificial intelligence as a way to resolve the dispute itself on the merits.

It should be noted that the fruits of scientific and technological progress, the active and positive use of digital technologies in the emergence and development of material legal relations, have also led to an increase in the use of electronic technologies in resolving cases by state courts.This has become one of the most important trends in the development of legislation regulating the administration of justice.

Forms and methods for using information technologies in out-of-court dispute resolution, online arbitration, and the impact of digitalization on legal proceedings in state courts are the subject of this chapter.

RESULTS

1. Online Dispute Resolution. The active expansion and development of e-Commerce and its objective demand for civil turnover contribute to the development of special legal regulation of online mechanisms for pre-trial settlement of disputes in legislation, which shows that the development of procedural forms is predetermined, including the level of development of material relations that give rise to relevant disputes and conflicts.

At the international level, the United Nations Commission on International Trade Law (UNCITRAL) is one of the proponents of developing Online Dispute Resolution (hereinafter—ODR).

At first, ODR did not differ much from traditional conciliation procedures, because the use of information technology was limited to the ability to exchange information and documents via e-mail and remote participation in meetings. Today, the ODR mechanism has become much more complex (Rusakova et al., 2019). According to the Technical Comments, the ODR process may consist of the following stages: negotiation; facilitated settlement; and a third (final) stage. At the same time, along with the parties to the dispute themselves, arbitrators, conciliators, and the administrator of the technological platform where Online Dispute Resolution procedures are carried out, and the parties can interact with each other, becomes a mandatory subject of ODR. The presence of the platform distinguishes online proceedings from classic conciliation procedures using information technology. The ODR procedures require a system to prepare, send, receive, store, exchange, or otherwise process messages in a way that ensures data security.

In the legal literature, the digital platform for dispute resolution is specially characterized, because it coordinates the behaviour of the parties to the dispute and essentially manages the conflict. It is often identified as a fourth party to the conflict, along with the parties to the dispute and the mediator, since it is responsible for information exchanges and corrections (editing claims), location of interests, and pressure points along the conflict (Katsh & Rifkin, 2001). It should be taken into account that the digital platform can be managed not only by mediators and arbitrators, but also directly by artificial intelligence technologies. The legal personality of the digital platform and its consideration as the status of a mediator are not obvious, since the very concept of machine administration of justice does not allow for comprehensive protection or any guarantee of the rights and interests of the parties to the dispute, performing only auxiliary work on the analysis of a specific incident by machine processing options for its possible resolution and justification under specified conditions, which in itself shows the applied value of robotics.

The UNCITRAL Technical Comments do not exclude extension of their provisions to both commercial and consumer disputes. This is due to the rapidly increasing practice of online trading, a significant proportion of which is the purchase of goods on the Internet for consumer purposes.

Within the European Union, Online Dispute Resolution has long been considered a promising mechanism for implementing consumer rights, as evidenced by the adoption in 2013 of the Regulation on Online Dispute Resolution (hereinafter—Regulation), and the Directive on Alternative Dispute Resolution with Consumer Participation (hereinafter—Directive), which required EU member states to provide consumers with access to a pan-European consumer dispute resolution platform that coordinates a network of national certified Online Dispute Resolution platforms.

The Regulation establishes an obligation to create "points of contact" in each member state of the European Union that provide support for Online Dispute Resolution, as well as substantive support on the specifics of personal data processing, confidentiality and information protection. The ODR platform, created in accordance with the Regulation, started functioning in January 2016. The European Commission acts as operator of the ODR platform, and independent intermediaries that meet the requirements of the Directive assist in resolving disputes on this platform.

At the same time, suppliers (of goods and services) are obliged to inform consumers about the possibility of using ODR platforms for dispute resolution. For their part, member states of the European Union should assess the compliance of organisations engaged in alternative dispute resolution with the requirements of the Regulation. The dispute resolution platform is free for consumers, and the European Commission is responsible for its creation and proper functioning.

In contrast to the wide demand and development of remote sales of goods in Russian law, there is no legal regulation of relations on the implementation of Online Dispute Resolution procedures, although the national program "Digital Economy of the Russian Federation" provides for this procedure.

Currently, a draft federal law has been prepared that provides for amendments to the Russian Federal Law "On Consumer Protection" in terms of creating a legal basis for the development of a system of alternative Online Dispute Resolution mechanisms. In the draft federal law, parties to consumer disputes act as participants in the system of alternative Online Dispute Resolution mechanisms: the consumer(s), the addressee(s) of the claim, neutral persons (specialists, experts, mediators, and others), and platform operators—persons who operate the platform.

There is an explanation for the active use of online arbitration in resolving consumer disputes. The most acute lack of Online Dispute Resolution mechanisms is manifested in consumer legal relations: as e-Commerce develops, the number of consumer complaints about online purchases of goods and services increases; there is a need to reduce the cost to consumers and the state for providing for judicial redress of violated consumer rights, and business costs in order to administer processing and storing consumer claims in documentary form. E-commerce involves electronic procedures for settling claims and disagreements of its participants, which is possible when creating and activating an online platform in which the consumer is able to submit claims to the manufacturer, seller, importer, and/or owner of the aggregator, which may be located in different jurisdictions.

Moreover, there are other mechanisms to prevent violations of consumer rights, namely chargeback, thanks to which consumers are not required to provide evidence to cancel the payment, whereas the seller is required to prove that the product or service was provided in conformity with the terms of the contract—only after which the platform makes a payment to the supplier. An example is

PayPal, which in most cases can freeze the amount of money and resolve a dispute, providing instant and effective enforcement.

In future, it is possible to predict the expansion of the scope of Online Dispute Resolution procedures; but even in this case, the guarantee of unhindered access to justice involves active judicial control and regulation of the issue of mandatory Online Dispute Resolution by "soft" law. The problem of enforceability of decisions made in Online Dispute Resolution is also relevant.

It is also noteworthy that the functioning of the ODR platform involves not only the creation of an electronic platform for interaction between the parties, but also, more importantly, the automation of the Online Dispute Resolution process itself, providing for the possibility of assigning these functions to robots (computer programs).

With this in mind, a number of important issues for the development of legal theory are put on the agenda, one of which is, for example, the question of whether artificial intelligence can act as an analogue of an intermediary; and what legal consequences follow from such a decision. So, in England, after unsuccessful attempts to reconcile with the participation of a mediator, the parties to the conflict used a Canadian service, Smartsettle ONE, thanks to which they were able to conclude a settlement agreement in less than an hour. According to the developers of the service, this system, with artificial intelligence, uses special algorithms to study the priorities of the parties, while, during the bidding process, the program helps users choose the best negotiating tactics for them so as to reach an optimal agreement.

In this regard, it is important to consider the enforceability of an agreement concluded as a result of computer analysis of documents submitted by the parties, relevant legal norms, and a body of judicial practice in similar cases. It seems that, if there is an agreement to conduct mediation (or any other agreement to conduct conciliation, or pre-trial procedures), the result of Online Dispute Resolution should be equivalent to the agreement reached in the framework of traditional conciliation procedures.

As for the Russian practice, the dissemination of alternative means of resolving disputes without going to court is hindered by the private contractual nature created between the parties—a compromise on the substance of the dispute (Inshakova & Tymchuk, 2018), which is significant—is not different from the contractual terms that change the material relationship of the parties to any agreement of the parties to settle the dispute before going to court, which, thereafter, will not have the force of an executive document. In fact, the parties' agreements on the merits of the dispute constitute the subject of obligations and are regulated by civil law; they are taken into account when resolving the dispute only in the context of the evidence collected in the case, and do not meet the nature of the institutions of procedural law. Such contractual terms are concluded outside of court proceedings but are always considered by the courts later, when assessing whether a participant in such an agreement has committed procedurally significant actions.

Taking into account the acute need for accessible and effective dispute resolution mechanisms that will not only improve the quality of justice by optimizing the judicial load (Lupoi, 2011), but also, first of all, reduce conflict, strengthen social and business ties, establish and develop partnerships, instill a respectful attitude to the law as well as increase legal awareness and social activity, changes were made to Russian legislation in 2019, which, among other things, provided for the possibility of notarizing a mediation agreement and giving it the force of an executive document (Federal Law No. 197-FZ, 2019). According to the new rules, a mediation agreement is certified by a notary with the mandatory participation of a mediator or a mediator-representative of an organisation that performs activities to ensure the conduct of the mediation procedure; therefore, it is not excluded that the agreement adopted as a result of online mediation can be notarized with the participation of a representative of the organisation that administers the corresponding online platform. In future, this notarial act can be attributed to the number of actions performed, including in electronic form.

The lack of uniform consequences for non-compliance with the pre-trial dispute settlement procedure, which leads to a high degree of legal uncertainty, also prevents the parties from updating and increasing the importance of pre-trial electronic interaction. Securing the law of obligatory pre-trial dispute settlement could not be viewed as a barrier to access to justice of the persons concerned, because determination of the relevant categories of disputes with a mandatory pre-trial order to consider such claims generally refers to the occupation(s) of the parties as the parties to the dispute, which are assigned significant requirements in terms of imaging the subject and content of the dispute, wherein requirements for compliance with pretrial procedures are not obvious, not only to the court at this stage of making a claim, but also for the defendant, merging with private disagreements and conflicts of participants of legal relationship.

However, in cases where the parties to a conflict occupy unequal negotiating opportunities—i.e. one of them occupies a significantly weaker side of the legal relationship—the mandatory introduction of a pre-trial dispute settlement procedure, which is expressed in the consumer's obligation to apply through a digital online platform with a claim to the seller (manufacturer, supplier, performer of works and services), should be considered as imposing electronic means of communication on citizens and limiting their constitutional right to access to justice.

In other cases, when the parties to a conflict are professional subjects, the absence of requirements in the legislation to comply with pre-trial procedures for resolving the dispute leads to the length and complexity of the trial. The introduction of mandatory pre-trial dispute settlement procedures are due to several interrelated factors: an objective assessment of the dispute in the claims between its members; regulatory inspection by the court of the validity of the dispute between the parties; discharge of the judicial system by providing parties with an opportunity to resolve conflicts and disagreements without court intervention in the initial stages of their proceedings, thereby saving the costs of a subsequent dispute in

court; preventive and early creation of conditions for concentration of the subject matter of the dispute and evidence in future court proceedings; prevention and visualization of any unfair exercise of procedural rights and/or obligations by the parties.

Russian legislation and judicial and arbitral practice do not provide clarity in determining the consequences of non-compliance with pre-trial procedures for resolving a dispute in a civil proceeding. On the one hand, failure to comply with the claimant's (pre-) order necessitates that the petition be returned by the court (APC Article 129, Part 1, Paragraph 5;CCP Article 135 Part 1, Item 1;APC RF Art. 129, Part 1, Item 1); and in instances where resolution of a matter in dispute is taken up, regardless of judicial instance (Resolution of Plenum of the Supreme Court of the Russian Federation, 2012)—left without review (APC RF Art. 148, Part 1, Item 2;GPKArt. 222, Part 1, Item 1, Para. 2; CAPArt. 196). On the other hand, current judicial practice allows us to consider the case on its merits if its materials are seen as the implementation of the defendant, who claimed non-compliance with the pre-trial procedures for dispute settlement, procedural rights and obligations of the party in the case (determination of the judicial board for economic disputes of the Supreme Court of the Russian Federation (2015). The adoption of this approach in current judicial and arbitral practice creates the risk of diluting the sources of procedural law, while verification of compliance with the pre-trial procedures for dispute settlement by the parties is the sole responsibility of the court, regardless of the objections and statements entered by the parties. The application of the consequences of non-compliance with pre-trial procedures for settlement of a dispute by one of the parties to the dispute does not apply to the exercise of procedural rights and the principle of dispositivity of civil proceedings.

2. Resolving a Dispute by Using Online Arbitration. Online arbitration can be defined as the process of resolving a dispute by an arbitration court using methods of electronic data exchange. In online arbitration, hearings can be conducted using video conferences; but, usually, a decision is taken based on the evidence uploaded by the parties to the online platform of the arbitration court, which provides the opportunity to ask and answer questions online. Thus, the correspondence between participants in the process is conducted by e-mail or other electronic channels of communication; procedural documents and evidence are transmitted electronically; advance disclosure of electronic evidence is increasingly used, including through the use of "cloud" technologies (e-discovery) (ICC Rules of Arbitration, 2012; ICC Friendly Dispute Resolution Rules, 2001; Vienna Rules, 2018). Thus, in the absence of direct interaction between the parties and the court, arbitration relies less on the interaction of the participants in the proceedings, and more on written evidence.

Arbitration through online communication differs from traditional arbitration only in its technology, which is used only to speed up and simplify traditional procedural actions and, despite all the technical features, online arbitration remains

a process for resolving a dispute by a real person, not a machine (Kurochkin, 2018), which determines the principle of enforceability of the resulting decisions in accordance with the provisions of international treaties and national procedural legislation, in terms of having proper procedures agreed upon by both parties. Thus, according to Article V of the United Nations Convention on the Recognition and Enforcement of Foreign Arbitral Awards (concluded in New York, 1958), recognition and enforcement of an arbitral award may be refused, including if it is established that the composition of the arbitral body or the arbitration process did not comply with the agreement of the parties or, in the absence of such, did not comply with the law of the country in which the arbitration took place. *That is, there are no legal grounds for limiting the enforceability of arbitral decisions made as a result of online procedures at the level of international treaties.*

At the same time, it is possible to conduct arbitration procedures in which the decision is formulated automatically by a computer program, rather than by a real person—the arbitrator, which raises the question of recognizing their legitimacy for the purposes of executing the final decision.

According to Russian procedural legislation (GPK Art. 426; APC Art. 239), the court may refuse to issue a writ of execution for compulsory execution of an arbitral award if the composition of the arbitral tribunal or the arbitration procedures did not conform to the agreement of the parties or federal law. Per Russian Federal Law No. 382-FZ (2015) in the Russian Federation," 29 December 2015, an arbitrator (arbitral judge) is an individual elected by the parties, or elected (appointed) in accordance with the procedure agreed by the parties or as established by Russian federal law, to resolve a dispute by a court of arbitration. A decision taken in an automatic mode hardly falls under this definition and, therefore, it is currently impossible to assert the enforceability of arbitral decisions taken as a result of the work of artificial intelligence without the participation of an individual arbitrator.

At the same time, given the rapid development of information technologies, the significant potential for using artificial intelligence to categorize disputes, analyse and generalize judicial practice, and predict court decisions with a high degree of probability, it seems inevitable that procedural legislation should be adapted to recognize and enforce automatically accepted arbitral decisions. If there is a clear and unambiguous voluntary agreement between the parties to conduct arbitration online, the result of which will be an automated decision, then it is impossible to refuse enforcement on the basis of lack of proper procedure for such a decision.

However, this approach requires appropriate legal and technological guarantees. So, in 2018 the European Commission for the Efficiency of Justice (CEPEJ) of the Council of Europe adopted the first European Charter on the Ethical Use of Artificial Intelligence in Judicial Systems and their Environment (hereinafter—the Charter), which sets out ethical principles relevant to the use of artificial intelligence in judicial systems and dispute settlement, for example: the principle of respect for fundamental rights; the principle of non-discrimination; the principle

of quality and safety; the principle of transparency, impartiality and fairness; the principle of being "under user control." (European Charter, 2018).

Creating an appropriate legal basis for the use of artificial intelligence and defining the boundaries of automated information processing, while maintaining the state court's control over an arbitral decision, including determining the grounds for refusing to execute it due to malfunctions, unauthorized external influence, etc., are necessary conditions for ensuring respect for human rights in conditions of delegating the dispute resolution function to artificial intelligence.

This signifies that the rules prohibiting direct or indirect violations of the fundamental values protected by the Convention for the Protection of Human Rights and Fundamental Freedoms, and other international treaties, should be fully integrated at the software development stage. And given the ability of information technology to identify existing differences by grouping or classifying data related to individuals or groups of individuals, the risks of reproducing and exacerbating such discrimination should be avoided.

In this part, it is particularly important to maintain judicial control and to create the ability for reviewing court decisions and providing access to the data set used for automated decision-making. The party must be informed that the final decision is binding, while maintaining the right of access to justice, so that the case can be considered directly by a judge within the meaning of Article 6 of the Convention for the Protection of Human Rights and Fundamental Freedoms.

3. Influence of Information Technologies on Procedural Law and Legal Proceedings in State Courts: Russian and Foreign Experience.

Ensuring a high level of court Informatisation and expanding the scope of application of the latest technologies in judicial activity are trends in the modern stage of the development of justice in most developed foreign countries. In accordance with the recommendation of the Committee of Ministers of the Council of Europe on the principles of civil procedure aimed at improving the judicial system, dated 28 February 1984, No. R (84)5: "the judicial authorities must have at their disposal the most modern technical means so that they could administer justice in the most effective manner, in particular by facilitating access to various sources of law, as well as by speeding up the administration of justice."

In various modern legal systems, the use and legal regulation of information technologies has its own characteristics—in some countries, electronic proceedings in a case have completely replaced its analogue in paper format; in others, legal proceedings are allowed both in a digital format and on paper. At the same time, it is possible to identify a number of key aspects that are somehow characteristic of the novelization of the order for administering justice.

1. Informing citizens about the activities of the judicial system by placing an interactive search engine on the Internet, through which information about the structure of the judicial system, the organisation of the courts, the staff of judges, the legal basis of the courts, the cases in progress,

etc., could be obtained. Standard forms for applying to the courts are disseminated via the Internet in Great Britain, Germany, France, Israel, and other countries.

In the United States, the electronic public access service "Public Access to Court Electronic Records" (PACER) allows users to obtain information about court cases online from federal appeals, district and arbitration courts. PACER provides access for registered users to information about court cases; however, use of this system must be paid for ($0.10 per page of a document).

The federal judicial system itself has a case management / electronic case files (CM/ECF) system; and PACER is the interface for public access to this system. The system is decentralized, and each court has its own servers and its own copy of the software, within which there is a functioning server and separate training and test servers. The test server is used to make changes and install new versions before commencing work. The training server allows users to learn how to use CM / ECF without affecting real cases. Currently, the US judicial system has developed a next-generation CM / ECF (NextGen) that affords use of the same account to access both PACER and electronic files in CM / ECF.

In Singapore, a leading country in the use of information technologies, their Electronic Filing System has been operating since 1997, first as part of a pilot project, and then as a platform for submitting documents to courts in electronic form via the Internet. The platform provides an electronic register and an entire document management system of the Supreme Court and subordinate courts. In addition, with its help, all documents submitted to the courts are automatically checked for compliance with requirements for the respective type of document, without requiring use of the human factor. Further routing of documents is also developed automatically.

2. Optimization of the notification of interested parties about the initiation and progress of legal proceedings, as well as the order for information exchange between participants of the process through the use of electronic means of communication.

A vulnerable element of legal proceedings is the notification of persons involved in the case about the initiation of proceedings, the holding of court sessions, and the performance of procedural acts carried out during the trial. The advantages of informing participants of the process using the Internet, thereby speeding up and simplifying the notification process and reducing human and material costs, are fully recognized by foreign governments that continue to introduce information technologies into the judicial process.

As a rule, it is possible, at the legislative level, to submit any document to a court in electronic form, as well as to exchange documents between parties in electronic form. Almost everywhere, with the exception of Singapore, electronic interaction requires separate consent of the party.

Thus, according to the provisions of the German Civil Procedural Code, an electronic document can be sent to parties to the proceedings if they have expressly agreed to the transfer of documents electronically (para. (3) § 174). Fully electronic interaction is established between courts and government agencies and institutions. Specific established channels for the transfer of documents are recognized as safe: via e-mail (De-Mail-Kontos); through a lawyer's special electronic mailbox; through the mail of an authority or a legal entity of public law; through other national transmission channels that guarantee the authenticity and integrity of data (§ 130a).

In Finland, there are also communication channels that are recognized as secure, for example, a special e-mail for lawyers—A-mail (advocatemail), connected to the server of state courts.

Rules of civil procedure in England also provide for the possibility to send court documents via electronic means of communication (6.23 (5), 6.23 (6)). Instruction 6A, detailing these rules (par. 4.1–4.3), specifies that documents may be sent via facsimile or other electronic means when:

1. The party (its representative) has previously indicated in writing that it is ready to receive notifications by facsimile or other electronic means, and has provided an e-mail address or other electronic identification; and
2. Official documents submitted by the party (its representative) indicate a facsimile number or email address.

However, if a party intends to deliver a document by electronic means (other than facsimile), it must first ask the other party whether there are any format-related restrictions on the recipient's consent to accept documents by such means (for example, between the format in which such documents should be sent, and the maximum size of attachments that can be received). If the document is sent electronically, it is not necessary to send or deliver a hard copy.

The experience of Kazakhstan is interesting, where a so-called "hybrid e-mail" was created for purposes of court notice—i.e., a method of sending correspondence in which notifications in electronic format are sent to the post office of the recipient's place of residence or to a location where a paper document format is printed and then delivered by courier to the addressee.

Under conditions of dispositivity of the process, active use is made of information exchanged between the parties through electronic communication; this is explained by their equal interest in the speedy elimination of any uncertainty in legal relations. The approach wherein electronic communication channels are chosen by the parties voluntarily seems to be more popular and effective than the imposition of digital technologies by state authorities.

3. Introduction of information technologies in court proceedings on the substantive merits.

Currently, among foreign law enforcement agencies, computer technology and electronic communications are used to better organize the work of courts and to speed up and simplify procedural actions. For this purpose, state courts are implementing an electronic case management system that provides information flow management: electronic registration of each case; identification of information about the parties; recording and archiving accounts of incoming and outgoing documents; efficient routing of the case and monitoring of procedural deadlines; preparation of judicial statistics; and communication with all participants in the process. This platform permits the processing and storage of documents with their registration, thus optimizing the process of legal proceedings in general. In the United States, this is the "Case Management / Electronic Case Files" (CM / ECF) system, which has been operating in all federal courts since 2004. Currently, certain types of production are being automated, in which the most simple, undisputed claims for collecting small amounts of money are resolved. For example, in Germany, electronic writ proceedings are functioning, the introduction of which has become possible under conditions of preserving only formal verification of the application for a court order for the admissibility of such claims to be collected. An application for issuance of a court order containing all the necessary conditions and requirements is filled out in an electronic form, posted on the Internet, and affording the possibility of correcting any mistakes made. There is no need to re-check the application for eligibility.

The use of videoconferencing in court proceedings is a recognised practice in foreign jurisdictions. However, in common-law countries, where jury trials are traditional, videoconferencing is the exclusive way to participate in a court session, since it does not allow for personal contact with a trial participant.

In the United States, Germany, Italy, and many other countries, production of a court decision in the form of an electronic document is allowed, as well as the delivery of court acts via electronic communication. However, since not all parties can accept an electronic document, production of a court decision in paper form is also permitted.

A qualitatively new stage in Informatisation of the justice process is the creation and operation of fully electronic courts. For example, the Internet court of Hangzhou in China, officially established in August 2017, is one of the first courts in China to hear cases exclusively over the Internet. Its competence includes disputes over intellectual property related to the Internet.

With regard to the activities of domestic courts, it should be noted that, at the present time, the duplicate and optional meaning(s) of the electronic form of fixing the results of procedural activity in relation to the documentary form is the main problem with further reforming Russian procedural legislation. Current procedural legislation renders the possibility of electronic interaction rather fragmentary, establishing a priority of paper media, for the most part. In particular, applications, complaints and other documents can be submitted to the court in the form of an electronic document signed with an electronic signature or by filling

out a form posted on the official website of the court on the Internet (for example, in courts of general jurisdiction, through the user's personal account, which is located on the Internet portal of the "Justice" State Automated System (www.sudrf.ru); and in arbitration courts, through a personal account created in the "https://my.arbitr.ru/#index" information system). Electronic methods for notifying participants in a process are becoming more widespread; electronic evidence is allowed, and court decisions are made in the form of electronic documents. With court permission, a court session may be broadcast on radio, television, or the Internet. The minutes of court sessions are compiled using technical means (audio recordings; video recordings). Information about the course of the proceedings is posted on the Internet, which allows participants in the process, as well as other persons with limited access to become acquainted with the case materials. In general, electronic technologies are currently used most actively in the arbitration process, and to a lesser extent in civil and administrative proceedings. This is due largely to the difference in the technical support between courts of general jurisdiction and arbitration courts, as well as the specifics of the subject structures of cases considered in these proceedings. An example of how the electronic form has become a self-sufficient element of the procedural form is only simplified proceedings in the arbitration process (APC Chapter 29). In this regard, it would seem promising to change the emphasis in legal regulation—the use of traditional means only in cases where there are no technical opportunities for access to electronic means of communication, provided that the voluntary consent of interested parties to electronic means of interaction is ascertained.

The legislative initiatives currently being developed to improve the interaction of participants in civil proceedings by using information technologies in the following main areas are aimed at wider use of the latest technologies: remote electronic access to the court through the personal account of the participant in the trial; remote receipt of court summonses and other court notices in the personal account of the participant in the trial; remote receipt of court acts and their copies in electronic form in the personal account of the participant in the process; introduction of the practice of allowing persons to participate in court sessions through web conferencing that supports remote participation in court sessions in real time, without the need to appear in court by authenticating a citizen using his biometric personal data.

The development of digital technologies and their use in the administration of justice not only ensures the openness and transparency of dispute resolution (publication of electronic copies of court acts, and placement of information about the date and time of case hearings); but also significantly changes the usual forms and ways of interaction between persons involved in the case and the court, while facilitating communication when presenting procedural statements and evidence in the process, while establishing new responsibilities for participants in the trial. In the Russian legal system, the recognition of electronic interaction of dispute participants in material relations is not universal, since, for example, in judicial

and arbitral practice, the submission of screenshots of correspondence confirming the direction of reporting documents to the case file is recognised as appropriate evidence of the fulfilment of obligations to provide services—if, by agreement of the parties to a dispute, the opportunity to perform a disputed obligation by the direction of accounting documents in electronic form (per Decision of Federal Arbitration Court of the Far Eastern District, 5 August 2014, No. F03-3226/2014,Case No. A73-12821/2013); that is, letters and accompanying reports by e-mail of parties to the dispute to each other not in all cases regarded as proof of proper performance of the disputed obligations.

At the same time, these directions for digitizing the procedural actions of the participants in the process and the evidentiary activities of the parties do not look so impressive (we are talking more about material and financial insufficiency), since in this case, information technologies perform only a subsidiary function, allowing the same traditional justice to be carried out faster, easier and more accessible. Such justice cannot be called electronic in the full sense, but rather the electronic provision of legal proceedings (Reshetnyak & Smagina, 2017).

The prospect of using digital technologies in taking certain legally significant decisions appears variegated: automation of taking procedural decisions when issuing court orders; decisions on cases of violations of traffic rules; when hearing so-called "simple" criminal cases, etc. Such experience is practically absent within the system of state courts. In Great Britain and Germany, electronic writ production is limited to a limited scope of claim for monetary compensation. In the United States, an artificial intelligence system has been introduced to help judges choose the nature and extent of restrictions to be imposed on criminal defendants: the program analyses, based on a pre-determined system of points, who, remaining at large, is likely to commit a new crime or flee the jurisdiction.

At the same time, the experience of non-state jurisdictional bodies, in which the potential of new technologies and even so-called artificial intelligence is realized, is relevant. A striking example of this is the Lex Machina platform, owned by LexisNexis, which predicts the outcome of a trial, as well as the Westlaw Edge platform of Thomson Reuters. This is accomplished by automatically collecting and analyzing data posted on the Internet about trials, judges, lawyers, parties, and the cases themselves. There are striking examples of programs that use artificial intelligence based on deep learning technology to predict the results of decisions of the European Court of Human Rights and the French Court of Cassation, with an accuracy of more than 90%. The widespread use of such programs has resulted in the introduction of criminal liability in France for using the results of the analysis of judicial practice, which enables predicting specific decisions that a particular judge might make in a given case. In contrast to the United States and the United Kingdom, where judges have accepted as a fait accompli that law firms dealing with artificial intelligence in order to analyse their decisions to the smallest detail and then model their future behaviour on these results, France has decided to eradicate this. According to the new Art. 33 of the Law on the Reform

of Justice reads as follows: No personally identifiable data concerning judges or court clerks may be subject to any reuse with the purpose or result of evaluating, analyzing or predicting their actual or supposed professional practices.

The success of programs that make decisions based on the analysis of a large array of electronic information makes us think about the prospects for using the capabilities of artificial intelligence in the field of justice. The legal literature confirms that artificial intelligence can exercise the powers of an arbitrator (Bogustov et al., 2019).

It seems that automation of the process of taking a legally significant decision is possible for those categories of cases where the subject of proof and evidence confirming facts relevant to the case are determined in advance, where the function of the court, in fact, is reduced to confirmation and certification. Such cases, first of all, include cases of writ proceedings; some scientists do not consider the production of a court order to be justice at all, since there is no adversarial procedural form, as such, a judge's free discretion, and there is an easy procedure for cancelling the issued court order (Sakhnova, 2014). If a form is completed on the court's website and the requisite evidence attached to it, a decision to issue an order can be taken by the program.

At the same time, any attempts to introduce an artificial intelligence system by completely replacing the work of a judge in reviewing and resolving disputes and conflicts and evaluating the evidence presented by the parties, can hardly be supported. Law enforcement activity consists not only of a formalized component that does not presuppose a judge's discretion, but is based on a literal reading of the law, where further formalization is possible (for example, the definition of objects of proof in certain categories of cases; the principle of formal evaluation of evidence, etc.), but also of judicial discretion, which presupposes the availability of freedom of choice within the legal norms (not where the choice is between a legal and a lawless possibility; i.e. judicial arbitrariness, but where the rule of law provides for the exercise of discretion in the process of resolving a legal issue). Formalized law can be algorithmized in principle (Castelluccia & Le Métayer, 2019), the law itself is a domain of rules that can be presented through code interpretable via artificial reasoning (Ashley, 2017). Discretion, on the contrary, is formed through legal awareness, ideological norms and principles that form the basis of the legal choice of a judge. But what will be the basis of a computer algorithm? The centuries-old history of human thought is no help here, since the imperative that can serve as the basis for the right choice for any particular case has not yet been formed, and it is unlikely that it will ever be proposed (Argunov, 2018).

In general, the prospects and consistency of applying such approaches to the administration of justice repudiates the very meaning of any trial based on guarantees of the implementation of procedural rights, the legality and fairness of human rights and law enforcement activities carried out by the court and not by a machine.

CONCLUSION

1. Dispute resolution by the disputing parties themselves (independently, or with the involvement of a conciliator), as well as dispute resolution in arbitration (arbitral court), can be carried out with the use of information technologies to some extent, while the range of "depth" of ADR digitalization varies from the use of electronic means of communication only as a way to simplify and speed up the conflict settlement process to the use of artificial intelligence as a way to resolve the dispute itself on the merits. The results of scientific and technological progress and the active and positive use of digital technologies in the emergence and development of material legal relations have also led to an increase in the use of electronic technologies in resolving cases by state courts, which has become one of the most important trends in the development of legislation regulating the administration of justice.
2. Technologies that allow reaching an agreement as a result of computer analysis of the parties' positions make it necessary to recognize the equivalence of an agreement concluded as a result of Online Dispute Resolution to an agreement reached within the framework of traditional conciliation procedures. The possibility of notarizing an agreement accepted as a result of online mediation with the participation of a representative of the organisation that administers the corresponding online platform is not excluded. In future, this notarial action can be attributed to the number of actions performed, including in electronic form.
3. Taking into account the rapid development of information technologies, the high potential of using artificial intelligence to categorize disputes, analyse and generalize judicial practice, and predict court decisions with a high degree of probability, it seems inevitable that the procedural legislation should be adapted in terms of recognition and enforcement of automated arbitral decisions. If there is a clear and unambiguous voluntary agreement between the parties to conduct an online arbitration, the result of which will be an automated decision, then it is impossible to refuse enforcement on the basis of the lack of proper procedure for such a decision. However, this approach requires appropriate legal and technological guarantees. Creating an appropriate legal basis for the use of artificial intelligence and defining the boundaries of automated information processing while maintaining the state court's control over the arbitration decision, including determining the grounds for refusing its execution due to malfunctions, unauthorized external influence, etc., are necessary conditions for ensuring respect for human rights in terms of delegating the dispute resolution function to artificial intelligence. The party must be informed that the final decision is binding, while maintaining the right of access to justice, so that the case can be considered directly by a judge

within the meaning of Article 6 of the Convention for the Protection of Human Rights and Fundamental Freedoms.

4. Algorithmization and automation of the process of making a legally significant decision by a state court is possible for those categories of cases where the subject of proof and evidence confirming facts that are important for the case are determined in advance, where the function of the court, in fact, is reduced to confirmation and certification. Such cases, first of all, include cases of writ production.
5. Any attempts to implement an artificial intelligence system by completely replacing the judge's work in reviewing and resolving disputes and conflicts, and evaluating evidence submitted by the parties, cannot be supported. In general, the prospects and consistency of applying such approaches to the administration of justice repudiates the very meaning of any trial based on guarantees of the implementation of procedural rights, the legality and fairness of human rights and law enforcement activities carried out by the court, and not by a machine.

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CHAPTER 15

GUIDELINES FOR THE BEGINNING OF CIVIL PROCEEDINGS IN THE ERA OF THE FOURTH INDUSTRIAL REVOLUTION

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The research goal of this scientific research is to identify changes in civil proceedings related to the introduction of information and communication technologies that have influenced both the process itself and the legal framework on which procedural legislation is based.

It is proved that: 1) the Introduction of digital technologies makes it necessary to consolidate new legal foundations in the legislation; 2) it is Necessary to create conditions for ensuring the availability of a judicial form of protection of rights and legitimate interests, despite the introduction of digital technologies; 3) Ensuring the implementation of social guarantees, including by providing judicial protection online; 4) The need for legislative regulation of the use of digital technologies in legal proceedings; 5) the Procedure for implementing procedural actions using digital technical means needs to be changed in the direction of simplification; 6) ensuring

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 191–198.

information security is the main task for the successful implementation of the creation of digital justice in the Russian Federation.

It is concluded that digital justice is not available in the Russian Federation and is a goal for the near future. Procedural legislation provides for the possibility of performing a limited number of procedural actions using digital technologies. Foreign experience of the transition to digital technologies in legal proceedings has proved its effectiveness, this can be seen from the experience of China, which created the world's first Internet courts.

It is proved that the ongoing changes in the judicial process radically change the foundations of justice, and create new basic principles of the entire civil process.

Keywords: Digital Justice; Civil Process; Confidentiality Principle; Inclusivity Principle; Accessibility Principle; Transparency Principle; Intellectual Justice Principle; Information Security Principle; Voluntary Principle; Digitalization; Conciliation Procedures; Internet Court; China; Russian Federation.

JEL Code: K40, K41, O30

MATERIALS

The basis of the regulatory framework of the research consists of: the Civil procedure code, Arbitration procedure code of the Russian Federation, Federal law of July 18, 2019 No. 191 "On amendments to certain legislative acts of the Russian Federation," these normative acts have enabled a comparison of the process of implementation of technical means in the civil procedure of the Russian Federation and the decree of the President of the Russian Federation from May 7, 2018 No. 204 "On the national goals and strategic objectives development of the Russian Federation for the period to 2024."

The doctrinal positions that formed the theoretical basis of the study were studied thanks to scientific works devoted to the phenomena of digital (electronic, virtual, network) development that has become a part of everyday life, which is reflected in the legal consolidation: Tarakanov (2019); Gaivoronskaya and Miroshnichenko (2019).

Foreign experience in implementing digital technologies in legal proceedings was studied by the authors in the works: Du and Yu (2019); Ermakova et al. (2018); Guodong and Meng (2019); Rusakova et al. (2021).

The impact of the digital economy on the state of civil society has been reflected in the works of such authors as: Khabrieva (2018).

The procedural foundations of legal proceedings were investigated by the authors, in the works of the authors: Inshakova and Kazachenok (2018).

METHODS

The study used a method of comparative analysis, combined with dialectical and historical approaches. the authors come to an important conclusion for legal science: the introduction of digital technologies changes the basic foundations of jus-

tice, as well as methods of cause-and-effect and system analysis, which allowed us to identify the main positive and negative aspects of the use of digital technologies in the judicial practice of Russia and China. On the basis of dialectical methods of cognition, the regularities of changes in the legal framework of the procedural legislation of China are revealed and suggestions for improving the Russian legislation are formulated. Based on the results of the analysis, an assessment of the prospects for the introduction of digital justice in the Russian Federation is given.

INTRODUCTION

In the era of the fourth industrial revolution, judicial proceedings as one of the main forms of protection of the rights of citizens and organizations underwent serious changes. The main reason is the introduction of technical means in all civil proceedings, from the procedure of filing an application to the court to the stages of appealing court decisions.

The protection of rights and legitimate interests in court has recently lost its significance, the main reason being that the court form does not correspond to modern realities, when the parties need to effectively resolve a dispute. Efficiency refers to its speed, cheapness, and retention of business connections.

The main objective of the ongoing procedural reform in the Russian Federation is to increase the credibility and popularity of legal proceedings by unifying civil proceedings, introducing conciliation procedures, and expanding the use of technical means. The adoption of Federal Law No. 197 (2019) was a serious step for introducing alternative procedures in the dispute resolution process. As a result, the alternative dispute resolution procedure involving a mediator (mediation) in the procedural codes has become one of the legislative conciliation procedures (Inshakova & Kazachenok, 2018).

The introduction of digital technologies in the judicial process is one of the tasks of the reform, as it should simplify and make available the judicial form of protection of the right, where the court is located at a great distance from localities.

Having analyzed the Russian procedural legislation, it is quite difficult to use technical means, since this requires obtaining special technical means, and this procedure is very difficult.

In this regard, the legal basis of all legal proceedings is changing, new principles are emerging on which the entire process is based, as well as ways to resolve disputes.

RESULTS

The main tasks of Informatization of the judicial system are to ensure information rights of citizens and organizations, transparency and openness of legal proceedings, and access to information about the activities of courts.

The implementation of these tasks should not contradict the General principles of the rule of law, the most important of which is the principle of legality, that is, the exact observance and application of laws. It is planned to radically change all

legal proceedings, to build it on new principles, namely: information openness and accessibility for citizens and organizations; efficiency, reliability and timeliness; ensuring information security; non-interference in the process of justice; creating a single information space, and others (Inshakova et al., 2019).

In recent years, the judicial form of protection of rights is losing its importance, due to the complexity, cost and duration of the process. Participants of civil turnover already at the time of conclusion of various types of transactions, where it is legally possible, choose other ways to protect the right: arbitration (arbitration proceedings), mediation and other methods.

The only possible mechanism for increasing the popularity of the judicial method is the active introduction of high technologies in the process, the transition to remote services, ensuring accessibility for citizens and organizations, and this leads to a change in the basic foundations of justice, namely the principles of legal proceedings (Khabrieva, 2018). The relevance of this process is determined by the need in a modern digital society to create new opportunities for the realization of their rights, including the right to judicial protection, to determine legal guarantees, and to preserve social equality in society (Gaivoronskaya & Miroshnichenko, 2019).

Principle of Confidentiality. The new modern principles are enshrined in law when applying to conciliation procedures at present. One of the innovations is the principle of confidentiality, which means that the extent to which information about the progress of this procedure is provided depending on the parties. As a General rule, information received during reconciliation is confidential, so far, it cannot be disclosed without the written consent of the parties. Meanwhile, whether this dispute will be the subject of judicial proceedings in the future, it is prohibited to disclose any statements and confessions of the parties, the terms on which the party is ready to conclude a settlement agreement, information contained in documents submitted during judicial reconciliation. Moreover, the extent of disclosure of information in a case depends on the parties to resolve the dispute. All information received on various media is also not subject to disclosure without the written consent of the parties. As a General rule, information obtained during the reconciliation process can be used for research, educational and informational purposes on the condition of anonymity of the parties. To achieve successful implementation of this procedure, it is necessary to have a mutual desire of the parties to resolve the dispute (Ermakova et al., 2018).

One of the important conditions for judicial reconciliation is the observance of the principle of cooperation, which involves the active participation of each of the parties in the peaceful settlement of the dispute, as well as involves active interaction with all participants in this procedure. Conciliation procedures are conducted in the form of negotiations, but they must be fruitful, productive and qualitative in nature, aimed at resolving the dispute. the main task of the judicial conciliator is to create a favorable atmosphere based on trust and respect (Rusakova et al., 2021).

Voluntary Principle. The success of conciliation procedures depends on the implementation of the principle of voluntariness, which means that the parties apply to these procedures on the basis of mutual consent similarly, a judicial concili-

ator, mediator, or any other third party who interacts with the parties is selected. The scope of the dispute, the course of this procedure, as well as the result of its resolution depends on the will of the parties.

These principles were enshrined in separate laws regulating alternative ways of resolving disputes. they are not typical for legal proceedings and are used only in part of conciliation procedures.

Legal proceedings are characterized by other principles on which the entire civil process is based: legality, dispositivity, competition, equality of the parties, transparency, and others.

Principle of Transparency. The creation of digital justice will require the establishment of new principles that are not yet enshrined in procedural legislation. One of the fundamental principles is the transparency of the judicial process, which means that all participants in the process should be able to track the progress of the case in real time. Moreover, this principle assumes the ability to determine the further movement of the case and even the possible decision on the case.

Principle of Openness. This principle is directly related to the principle of openness, if a dispute is considered in open mode, then everyone can get acquainted with its progress in the flesh before connecting to a video conference when the trial is underway.

In addition, you can read the rules of online litigation and methods of working online.

The Principle of Intellectual Justice. Instead of the existing principle of justice in legal proceedings with the introduction of digital technologies, a new principle of intellectual justice will appear, when artificial intelligence technology will be used to make the process fair and justice more efficient and convenient. With the use of high technologies, the "human factor" will be minimized, but modern society is not yet ready for the fact that even the simplest cases will be decided not by a judge, but by a computer program.

However, many representatives of the Russian judicial community, due to the workload of insignificant cases, express their opinion that it is simply necessary to introduce digital technologies in cases with small claims or in the case of undisputed claims, when a decision can be made automatically on the basis of the submitted documents.

China is the first country in the world to create Internet courts, for the creation of which special explanations of the Supreme people's court were adopted on August 18, 2017, related to the production of cases that arose on the Internet. Such Internet courts have the competence to consider civil and administrative cases as a court of first instance at the level of the city court. The Beijing Internet court, founded on September 9, 2018 in accordance with the main idea of "online case heard online," has built and uses an online e-court platform, in which all procedural actions occur automatically using digital technologies: identification of the person, verification of procedural documents and their distribution on the platform, risk assessment of the trial, electronic signature, and others (Guodong & Meng, 2019).

According to statistics, Internet courts have proven their effectiveness in comparing the number of cases received and reviewed.

The Principle of Inclusiveness. As mentioned above, it is necessary to highlight another socially—oriented principle-the principle of inclusiveness, which means ensuring equal conditions and access to judicial protection in the course of proceedings in Internet courts, for people with limited mobility and without disabilities, as well as other segments of the population, by performing all procedural actions online. Thus, judicial protection of rights and legitimate interests is carried out without leaving the house. This is achieved by creating a special platform for online dispute resolution; in the framework of which Internet technologies are used; in order to make several actions possible to carry out an online trial. This includes filing a complaint, making a statement of claim, managing the process, conducting mediation, presenting evidence, conducting direct and/or cross-examination, pre-trial preparation of the case, trial, making a decision and enforcing it, and other actions. Through the Internet, the parties directly present their claims to each other, as well as exercise other rights, for example, submit petitions.

The Principle of Information Security. The policy of openness of legal proceedings to the public should guarantee information security to the participants of the process, so we can highlight a new principle of ensuring information security (Shartava et al., 2019). According to which it is necessary to develop mechanisms for creating a single secure information space, taking measures to prevent any cyber-attacks or unauthorized access to information on ships' servers, maintaining a balance of interests between all interested parties, by searching for technical means of protection (Frolova et al., 2018).

Court databases should be well protected from leakage of personal data of participants in the process, changes in information and its dissemination. The creation of a single information space is now simply necessary and all the necessary conditions exist for this, which do not contradict Russian legislation.

The emergence of new principles of justice makes it necessary to create a new classification depending on the dispute resolution procedure: judicial dispute resolution and one of the conciliation procedures, as well as online procedure.

Currently, it is not possible to apply the same principles for all dispute resolution methods, since they have different goals and objectives. Conciliation procedures are aimed at preserving the partnership of the parties, and do not set a mandatory resolution of the dispute, and the task of the judicial process is to make a court decision binding on all persons involved in the case. With regard to conciliation procedures, the conclusion of an agreement depends to a large extent on the parties, and in the framework of judicial proceedings, the court decision has a coercive force, hence the different principles of implementation.

Russian procedural legislation is being reformed. this is primarily due to the gradual unification of civil, arbitration and administrative processes, new ways of resolving disputes are being fixed, and digital technologies are being introduced.

CONCLUSION

The implementation of these principles should assist to solve the main tasks: to increase the trust of citizens in the Russian judicial system, to increase its efficiency, and to actively introduce new modern information and communication technologies.

Many of the goals and objectives set for the legislator have not found their way into legislation. this is the creation of digital justice.

According to the Order from 26 November 2015, the Judicial Department at the Supreme court of the Russian Federation, e-justice is the method and form of implementation of the statutory proceedings, based on the use of information technologies in courts' activities, including interaction of the courts, individuals and legal entities in electronic (digital) form. This definition contradicts the definition of justice, since justice is the activity of judicial bodies carried out in a procedural form, focused primarily on the protection of the rights and legitimate interests of citizens and organizations, that is, it is not limited to any individual actions.

It should be noted that in the Russian Federation there is no digital (electronic justice), but only the possibility to carry out certain procedural actions using digital technologies. The list of these actions is also quite narrow, since there is no single developed concept for understanding digital justice.

The development of the legal framework for digital justice is a guarantee of its implementation, compliance with and protection of the rights and legitimate interests of participants in the process, and a guarantee of the right to judicial protection in the era of the 4th industrial revolution.

The adopted concept of information policy of the judicial system for 2020–2030 establishes the necessary foundations for the emergence and implementation of digital justice, and its successful implementation contributes to increasing the level of confidence of citizens and organizations in judicial proceedings, through the introduction of modern information and communication technologies, improving the technical equipment of courts, the work of court websites and other information systems of state bodies and institutions.

In the Russian Federation as part of the implementation of the Decree of the President of the Russian Federation No. 204 (2020), Russian President Vladimir Putin in his address to the Federal Assembly, almost every subject, drew attention to digital technology, up to the guarantee provision to all citizens on the territory of Russia free of the Internet in 2020.

This attention of the state to this area creates all the necessary conditions for the active introduction of digital technologies in all spheres of public life of citizens, perhaps in the near future we can talk about the emergence of digital justice in the Russian Federation.

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CHAPTER 16

REGULATION OF THE TURNOVER OF INTELLECTUAL PROPERTY ON THE INTERNET

Blockchain-Protection of the Rights of Authors

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In this chapter of the monograph, the authors investigated the modern regulation of the intellectual property turnover in the information and telecommunication network of the Internet, focusing on protecting authors rights of using distributed registry technology (blockchain).

Intellectual property gets new life with the development of the Internet. Copyright objects have moved to a new environment and faced with new obstacles. The problems mainly exist due to the Internet is a little explored and poorly regulated area of public relations. It is even debatable whether the law of which state is applicable in a particular dispute between entities from different countries. The limited possibilities of real copyright protection on the Internet keep many authors from publishing the materials of their works, which do not allow them to be presented to the general public. Nevertheless, Internet piracy has become a problem for most authors and is booming. Without government intervention and clear legal regulation, the Internet

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 199–208.

is becoming not the method of developing the turnover of intellectual objects, but an anti-creative restriction for authors. Based on the materialistic worldview, the universal method of historical materialism, the authors used general scientific and particular scientific methods for research, which allowed to implement a systematic approach to the subject of study.

Particular attention is paid to the storage of copyright originals and the use of electronic remote way by the objects of intellectual property. For the successful functioning and further improvement of the circulation of objects of intellectual property on the Internet, it is relevant and useful to disclose existing problems and the possibilities of protecting the rights of authors using distributed registry technology (blockchain).

It is proposed to create a regulatory framework for the use of technology of a distributed registry (blockchain) and recognition by state organs of legally significant actions performed by users of the registry. It is necessary to conclude international agreements for the stable functioning of the objects turnover of the intellectual property on the Internet at the inter-jurisdictional level. In this case, it is required to regulate the implementation of smart contracts; ensuring safe storage and use of data, as well as methods and boundaries of participation of state organs in the procedure for entering data into a distributed registry and their use by interested parties.

Keywords: Intellectual Property, Turnover Objects, Distributed Registry, Copyrights, Electronic-Digital Services, Internet, Smart Contracts, Blockchain.

JEL Code: K10, K15, K2, K120, K150.

MATERIALS

The scientific development of the material was carried out on the basis of a set of regulatory and doctrinal sources. The chapter uses federal legislation and other regulatory acts of the Russian Federation. We studied the Civil Code of the Russian Federation (Part I) (State Duma of the Russian Federation, 1994), Federal Law of November 24, 2014 No. 364-FZ "On Amendments to the Federal Law "On Information, Information Technologies and the Protection of Information "and the Civil Procedure Code of the Russian Federation" (Council of the Federation, 2014), "Federal Law of July 2, 2013 No. 187-FZ "On Amending Certain Legislative Acts of the Russian Federation on the Protection of Intellectual Rights in Information and Telecommunication Networks" (Council of the Federation, 2013), Draft Federal Law "On Amendments to the Civil Code of the Russian Federation regarding Improving the Turnover of Intellectual Rights in Information and Telecommunication Networks" of 2019 (Research Center for Private Law named after S.S. Alekseev under the President of the Russian Federation, 2019), Judicial Acts of the Courts of the Subjects of the Russian Federation (Mosgorsud, 2015).

Doctrinal sources are represented by scientific publications of domestic jurists and economists, including: Goncharov A.I., Dolinskaya V.V., Inshakova A.O., Kazachenok O.P., Sevastyanov M.V., Tarakanov V.V.

METHODS

The content of this chapter of the monograph has been developed on the basis of a materialistic world view and the universal scientific method of historical materialism. The general scientific methods of cognition are applied: the dialectic, hypothetical-deductive method, generalization, induction and deduction, analysis and synthesis, an empirical description. The study also used private scientific methods: dogmatic, comparative legal, hermeneutic, structural and functional and etc.

INTRODUCTION

Many areas of modern public relations, including the turnover of intellectual property, are implemented using the Internet. The protection of the authors rights due to the existence of the specified information and telecommunication network is of particular importance. The Internet has become an integral part of almost every person's life. Here, correspondence is carried out, arrays of information are stored, educational services are provided, data is exchanged, goods and services are advertised, deals are signed, etc. According to our estimates, at least 2 billion people are currently Internet users, while the number of such users is increasing daily. Internet accessibility for corporations and individuals makes them both potential buyers and potential sellers. An increase in the number of these entities gives a gigantic effect for the growth of both consumption and production. According to colleagues, for example, electronic auctions account for about 86% of the total volume of public procurement procedures in the Russian contract system. Obviously, the participation in state online tenders for deliveries and contracts significantly expands the possibilities of modern business (Tarakanov et al., 2019).

No country in the world has codified legislation regulating legal relations on the Internet. There are only certain legal acts regulating special issues of network functioning. At the international level, there are also no agreements that could fully regulate relations on the Internet. On the example of relations in the global information and telecommunications network, a situation is observed when emerging business relations significantly outpace their legal regulation (Inshakova et al., 2017a, 2018).

The problem of compliance with copyright and related rights on the Internet is relevant and acute for modern Russia. Even if there is a new electronic and remote way of their circulation for copyright objects, this does not reduce the need for their legal protection. Copyright protection measures remain unchanged due to the existence of the Internet. But it's very problematic to practically implement them by conventional means. The Internet provides many opportunities for the illegal use of objects of the intellectual property.

RESULTS

Ideally, it is believed that all users who post any objects of the intellectual property rights on the Internet should only do so with the written consent of the official copyright holders to publish, use and reproduce these works. Unfortunately, in practice, the legal procedure is followed fairly rarely. Widespread on the Internet is a situation where books, articles or photographs are copied from various sources and are placed without the consent of the author. In such cases, the link to the author is either completely absent, or a completely different author is indicated, which is illegal. Freedom of action and information technology, make it possible to download and easily modify literary works on the Internet, distribute audio or video materials, etc. The so-called "Anti-Piracy Law" introduced a system for blocking sites with pirated content in Russia. However, the technical capabilities of the Internet make it possible to create "mirrors" of sites, to visit illegal sites using a system of blocking bypass means, and people who host pirated content are constantly creating new Internet sites, adding new and new copyright objects to it (Council of the Federation, 2014).

The Civil Code of the Russian Federation provides protection for both published and non-published works (Part 3 of Article 1259 of the Civil Code of the Russian Federation). A condition is the expression of the author's intention in any objective form (written, oral, graphic, in the form of audio or video recordings, etc.). The publication of a work on the Internet is its objective consolidation, since the network is a global database. Consequently, works published on the Internet are protected by copyright, despite the fact that this is not expressly specified in the law (Inshakova et al., 2017b).

Firstly, one of the reasons for the deplorable situation regarding copyright compliance on the Internet is the misconception that users have. People believe that works presented in the public domain are not protected by law. For example, some media outlets use photos from open sources without entering into any agreements with the author. But even the work exhibited by the author is not deprived of legal protection. Indeed, according to the law, "the absence of a ban is not consent (permission)" (State Duma of the Russian Federation, 1994). Secondly, an important reason for copyright infringement by Internet users is the reluctance of people to spend money on what you can get for free. At the same time, some categories of the population do not really have the financial ability to purchase music and films legally due to low incomes.

Considering the rules in the Russian legislation governing the protection of intellectual property, attention should be focused on the fourth part of the State Duma of the Russian Federation (1994) provide for the protection of intellectual and exclusive rights. However, to apply these articles of the law to relations on the Internet, their modernization or additional legal mechanisms are necessary. In domestic judicial practice, copyright protection on the Internet is carried out according to the norms of the Civil Code of the Russian Federation. In particular, in the Decision of the Moscow City Court in case No. 3-726 (Mosgorsud, 2015).

when the claim for the protection of exclusive rights to intellectual property results posted on the information and telecommunications network is satisfied (Decision of the Moscow City Court in case No. 3-726 / 2015). However, this practice does not provide a clear understanding of how to protect intellectual property on the Internet.

The government authorities, together with the scientific and expert community, have taken certain steps to address copyright compliance issues on the Internet.

The first area is the establishment in the territory of the Russian Federation of pre-trial restriction of access to copyright objects posted on the Internet in violation of the rights of the author. From August 1, 2013, such a procedure exists in relation to film and television films (Council of the Federation, 2013). Taking into account the relative effectiveness of this mechanism, the legislator introduced the same mechanisms in relation to other objects of copyright and related rights, with the exception of photographic works and works obtained by methods similar to photography. For this, Federal Law No. 364-FZ (Council of the Federation, 2014) "On Amending the Federal Law "On Information, Information Technologies and Information Protection" and the Civil Procedure Code of the Russian Federation" was adopted (Federal Law of November 24, 2014 No. 364-FZ).

The second area of legislative work is related to the development of a fundamentally new approach to the fight against piracy in information and telecommunication networks, called the "global license" (Research Center for Private Law named after S.S. Alekseev under the President of the Russian Federation, 2019). The meaning of this initiative is as follows: the introduction on the territory of the Russian Federation of state accreditation in the field of use of copyright and related rights in the digital environment ("the right to bring to the public"). In practice, the implementation of the idea is that Internet users must make a certain payment, included in the cost of Internet-traffic, to their telecom operator to gain access to the content. Through this operator, money should be transferred to an accredited organization for managing copyright and related rights for the subsequent transfer of these funds as a reward for the use of objects of the intellectual property to their authors.

At first glance, such system seems fair and resolves many of the problems that exist today, but this mechanism also has significant drawbacks.

Firstly, the "global license" implies a mandatory fee for internet access. But the fact that providing the subscriber with access to the network is not a service of access to intellectual property is ignored, and copyright holders and related rights have nothing to do with relations associated with communication services.

Secondly, the technical side has not been fully worked out in the mechanism of the "global license," namely, the implementation of monitoring and analysis of Internet traffic, its content to determine the amount of remuneration due to a particular author, depending on the frequency and amount of use of his work on the network. In practice, this is possible only with the use of a special software and hardware complex that works with DPI technology (Deep Packet Inspection),

which should be used by each telecom operator. The technical and other efforts required to ensure the operation of this complex will entail additional costs, which, in turn, will increase the cost of Internet-traffic. This will adversely affect the ability of poor people to access the Internet.

Thirdly, the introduction of a "global license" will violate the obligations assumed by Russia upon joining the World Trade Organization (paragraph 1218 of the Report of the working group on Russia's accession to the WTO). Since the granting of the right to collect and distribute payments by an authorized accredited organization is a violation of the obligations to refuse the non-contractual management of intellectual rights accepted by Russia upon entry into the WTO.

The fourth drawback of this concept is that such a procedure would violate the rights of Internet users. The fee charged for the use of objects of the intellectual property is assumed by default. But if a citizen does not use these objects, it turns out that he pays for what he does not actually receive. This is a violation the basics of civil law (Inshakova et al., 2018). In addition, experts who have explored the concept of a "global license" note that this system cannot solve the problem of piracy, as the legislative initiative does not offer the introduction of any additional liability with respect to owners of Internet-servers.

The problem of protecting the rights of authors of the Internet is an acute and urgent problem not only in Russia, not a single national rule of law at the moment can ensure their effective protection. In-depth study of the issue not only from a legal, but also from a technical point of view allows us to argue that it is impossible to provide the authors with absolute protection in the information and telecommunication network. There are no procedures that would not allow you to copy a book or movie and put them on the web. Sites with pirated content are blocked, and their owners create new ones and fill them with the same files stored on removable carriers. Unable to track ordinary Internet-users that downloading illegal music. If that were possible, given the scale of piracy in the music sphere, it's hard to imagine what the consequences would be. Nevertheless, the state is called upon to combat illegal actions as far as possible. Despite the difficulties that the circulation of intellectual property objects encounters on the Internet (for example, after publishing a work on the network, it is very difficult for the author to control further actions carried out with the result of his creation), it is necessary to develop this problem and look for all possible ways to solve it. In particular, to solve the problems caused by the development of technologies, the latest information technologies should be used, which will ensure effective legal regulation.

The team of colleagues came to the conclusion that, despite the specifics of the Internet, the intellectual property objects appearing in it do not have features that allow them to be distinguished into another legal system. Colleagues argue that modern jurisprudence is capable of protecting intellectual property in the virtual reality of the Internet. In addition, decentralized data storage, exchange and processing technologies, the so-called blockchain, came to the aid of copyright holders (Kalinina et al., 2019). In 2018, for the first time in Russia, in the Unified

Depository of the results of intellectual activity, copyright was registered using the blockchain. Deposits of authorship are carried out without the participation of third parties and are not limited by geographical boundaries. The distributed registry can store data on the output parameters of the intellectual property and the creative result itself (digital fingerprint). The authenticity of the work is confirmed by a cryptographic guarantee (digital printing and signature). Certification of documents uploaded to the distributed registry is carried out, so the question is solved, for example, about the authenticity of authorship of photos from stock stores.

The innovative nature of blockchain technology lies in the collective control, which ensures the integrity of a distributed registry and eliminates the need for a central regulatory authority. Transactions are verified and confirmed by all computers on which the blockchain is stored. This technology is considered "virtually unbreakable" to change any information in the grid of blocks, a cyber attack should be directed to all copies of the registry at the same time. As a general rule, the blockchain is an open and anonymous network, while there are varieties of it, access to the administration of a distributed registry in which is due to an authorization check.

The blockchain has already found application in the field of protecting and protecting the rights to brands, in the field of marketing and attracting customers, since it allows you to create a reliable archive of information blocks with time stamps, such a chain cannot be changed externally. For example, the blockchain is used by Mercedes-Benz to track components and spare parts in the supply chain. This allows you to control the quality of the products received and to avoid litigation over violations of the terms of supply contracts.

The legal side of using the blockchain includes many potential barriers to its official use. Questions arise primarily in determining the applicable law and jurisdiction. However, for industries which actively use intellectual property, distributed register technology is promising for protecting the results of creative activity, for example, when proving authorship in court. The positive influence of the blockchain also lies in the acceleration of many processes in copyright relations: confirmation of authorship and origin of the object; registration of intellectual property rights; control and monitoring of intellectual property rights; providing evidence of first use in commercial activities; development and implementation of agreements in the field of intellectual property; digital rights management, etc. The creation of "smart registers" by the departments that regulate intellectual property relations is also promising. These offices could create unchangeable records of a specific event in relation to rights to an intellectual property object, for example, on licensing a design, trademark or patent, assignment of rights, etc. This technology would simplify the layout, storage and provision of relevant evidence. The ability to track all actions performed with a particular right seems useful to optimize the audit of intellectual property rights. It would also facilitate the simplification of legal audits in deals related to objects of the intellectual property.

At the same time, blockchain is promising in the field of unregistered intellectual property rights, since according to the Berne Convention for the Protection of Literary and Artistic Works of September 9, 1886 (as amended in 1971), copyright in many jurisdictions is not subject to mandatory registration. The procedure for placing data on such rights in the information chains of blocks can provide evidence of the creation, use and compliance of the results of creative activities with certain requirements (such as, for example, originality). When an original sample or work is uploaded to a distributed registry, along with information about its author, a time-stamped record will be created, which will serve as a reliable proof of priority that cannot be falsified or changed.

In our opinion, the blockchain technology should be used in combination with smart contracts, since the technology allows for the storage, execution and monitoring of such contracts. They may be of interest in terms of digital rights management and other deals related to objects of the intellectual property. Smart contracts can be used when concluding and executing agreements concluded in the field of intellectual property, for example, for transferring payments for the right to use an object of copyright or a mean of individualization.

If there was a distributed registry with data on owners, legal licensees, etc., each link in the supply chain, including consumers and customs authorities, would be able to verify the authenticity of a product to exclude fakes. Such distributed registries allow you to check the origin of the goods (place and time of its production, data on the manufacturer and production process, sources of raw materials, etc.). The use of microchip blockchain tags, protected labels and other electronically scanned tags on products is one of the effective ways to use the blockchain in the fight against counterfeit products (Inshakova et al., 2020).

CONCLUSION

When infringing on his legal rights, the author may be faced with a situation in which it will be difficult for him to prove his authorship. Saving a work on the blockchain is applicable for fixing legal facts important to authors. There are several similar Internet-services: Proof of Existence, Emernotar, Depositor. They have a hash of the file with the work, as a result of which the hash (a unique fingerprint of the file) is entered into the information chain. The resulting record contains timestamps and is not subject to further change. In the event of a dispute, the hash operation is repeated, the result is compared with a hash in the blockchain. If there is a match, a guarantee is realized that this file was entered into the registry at a specific time in the past.

The procedure for entering data on a particular work in the blockchain is comparable either to registration of rights or to deposit. The first is controversial, since copyright is not subject to registration. At the same time, state authorities do not carry out the procedure for entering data into the blockchain. More similarities we see with deposit. Compared with the traditional procedure, the blockchain

significantly simplifies the fixation of the fact of authorship, reduces its cost and implementation time.

Using blockchain to get copyright confirmation is becoming commonplace, but not all state organs, judicial organs and legal entities will be able to perceive such sources of information as sufficient proof of authorship, as technology is still evolving and has no legitimate status. The legal status of the operators of distributed registries is not clear, there are questions about their responsibility for the accuracy of the information received from these registries, etc.

The Skolkovo Foundation's initiative in cooperation with the World Intellectual Property Society and other organizations for the establishment of the IP-Chain Association deserves support, the target of which is to create standards, technologies and tools for the interaction of intellectual property market participants in the digital environment. The Association announced the technological embodiment of the blockchain idea in copyright, namely, the IP-hub platform. On it, copyright holders will be able to post works and establish conditions for their use. The platform is a specific store, a kind of fair, for deals in the sphere of intellectual property. In this way, the blockchain will allow authors and consumers to make their contacts transparent, and interested parties to find reliable information on the results of creative activity, eliminate unnecessary intermediaries and reduce financial costs while increasing the intensity of turnover of objects of the intellectual property. It is necessary to create a regulatory framework for the use of technology of a distributed registry (blockchain) and the recognition by state organs of legally significant user actions in a distributed registry. It is also necessary to sign international agreements for the stable blockchain-functioning of the turnover objects of the intellectual property in the Internet at the inter-jurisdictional level.

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CHAPTER 17

PREVENTIVE AND PROACTIVE MEASURES TO PROTECT THE RIGHTS OF CONSUMERS OF ENTERTAINMENT SERVICES

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In this Chapter of the monograph, the authors disclose preventive and proactive measures to protect the rights of consumers of entertainment services with the use of quest rooms in a climate of neoindustrialization.

The proactive prevention of the quest industry issues raised by the authors is necessary and realizable using a polysubjective jurisdictional blockchain based on the National Association of Quest Industry Participants. Registration of a personal account for each member of the Association with a full indication of their name, legal address, head in charge, and bank details will make it possible to easily identify the organizer of the quest for purposes of appealing to competent authorities for the protection of consumer rights. In our opinion, the indication of locations and scenarios of quests with ranking by anxiety level and age limits set by experts will also contribute to the transparency of quests. The authors relied on the materialistic world view and the general scientific method of historical materialism; in their research,

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 209–220.

they used general scientific and specific scientific methods, which allowed them to implement a comprehensive approach to the subject of research.

Special emphasis is placed on the issues of consumer right protection—a weak spot in the attitude of society to the compensated provision of quest entertainment service. For the successful functioning and further improvement of quest services, it is relevant and useful to reveal the existing problems and opportunities of protecting the rights of consumers of these services through the use of the distributed ledger technology (blockchain technology).

The rapidly growing branch of quest services of the entertainment industry goes under the radar of legislative authorities, which is wrong. In a climate of neo-industrialization, preventive and proactive measures are needed to protect the rights of consumers of entertainment services which involve the use of quest rooms, for the purpose of forming and establishing this new segment of social relations and business activities in an inherently conflict-free way.

Keywords: Services, Entertainment, Quest, Blockchain, Contract, Consumer Rights, Electronic Digital Services, Internet, Proactive Prevention

JEL codes: K10, K15, K2, K120, K150

INTRODUCTION

Neoindustrial transformations of domestic economy sectors are taking place before our eyes, and the entertainment industry is a vivid example of it (Tarakanov et al., 2019). Over the recent five years, quests have become the most rapidly developing area of the offline entertainment industry, in which real people are actually involved. This public relation has been regulated as the compensated provision of services for a wide range of consumers. The protection of rights of consumers of these services is a quite relevant issue, since the quest industry itself is not regulated by any special legislation.

This entertainment format was formed in the United States approximately in 2006 (Smirnova, 2019). We believe that emergence of quest industry as the business in Russia dates back to 2014, when quest rooms began to spread rapidly, gradually covering the entire territory of the Russian Federation. Thus, for example, according to expert E. Oshchepkov, the quest market in St. Petersburg grew 10 times for 2015. 5–6 organizations with 1–2 quests were opened monthly. In 2016, there were 58 quest organizing companies and approximately 190 versions of quests in Saint Petersburg (https://questguild.ru). In 2017, the number of quest rooms in Saint Petersburg already exceeded 200, while in Moscow it exceeded 600 (Zenovina, 2019).

MATERIALS

The material has been scientifically elaborated on the basis of a set of regulatory, doctrinal and other sources. The authors of the paper used the federal legislation

and other statutory regulations of the Russian Federation. The authors analyzed the The Civil Code of the Russian Federation (Part I) (The State Duma, 1994); GOST 1.0-92 (Electronic fund of legal and regulatory technical information, 1993); GOST 1.2- 2009 (Electronic fund of legal and regulatory technical information, 2010); Law of the Russian Federation No. 2300-I of 07.02.1992 "Concerning the Protection of Consumer Rights" (Consultant, 1992); "Technical Regulations on Safety of Buildings and Structures" (Council of the Federation, 2009a); "Technical Regulations on Fire Safety Requirements (Council of the Federation, 2009b); "On Sanitary and Epidemiologic Well-Being of the Population" (Council of the Federation, 2009c); Resolution of the Plenum of the Supreme Court of the Russian Federation No. 25 of 23.06.2015 "On Application by the Courts of Some of the Provisions of Section I of Part 1 of the Civil Code of the Russian Federation" (Plenum of The Supreme Court of The Russian Federation, 2015).

Doctrinal sources are represented by academic papers of domestic legists and economists, including: Goncharov, A.I., Dolinskaya, V. V., Zenovina, V., Inshakova, A. O., Sevostyanov, M. V., Smirnova, E., Tarakanov, V. V., Fridman, V.E. et al.

METHODS

The content of this Chapter of the monograph has been elaborated based on the materialistic world view and the general scientific method of historical materialism. The general scientific methods of cognition have been used: dialectic method, hypothetico-deductive method, generalization, induction and deduction, analysis and synthesis, and empirical description. In addition, specific scientific methods were used in the research: dogmatic, comparative legal, hermeneutic, structural and functional, etc.

RESULTS

The quest branch from the perspective of a business model is a highly competitive market in the small business sector; most often, quest rooms are pet projects of individual entrepreneurs and small limited liability companies with minimum charter capital, or of the same persons purchasing the right for the organization of quests under the well-known brand through the conclusion of the franchise contract, sometimes just independent business entities. Due to the decentralization of the industry, there is no methodological and organizational unity of quest industry in Russia. In this regard, the issue of regulation and self-regulation of the quest branch has been recently discussed at the state level (National Association of Quest Industry Participants, 2019).

In particular, according to the chairman of the Moscow City Duma A. Shaposhnikov, firstly, the state should regulate the industry by means of regulation and careful monitoring. Then we can talk about the need to license this type of activity, adopt special norms and regulations with a view to ensuring safety of consumers of such services. The second alternative is self-regulation of the indus-

try. According to many lawyers, the norms of Federal Laws "Concerning the Protection of Consumer Rights," "Technical Regulations on Safety of Buildings and Structures," "Technical Regulations on Fire Safety Requirements," "On Sanitary and Epidemiologic Well-Being of the Population" create a sufficient legal framework for ensuring consumer safety,—of course, if these laws are strictly observed. However, the problem is that entrepreneurs neglect the norms established by laws. Then we can actually consider the option in which the industry is in control of the activities of the quest organizing companies (Moscow City Council, 2019).

In our opinion, licensing in this industry is a meaningless and harmful decision for both the industry and the state. The imposition of new powers on the state, which will inevitably entail heavy costs from the budget, on the one hand, and will "nightmarize the business," on the other hand, is less preferable than self-regulation. We put forward the following arguments in favor of self-regulation of quest industry: 1) regulation of the mature market is the responsibility of experts based on already existing foreign experience, in contrast to speculatist officials; 2) civil society is developing, legal consciousness of society is growing, the activity of participants of quest industry is promoted; 3) the stability of the industry is ensured, the industry is protected from abuse of power and other abuses; 4) there is no institutional load on the state apparatus and cost loading on the budget.

In order to express and protect the interests of the Russian quest community in February 2017, the National Association of Quest Industry Participants (NAQIP) was established. Based on an analysis of information presented at the official website of Association, it follows that the membership in this Association is voluntary. The basic entry membership fee in the Association is 1000 rubles per month; the amount of annual Association membership fee is determined by the decision of the general meeting of the association members depending on the approved package of services (Paragraphs 5.1–5.2 of the membership contract) (https://www.ассоциацияквесторовроссии.РФ). Hence, it follows that not all the participants of the quest market join the abovementioned organization (National Association of Quest Industry Participants, 2021).

The main efforts in the activities of the association are aimed at economic support of quest industry participants, consulting on marketing, analytics, promotion of services in a competitive market. Legal consultations are sporadic and mainly deal with safety issues. The only universal document which was drawn up for the quest organizers is the standard of safety which is based on requirements of standards GOST 1.0-92 and GOST 1.2-2009, but then, it is non-regulatory, it carries no legal weight (in accordance with Paragraph 2 of Section 1 of the Standard) (https://www.ассоциацияквесторовроссии.РФ).

In our opinion, the National Association should pay attention to a number of significant legal issues, the emphasis on the solution of which should be expressed in standardized guidance papers, as well as technical recommendations. One of the most important problems for the consumer is the specifics of conclusion of the contract between the participant and the quest organizer. As a matter of practice,

two main types of contracts in the field of organization of entertaining quests have been developed.

We include contracts that are referred to as "public offer contract," "public offer," "offer contract," "standard form contract," as well as "service contract," with the first type, for example: LLC "Boo Quest" (http://booquest.ru/dogovor-oferty), LLC "Nora Krolika" (https://norakrolika.ru/offer/), LLC "ZaSov" (http://www.za-sov.ru/akcii/oferta/), IE Ilova, O.A. (http://goodzone30.ru/wp-content/uploads/2019/02/Contract.pdf). Such type of contracts is sometimes executed in practice in the form of a single publicly available document. This contract belongs to the category of public bilaterally binding contract. The question of whether this contract is real or consensual can be answered depending on the content of the offer. In the analysis of empirical evidence, we have found that organizers associate the moment of conclusion of public offer contract with the following conditions: 1) since the moment of submission of quest reservation application (https://karantinum.ru/oferta/). In our opinion, it is illogical that the moment of conclusion of the contract is not associated with the acceptance of reservation application by the organizer; 2) from the moment of payment for the quest order (https://quest-lab.ru/agreement/); 3) from the moment of participation in the game (http://booquest.ru/dogovor-oferty). This being said, offer contracts often provide for an alternative series of activities providing evidence of acceptance. Now we shall turn to the algorithm for the conclusion of the contract between the quest organizer and the quest participant, which has been fully formed as a custom. Its most common view is typical for all participants of the quest entertainment market and is presented below.

1. The organizer places for public access the information about entertainment programs with a brief description, photographs of the environment (pursuing publicity objectives, but not disclosing the details of playthrough mechanism), with the indication of age limits, duration of the game, the so-called "fear scale," the number of people and the cost of the game. The placement for public access implies publication of this information at the official website of the quest organizer, in groups on social networks, as well as posting information on websites serving as quest aggregators. Quest aggregators accumulate information about all entertaining gaming events with the use of quest rooms in a certain territory (often in the territory of a single settlement), as well as contact telephone numbers and email addresses of the quest organizer. Furthermore, the above websites post the electronic form of reservation, which contains information about the name of the game, its date, time, cost and current status (whether the specified time period is unoccupied or already reserved).
2. The customer, having read publicly available information, sends the reservation application to the quest organizer by means of the electronic form of application or over the phone.

3. The quest organizer shall confirm reservation, at the sole discretion of the organizer—either on a partial prepayment basis by bank transfer or without it. At this stage, the parties arrive at agreement on all fundamental terms (fundamental terms of the contract for the provision of quest entertainment services shall be understood to mean the term of the subject matter). Moreover, at this moment, the quest organizer fixes the time point at which the participant must present himself/herself in order to conclude the contract in writing in the form of a single document. Experience has shown that usually this time shall not be later than 15 minutes before the start of the quest game.
4. At the day on which quest entertainment activity is held, the customer arrives at the venue of the game where he fulfills his obligation to pay for the quest and signs a document which certifies the creation of legal relations between the quest participant and the quest organizer.

We include the above document drawn up in writing in the second type of documents which certify the creation of legal relations between the quest organizer and the quest participant. In our opinion, such document is an auxiliary contract and is not a written expression of the publicly available offer contract. First, these documents differ significantly in content: if the offer establishes legal status as a participant and as a quest organizer, then the second type of contract which includes the so-called "agreement on liability of the quest participant and risk acceptance," as well as "rules of the game," "the rules of conduct for quest participants," regulates the legal status of participants only. It can be argued that the rules of the game or a liability agreement signed by the quest participant immediately prior to the session, do not duplicate the content of public offer, and this document cannot be considered as a tool of formalization of agreement which was achieved as a result of reservation of the session.

Second, the player liability agreement serves as a contract which is an additional legal remedy for the organizer. It provides for conditions that limit or eliminate the quest organizer liability in case of infliction of harm to life or health of the player during the session, as well as establishes liability for the infliction of harm to stage requisites or other property of the quest organizer, as well as life and (or) health of actors. The fact that this contract protects the organizer is confirmed by the fact that the liability agreement is signed only by the player, and created in one copy only which shall be held by the quest organizer. According to the existing custom, the player shall not receive a duplicate copy.

Quite often, these documents contain absolutely no indication of a quest organizing party. For example, creative company Quest Guru acts this way. This document is a list of provisions defining the legal status of the quest participant, without setting any responsibilities for the organizer. In particular, this document places limitations on the use of movable communication in the course of the game, additional light sources, as well as penal sanctions for damage to property owned by the organizer are set. At the same time, one cannot but note the absence of any indication of the

contacts of the organizer, since the role of the organizer is often fulfilled by various individual entrepreneurs within the terms of the franchise contract. The rules only contain the name "creative company Quest Guru," without indication of the address, telephone number, email address or other information which would enable identification of the quest organizer. In the meantime, quest participants undersign the rules, indicating their full names. Here, the obvious dominance of the strong party over the weak party in relations can be observed, which is unacceptable, since it violates the basic civil principle of equality of parties (Inshakova et al., 2017).

That said, without signing the agreement on liability of the player and risk acceptance, the organizer will withdraw from fulfilling his obligations to play the game session. Thus, the conclusion of a written agreement evolves into the prerequisite for the conclusion of the contract. Since the standard form contract has no need of signing, and the agreement on liability of the participant and risk acceptance is made in one copy held by the organizer, questions arise about how the quest participant will be able to prove the fact of existence of contractual relations with the quest organizer in case of a dispute. In this case, the player proceeds from the documents available to him: 1) notarized screenshots of correspondence with the organizer; 2) transcript of incoming and outgoing calls of the subscriber; 3) a receipt which confirms the wire transfer of funds as advanced payment. It is recommended that individual consumers pay special attention to the payment receipt, since a clear indication of the purpose "advanced payment for quest game session" in the box "purpose of payment" or in the message on the transfer of funds will solve the problem of proving the existence of legal relations between the quest organizer and the quest participant. In the meantime, the organizers which use small quest rooms, usually they are individual entrepreneurs request not to indicate the real purpose of payment to conceal their income from tax authorities.

Unfortunately, in many cases, in practice, in particular, when public offer is published (for example, LLC "ZaSov") or when reading the rules of conduct for participants (for example, the rules of creative company "Quest Guru"), no contacts are indicated which would make it possible to identify the organizer, and it may be difficult to identify the quest organizer in case of a dispute. If a limited liability company can be identified by its registered address using the certified copy of an entry from the Unified State Register of Legal Entities, then individual entrepreneurs cannot be identified in such a way. Moreover, the quest organizer often acts under the trademark which is inconsistent with the name of the business entity and the name of the individual entrepreneur. Sometimes information about the copyright holder of website is the only publicly available information, while there is no information about the direct quest organizer (this is also quite typical for quest aggregators). In this case, suits can be filed in respect of a person to whom the advanced payment was transferred, since this person is considered the contractor in accordance with the contract for the compensated provision of services.

The proactive prevention of the quest industry issues we have raised is necessary and realizable using a polysubjective jurisdictional blockchain based on the National Association of Quest Industry Participants (Kalinina et al., 2019).

Registration of a personal account for each member of the Association with a full indication of their name, legal address, head in charge, and bank details will make it possible to easily identify the organizer of the quest for purposes of appealing to competent authorities for the protection of consumer rights. In our opinion, the indication of locations and scenarios of quests with ranking by anxiety level and age limits set by experts will also contribute to the transparency of quests.

At the same time, on the basis of methodological recommendations developed by lawyers, the polysubjective jurisdictional blockchain can become a platform containing a model constructor of main types of contracts. This might be the contract for the provision of entertainment services, franchise contract, agency contract, licensing contract with copyright holders of scenarios and other intellectual property items used in the quest, premises leasing contract, etc. This preventive and proactive instrument will make it possible to eliminate the risk of inclusion of conditions inconsistent with the civil legislation, in the contract. Of course, there is a need for this, since currently null and void conditions can still be found in many contracts. Thus, for example, one of the conditions of the agreement on liability of the player and risk acceptance is often the elimination or limitation of liability of the quest organizer for the infliction of harm to life and (or) health of a participant. A similar condition has been found in the course of analysis of the agreement on liability of the player and risk acceptance by LLC "Panika." The unique character of this agreement also consists in the fact that a participant in one of the paragraphs of the document exempts organizers and actors of LLC "Panika" and LLC "Panika" in general from liability and prosecution. Moreover, it exempts from liability officials, agents and (or) employees, other participants, financing institutions, sponsors, advertisers and, where relevant, owners and lessors of the premises in which the events are held (https://docviewer.yandex.ru, agreement on liability of the player and risk acceptance). The abovementioned term of agreement is inconsistent with Paragraph 4 of Article 14 of Law of the Russian Federation No. 2300-I of 07.02.1992 "Concerning the Protection of Consumer Rights," according to which the contractor shall be responsible not only for his actions in the provision of services, but also for damage caused by the use of materials, equipment, tools and other necessary means for the performance of works or provision of services, regardless of whether the level of scientific and technical knowledge allowed discovering their special properties or not. The quest participant may know nothing about the nullity of the abovementioned term of agreement, and, given the proper perseverance and persuasion skills of the organizer, the affected participant will lose the right to defense. We already know a number of cases when the consumer received a substandard service from the perspective of safety.

In addition, a liability agreement may provide for penalties for the infliction of harm to the property of the organizer and life and (or) health of the entertainer actor. LLC "Panika" uses the above-mentioned agreement to oblige the participant to pay a penalty of 10,000 rubles in case of willful infliction of harm to the actor and in future to fully pay for treatment; in case of unwilful infliction of harm to the

entertainer actor the fine will be 5,000 rubles, excluding the costs for treatment, which shall also remain with the person who inflicted harm. The rules for participation in game events held in quest rooms "CLEVER" set a fine of 500 rubles for the damage of stage requisites of the game.

Another term of the contract which can be commonly encountered in practice is a prohibition against taking photos and videos (including for personal goals) in the territory of a quest room. Such restrictions are set by organizers in order to maintain the confidentiality of quest details, puzzles, setting elements and the main stages of scenario.

In accordance with the current legislation, shooting is prohibited in courts, penal institutions, at meetings of the State Duma, at the territory of customs facilities, in the building of the Russian Federation State Committee for Construction, Architectural and Housing Policy, and in the premises of the Ministry of Fuel and Energy of the Russian Federation, near the state border of the Russian Federation without the permission of the chief of the border department of the FSB, in the administrative buildings of Federal Service for Environmental, Technological, and Nuclear Supervision, it is forbidden to photograph ships and on-shore military facilities from foreign ships. Based on the provisions of Article 209 of the Civil Code of the Russian Federation, owners of buildings and premises may establish the rules of conduct for visitors, but may not ban taking photos. At the same time, by banning visitors from taking photos, the organizers photograph the participants themselves after the quest is completed using the photographic equipment owned by the organizer, in the location that does not disclose any details of the quest, to post pictures on social networks and at the official website of the quest rooms for promotion purposes. However, according to Article 152.1 of the Civil Code of the Russian Federation, the publication and further use of the image of an individual (including its photographs, as well as video recordings or works of visual art on which he is depicted) are only allowed with the consent of this individual. After the death of the individual, his/her image can only be used with the consent of children and surviving spouse, and in their absence—with the consent of parents. Such consent is not required in the following cases: 1) the image is used in the interests of the state, society, or other public interests; 2) the image of the individual was obtained when he / she was photographed in public places or at public events (meetings, congresses, conferences, concerts, shows, sports events, and similar events) except when such an image is the main target to be used; 3) the individual posed for a valuable consideration.

Paragraphs 47–48 of the Resolution of the Plenum of the Supreme Court of the Russian Federation No. 25 of 23.06.2015 "On Application by the Courts of Some of the Provisions of Section I of Part 1 of the Civil Code of the Russian Federation" clarify that if the consent for disclosure was given verbally or by taking tacit actions (e.g. arrival and posing for photographing of quest participants, during television filming of talk shows, etc.), then such consent shall cover the use of the image to such extent and for such purposes that are apparent from the

environment in which it was performed. At the same time, the burden of proving the legitimacy of disclosure of an individual shall rest with a person who made such disclosure (Fridman, 2019).

In addition, recordings taken from surveillance cameras mounted in each quest room with a view to ensuring monitoring of the playthrough process by the quest moderator, can serve as preventive and proactive measures to protect the rights of consumers of entertainment services if the organizer will challenge the fact of provision of such services. In our opinion, normative consolidation of the time of retention of video recordings of sessions in the distributed ledger (including on the NAQIP server) for information security, as well as the obligation to present the abovementioned records at the request of the quest participant and law enforcement agencies will significantly increase the security of consumers of the entertainment service. Moreover, this video will become one of the most important means of proving innocence of the organizer if a player is injured in the course of the quest out of his/her own negligence.

Within the scope of the polysubjective jurisdictional blockchain, all information that is placed in the distributed ledger will be accurate for sure. Quest aggregators often post false information on the Internet. Thus, during the prosecutor's inspection, it was established that the quest aggregator at the following URL: https://volgograd.mir-kvestov.ru presents false information about quests. Thus, individual entrepreneur Vasilyeva, E.V., being a quest organizer as a "CLEVER" franchisee, made a statement that there are no age limits for the quests that are implemented by their company. In the meantime, according to the information from the quest aggregator, quests called "Zone Z" and "Den" stipulated age limit of 12+.

Age limits are a severe issue, since the main consumers of entertainment services with the use of quest rooms are individuals aged 11 to 18. Horror quests are especially popular in this category of consumers. High-quality graphic images of deaths, models of bloodied limbs, bones, and surgical instruments with brown stains, are used to create an atmosphere in such quests. In combination with terrifying music, as well as acting, such as the victim of a maniac or a serial killer, this can cause irreparable harm to the mental health of a quest participant under age. According to organizers themselves, the age of participants is established at the moment of quest reservation by spoken question; no verification of documents or presence of adult attendants is required.

CONCLUSION

Quest entertainment activities have become very popular with adolescents and young people aged 12 to 30; the promotion and functioning of quests in the present context is closely related to information technologies. Quest advertising is primarily placed on the Internet, in particular, not only on official websites of quests but also through independent Flamp platforms. Official websites and quest aggregators act as platforms for the conclusion of contracts between the organizer and the individual quest participant. Moreover, the organizer of these services

usually request prepayment which is made via electronic funds transfer. Nevertheless, we believe that this rapidly growing branch of the entertainment industry goes under the radar of legislative authorities, which is wrong. In a climate of neo-industrialization, preventive and proactive measures are needed to protect the rights of consumers of entertainment services which involve the use of quest rooms, for the purpose of forming and establishing this new segment of social relations and business activities in an inherently conflict-free way.

The application of the polysubjective jurisdictional blockchain in quest industry will not only help preventing the proneness to conflict in these public relations, saving institutional, financial, labor, time and psychological resources, but also protecting the rights of consumers serving as a weak, defenseless party to the contract for the compensated provision of entertainment services.

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CHAPTER 18

INTERACTION OF NEO-INDUSTRIALIZATION SUBJECTS IN THE CONTEXT OF INTENSIFICATION OF DIGITAL TECHNOLOGIES

A System of Sources of Legal Regulation in the Republic of Belarus and the Russian Federation

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The purpose of this scientific research is to identify the main regulatory requirements characterizing from a legal point of view the very concept of "neo-industrialization," its structure, the system of legal regulation of the relationships of its subjects in the context of the intensification of digital technologies.

It is proved that neo-industrialization is a new concept for the legal systems of Russia and Belarus, which currently do not contain their comprehensive legal regulation. Large blocks of social relations included in the concept of "neo-industrialization," such as science, production, management, digitalization, also have different degrees of legal regulation in our states. At the same time, there is no concentration

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 221–236.

of legal regulation aimed at a single goal: improving the efficiency of the economy and production, creating breakthrough new technologies that can radically increase labor productivity, modernize the most critical aspects of public life, and switch to integrated electronic control schemes for an extended production cycle.

It is proved that in the Russian Federation and the Republic of Belarus, there are initial primary strategic legal documents adopted by the heads of state, government and parliaments containing legal and volitional instructions for combining the capabilities of science, production, and digitalization.

These requirements include the following:

1. Civil law, commercial law, information law and other branches of law, as objective regulators of transformation processes in the economy;
2. The need for a comprehensive and systematic legislative settlement of all newly emerging social relations, including digitalization;
3. A combination of state and non-state regulation of public relations in the field under study;
4. The technological and financial conditionality of the legal regulation of neo-industrialization relations.

The author concludes that the legal regulation of the digitalization of the economy is not a mechanical reflection of its condition, but also requires a scientific approach, systematic and integrated research, and regulation. Without such an attitude, the regulatory and stabilizing function of law would not be feasible. Digital technologies, regulated by law can also have a transforming effect on legal regulatory mechanisms.

Keywords: Neo-Industrialization, Science, Production, Digital Economy, Law, Subjects, Interaction, Intensification, Regulation, Source System, Legislation, Civil Law, Information Law, Protection of Rights.

JEL Code: K15, K24, O14, O19, O33

MATERIALS

The theoretical basis of this study was the scientific works of Russian and Belarusian scientists on the legal regulation of digital technologies in the economy.

In particular, the monograph edited by professors Vaipan V.A. and Egorova M.A. “Legal regulation of economic relations in modern conditions of development of the digital economy” (Belitskaya et al., 2019), comprehensively covering the history of the digital economy, the principles of its legal regulation, including problems concerning certain types of entrepreneurial activity, the circulation of cryptocurrency and technical blockchain, public procurement, insurance, advertising, transportation, and other contracts and relations; the monograph “Financial law in the context of the development of the digital economy” (Inshakova et al.,

2019); the monograph "Features of the regulation of labor relations in the digital economy" (Waipan & Egorova, 2019); articles by:

- Bobrova N.A. "Digitalization: pros and cons" (Bobrova, 2019), which analyzes the concepts of the digital economy, digital state, digital (electronic) government, as well as their importance in the fight against corruption;
- Inshakova A.O., researching the law and information and technological transformations of public relations in the industry 4.0. (Inshakova, 2019),
- Kamenkova V.S. "On the system of legal regulation of the digital economy of the Republic of Belarus" (Kamenkov, 2019), which considered a set of legal acts on the digital economy;
- Sitdikova L.B. and Starodumova S.Yu. "The information component in corporate relations in the digital economy" (Sitdikova & Starodumova, 2019), which considers the information component in corporate relations;
- Saurina A.A. "Digitalization as a factor in the transformation of law" (Saurin, 2019), which believes that digitalization has a unique transformational value, and the law has only to develop an appropriate strategy for digitalization, the foundation of which should be constitutional values;
- Frolova E.E., Polyakova T.A., Dudina M.N., Rusakova E.P., and Kucherenko P.A., analyzing the economic and legal aspects of information security in the digital economy (Frolova et al., 2018), etc.

The influence of neo-industrialization on the further development of the economy was investigated in the works of such economists as Gubanov (2012); Tsindeliani (2019); Orlovsky and Kuznetsova (2018); and others. Neo-industrialization plus vertical integration: (on the formula for Russia's development); Gubanov and Semenovich (2012); Grandberg (2009); Larionov (2009); Baynev (2009); Naimushin (2009); Babaev (2008); Amosov (2009); Tolkachev (2010); Tsvetkov (2010) and others.

METHODS

The study is grounded on such methods as structural-functional analysis, which allows differentiating and refining of the elemental composition of doctrinal representations of neo-industrialization, as well as a comparative method and hermeneutics, which identify the worldviews, present in the texts under study.

INTRODUCTION

The topic of neo-industrialization is new to jurisprudence, both in Belarus and in the Russian Federation. Even in the economic sphere, this problem has not yet been adequately addressed and has not been fully disclosed. Moreover, the interaction of the subjects of neo-industrialization in the context of the intensification of digital technologies should be considered as a complicating factor. For these reasons, one should not look for an abundance of sources of legal regulation of

these latest public relations. However, there is a need to analyze existing sources, their content, and their compliance with modern requirements and development prospects.

In this regard, it is first necessary to divide the problem under study into its constituent parts and analyze the degree and level of their legal regulation.

At first glance, there are three relatively independent blocks of new social relations: neo-industrialization itself (production plus science), its actors in interaction, and the digital economy.

It is easy to notice another characteristic feature of neo-industrialization: its economic genesis and continuous connection with economic, social relations. This circumstance allows us to take as a basis for the present study the basic economic concepts, their well-known definitions and try to give them legal coloring, and legal forms.

Understanding that the term "neo-industrialization" itself comes from the concept of "industrialization," we turn to it.

According to dictionary definitions of this economic concept, we have the following:

- "Industrialization"—the broad development of organized economic activity for the needs of production. Industrialization is characterized by the transformation of a predominantly agrarian economy into a more specialized and capital-intensive economy (Gavrilenko, 2009);
- Industrialization of the country—the transfer of the country's economy to industrial rails, a significant increase in the share of industrial production in the economy, the creation of large-scale machine production in the entire national economy or its sectors (Raizberg et al., 2011).

Legal dictionaries and systems have so far only such results:

- Industrial and innovative project—a set of measures aimed at technology transfer, creation of new or improvement of existing production facilities, technologies, goods, works and services implemented over a certain period (Model Law "On Joint Research and Cooperation in the Development and Production of Innovative Products (services)");
- Industrial park—a system of objects of scientific and industrial infrastructure intended for industrial production or modernization of industrial production and managed by a management company—a commercial or nonprofit organization created following the legislation (Model Law "On State Industrial Policy, (Article 3)).

We gain a general idea of the concept of "neo-industrialization" when studying the scientific works of economists.

It consists of introducing ."... information and computer technologies into the management of the entire product life cycle—from developing and design to af-

ter-sales service and disposal. The new industrial revolution, as it is increasingly called in the West, should lead to a jump in labor productivity and the modernization of all aspects of social life "(Pobyvaev & Tolkachev, 2016).

Neo-industrialization, as economists point out, is the process of large-scale implementation of a set of breakthrough technologies in production. Based on integrated electronic control of an extended production cycle, a person is freed from routine management operations and can focus on higher-level management functions.

Other scholars consider neo-industrialization as an economy based on knowledge, human resources, involving the widespread use of digital technologies, electronic information resources, and as a result, the emergence of new means of production, the achievement of a new level of welfare and social development. In contrast to the traditional scheme, computer, communication, and network technologies will prevail in the new economy, and company and product management will depend on information obtained through management and production informatization.

RESULTS

We have to admit that earlier, even the processes of industrialization in our states did not seek to regulate with the help of legal norms. The sector of the real economy, the processes for the production of goods and services turned out to be literally outside the legal regulation. We will find in the legal systems of the Russian Federation and the Republic of Belarus, instead of systemic legal regulation, only specific fragments of it. However, there is no need to talk about the legal regulation of neo-industrialization.

Hence the understanding prevails that the legal regulation of neo-industrialization or a new technical revolution in the Russian Federation and the Republic of Belarus will have to be re-established using existing fragments, as well as filling it with radically new content. At the same time, it is necessary to recall the convergence and harmonization of these processes not only in the states mentioned above, but also within the framework of the Union State, the EAEU, the CIS and other interstate associations striving to be among the leading ones.

As the subjects of neo-industrialization, based on its existing definitions, will be those persons engaged in economic activities, producing goods (products), scientific, educational and scientific-production activities, and organizations -developing and introducing high technologies, including digital transformations, as well as relevant governing bodies. In other words, all persons capable of scientifically substantiating and applying high technologies in the production of goods, organizing, and managing these processes.

For Belarus, specific directives of the President of the Republic of Belarus and other legal acts, including various sectoral programs, can be called general and partly programmatic or indicating that the state has an interest in the development of science in the context of its interaction with production.

Thus, the Directive "On Priority Directions for Strengthening the Economic Security of the State" contains an instruction to the Government of Belarus to implement into the practice of management of new forms of integration of science, education, and production based on organizations of all forms of ownership (clusters, technological platforms).

The Law National Legal Internet Portal of the Republic of Belarus (2021a) as such directions, includes:

- The state support and coordination of scientific research in priority areas of development of the national economy;
- The creation of conditions for the rapid implementation of the achievements of science and advanced technologies; and
- Complementary integration of science and education, improving the system of training the scientific personnel of the highest qualification to provide the staff for fundamental and applied research and development and high-tech industries.

In the Russian Federation, the essential document of strategic planning that defines the national interests and strategic national priorities of the Russian Federation in the studied sense is the National Security Strategy.

This Strategy also includes tasks such as the integrated development of scientific potential, the restoration of the full scientific and production cycle—from basic scientific research to the implementation of applied science in production following the priorities of socio-economic, scientific, and scientific-technological development of the Russian Federation.

In general, concerning science, each of our states has a particular system of legal regulation, consisting of many scattered regulatory legal acts of various levels. Unfortunately, we can also state its drawback: the absence of purposeful, equal and useful participation of science with its possibilities of influencing advanced (digital and other) technologies, as a real production force.

Thus, in the Republic of Belarus, The Law National Legal Internet Portal of the Republic of Belarus (2021b) can be called the core of legislative regulation of science. We will see its purpose in the preamble to it: this Law is aimed at creating favorable conditions for the implementation of scientific activity, strengthening the state support for science as a necessary precondition for the economic and social development of the Republic of Belarus, increasing the intellectual and cultural level of its citizens, strengthening the authority and independence of the state.

The presence of a distance between science and industry is also evidenced by the composition of subjects of scientific activity. The Law National Legal Internet Portal of the Republic of Belarus (2021c) refers to those persons as private and legal entities, including temporary scientific groups, scientific organizations, educational institutions, organizations that implement educational programs of

postgraduate education that carry out the scientific activity. There are no product manufacturers on this list.

Other private and legal entities may be participants in scientific activity. These are persons who have acquired the right to participate in this activity as its investors, customers, as well as providing information, patent and licensing, software, organizational and methodological, technical support of scientific activity, as well as ensuring the uniformity of measurements in the field of scientific activity (Law of the Republic Belarus on scientific activity from 10.12.1996, Art. 7).

The relations between the subjects and (or) participants in the scientific activity are based on a contractual basis or on other grounds provided for by Law of the Republic of Belarus on scientific activity of October 21, 1996, article 8. It turns out that the subjects and participants in the scientific activity may not agree. Thus, we need other principles of relations between these individuals, built on a common interest.

This Law (The Law National Legal Internet Portal of the Republic of Belarus (2021c) does not contain other goals and objectives concerning material production and the specific relationship with the economy, except for very general legal norms on the objectives of creating temporary scientific teams (Art. 11), and others.

The interaction in this Law (The Law National Legal Internet Portal of the Republic of Belarus (2021c) is even listed as a principle of state regulation of scientific activity. But the interaction is very limited: it includes only scientific organizations with educational institutions, as well as organizations implementing educational programs of postgraduate education (Art. 4). The interconnection of scientific and industrial activities at the national and other large-scale levels, digital technologies, and digitalization, in general, are not discussed here at all.

There is also no sectoral approach to the organization of scientific research in the Law under study.

In the Russian Federation, the basis of legislative regulation of scientific approaches to the problems of other spheres of life is the Law "On Science and the State Scientific and Technical Policy." The name of this Law, its preamble, in the absence of its goals and objectives, allows us to conclude what is the direction of legal regulation in science. Thus, the preamble says that the law regulates the relations between subjects of scientific and (or) scientific and technical activity, government bodies, and consumers of scientific and (or) scientific and technical products (works and services), including the provision of state support for innovative activities.

Scientific or research activities are divided into the following types:

- Fundamental scientific research—experimental or theoretical activity aimed at gaining new knowledge about the fundamental laws of the structure, functioning and development of humanity, society, and the environ-

ment. We also note that the issue is not long-term and promising research in the economy, or production;

- Applied scientific research—research aimed primarily at applying new knowledge to achieve practical goals and solve specific problems. And again we find here general messages, and the focus is on solving not specific, but universal problems; and
- Exploratory research—research aimed at obtaining new knowledge for their subsequent practical application and (or) the application of new knowledge and carried out by carrying out research work. Again, something general and abstract.

Moreover, only scientific and technical activity is an activity that should be aimed at obtaining, applying new knowledge to solve technological, engineering, economic, social, humanitarian, and other problems, ensuring the functioning of science, technology and production as a single system (Art. 2).

The subjects of scientific and (or) scientific and technical activities under the Russian Law are individuals—citizens of the Russian Federation, as well as foreign citizens, stateless persons within the rights established by the legislation of the Russian Federation and the legislation of the constituent entities of the Russian Federation, and legal entities provided that scientific and (or) scientific and technical activity is provided for by their constituent documents (Rossiyskaya Gazeta, 2021). The Law does not include the manufacturers of goods, either.

The main legal form of relations between a scientific organization, a customer and other consumers of scientific and (or) scientific and technical products are agreements (contracts) on the creation, transfer, and use of scientific and (or) scientific and technical products, provision of scientific, scientific and technical, engineering and consulting and other services, as well as other contracts.

We assume that it is not difficult to notice the artificiality of the separation of scientific and scientific-technical activity, as well as the lack of a targeted focus of priority types of scientific activity on the development of economy and production.

Even in the Law mentioned above, government bodies and state academies of sciences are tasked with determining priority areas for the development of science, ensuring the formation of a system of scientific organizations. They also carry out intersectoral coordination of scientific and (or) scientific and technical activities, to develop forms of integration of science and production, and alike. (Art. 7).

This Law (on Science and State Science and Technology Policy, 1996) does not contain other large-scale goals and objectives concerning material production, either.

The mechanism of interaction and other interconnection of scientific and production activities at the state and other large-scale levels, digital technologies are not mentioned in this Law.

It is not difficult to notice significant differences in the legal regulation of scientific activity at the level of the laws of the two states that make up the Union State.

The above analysis indicates the need for new approaches in the legal regulation of scientific activity, taking into account the comments and suggestions already made.

Concerning the legal regulation of the concepts of "production" and "production activity" in our states (their possible synonyms and analogs), the situation seems even more complicated.

The Civil Code of the Republic of Belarus (hereinafter referred to as the Civil Code), by its principal and priority private legal regulation method, does not and cannot have a systematic and comprehensive legal regulation of social relations related to material production, production activity itself, and only fragmentary refers to the production. At the level of laws, such regulation does not exist.

For other reasons, but also fragmentary, separate types of production (production of certain goods) and production activities are regulated by other legislative acts and bills. At the same time, these examples confirm the need for systemic regulation in the whole production activity.

Here is evidence of this:

> ... industrial production in the system of national industry is a set of types of economic activity, determined based on appropriate classifiers of types of economic activity, aimed at ensuring the production of industrial products and import substitution products that are competitive in the world markets" (Commonwealth of Independent States, 2021a);

> ... production is an activity, the result of which is a product. This concept is used in relation to a number of types of economic activity. It is intended not only for agricultural activities, mining, or manufacturing. It is also used for services. For the definition of production, more specific terms can be used: the provision of services, processing, recycling, and alike, depending on the field of activity. Production can be measured in different ways, both in tangible (physical) terms and in value" (Commonwealth of Independent States, 2021b);

> ... the production of organic products—the work of the direct creation, processing of organic products using the methods, technologies provided for by regulatory legal acts, including technological, regulatory legal acts, as well as technical regulations of the Eurasian Economic Union and the Customs Union" (Commonwealth of Independent States, 2021c);

> ... industrial production of medicines—a set of works necessary for the industrial production of medicines and including all stages of the production process, or one or more of them." (National Legal Internet Portal of the Republic of Belarus, 2021a)

The fact that specific types of production activities are regulated at the legislative level: architectural, urban planning and construction activities (National

Legal Internet Portal of the Republic of Belarus, 2021a); freight forwarding activities (Law of the Republic of Belarus on freight forwarding activities, 2006); road activities (Law of the Republic of Belarus on Roads and Road Activities, 1994), and others, only strengthens the arguments in favor of the comprehensive regulation of production itself.

For production activities, social relations are also characteristic of organizing it (planning, providing raw materials, organizing production processes, accounting, storage, sales, and alike), as well as relations for property management, including receivables management, and others. Unfortunately, there are no systemic legal acts on this subject, either.

One can also cite a fairly common jurisprudence (published and unpublished) of both states, actively using the concepts of "production activity," as well as synonymous and similar terms (financial, business, business, trade, construction, and others), and even the numerous facts of holding private and legal entities accountable for violation of the legislation regulating production activities.

A similar state of legal regulation of social relations related to production and production activities can be observed in the Russian Federation.

For example, Rossiyskaya Gazeta (2021) indicates industrial, technical, innovative, tourist and recreational activities or activities in the port exclusive economic zone (Art. 12). However, it does not disclose the content of these concepts with the ensuing consequences.

Providing more examples of the lack of proper legal regulation of production activities or its imperfections does not make much sense.

The ground of the implementation of the codified legal regulation of digital technologies in the economy and digitalization in general is the Civil Code of the Republic of Belarus and the Civil Code of the Russian Federation (hereinafter—the Civil Code of the Russian Federation, Rossiyskaya Gazeta, 2021).

However, in the Civil Code of the Republic of Belarus, the legal regulation of digital technologies is reduced only to the indication that mining, acquisition, alienation of digital signs (tokens) does not apply to entrepreneurial activity.

At the same time, the National Legal Internet Portal of the Republic of Belarus (2021b) is in force and pursues the solution of such basic tasks as:

- Creation of conditions for the functioning in the Belarusian jurisdiction of commercial organizations, engaged in the development of their products of the information technology industry, as well as market promotion and sale of these products or property rights to them; and
- creation of legal conditions for the introduction of distributed register technology into the economy of the Republic of Belarus, as well as the use of modern financial instruments based on this technology in civil circulation (Shevchenko, 2017).

At first glance, the Civil Code of the Russian Federation has systematically and comprehensively resolved the issues of digital technologies.

Firstly, since October 2019, digital rights have become new property rights and, ultimately, objects of civil rights (Art. 128). However, the issue of electronic money, the classification of digital financial assets (cryptocurrencies, tokens) and crowdfunding (attracting investments through electronic platforms) and others, has not been resolved. It is assumed that digital technology will not cover all rights, but only those that the law allows. From this point, we can conclude that it can be not only civil rights.

Secondly, new legal norms on digital rights have appeared in the Civil Code of the Russian Federation. Obligatory and other rights named as such in the law are now recognized as digital rights, the contents and conditions for the implementation of which are determined in accordance with the rules of the information system that meets the criteria established by law. Implementation, disposal, including transfer, pledge, encumbrance of digital law in other ways, or limiting the disposal of digital law is possible only in the information system without contacting a third party (Art. 141.1.).

The program documents of a strategic nature on the legal regulation of the digital economy in the National Legal Internet Portal of the Republic of Belarus (2021c).

In particular, the goal of this State Program is formulated as improving the conditions conducive to the transformation of spheres of human activity under the influence of information and communication technologies (hereinafter—ICT), including the formation of the digital economy, the development of the information society and the improvement of e-government.

Among the program that can be attributed to strategic documents is the National Legal Internet Portal of the Republic of Belarus (2021a).

The program states that in the framework of the digital transformation of the national economy it provides:

- The formation of a system of legal regulation aimed at ensuring the transition to the digital transformation of the national economy;
- Development and implementation of technologies, implementation of innovative projects aimed at forming a modern industrial sector, including big data and the Internet of things technologies, a register of blockchains, robotics and additive technologies; and
- Development of Internet platforms (crowdfunding) as a tool for interaction between consumers and producers of goods and services, investors, and investment applicants.

IN THE RUSSIAN FEDERATION

The Development Strategy of the information society in the Russian Federation for 2017—2030 names the tasks, necessary for the realization of national interests, in particular:

- Ensuring compliance with antitrust laws when conducting business by Russian and foreign organizations in the field of the digital economy, as well as equal tax conditions;
- Introduction of amendments to the legislation of the Russian Federation aimed at ensuring compliance of legal regulation with the pace of development of the digital economy and the removal of administrative barriers;
- Ensuring the participation of the Russian state bodies and organizations in the development of international treaties and other documents in the field of the digital economy and others;
- The State program of the Russian Federation "On Economic development and innovative economy."

However, one needs to understand the alternative clearly. Without the proper integrated and systematic, coordinated actions, regulation of scientific and industrial activities, as well as digitalization, it will be impossible to establish their necessary interaction in order to achieve the goals and objectives of neo-industrialization.

CONCLUSION

It seems that in the studied area, there should be practical, both state and non-state (self-government, public administration) regulation, coordinated to achieve common goals and objectives.

The state policy in the field of legal regulation of the interaction of scientific and industrial activities, digitalization should become part of the state socio-economic policy and constitute a combination of legal, political, economic, social, informational, consultative, organizational and other measures implemented by public authorities, local authorities and self-government, civil society organizations.

The approximate goals of the state policy in the field of legal regulation can be:

1. Increasing the efficiency of legal regulation of public relations by developing special legislation on neo-industrialization, establishing the limits of state and non-state regulation of it, requirements for its subjects, forms, criteria, and results of their cooperation, as well as ensuring state control (supervision) of activities in this area;
2. Fixing legal, economic, social and other incentives, as well as guarantees for the implementation of a set of breakthrough technologies in production, improving the quality of products, their competitiveness, etc.;
3. Ensuring and protecting the rights of persons participating in neo-industrialization; and
4. Stimulating the development of neo-industrialization in other areas of the economy.

The main principles of the state policy in the field of legal regulation of neo-industrialization can be:

1. The strategic importance of neo-industrialization in the structure of the state economy, in the sectors of the economy, in the economy of specific entities and its consistent implementation;
2. The delimitation of powers to support neo-industrialization between government bodies, bodies of state management, local government land self-government;
3. The creation of a system of incentives and responsibility of state authorities, government bodies and bodies of local government and self-government for ensuring favorable conditions for the implementation and development of neo-industrialization;
4. Participation of subjects of neo-industrialization (including through self-government mechanisms) in the formation and implementation of the state policy in the field of legal regulation of neo-industrialization, iexamination of draft normative legal acts regulating issues of neo-industrialization;
5. Ensuring equal access of subjects of neo-industrialization to receive state support in accordance with the conditions for its provision, provided for by the legislation on neo-industrialization;
6. Ensuring the priority of protecting the rights and legitimate economic interests of the subjects of neo-industrialization concerning the interests of other subjects of the economy;
7. Freedom of economic activity and active international cooperation of the subjects of neo-industrialization.

The priority areas of the state policy in the field of legal regulation of neo-industrialization can be:

1. Determination of the priority strategic (budget-forming, economic-forming, industry-forming, city-forming, and alike) subjects of implementation of the principles of neo-industrialization;
2. The implementation of the state, municipal and public support for the subjects of neo-industrialization;
3. Ensuring the sustainable and consistent development of neo-industrialization in the sectors of the economy, in regions, in settlements using domestic and proven foreign experience;
4. Promoting the domestic experience of neo-industrialization in the domestic and foreign markets;
5. Ensuring favorable conditions for the production and turnover of products manufactured on the subjects of neo-industrialization;
6. The development of educational and scientific activities, including by improving the training system for subjects of neo-industrialization;

7. The project and development of a risk insurance system in the field of neo-industrialization;
8. The regulation of responsibility for counteraction and other negative impacts on the implementation of neo-industrialization.

To implement successful state policy in the field of legal regulation of neo-industrialization, the following measures can be applied:

1. Targeted and systematic provision of budget funds to sectors of the economy or specific subjects of neo-industrialization, including for the training of qualified personnel;
2. The search for ways of self-financing of subjects of neo-industrialization;
3. The application of special tax regimes concerning subjects of neo-industrialization;
4. The regulation of the market for products, manufactured by neo-industrialization entities, including customs-tariff and non-tariff regulation;
5. The development of industry science in conjunction with fundamental science, goals, and objectives facing the real sector of the economy;
6. Training highly qualified scientific personnel capable of leading specific subjects of neo-industrialization and realizing the challenges;
7. Promoting the activities of self-regulatory organizations in this area and other projects.

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CHAPTER 19

DIGITAL RIGHTS AS A NEW OBJECT OF CIVIL RIGHTS

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In this chapter the problem of assigning digital rights to a new object of civil rights is raised, the prospects of such an innovation are considered. The need to analyze this topic is determined by global changes in all spheres of public life as a result of the large-scale introduction of digital technologies, one of the directions of which is the possibility of exercising obligations and other rights in an information system without resorting to a third party.

The study addresses the issues of civil regulation of digital rights as a new subject of civil law in the light of the introduction of amendments to the Civil Code of the Russian Federation, including the introduction of a legal definition of the concept "Federal Law No. 34-FZ, signed by the President of the Russian Federation on March 18, 2019, "digital rights." The correlation of the category "digital rights" with the categories "utilitarian digital rights," "uncertificated securities," "tokens" and "cryptocurrency" is analyzed. The aim of the study of these issues is to identify the place of digital rights in the system of civil rights under the laws of the Russian Federation. The decisive research method for achieving this result was a systematic analysis of the categories of "civil rights objects" and "digital rights." We also used the general

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 237–250.

scientific dialectical method of cognition, private scientific methods (formal legal, method of interpreting legal norms, legal modeling method) and empirical methods (comparison, description, interpretation).

The authors come to the conclusion that the introduction of the concept of "digital rights" into civil law in the form in which it is presented today is not entirely justified, and the assignment of such rights to objects of civil law is illogical. The point of view is defended, according to which it is advisable to consider digital rights only as a form of securing rights, and not to relate them to objects of civil rights.

The results of the study formulated by the authors can serve as a basis for further scientific research on the implementation of property rights in the information system and other problems of the theory of civil law.

Keywords: Digital Economy; Digital Rights; Utilitarian Digital Rights; Objects of Civil Rights; Uncertificated Securities; Token; Blockchain; Cryptocurrency.

JEL Code: K1, K15

MATERIALS

The solution to the problem of the study of civil regulation of digital rights as a new object of civil law was carried out on the basis of a complex of sources. The regulatory framework was compiled by the Civil Code of the Russian Federation, Federal Law of March 18, 2019 No. 34-FZ "On Amendments to Parts One (The State Duma, 1994), Two (The State Duma, 1995), and Article 1124 of Part Three of the Civil Code of the Russian Federation" Federal Law of August 2, 2019 No. 259-FZ "On Attracting Investments Using Investment Platforms and on Amending Certain Legislative Acts of the Russian Federation" (The State Duma, 2001).

The information and empirical basis of the study was: the passport of the national project "National Program "Digital Economy of the Russian Federation", approved by the minutes of the meeting of the Presidium of the Presidential Council on Strategic Development and National Projects dated June 4, 2019 No. 7 (ConsultantPlus, 2019c); the passport of the Federal Project. Regulatory regulation of the digital environment (approved by the Presidium of the Government Commission on digital development, use of information technologies to improve the quality of life and business conditions, Protocol No. 9 of 28.05.2019) (ConsultantPlus, 2019b); On amendments to parts One (The State Duma, 1994), Two (The State Duma, 1995), and Three (The State Duma, 2001) of the Civil Code of the Russian Federation.

The theoretical basis of the study was the scientific work of such Russian scientists as: R.S. Bevzenko, L.Yu. Vasilevskaya, V.V. Dolinskaya, A.A. Ivanov, A.O. Inshakova, L.A. Novoselova, M.A. Rozhkova, S.V. Sarbash, V.V. Tarakanov, A.M. Erdelevsky, Novoselova (2019), and others.

METHODS

The research methodology is based on the general scientific dialectic method of cognition and the private scientific research methods: formal legal, method of interpretation of legal norms, method of legal modeling. Empirical methods of comparison, description, interpretation were used. The determining method was a systematic analysis of the categories of "civil rights objects" and "digital rights" in terms of their impact on the current state of civil law regulation of public relations (The Concept of Development of Civil Legislation of the Russian Federation, 2009).

INTRODUCTION

The active development of information technologies, social networks, search engines, the "mobile revolution" and widespread digitalization have a significant impact on Russian civil law: there are new social relations in need of regulation, new objects of intellectual property; the lawmaker is asked questions that are previously unknown to the rule of law, requiring answers in order to ensure the safety of deals in the digital environment (Tarakanov et al., 2019). All of this gives rise to the need to review established approaches in the theory of civil law and practice and develop relevant ones.

On October 1, 2019, amendments to the Civil Code of the Russian Federation (hereinafter referred to as the Civil Code of the Russian Federation) entered into force, enshrining the concept of "digital rights" and creating the basis for regulating relations within the digital economy. The President of the Russian Federation signed the relevant Federal Law No. 34-FZ (The State Duma, 2001). The law was developed in the framework of the federal project "Regulatory regulation of the digital environment" (ConsultantPlus, 2019b) of the national program "Digital Economy of the Russian Federation" (ConsultantPlus, 2019c).

According to the amendments, digital rights are a new object of civil rights (The State Duma, 2001). They mean special "obligations and other rights, the content and conditions for the implementation of which are determined in accordance with the rules of the information system that meets the criteria established by law." At the same time, the implementation, disposal, including transfer, pledge, encumbering of digital law in other ways or limiting the disposal of it is possible only in the information system without contacting a third party (The State Duma, 2001).

On the basis of the Law, the written form of the transaction is also considered to be complied with if it was made using electronic or other technical means that make it possible to reproduce the contents of the transaction in unaltered form on a physical medium. The requirement for a signature in this case is considered fulfilled if it is possible to reliably determine the identity of the citizen (item 1 of article 160 of The State Duma, 1994). Thus, now a contract in writing can still be concluded by drafting one electronic document signed by the parties, or by

exchanging such documents or other data (The State Duma, 1994). For example, a contract of retail sale will be considered concluded from the moment the seller issues the electronic document confirming payment to the buyer (The State Duma, 1994). However, in accordance with the amendment made to Art. 1124 of the Civil Code of the Russian Federation (The State Duma, 2019b) it is not permitted to make a will using electronic or other technical means.

In this regard, the task of studying the civil law regulation of digital rights as a new subject of civil law is of particular relevance, including consideration of whether this innovation is appropriate and how well the legislator, aiming to regulate the sphere of digital rights, formulated and enshrined their concept in the law.

The purpose of the study of these issues is to identify the place of digital rights in the system of civil rights under the laws of the Russian Federation.

RESULTS

The analysis of the changes made it necessary to refer to the previous editions of The State Duma (2001) to understand the logic of the legislator in determining the concept and types of objects of civil law and to identify the advantages and disadvantages of the previous and present versions of this article in their comparison.

Concept and Types of Objects of Civil Rights

The legislator formulates the legal definition of the concept of "objects of civil rights" by listing their types. In the original version of The State Duma (1994) (hereinafter referred to as edition No. 1) "objects, including money and securities, other property, including property rights, were recognized as civil rights objects; work and services; information; results of intellectual activity, including exclusive rights to them (intellectual property); intangible goods." Edition No. 1 can be called the most concise (according to some authors, the most successful) of all subsequent ones, although it has its drawbacks, for example, there is no explanation of what is included in the concept of "other property, including property rights."

The next edition of Art. 128 of the The State Duma (2006) (hereinafter referred to as edition No. 2) changed this list. Firstly, information was excluded from the list of objects of civil rights. This was explained by the fact that information has an "own" branch of legislation—information law and therefore does not need to regulate public relations about it also by civil law (Rozhkova, 2018). Secondly, the phrase "results of intellectual activity, including exclusive rights to them" was supplemented by the word "protected," which means that not all results of intellectual activity began to be recognized as objects of civil law. Thirdly, the "new means of individualization" appeared in the new edition, which were equated with the results of intellectual activity (intellectual property). In edition No. 2, the category of other property was not specified, which still causes its misunderstanding.

Article 128 of the Civil Code of the Russian Federation as amended by the The State Duma (2013) (hereinafter referred to as Edition No. 3) has undergone significant changes. The objects of civil rights included "things, including cash and documentary securities, other property, including cashless funds, uncertificated securities, property rights; work results and provision of services; protected results of intellectual activity and equivalent means of individualization (intellectual property); intangible goods."

With regard to wording No. 3, two points of view have developed in the theory of civil law: the first adhere to those who believe that this wording is art. 128 of the Civil Code of the Russian Federation is more clear and complete (Grishaev, 2014), and the second—those who disagree with this (Chegovadze, 2014). The latter, in support of their arguments, indicate that edition No. 3 did not solve the earlier set in the Concept for the development of civil legislation of the Russian Federation (The concept of development of civil legislation of the Russian Federation from 07.10.2009) issues, including the uncertainty in the interpretation of such categories as "other property" and "property rights" did not eliminate. The division of money into cash and non-cash funds was sharply criticized in order to consider cash as objects of property rights, and non-cash as objects of claims. The authors ask: if follow this logic, the funds held in the bank account belong to the subject only by right of claim, then to whom do they belong by right of ownership. The "results of work" as objects of civil law are also considered doubtful to such authors, since, in their opinion, they do not have the obligatory feature of the object enshrined in Art. 129 of the Civil Code of the Russian Federation,—turnover capacity (Chegovadze, 2014).

Many lawyers noted the imperfection of Art. 128 of the The State Duma (1994), in which it existed until the adoption of Federal Law No. 34-FZ (ConsultantPlus, 2019c).

In The State Duma (1994) the words "things, including cash and documentary securities, other property, including non-cash funds, uncertificated securities, property rights" were replaced by the words "things (including cash and documentary securities), other property, including property rights (including cashless funds, uncertificated securities, digital rights)." Thus, now non-cash money and non-documentary securities are directly assigned to the category of "property rights," the question remains open, what else includes the category of "other property" along with property rights. However, the main innovation was the inclusion in the Art. 128 of The State Duma (2001) a list of objects of civil rights of the category "digital rights."

Digital Rights in the System of Civil Rights

First of all, it is noteworthy that the legislator put digital rights on a par with traditional objects of civil rights, namely with property rights, including non-cash money and paperless securities (item 1, Article 128 of the Civil Code of the Russian Federation). Initially, the Art. 141.1 of the The State Duma (2001) it was

proposed to understand digital rights "A set of electronic data (digital code or designation) existing in an information system that meets the statutory characteristics of a decentralized information system. Provided that the information technology and technical means of this information system provide a person who has unique access to this digital code or designation, the opportunity at any time to get acquainted with the description of the corresponding object of civil rights." Thus, based on this definition, a digital code or designation was recognized as digital right (Shestakova, 2019; Vasilevskaya, 2019).

In the final version of Art. 141.1 of the The State Duma (2001), the concept of digital rights is formulated according to the model for determining the concept of an uncertified security (Article 142 of the The State Duma, 2001): "digital rights recognize binding and other rights named as such in the law, the content and conditions for the implementation of which are determined in accordance with the rules of the information system that meets the criteria established by law."

In the draft Art. 141.1 of the Civil Code of the Russian Federation, the legislator referred to digital rights only the rights arising from users of cryptocurrency platforms and ICO (Initial Coin Offering). In the final version of the article, it was decided to abandon the binding of digital rights exclusively to decentralized information systems (decentralized registries) (Konobeevsky, 2019). The expert opinion on the draft Federal Law (2018) (hereinafter referred to as the Expert Opinion) was noted that the project greatly narrows the concept of "digital law," which is given in conjunction with its existence only with a distributed registry. After all, rights in electronic form can exist not only in the blockchain. Indeed, such an approach would discriminate against all other technologies that are capable of securing rights electronically. Blockchain technology has a certain time frame for existence, and to link innovation with this design, which may become obsolete over time, seems inappropriate.

As a result, we got the definition of the concept of "digital rights" so extensive that any rights fixed in digital form can be included in it. For example, the Expert Opinion indicated the similarities with digital rights of balance of a mobile phone, bonuses from various organizations credited to electronic cards and recorded in their information systems, bonuses (currency) in computer games, etc. With the development of technology and the digitalization of society, there will be more such examples. Such a broad understanding of digital rights, the presence of The State Duma (2001) ("named as such by law," "meeting the criteria established by law") enable the legislator to gradually work out this category in more detail: establish their specific types, characteristics, content, etc. However, the answer to the question of how long and by what laws this should be done by The State Duma (2001) does not contain. The norms of the Civil Code of the Russian Federation on digital rights are more declarative in nature and only state that digital rights exist as objects of civil rights and relate to property rights in the information system.

The legislator gives only a general description of digital rights—these are "obligation or other rights, the content and conditions of which should be determined

in accordance with the rules of the information system that meets the established the law featured." However, this wording is not disclosed by the legislator. It can be assumed that digital obligations include existing in electronic form the right to demand a result, an action, transfer of property, etc. The appearance of other digital rights, their contents and conditions are determined by the rules of the information system. Other digital rights (however, as well as binding ones) "live" in the framework of the information system. Simplified digital right is a right that is provided for by an information system. It seems that the legislator could well do without using item 1 of Art. 141.1, since they in no way contribute to the disclosure of the concept of digital right (Erdelevsky, 2019). Obviously, item 1 of Art. 141.1 of the Civil Code of the Russian Federation is of a referral nature and by itself does not allow disclosing the content and conditions for the implementation of digital right. These or those rights will be called digital in special laws, which will provide for signs that an information system must meet, that establishes rules for determining the content of digital law and the conditions for its implementation.

One of these types of digital rights—"utilitarian digital rights"—is already provided for in The State Duma (2019a), also called the "Crowdfunding Law," which entered into force on January 1, 2020. In addition to traditional methods of attracting investments through loans and placing equity or debt securities, Federal Law No. 259- FZ also provides for attracting investments through the offer of utilitarian digital rights. It turns out that now there are just digital rights and utilitarian digital rights.

Utilitarian digital law is the right provided for in Art. 8 of The State Duma (2019a). It arises in the investment platform in three varieties: 1) the right to demand the transfer of things (things), other than real estate; 2) the right to demand the transfer of exclusive rights to the results of intellectual activity and (or) the rights to use the results of intellectual activity, except for patent rights; 3) the right to demand the performance of work and (or) the provision of services. All three varieties—these are binding rights. In turn the investment platform according to Art. 2 of The State Duma (2019a) is an information system. Thus, utilitarian digital law is the right that is provided for by the investment platform. In legal literature, the existence of this "newfangled right" has already been criticized by individual authors, which analyzing it with examples of selling the right to receive gadgets or creative works on investment platforms, they identify this digital right with the construction of alienation of objects on a prepaid basis, however, with an unpredictable result, and not with investments (Ivanov, 2019).

Probably, in the near future we should expect the appearance of other laws, in which other types of digital rights will be settled.

It is worth paying attention to the peculiarity of the procedure for the implementation and disposal of digital rights: this can only be done in the information system and this does not require a third party (Alekseychuk, 2019).

The concept of "digital rights," enshrined in the Civil Code of the Russian Federation, does not cover objects that have been transformed for deals into digital form. That is, this concept includes only rights in respect of which it is expressly indicated that they can be created and circulated as digital. So, according to part 3 of Article 8 of Federal Law No. 259-FZ, digital rights are recognized as utilitarian if they initially arose as a digital right on the basis of an agreement on the acquisition of utilitarian digital law, signed using an investment platform. This indicates a certain similarity between digital rights and securities.

Digital Rights and Uncertificated Securities

When discussing the digital rights bill, a proposal was made to equate digital rights with uncertificated securities, since they are largely similar: in both cases, property law is not tied to a tangible carrier; they are disposed of by making entries in a special accounting system.

The professor of Department of Civil Law, Faculty of Law, Lomonosov Moscow State University, Doctor of Law, Chairman of the Expert Council under the Coordination Council of the Russian Union of Industrialists and Entrepreneurs on Digitalization A.V. Asoskov explained why the legislator did not go along the way of identifying digital rights and uncertificated securities. Being able to equate digital rights with uncertified securities or create a new civil rights object parallel to the existing one (uncertificated securities), the legislator chose the second way due to the fact that the Russian legislation on uncertified securities is underdeveloped. The Law on the Securities Market (The State Duma, 1996) allows for the existence of only investment uncertificated securities certifying monetary claims or corporate rights to participate in the authorized capital of joint-stock companies. Although in foreign practice uncertified securities are actively used, certifying other property rights. Therefore, the choice of the first option would create the need for a radical transformation of the Russian legislation on the securities market, which would drag on for a long time, and the draft law on digital rights would remain a draft law for a long time. However, A.V. Asoskov is sure that with the improvement of Russian civil law, both methods of certification of property rights will become a single legal institution (The State Duma, 1996).

At the same time, Federal Law No. 259-FZ, which entered into force on January 1, 2020, introduces the possibility of issuing and circulating securities certifying utilitarian digital rights (Article 9). A non-issuance non-documentary security certifying that its holder holds utilitarian digital law is called a "digital certificate." It has no face value and secures the right of its owner to demand from the depository, which has the ability to dispose of utilitarian digital right, to provide services for the implementation of utilitarian digital law and (or) to dispose of it in a certain way. A digital certificate is issued by the depositary to the holder of utilitarian digital law, accounting of which is carried out by this depositary. The issuance of a digital certificate does not require state registration. This is an example of how the legislator uses the existing infrastructure to trade utilitarian

digital rights. And this despite the fact, that given the definition of things that is now contained in Art. 128 of the Civil Code of the Russian Federation, uncertified securities cannot be objects of utilitarian digital rights.

The Ratio of the Concepts: "Digital Rights," "Tokens," "Cryptocurrency"

The Legal Department of the State Duma Staff in its expert opinion (ConsultantPlus, 2020). indicated that the introduction of the new term" digital rights "into the Civil Code of the Russian Federation was not practical. It would be more logical to use the terms "token" and "cryptocurrency" that have already become known in practice (this criticism was expressed in the framework of the initial narrow understanding of digital rights).

Based on the explanatory note to the draft law (ConsultantPlus, 2020), the legislator sought to resolve issues of cryptoeconomics, and it would be logical Use long-established and actively used terms. In addition, the term "digital rights" in the world is interpreted in a completely different way than the legislator suggested, namely as "human rights in the digital space" (Sannikova & Kharitonova, 2018).

According to L.A. Rodionov, the basic concept of "digital rights" enshrined in the Civil Code of the Russian Federation is a legal analogue of the term "token" (Rodionov, 2019).

M.A. Rozhkova believes that tokens in the Civil Code of the Russian Federation are named as "digital rights." And the use of tokens is a significant moment characteristic of a private blockchain (Rozhkova, 2019).

Without going into the analysis of the essence of the token (English token—token, sign, symbol), which clearly requires an independent in-depth study, and greatly simplifying, we can characterize the token as an electronic (digital) record that certifies real, obligation and other property rights or otherwise, including the intangible good of interest to the token holder (Rozhkova, 2019).

Usually the concept of "law" requires an explanation of what kind of law is involved and what is its content. We believe that in the concept of digital law, the term "digital" is used rather as a replacement for the term "token, to which information about property law is attached." That is, this term defines the rights that have acquired special qualities and have been singled out in a separate category on the basis of accounting features (and not on their actual content). There is no special right in digital law (Digital rights as a new object of civil law, 2019).

In the Russian legislation, there is currently no definition of cryptocurrencies, which are a type of digital currency, the creation and control of which are based on cryptographic principles. In simple terms, cryptocurrency is a digital currency. Coins act as its unit. They are protected from the possibility of falsification, representing encrypted information inaccessible for copying due to the use of the cryptography method. The concept of "cryptocurrency" is short for "cryptographic currency"—it is a currency distributed through computer networks in the form of

unique digital codes, which has a certain measure of value used in calculations and also for investments (Rodionov, 2019). The most common and famous cryptocurrencies are Bitcoin, Ethereum, Litecoin, etc.

In Russia, cryptocurrency is not included in digital rights. Garant (2020) provided for an independent art. 141.2 of the Civil Code of the Russian Federation ("Digital Money"), which proposed the concept of digital money and provided that the rules on digital rights apply to their circulation in cases where it can be used as a means of payment. However, when Federal Law No. 34-FZ was adopted, digital money (cryptocurrency) was excluded from the Draft Federal Law. Thus, amendments to the Civil Code of the Russian Federation can be assessed as neutral for the crypto industry.

So, apparently, the legislator created the unjustifiably complex legal construction of "digital rights," with the aim of extending the property rights regime to tokens and cryptocurrencies. But there is no objective need for it. In order to introduce them into economic circulation, it would be sufficient to recognize the fact that property rights can be fixed in digital form (Konobeevsky, 2019).

Proposed by the legislator in Art. 141.1 (ConsultantPlus, 2019a), the definition of "digital rights" and their reference in Art. 128 of the Civil Code of the Russian Federation, the number of objects of civil rights is subject to reasonable criticism.

Retired Judge of the Supreme Arbitration Court of the Russian Federation, Doctor of Law S.V. Sarbash believes that digital law is the design of any well-known law: proprietary, binding, corporate, exclusive, personal, that is, only its form, no more (Digital rights as a new object of civil law, 2019).

According to R.S. Bevzenko, digital rights are not an independent type of objects of civil rights. This is a form of existence of property rights (Bevzenko, 2019). Obviously, the term "digital" indicates only the form of content of the rights and the environment where they exist. Therefore, it is not logical to include digital rights in the list of civil rights, as we do not include, for example, "paper rights," "papyrus rights," etc.

We believe that digital rights should not be attributed to objects of civil rights, but should be considered only a form of enforcing rights. The Presidential Council for the Codification and Improvement of Civil Legislation in its expert opinion on the Draft (Expert opinion on the draft Federal law No. 424632-7 "On replace to parts one, two and three of the Civil code of the Russian Federation" dated 17.01.2019 No. 183-1 / 2019) indicated that digital right is a new way of fixing obligations and other rights, and not an object of civil rights. And it is advisable to agree with this provision.

CONCLUSION

Thus, we can conclude that the introduction into civil law of the concept of "digital rights" in the form in which it is presented today is not entirely justified, and the assignment of such rights to objects of civil law is illogical.

Of course, from the point of view of legal technology, all the basic concepts of the digital economy in the future should be fixed in the Civil Code of the Russian Federation in order to avoid many conflicts in the practical implementation of digital technologies in civil law relations (Inshakova et al., 2019).

However, the digital economy is currently in its infancy and dynamic development. In economic practice, many modern economic and technological models of relations have not been finally formed yet (Frolova et al., 2018). In this regard, it seems premature to declaratively fix the basic concepts of the digital economy, which include the concept of digital rights, in the Civil Code of the Russian Federation as a codification act, since they are not yet established not only in legal science and practice, but also in economics.

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CHAPTER 20

LEGAL STATUS AND DELINEATION OF RESPONSIBILITY IN THE DEVELOPMENT AND USE OF ARTIFICIAL INTELLIGENCE SYSTEMS

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The study raises the problem of the legal status of artificial intelligence, issues of legal responsibility for the actions of artificial intelligence, in particular, civil liability for damage caused by artificial intelligence systems to the third parties. The necessity to analyze this topic is determined by global changes in all spheres of public life as a result of the large-scale introduction of digital technologies, one of the directions of which is the development of artificial intelligence, including those provided for by the corresponding national program of the Russian Federation for the period until 2030. In Russia, there is still no special legislative regulation that takes into account the specifics of the application of artificial intelligence technologies. At the

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 251–266.

same time, an analysis of world experience shows that in a number of countries there is already a primary legal regulation of the use of artificial intelligence and robotics. However, at the moment in the world there are no unified approaches to the legal regulation of artificial intelligence systems, which is associated with the presence of a number of problems that do not have an unambiguous solution. Among such conceptual problems, one can single out the problem of liability for harm using artificial intelligence systems, which is very closely related to the problem of the legal status of artificial intelligence when interacting with a person.

The purpose of the study is to identify the foundations of the legal regulation of new social relations emerging in connection with the development and use of artificial intelligence systems, the rationale for the development of legislation in the context of digitalization of the economy and the introduction of artificial intelligence. Which takes into account the balance of interests of society, the state, companies developing artificial intelligence systems, as well as consumers of their goods, works and services. The decisive research method for achieving this result was a system analysis of the category of "artificial intelligence" in the context of its application in legal relations. We also used the general scientific dialectical method of cognition, private scientific methods (formal legal, method of interpreting legal norms, legal modeling method) and empirical methods (comparison, description, interpretation).

In conclusion the authors point out that the problem of responsibility, directly related to the problem of legal status is the most complex legal aspect of artificial intelligence systems development. The point of view is defended, according to which the standardization of the models of responsibility considered in the study in relation to artificial intelligence should be implemented at the global level and it should not be limited to the framework of only the national state, and should be aimed to establish such a regime of legal regulation of the use of artificial intelligence systems that will provide the necessary degree of protection of human and civil rights and freedoms, meet the interests of society and the state, be based on basic ethical standards.

The results of the study formulated by the authors can be served as a basis for further scientific research of the institute of legal responsibility for the actions of artificial intelligence and other problems of legal regulation of the development of artificial intelligence systems and robotics.

Keywords: Artificial Intelligence, Robotics; Robot, Legal Responsibility, Reimbursement Harm, Digital Economy

JEL Code: K1, K15

MATERIALS

The scientific base of the research is based on the works of the Russian (L.S. Bolotova, V.A. Laptev, P.M. Morhat, V. B. Nagrodskaya, L. A. Novoselova, I.V. Ponkin, O.V. Revinsky, A.I. Redkina, E.P. Sesitsky, V.N. Sinelnikova) and foreign (P.M. Asaro, P. Čerka, J. Grigienė, G. Sirbikytė, S.M. Solaiman) scientists.

The regulatory framework was drawn up by Decree of the President of the Russian Federation (President of the Russian Federation, 2019), which approved the "National Strategy for the Development of Artificial Intelligence for the Period until 2030," domestic legislation and regulatory legal acts of foreign countries (European Parliament, 2017).

The information and empirical basis of the study in terms of substantiating models of legal liability in relation to artificial intelligence was the analytical review of the global robotics market for 2019, prepared by Sberbank of Russia (Skolkovo, 2019).

METHODS

The research methodology is based on the general scientific dialectic method of cognition and the private scientific research methods: formal legal, method of interpretation of legal norms, method of legal modeling. Empirical methods of comparison, description, interpretation were used. The determining method was a system analysis of the category of "artificial intelligence" in the context of its application in legal relations.

INTRODUCTION

In order to ensure the accelerated development of artificial intelligence in the Russian Federation, to conduct research in the field of artificial intelligence, to increase the availability of information and computing resources for users, to improving the training system for specialists in this area, President of Russia Vladimir Putin approved the National Strategy for the Development of Artificial Intelligence for the period until 2030, on which a Decree was signed on October 10, 2019 (President of the Russian Federation, 2019) (hereinafter—Strategy). In this regard, the President of the Russian Federation instructed the Cabinet of Ministers to ensure amendments to the national program (ConsultantPlus, 2019b). In addition, the Cabinet of Ministers must annually submit to the President of the Russian Federation a report on the implementation of the Strategy, as well as provide for the formation of draft federal budgets in 2020–2030 for the implementation of this Decree.

Artificial intelligence in the Strategy refers to technological solutions that allow you to simulate the cognitive functions of a person and get results when performing certain tasks that are comparable, at least, with the results of human intellectual activity.

The Strategy notes that artificial intelligence includes an IT infrastructure, software (which also uses machine learning methods), as well as processes and services for data processing and search for solutions.

Countries with the development of artificial intelligence will receive advantages not comparable to nuclear weapons, and Russia has every chance of succeeding in this, said the Russian President Vladimir Putin (Putin, 2019).

The Ministry of Economic Development of Russia, in the framework of the federal project "Normative regulation of the digital environment," is working on a number of concepts related to the regulation of legal relations in the digital economy (ConsultantPlus, 2019a). One of them is the Concept of regulation of artificial intelligence and robotics technologies until 2023 (President of the Russian Federation, 2019) (hereinafter referred to as the Concept). In the Concept, in particular, it is noted that currently there are no unified approaches to the legal regulation of artificial intelligence systems in the world, which is associated with the presence of a number of problems that do not have an unambiguous solution. Among such conceptual problems are highlighted: the problem of self-identification of the artificial intelligence system when interacting with a person and the problem of responsibility for causing harm using artificial intelligence systems. The Concept emphasizes that the most significant issues in the application of artificial intelligence systems in the context of civil law relations are issues of civil liability for harm caused by artificial intelligence systems.

In this regard, the study of the institute of legal, first of all, civil law responsibility in case of damage by artificial intelligence systems is of particular relevance. Including consideration of the issues of determining the persons who will be responsible for their actions, as well as the possibility of using other methods to compensate for the harm caused by the actions of artificial intelligence systems (for example, liability insurance), and changing the mechanisms of not only civil law, but and criminal law and administrative liability.

The purpose of the study of these issues is to identify the foundations of legal regulation of new social relations emerging in connection with the development and use of artificial intelligence systems. It also consists in substantiating the development of legislation in the context of the digitalization of the economy and the introduction of artificial intelligence, taking into account the balance of interests of society, the state, companies developing artificial intelligence systems, as well as consumers of their goods, works and services (Inshakova, 2019).

RESULTS

The Concept and Legal Status of Artificial Intelligence

There is no clear, universally accepted definition of artificial intelligence. A variety of definitions of this concept is mainly proposed in the legal doctrine and contained in a number of regulatory acts mainly of foreign countries. Summarizing, all these definitions can be divided into two groups: 1) definitions characterizing the field of scientific knowledge; 2) definitions characterizing the signs and properties of certain devices or systems. Moreover, the definitions related to the second group characterize the system of artificial intelligence to the greatest extent from the standpoint of intellectual property rights (Sesitsky, 2019) and are the most common. So, according to L. S. Bolotova, artificial intelligence is an artificial (computer) system that can imitate human intelligence, that is, its ability

to receive, process, store information and knowledge and perform various actions on it, collectively called—intellection (Bolotova, 2012).

V. N. Sinelnikova and O. V. Revinsky believe that artificial intelligence is a computer program created by man and capable (due to the team architecture embedded in it) to create new information or objectively expressed results of his activities (Sinelnikova & Revinsky, 2017).

According to the point of view of I. V. Ponkin and A. I. Redkina artificial intelligence is an artificial complex cybernetic computer-software-hardware system (electronic, including virtual, electronic-mechanical, bio-electronic-mechanical or hybrid) with a cognitive-functional architecture and its own or relevant (given) computing power of the necessary capacities and fast action (Ponkin & Redkina, 2018).

P. M. Morhat proposed the following definition of artificial intelligence: it is a fully or partially autonomous self-organizing computer-hardware-software virtual (virtual) or cyberphysical, including bio-cybernetic, system (unit), not living in the biological sense of this concept, with appropriate mathematical software, endowed / with software-synthesized (emulated) abilities and capabilities (Morkhat, 2018a, p. 30).

A. Gurko succinctly formulated the definition of the concept of artificial intelligence and believes that these are machines (robots) and/or programs that are aimed at solving intellectual problems, as if such tasks were solved by a person (Gurko, 2017).

E. P. Sesitsky proposed a definition of the concept of "artificial intelligence system," which means a computer system, which is a combination of algorithms, computer programs, databases and hardware software based on artificial intelligence technologies (Sesitsky, 2019).

In the annual analytical review of the global robotics market published by Sberbank of Russia for 2019, artificial intelligence is defined as "the ability of programs and devices to interpret data, learn from them and use the acquired knowledge to achieve goals, including on their own" (Sberbank, 2019).

With regard to foreign regulations and official documents, for example, in Japan's Basic Law of December 14, 2016 No. 103 "On the Development of the Use of Public and Private Sector Data" (European Parliament, 2017) the term "Technology related to artificial intelligence." This is a technology for the implementation of such intellectual functions as training, inference and judgment, embodied by artificial means and the use of the corresponding functions realized by artificial means.

In the 2011 Revised Nevada Code of Laws (USA) (Justia, 2011), artificial intelligence means using computers and related equipment to allow a machine to duplicate or simulate human behaviour.

Significantly simplifying, we allow the use of the terms "robot" and "robotics" as synonyms for artificial intelligence. Although of course "robot," "robotics" and "artificial intelligence" are not equivalent categories. A robot is a programmable

machine that can autonomously or automatically perform certain actions. Robotics is positioned as a specific industry that implements robots in a particular area. In turn, artificial intelligence is designed to perform those tasks that can be solved without the participation of human intelligence (Navrodska, 2019).

The legal status of artificial intelligence (robot), closely related to the issue of liability for harm using artificial intelligence systems, is the subject of debate. Moreover, it depends on the measure and nature of the autonomy of artificial intelligence (artificial intelligence system) on a person (Ponkin & Redkina, 2018). To date, scientists studying this issue are conditionally divided into two camps: who advocate the assignment of the status of an object of rights to artificial intelligence (such are the majority), and those who consider it is necessary to give artificial intelligence the status of a subject of rights.

At the University named after O. E. Kutafin (Moscow State Law Academy), a survey was conducted on urgent problems of artificial intelligence systems, revealing the following difference in the views of scientists. When asked how respondents assess the idea of recognizing artificial intelligence technologies as subjects of law and applying the rules on legal entities to them by analogy, 75% said that they considered this idea to be absurd and only 3% said that the idea would be promising and useful (Navrodska, 2019).

Artificial intelligence (robot) as an object of rights is programmed for a certain limited range of machine actions, which makes it possible to recognize responsibility for the owner or other person who owns the robot legally. Artificial intelligence (robot) as a subject of rights is also programmed for a certain range of machine actions, however, under a number of previously known circumstances, it is able to carry out actions independently (Navrodska, 2019). If artificial intelligence is recognized as a subject of law, that is, one who has the ability to exercise subjective rights and bear legal responsibilities, who will be legally responsible for the actions of such a subject: is it artificial intelligence (robot) or the person who programmed it?

Taking into account the fact that the question of the legal status of artificial intelligence is not finally resolved, there is a problem: who should take responsibility and compensate for the harm caused by the actions of artificial intelligence?

Legal Liability in the Application of Artificial Intelligence Systems

There are different positions on modelling liability with respect to the use of artificial intelligence.

Resolution adopted by the European Parliament No. 2015/2103 (INL) "Civil law on robotics" (European Parliament resolution of February 16, 2017 with recommendations to the Commission on Civil Law Rules on Robotics) does not contain direct action standards, but it is one of the first comprehensive legislative acts in this area.

The problem of responsibility in this document is one of the central ones. It is dedicated to 10 points in the preamble and a whole section. Considering this prob-

lem, the European Parliament stated that, in the existing legal framework, robots alone cannot be held responsible for actions or inaction that caused harm to third parties. The existing rules of liability include cases where the actions or omissions of robots are causally related to the actions or omissions of specific persons, for example, manufacturers, operators, owners or users, and they could anticipate and prevent the behaviour of robots resulting in damage. In addition, manufacturers, operators, owners or users may be held objectively liable (independent of fault) for the actions or inaction of robots.

At the same time, parliamentarians proceeded from the fact that the higher the autonomy of the robot, the less the robot can be regarded as a simple tool in the hands of third parties (manufacturer, operator, owner, user, etc.). This argument is often made in the context of the discussion of the problem of responsibility: the robot is just a tool, respectively; individual rules for handling tools would look strange.

The European Parliament takes a different approach. Next-generation robots will be able to adapt and learn. Such abilities make the behaviour of robots almost unpredictable, since robots will self-learn based on their own experience, and their interaction with the environment will be unique and individual. The autonomy of robots raises the question of whether the usual rules of legal liability are sufficient. Is it necessary to develop new principles and rules that would clarify the legal liability of third parties for actions and inaction of robots that do not allow us to establish a causal relationship with the behaviour of a particular person. In addition, if the machines are designed so that they themselves can choose their counterparties, discuss the terms of contracts, sign contracts and decide how to execute them, then the usual rules will not apply to them. Accordingly, the following question arises from this: the legal nature of autonomous robots. Can it be within the framework of existing legal categories or is it necessary to create a new category that will have its own set of characteristics and provisions? As a solution to this problem, the European Parliament proposed a number of measures:

- Adopt a combined regulation in which legislative provisions on liability are combined with non-legal norms in the form of guidelines and codes of conduct (item 51);
- Not to establish any restrictions in relation to compensation for harm solely on the grounds that the harm was not caused by a person (item 52);
- Until otherwise established, recognize that responsibility should lie with the person, and not with the robot (item 56);
- When deciding on responsibility, take into account the real level of autonomy of the robot and what instructions it followed: the higher the ability of the robot to learn, the higher the level of its autonomy and the longer the robot trained, the more responsibility should be borne by the person who trained him (item 56);

- In cases where it is rather difficult to determine the person obligated to bear responsibility for harm due to the high level of autonomy of the robots, introduce a mandatory insurance system similar to the car driver liability insurance system (item 57);
- Create a reserve fund of funds that can be used to compensate for damage that is not covered by insurance (item 58). Such a fund may be common to all "smart" autonomous robots, or funds should be created for each category of robots;
- Partially relieve the manufacturer, developer, owner or user of the robot from liability, provided that they contribute funds to the compensation fund, as well as if they jointly insure liability in order to guarantee compensation for damage caused by the robot (item 59);
- Assign each robot an individual registration number entered in a separate register in the EU (item 59). This is necessary to trace the relationship between a particular robot and a compensation fund. The European Agency for Robotics and Artificial Intelligence could maintain such a register; and
- Give robots a special legal status in the future. The most advanced autonomous robots could be created as electronic persons and be responsible for the damage caused by them (item 59).

It should be noted that the approach presented in the EU Resolution also meets with criticism, for example:

- The expression "liability of robots" should be excluded, since it implies that the robot itself bears civil liability for any damage caused. Instead, the notion of "subsidiary liability" should be used. Taking into account the fears that the robot may be endowed with legal personality, there can be no question that it may be partially or fully responsible for its actions or inaction. Only a physical person must be liable using various insurance mechanisms; and
- It is difficult to determine the liability for damage caused by an autonomous robot. Typically, damage caused by an autonomous robot can occur due to a technical defect, which involves the application of the manufacturer's liability rules. Damage caused by autonomous robots can also be dictated by a user error. In such cases, strict liability or liability may apply, based on guilt, depending on the circumstances of each individual case.

The issue of responsibility is part of a much more general research on robotics.

For example, a study by Roadmap to US Robotics (A Roadmap for US Robotics From Internet to Robotics, 2016) addresses the issue of responsibility in the context of the ethical and legal implications of the development of robotics. The study shows several situations that potentially pose a serious challenge to the current legal system. One of them is causing unplanned harm when an autonomous system for some reason performs actions that no one programmed in it.

Japan's New Robotics Development Strategy (New Robot Strategy, 2015) also mentions the issue of responsibility—in the context of regulatory reform to create the necessary legislative environment for the development of robotics.

This document notes that the collection and study of information about incidents involving robots, determining the degree of responsibility of the device manufacturer, their classification from the point of view of current standards—all these issues must be resolved to conduct a "revolution of robots." In this case, it is necessary to take into account trends in the development of technologies and commercial use of robots. Law adjustments should be based on incident information.

Summarizing, it can be noted that there are following main approaches to modelling liability with respect to the use of artificial intelligence, in particular, robots (Sberbank, 2019):

1. The complete release of anyone from responsibility for the actions of the robot, for example, with reference to the unpredictable actions of fully autonomous robots as force majeure circumstances. So, V.A. Laptev believes that it is worth considering the possibility of considering unpredictable actions and decisions of artificial intelligence as circumstances of force majeure, completely excluding liability (Laptev, 2017).
2. Partial exemption from liability. A model that is close to full exemption from liability is the exemption from any responsibility for the actions of the robots of a particular person while paying victims compensation for harm, either through insurance institutions or through special compensation reserve funds. Thus, this approach has two different variations: the manufacturer or the owner (user) can be released from liability only if they take the necessary actions to insure the relevant risks or take part in the system of compensation reserve funds. For example, V.A. Laptev believes that manufacturers or users of artificial intelligence systems should be subject to compulsory third party liability insurance by analogy with vehicle owner liability insurance (Laptev, 2017).

   However, at the moment there is uncertainty in the order and the very possibility of applying existing insurance institutions to relations involving robots and artificial intelligence systems. The absence of special provisions in this regard either makes insurance of robotic products or artificial intelligence systems impossible (which negatively affects the possibility of their implementation), or makes it unreasonably expensive (which also hinders the development of the industry).

   On the contrary, the effective functioning of insurance institutions in the industry has a positive effect on the speed of introduction of robots in civilian turnover. Thus, the existence of a signed contract of liability insurance for harm can be (and in a number of foreign countries acts) a key condition for the release of certain types of robots or artificial intelligence systems into turnover.

In this regard, the Concept of Regulation of Artificial Intelligence and Robotics Technologies until 2023 indicates that in the medium term, cases and conditions of compulsory liability insurance for damage caused by the use of robots or artificial intelligence systems should be determined, including as alternatives to other regulatory tools.

3. Responsibility only when there's guilt. According to this model, responsibility for the actions of a robot comes only depending on the guilt of a particular subject.

   Moreover, it is in this model that the greatest number of the most varied liability options is possible:
   - If the robot causes damage caused by a design defect, the manufacturer is liable;
   - If the accident occurred due to a malfunction of the software, the developer is responsible;
   - If the robot is sold with open source software, the responsible person will be the one who programmed the application that caused the robot damage;
   - If the robot is self-learning, the responsibility is the one made the greatest contribution to its training; and
   - If the robot executed specific commands, the responsibility lies with the operator or user who issued such commands.

   Given the specifics of a particular legal system, various combinations of responsibility are possible in this approach, for example, joint liability of several entities.

   In addition, the solution to the question may vary depending on whether the user and / or the injured person is a professional in a particular robot application.

4. Limited innocent liability of the manufacturer (owner, other person). In this model, very close to the second position described above, liability is innocent, but limited. A limited liability condition may be, for example, insurance of risks of using the robot, replenishment of the compensation reserve fund, and other actions (for example, providing the robot with a black box, a red button for quick shutdown, providing information about its operation, etc.).

   Artificial limitation of producer responsibility is a way to increase the innovative potential in the robot industry, reducing concerns liability costs and eliminating the rule that manufacturers should be held accountable for risks that could not be avoided.

   The Concept of Regulation of Artificial Intelligence and Robotics Technologies until 2023 notes that further study of the institute of civil liability without fault is required in case of damage to artificial intelligence systems that have a high degree of autonomy when they make decisions. Including from the point of view of determining the persons

who will be responsible for their actions, as well as the possibility of using other methods to compensate for damage caused by the actions of artificial intelligence systems (for example, liability insurance, etc.).

5. Full innocent responsibility for the actions of the robot. It is assumed that a certain person is generally considered to be responsible for the actions of robots. In this model, the most often responsible persons will be manufacturers (especially in consumer relations) and owners of robots, recognized as a source of increased danger. Indeed, many artificial intelligence technologies (unmanned aerial vehicles, medical and industrial robots) are very likely to be classified as sources of increased danger. Then, for damage caused as a result of their use, liability will come in accordance with Art. 1079 of the Civil Code of the Russian Federation (The State Duma, 1995).
6. A position involving the endowment of robots with legal personality (rights and obligations, for example, the status of an electronic identity), which, accordingly, will allow them to bear personal responsibility. Among some researchers, there is a point of view according to which robots should be endowed with the status of an electronic person in order to free their creators and users from potential responsibility for the actions of artificial intelligence (Solaiman, 2017). P.M. Morhat believes that the introduction of a separate special institution of an electronic person will streamline the legal relationship and the legislation applicable to them (Morkhat, 2018b).

At the same time, the question of whether the artificial intelligence system can be held accountable for its actions, which is directly related to the question of the possession of artificial intelligence as a legal personality, causes great debate. Granting artificial intelligence legal personality, we compare it with man. However, this artificial intelligence system does not have the human consciousness and feelings in order to understand that it commits this or other offense.

It should be noted that according to Peter Asaro some aspects of the concept of legal personality could still be applied to subjects that do not fully correspond to the concept of personality. That is, from this point of view, the artificial intelligence system can be considered as subjects with a certain quasi-legal personality (Asaro, 2007). The endowment of the artificial intelligence system with certain limited rights and obligations can be carried out to achieve certain goals in a particular area, and not to endow such a system with full legal personality. For example, when it comes to accessing voice data obtained by a virtual assistant, installed on a smart phone when investigating crimes.

According to a number of authors, when endowing the artificial intelligence system with certain quasi-rights, this is not about giving it real

rights, but rather about legal fiction aimed at simplifying and optimizing the application of existing legal regimes.

However, it should be mentioned that the artificial intelligence system cannot fully acknowledge and understand the consequences of the harmful acts committed by it. With regard to criminal liability, this entails the almost complete absence of the subjective side of the crime, and hence the absence of corpus delicti. The question of artificial intelligence system responsibility is in many ways a dead end due to the complete senselessness in this case of criminal (established specifically for humans) or administrative responsibility measures which are simply not applicable to artificial intelligence systems, and meaningless in relation to them. In this regard, the Concept for the Regulation of Artificial Intelligence and Robotics Technologies until 2023 indicates that in the medium term it is advisable to conduct additional studies on the issue of changing the mechanisms of not only civil liability, but also criminal and administrative liability.

This option of liability, as well as the option with no liability, is extreme. The rest of the models are inside these two extremes.

7. Mixed liability regime. It assumes that different responsibility modes are applied for different robots. It is the ranking of robots by the degree of their danger to third parties and society and compliance with special conditions for acquiring them in property. The need for such an approach seems logical.

Currently, the most common (traditional) model is the real actor, according to which artificial intelligence is a tool of a real violator, performer of an offense. Therefore there will always be known the offender a specific person, who will be responsible for the operation, of a certain system of artificial intelligence. The implementation of such a model will not require any major changes to existing legislation.

At the same time, artificial intelligence is a new phenomenon that has yet to be studied in detail, able to perform tasks without the participation of human intelligence (Tarakanov et al., 2019). It is this function that allows artificial intelligence to act differently in similar situations, depending on previously performed actions. “If the artificial intelligence of the future meets expectations, that is, it turns out to be a thinking humanoid robot with feelings and emotions, then laws will need to be changed in order to cover the roles of robots in society. This means that it will be necessary to review the existing legal system and adapt it according to the changing needs of society” (Čerka et al., 2015). At the same time, the general vector of possible changes should be aimed at guaranteeing an effective and fair distribution of responsibility in case of damage by the artificial intelligence system.

CONCLUSION

The 21st century is a time of scientific technologies development (Inshakova et al., 2019), one of its achievement was the development in the field of artificial intelligence and robotics. Unfortunately, the practical application of these areas is not fully ensured by the international legal and national legal framework.

The problem of responsibility, closely related to the problem of legal status, is indeed one of the most difficult in relation to the legal aspects of the development of artificial intelligence and robotics systems (Frolova et al., 2018).

The most controversial legal issue is the definition of liability for harm caused by the use of artificial intelligence. It is caused by several factors. First, institutions of responsibility can have separate nuances for different categories of artificial intelligence, depending on the degree of their social danger, controllability, or learning ability. Secondly, in a number of cases, it is difficult to establish the actual circumstances of the harm. Thirdly, the same situation can get a different solution from the particular jurisdiction point of view. Therefore, national features of a particular legal system often do not allow taking into account the existing experience of other countries. As a result, among lawyers there is a wide variety of points of view on this issue. The problem of responsibility itself is a kind of showcase of the whole problem of legal regulation of the development of artificial intelligence.

At the same time, the models of responsibility considered in the study as applied to artificial intelligence are not limited only by the national state. Therefore, their standardization must be implemented at the global level.

Artificial intelligence can be both good and evil, therefore, legislators should take special security measures to create and maintain a register of robots with identification of their owners, as well as a ban on creating "killer robots" and programming for causing harm, based on the principle that human is the highest value of society and the state.

The legal regulation of the artificial intelligence systems use should provide the necessary degree of protection human and civil rights and freedoms, meet the interests of society and the state.

The development of artificial intelligence technologies should be based on basic ethical standards and include:

- The priority of human well-being (the goal of ensuring human well-being should prevail over other goals of the development and application of artificial intelligence systems and robotics);
- Prohibition of harm by artificial intelligence and robotics (the development, circulation and use of artificial intelligence and robotics systems capable of causing intentional harm on their own initiative should generally be restricted););

- Human control (to the extent that this is possible taking into account the required degree of autonomy of artificial intelligence systems and robotics and other circumstances);
- Projected compliance with the law (the use of artificial intelligence systems should not obviously lead to a violation of legal norms for the developer);
- Prevention of hidden manipulation of human behaviour;
- Designed security (when developing artificial intelligence systems, an adequate level of personal and public security should be provided).

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CHAPTER 21

MODIFICATION OF INTERNATIONAL MECHANISMS FOR PROTECTING HUMAN RIGHTS UNDER CONDITIONS OF ANTHROPOGENIC ENVIRONMENTAL IMPACT WITH THE INTENSIVE DEVELOPMENT OF TECHNOLOGY OF THE SIXTH TECHNOLOGICAL ORDER

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New technology of the sixth technological order, on the one hand, will be more oriented towards the preservation of the environment, but, on the other hand, will be hazardous to the environment. However, this damage will be of a different kind

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 267–276.

than today. In this article, we would like to analyze what changes are taking place today in the international mechanisms for protecting environmental human rights in the context of the intensive development of the sixth technological order. For almost 50 years, the international community has been discussing the relationship between human rights and the environment. As relations in this area of international cooperation developed, it triggered the adoption of international legal acts of a binding and recommendatory nature aimed directly or indirectly at protecting procedural environmental human rights: the right of access to environmental information; the right to public participation in decision-making; the right to access justice in environmental matters. The article discusses three areas for development of the protection of environmental human rights at the international level. The authors refer to various examples from current international legal practice. The article highlights the active role of Latin America, where two important documents were recently adopted: the 2018 advisory opinion of the Inter-American Court of Human Rights on the environment and human rights, and the 2018 Escazú Agreement on access to information, public participation and justice in environmental matters in Latin America (Escazú Regional Agreement on Access to Information, 2020). In conclusion, the authors postulate that such intensive codification and progressive development of international law in the field of protection of environmental human rights on the one hand inspires and shows that the international community is aware of the terrifying level of environmental degradation. Moreover, there is a dynamic process of development of international environmental law and international human rights law. On the other hand, there is a fear of fragmentation and contradictions in the interpretation of numerous treaties governing (directly or indirectly) the protection of environmental human rights.

Keywords: Environmental Human Rights, Climate Change, Aarhus Convention, Escazú Agreement, UN Human Rights Treaty Bodies

METHODS

The methodological basis of the study involves a combination of general scientific (dialectical, historical, inductive, deductive, analytical, synthetic) and private scientific methods (formal-legal, comparative-legal, interpretative, statistical, procedural and dynamic).

INTRODUCTION

While maintaining the current pace of technological and economic development, the sixth technological order will be accompanied by a new scientific, technical and technological revolution (Kablov, 2010). It is assumed that nanotechnology, genetic engineering, alternative energy, and global information networks will be the basis of the sixth order (Inshakova et al., 2019).

It is supposed to update the social sphere and modernize the agricultural sector. Thus, a number of scientists believe that these technologies will make it possible

to achieve aspirations for careful treatment of the environment (Shapovalova & Zakharova, 2012).

Another more precautionary approach demonstrates that, for example, nanotechnology can be both a source of possible environmental problems of the future, and the basis for creating new promising types of environmental engineering and technology. In the future, nanotechnology and nanomaterials obtained with their help may become sources of so-called nanopollution. The first information about its appearance and impact on human health and natural organisms is already available (Inshakova & Inshakova, 2020; Kozachek, 2015).

There are many other studies showing the negative impact of the sixth technological order on the environment. For example, hydroelectric power stations and tidal power plants change the regimes of the currents and temperatures of rivers and sea bays, and become barriers to the migration of fish and other flows of matter and energy. In addition, one of the significant side effects of hydroelectric power stations is flooding of territories suitable for resettlement, agricultural and other activities. At the same time, landslide processes may develop on the banks of reservoirs at hydroelectric power stations; changes in local climatic conditions and the development of seismic phenomena are possible. The stagnant water regime in the reservoirs can provoke not only an increase in greenhouse gas emissions, but also the accumulation of harmful substances that pose a threat, including to human health. Breakthroughs and collapses of the dams of hydroelectric power stations—especially in mountainous and earthquake-prone areas—can pose a special danger. One of the largest disasters of this kind occurred in 1963 on the Vajont River in the Italian Alps, where a giant landslide descended into the reservoir at the dam of the hydroelectric power station, causing the wave to overflow through the dam and the formation of a "tsunami" of up to 90 m height. The huge wave demolished several settlements, more than 2,000 people died (Degtyarev, 2019).

Wind energy is the least dangerous from the point of view of greenhouse gas and pollutant emissions, but at the same time, it raises a number of environmental claims with regard to other issues. They include noise pollution of the area, "aesthetic pollution," the risk of the impact of rotating blades on the psyche. Another group of claims is related to the impact on the fauna—in particular, windmills can scare away birds and cause their death when they collide with the blades (Degtyarev, 2019).

Thus, of course, new technology will pose a danger to the environment. However, this damage will be of a different kind than today. It is necessary to carry out detailed scientific research in this area, to learn to assess this type of environmental damage so that in the coming decades people could protect their rights, including environmental rights. In this article, we would like to analyze what changes are taking place today in the international mechanisms for protecting environmental human rights in the context of the intensive development of the sixth technological order.

Today, the importance of environmental human rights in the world is growing, and we see the increase in the number of international mechanisms aimed at their protection. It seems that there are three main areas of the development of environmental human rights at the international level. Firstly, it is an expansive interpretation of the available categories of human rights (civil, political, social and cultural human rights) enshrined in international human rights treaties at the universal and regional levels. Secondly, it is the development of international environmental agreements at the regional level aimed at the protection of procedural environmental human rights: the right of access to environmental information; the right to public participation in decision-making; the right to access justice in environmental matters. Thirdly, it is the incorporation of environmental human rights in various international environmental agreements. It is clear that it is impossible to discuss in one article all the trends and problems of protecting environmental rights in international law. Numerous monographs (Grear & Kotzé, 2015) are devoted to this issue, and the British publishing house "Elgar Publishing" issued Volume 7, which is entirely dedicated to the problem of environmental human rights (more than six hundred pages), as part of the publication of a 12-volume encyclopedia of environmental law (May & Daly, 2019). In this article we would like to highlight some current trends in this area of international cooperation, as well as analyze in more detail one of the environmental human rights—the human right to environmental information.

RESULTS

The following trends should be noted in the framework of the *first area* of the development of environmental human rights. Historically, the Bill of Human Rights was adopted before the first UN environmental conference—the 1972 Stockholm Conference on the Human Environment. Based on the fact that it is extremely difficult to make amendments to the Universal Declaration of Human Rights, the International Covenant on Civil, Political Rights and the International Covenant on Economic, Social and Cultural Rights, and the environmental imperative urgently requires to be reflected in human rights agenda, the evolutionary process of an expansive interpretation of the existing human rights has begun in order to protect human rights related to the favorable state of the environment. Today, this takes place in various forms, for example, in 2018, the UN Special Rapporteur on human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment adopted the "Framework Principles on Human Rights and the Environment," which were approved by the UN Human Rights Council Resolution (Individual Communication, 2020). This is most reflected in the framework of the activities of the human rights treaty bodies, which monitor the fulfillment by states of their obligations under these agreements (Abashidze & Koneva, 2019). These activities include primarily the consideration of periodic reports of states, the adoption of general comments and the consideration of complaints filed by individuals / collective entities / states on violations by states of

the provisions of international human rights treaties. For example, in 2020, the UN Human Rights Committee for the first time considered a case related to asylum claims due to climate change (Individual Communication, 2020). This case is new and has not been previously analyzed in the scientific literature, so we will consider it in detail.

A citizen of Kiribati, seeking asylum in New Zealand, complained to the Committee about the decision of the New Zealand court to deport him to his homeland, although, according to him, such move violates his right to life. Ioane Teitiota and his wife and children moved to New Zealand, as rising sea levels threaten to flood Kiribati, an island nation in the Pacific Ocean, and make it unsuitable for living. According to Teitiota, fierce conflicts related to the right to land erupt in the country because of the reduction in the area of fertile land. Due to soil degradation, it is becoming increasingly difficult to make a living by working in the field. In addition, due to sea level rise, fresh water mixes with salt and becomes unsuitable for drinking. However, in 2005, New Zealand authorities rejected Teitiota's petition and expelled the family to their homeland. In a complaint to the Human Rights Committee, Teitiota claims that this decision violates his right to life. The UN experts, having carefully listened to his arguments and scrutinized all the available information, came to the conclusion that in this case there is no threat to life, since the country has already taken appropriate protective measures. Nevertheless, Yuval Shani, one of the Committee members, emphasized that this decision of the Committee sets new standards that in the future can contribute to a favorable outcome of other cases related to asylum claims due to climate change. Moreover, according to independent experts, "climate change refugees" are not required to prove that in case of deportation to their homeland they are confronted with imminent danger. They explained that climate threats could be both sudden, for example, in the case of hurricanes or floods, and progressive, as occurs with salinization and land degradation. Both can force people to seek a safe residence in other countries. Committee members also stressed the need for international support for countries affected by climate change. Unless decisive measures are taken, both internationally and nationally, entire states may find themselves under water. In this case, the threat to life is obvious and the receiving states will not be able to deport asylum seekers from such countries (Teitiota v. New Zealand, 2020).

When considering the *first area* of development of environmental human rights, it should be noted that this process does not happen in isolation at the universal level, but is progressively developing within the framework of regional human rights systems: Inter-American, African and European. In the first two systems of human rights protection, environmental rights are recognized directly in international documents, and in the European system, they are derived from other categories of human rights through an expansive interpretation. At the same time, we should mention an important trend: in the first two regional human rights systems, despite the fact that environmental human rights are enshrined in the international instruments, the process of an expansive interpretation of the existing hu-

man rights continues in parallel. This demonstrates the comprehensiveness of the concept of "greening the law" and the difficulty in establishment of environmental human rights in specific limited terms. What is more, on February 7, 2018, the Inter-American Court of Human Rights published a landmark Advisory Opinion on the Environment and Human Rights (UN Human Rights Council Resolution, 2018). This is one of the latest significant decisions of a general nature adopted by an international court. Since it has not yet been analyzed in detail, we should note the following. Reaffirming that human rights depend on the existence of a healthy environment, the Court ruled that states must take measures to prevent significant environmental harm to individuals inside—and outside—their territory. In other words, if pollution can travel across the border, so can legal responsibility. Many central elements of the Opinion—including the nature of the requisite causal nexus, the level of due diligence, and the scope of extraterritorial duties—remain to be clarified in future litigation. However, the Opinion will likely have significant implications: 1) it may influence how mega-infrastructure projects in the Americas, including offshore platforms, dams, and cross-border pipelines, are approved, monitored, and executed; 2) it may open the door to transboundary climate litigation; 3) the Court noted that states are increasingly expected to regulate activities of its enterprises abroad, potentially hinting at a higher standard for multinational companies operating in the Americas; 4) the Court's Opinion could shape the practice of other human rights tribunals and national courts (Banda, 2020).

With regard to the *second area*, it should be noted that until recently there was only one international treaty at the regional level dedicated exclusively to the protection and promotion of environmental human rights. This is the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 1998 (UNECE, 1998). Over more than 20 years since the adoption, the Aarhus Convention has been ratified by 47 Parties (out of which 46 countries and the European Union). The most important achievement of the Aarhus Convention is the establishment of a special monitoring mechanism (similar to the aforementioned human rights treaty bodies) with quasi-judicial functions that allows for consideration of complaints filed by individuals/collective entities / states about states' compliance with their obligations under the Aarhus Convention. The Committee has already accepted more than 170 complaints and has contributed significantly to improving the efficiency of the international legal regime for the protection of environmental human rights. It can be noted that the Committee has considered complaints against the European Union regarding its possible non-compliance with the provisions of the Aarhus Convention.

Prospects for the further codification of the right of access to environmental information in terms of the development of PRTR were recorded in paragraph 9 of Article 5 of the Aarhus Convention, which referred to the creation of national publicly available inventories or pollution registers. Five years after the adoption of the Aarhus Convention in Kiev (UN, 2003), the Protocol on PRTR to the Aarhus Convention (hereinafter—the Kiev Protocol) was adopted, which entered into

force on October 8, 2009. To date, the Protocol has been signed by 40 participants and 36 of them ratified it: 35 States and the EU (Abashidze et al., 2019).

In 2018, inspired by the positive example of the Aarhus Convention, 24 Latin American and Caribbean states in San Jose, Costa Rica, on March 4, 2018 adopted the Escazú Regional Agreement on Access to Information, Participation and Justice in Environmental Matters in Latin America and the Caribbean (2020). In two years, the Agreement has secured 22 Signatures and 8 Ratifications. According to Article 22, the Agreement shall enter into force on the ninetieth day after the date of deposit of the eleventh instrument of ratification, acceptance, approval or accession. Thus, three more ratifications are required for this Agreement to enter into force.

In general, we would like to note that at present, as an alternative to the European and Inter-American regional human rights protection systems, we witness the development of quasi-judicial practice of committees monitoring compliance with the specialized international agreements aimed exclusively at observance of procedural environmental human rights. So far, Europe has avoided the contradiction between these areas of environmental rights protection, and in Latin America, the Escazú Agreement Compliance Committee has not yet been launched. But potentially there are grounds for fragmentation in the protection of environmental rights at the international level in these two regions of the world.

Interesting processes are also observed with regard to the *third area* of development. More and more international agreements indirectly affect the protection of environmental human rights. For example, the environmental rights of indigenous peoples are reflected in the 2010 Nagoya Protocol on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising from their Utilization to the 1992 Convention on Biological Diversity. In addition, environmental human rights in general and environmental rights of indigenous peoples in particular are mentioned in the 2015 Paris Climate Change Agreement to the 1992 United Nations Framework Convention on Climate Change (Solntsev, 2018).

Such intensive codification and progressive development of international law in the field of protection of environmental human rights on the one hand inspires and shows that the international community is aware of the terrifying level of environmental degradation. Moreover, there is a dynamic process of development of international environmental law and international human rights law. On the other hand, there is a fear of fragmentation and contradictions in the interpretation of numerous treaties governing (directly or indirectly) the protection of environmental human rights.

CONCLUSION / RECOMMENDATIONS

In this study, we showed that international mechanisms for protecting environmental human rights are changing significantly and are trying to adapt to the new sixth technological order. However, this is not enough. One of the upcoming challenges in this regard will be the lack of proper scientific expertise and assessment

of environmental damage. It seems that engineers, environmentalists, and lawyers should strengthen collaborative interdisciplinary research.

Although significant progress has been made in clarifying the complex and multifaceted relationship between human rights and the environment, there are still a number of open questions in the dialogue on these two areas of law and politics.

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PART III

ECONOMIC AND LEGAL REGULATION OF TECHNOLOGICAL FORMATION OF THE INDUSTRY 4:0 AND INTERNATIONAL INTEGRATION OF THE RUSSIAN FEDERATION

CHAPTER 22

VECTORS OF DEVELOPMENT OF LEGAL REGULATION TO MEANS OF INDIVIDUALIZATION IN THE BRICS ASSOCIATION

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In this chapter, the authors reveal the main directions of regulation of protection rights of economic entities of BRICS jurisdictions on the means of their individualization in modern conditions.

Neo-industrialization, characterized by the substantial simplification of access to information for all Internet users, has exacerbated the problem of the original identity of commercial organizations. In modern conditions, the uniqueness of trademarks is very important for successful business activities. Buyers who purchase goods of predominantly high quality get used to the trademark of manufacturer each product, the supply and demand of such goods balance each other, economic activity is stable, with positive results for all participants. However, unscrupulous entities, for the purpose of illegal enrichment, often fake goods under the original and sell tainted goods. The legislation of the BRICS association, which should regulate these relations, is not fully formed. But, according to our estimates, the volume of trade transactions between business entities of member countries of associations exceeds

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 279–288.

$ 120 billion per year. Based on the materialistic worldview, the general method of historical materialism, the authors used for research general and particular scientific methods, which allowed us to implement a systematic approach to the subject of study.

The main attention is paid to the allocation and disclosure of the main directions of development of regulation and protection of rights to means of economic entities individualization in the BRICS association. The necessity of developing unified international treaties at the level of the BRICS member countries is justified.

At the international level, there is a sufficient number of legal acts regulating the protection of legal entities rights to means of individualization. The problem that arises when applying these acts for business entities from the BRICS member countries is the lack of a unified approach to solving this problem. It is necessary to sign certain regional agreements that would apply to this group of states. The problem can and should be solved through the use of modern information technology.

Keywords: Neo-Industrialization, Product, Brand, Identification, Legal Regulation, Foreign Economic Deals, BRICS

JEL Code: K12, K19, K23, K39, K42.

MATERIALS

Scientific development of the material is carried out on the basis of a set of regulatory, doctrinal and other sources. The chapter examined the norms of: The Civil Code of the Russian Federation (The State Duma, 1994); the concept of the participation of the Russian Federation in the BRICS association (Approved by the President of the Russian Federation by Decree of February 9, 2013) (Kremlin, 2013); the concept of the chairmanship of the Russian Federation in the BRICS interstate association in 2015–2016 (Approved by the President of the Russian Federation by Decree of March 1, 2015) (BRICS, 2015). International documents relating to the legal regulation of relations on the use of means of legal entities individualization were analyzed. In particular, the Madrid Agreement on the International Registration of Marks of April 14, 1891, the Nice Agreement on the International Classification of Goods and Services for the Registration of Marks of June 15, 1957, and others are analyzed.

Doctrinal sources are represented by scientific publications of domestic jurists, including: Inshakova A.O., Belikova K.M., Goncharov A.I., Lokteva E.D., Lukhmanova S.N., Majorina M.V., Alimova Ya.O., Sevostyanov M.V., Yarygina I.Z., and others.

METHODS

The content of this chapter of the monograph has been developed on the basis of a materialistic world view and the universal scientific method of historical materialism. The general scientific methods of cognition are applied: the dialectic, hypo-

thetical-deductive method, generalization, induction and deduction, analysis and synthesis, an empirical description. The study also used private scientific methods: dogmatic, comparative legal, hermeneutic, structural and functional, etc.

INTRODUCTION

In modern business, one of the main tasks of entrepreneurial activity is the allocation of your product from the aggregate of similar products of other participants in the turnover and the protection of their original products from the actions of unscrupulous persons. To solve the problem, there are special visual tools—means of individualization of goods: company name; trademark; service mark; appellation of origin; commercial designation. Of great importance are the means of individualization of goods, works and services for the average consumer, since it is with their help that people get the opportunity to distinguish and choose products of various manufacturers for themselves.

Russian civil law provides ways to protect the violated rights of legal entities from the unlawful use of their means of individualization (Inshakova et al., 2017). Moreover, Russia is a member of interstate integration associations, so the volume of trade deals between business entities of the EAEU and BRICS countries exceeds $ 120 billion. However, the legislation of associations, which is mandatory for business entities of these jurisdictions, which should regulate these relations, has not actually been formed in the proper amount.

RESULTS

BRICS is an association with a special legal status. It is a platform for developing dialogue and cooperation between member states (Brazil, Russia, India, China and South Africa). It should be clarified that until February 2011 this association consisted of only 4 members, and only on February 18, 2011 South Africa became the 5th member of this platform. The purpose of this structure is to ensure security, prosperity and economic development in a multi-polar, interconnected and globalized world. Achieving this goal is possible by developing concepts for effective cooperation and significant activity of the economic and technological capabilities of the participating countries. With the help of economic integration and sectoral coordination, the cooperation of the BRICS countries will provide stable economic development and will strengthen the financial and social situation of citizens within the states themselves. Ultimately, the BRICS member countries will take a more advantageous position in the light of economic globalization, achieve their foreign policy goals and create a favorable economic environment for national development.

The objectives of the BRICS community also include: 1) achieving peace and stability through the norms and principles of international law while maintaining the coordinating role of the UN Security Council; 2) the transformation of the international financial and economic system; 3) the distribution of trade and economic ties in accordance with the rules of the WTO; 4) improving the economies of the BRICS

member states; 5) the introduction of innovative technologies; 6) mobilization of internal and external investments; 7) support for scientific research and improving the education systems of the member states of this platform (The Concept of participation of the Russian Federation in the BRICS association of February 9, 2013).

The creation of the BRICS platform is seen as the implementation of the objective laws of international development. This process should be considered as a special element of the new concept of interstate relations. The tasks of the BRICS group are to regulate such issues of international cooperation as: 1) transforming the global financial and monetary system, maintaining justice and the effectiveness of its implementation; 2) ensuring the implementation of the rule of law principle in relations not only between the participants of this platform, but also with other foreign countries, the spread of foreign policy cooperation between the BRICS countries in the maintenance of peace, relying on the preservation and observance of the sovereignty of third countries; 3) improving the bilateral economic relations of the BRICS member country with other participants in the group; 4) distribution of linguistic, cultural and informational presence in the international community (The Concept of the Chairmanship of the Russian Federation in the BRICS Interstate Association, 2015).

Since the emergence of BRICS on this platform, participants have held 7 summits at which they formulated means and methods of interaction, identified trends aimed at equal and beneficial cooperation in various fields (for example, political, economic, social and humanitarian, etc.). In addition, a specific tendency to strengthen and improve ties was identified, which is confirmed by the Ufa Declaration adopted at the 7th BRICS Summit. Therefore, taking into account the existing realities, BRICS is a set of independent and equal countries that are active participants in international integration processes, improving and building up trade and political relations in the group itself. Let us further consider the legal regulation of economic relations within the framework of this platform, including the problems of means of individualization.

Cross-border contractual relations are generally characterized by a special regulatory system (Majorina & Alimova, 2017). The BRICS countries are no exception, but they have their own specifics. According to Alimova Ya.O., this specificity is manifested in the following. Firstly, these are special legal sources containing both unified substantive rules (material regulation method) and conflict norms (conflict regulation method); secondly, there are non-legal (non-state) sources of regulation (Alimova, 2019).

An important role in the conclusion of international foreign trade transactions is played by contracts with the participation of entities from 2 or more states, which include unified material standards. Despite this, among the BRICS documents, there is practically no agreement where all the participating states would participate simultaneously. In this regard, Yarygina I.Z. rightly emphasizes that the dominant negative circumstance that hinders the improvement of the financial

relations of the participating countries is the imperfection of the legislation in the field of property rights protection (Yarygina, 2018).

As an example of the lack of a single international-legal approach to the regulation of economic relations, we can cite the UN Convention on the limitation period in the international sale of goods in 1974, which Russia and Brazil signed but did not ratify. Another example is the UN Convention on the use of electronic communications in international treaties of 2005, which China signed in 2006 but did not ratify, unlike the Russian Federation, which has been operating in our country since 2014. Another typical example is the Vienna Convention on Contracts for the International Sale of Goods of 1980, which only the Russian Federation and China have signed and ratified from the BRICS countries.

The analysis allows us to argue that it is not possible to find conventions in which all the BRICS member states would participate. Despite this, during the study, some exceptions to this rule can be found, although they do not fully relate to contractual relations. The first example is the Convention on the Recognition and Enforcement of Foreign Arbitral Awards, concluded in New York in 1958. All BRICS countries are considered as participants in this international act. Russia, acting as the successor of the USSR, and India—since 1960, South Africa since 1976, China since 1987 and Brazil since 2002. It was this circumstance that led to the fact that there was a noticeable advance in the discussion about the prospects for the establishment of international arbitration under the BRICS.

Another example is the Cape Town Convention on International Safeguards for Mobile Equipment (UNIDROIT, 2001). This international treaty entered into force in 2006, all members of the BRICS group signed and ratified this document. The Convention also applies in cases where, at the time of conclusion of the contract providing for the "international guarantee," the debtor is in the territory of the state that signed the Convention. At the same time, the location of the creditor in a state that has not signed this Convention does not affect the application of this international act. The Convention also provides for rules aimed at regulating issues such as jurisdiction and applicable law (resolving the conflict of choice of the applicable law).

The authors pay attention to such a variety of international legal regulation of economic relations as International Trade Terms (INCOTERMS). These terms are respected by all participants in the BRICS countries. The peculiarity of this regulator of economic relations is that INCOTERMS is a collection of trading customs expressed in special designations (terms), establishing the basic conditions for the supply of goods in the contract of sale (pricing, distribution of responsibilities of the parties for the supply, provision of documents, risk transfer options, etc.) (Belikova et al., 2015). There are many editions of these terms, but the current edition is INCOTERMS 2010 (Aloqabannk, 2010). INCOTERMS was created to provide entrepreneurs with a specific set of rules for the interpretation of trade terms that are reflected in international private law contracts. INCOTERMS is considered not only as a collection of customs, but also as an addition to the 1980 Vienna

Convention, which undoubtedly has a positive effect on the unification of civil law in the world and, in particular, in the unification of the BRICS.

The UNIDROIT Principles of International Commercial Contracts are another legal means of regulating international economic relations among the BRICS member countries. This international act was first published in 1994. It is an example of an innovative approach to the regulation of international economic relations. The main goal target to create general rules for the implementation of world trade which would be recognized in all countries. The principles of UNIDROIT are related to the will of participants in civil matters. In order to use these Principles, their application should be explicitly provided for in international agreements. As an exception to this rule, the application of these Principles is allowed in the absence of an agreement on the applicable law. The special role that the UNIDROIT Principles play is, firstly, that they are intended to qualify legal concepts. This allows, on the one hand, to develop a single set of concepts in the field of international trade, and secondly, it contributes to the unified regulation of cross-border economic relations.

In the framework of the implementation of international legal, economic, scientific and technical cooperation, the solution of such issues as the international protection of intellectual property is of great importance. A distinctive feature of the rights to the results of intellectual activity is manifested in the fact that they operate in a certain territory (are territorial in nature). These rights are recognized and protected in the territory of the country where these rights first arose. This problem (protection of these rights) can be overcome through the use of international treaties on the mutual recognition and protection of rights to the results of intellectual activity that have arisen in other countries. A similar rule applies to the protection of rights to means of individualization.

Luhmanova, characterizing the legal regulation of intellectual property relations through a system of developed sources of international law, presented in the form of international treaties and agreements, conditionally divides them into several groups on separate grounds. According to the circle of participants, international acts in the field of means of individualization can be differentiated into groups: 1) general agreements (with an unlimited number of participants). Examples include the Nairobi Treaty on the Protection of the Olympic Symbol (WIPO, 1981) or the Convention establishing the World Intellectual Property Organization (WIPO, 1967); 2) regional agreements (with a limited number of participants). An example is the Agreement Establishing the African Intellectual Property Organization; 3) bilateral (treaties in which two states participate, or treaties when one state acts on the one hand and several states on the other). Depending on the subject of regulation, universal and special agreements can be distinguished. Universal agreements include the Convention for the Protection of Industrial Property (1883). Special agreements are aimed at regulating certain groups of relations, for example, the 1994 Trademark Law Treaty (WIPO, 1994a), which provides for the regulation of rights to such marks, which consist of visual

signs. This act is applied provided that the contracting parties extend the validity of the contract to such signs (Luhmanova, 2010).

As noted above, the BRICS platform does not have a valid international legal regulation of most economic relations. This problem is also quite acute in relation to means of individualization. This does not mean that these legal relations are not regulated internationally at all. In this regard, we will directly consider international acts in the field of protecting the rights of legal entities to individualization means, in which both the BRICS member states and the national jurisdictions take part together.

An international instrument that can be used to protect these rights is the Madrid Agreement Concerning the International Registration of Marks of 1891 and its Protocol of 1989. This agreement has several advantages. Firstly, the application is submitted in one of the languages provided for by this agreement (English, French or Spanish), a unified state duty is provided (Madrid Agreement on the International Registration of Marks of April 14, 1891); secondly, there is no need for the services of patent attorneys, since the World Intellectual Property Organization receives applications and sends copies of them to all states. Only 2 countries, China and Russia, agreed to this agreement and its protocol, signed both the agreement and the protocol, while Brazil and India signed only the protocol to the agreement.

The Singapore Treaty on the Law of Trademarks was signed in Singapore on March 27, 2006 (WIPO, 1994b). It is an international act that governs the protection of rights to means of individualization. This agreement stipulates the requirements that must be met when filing applications with patent offices, the procedure for establishing the filing date, the particulars of splitting an application, changing information about names and addresses in an application, etc. However, this act is signed only by China so far, still not ratified.

The Nice Agreement on the International Classification of Goods and Services for the Registration of Marks of 1957, which was signed and ratified by most of the BRICS member states except South Africa, was of no small importance for the development of ways to protect the rights to means of individualization. The Nice Agreement provides for the classification of goods and services in the relationship of which a trademark and service marks may be registered. According to the Nice Agreement, at each registration by the Office of the trademark of the participating States, it is necessary to include in the official documents the numbers of the classification classes to which the goods or service for which the mark is registered. The classification structure consists of a list of classes and an alphabetical list of goods and services. These lists are periodically updated and updated by the Committee of Experts, in which representatives of all member countries of the association are represented (WIPO, 1957).

Bilateral agreements between the BRICS participants should be highlighted. Provisions on the protection of rights to means of individualization are provided, as a rule, in the form of a protocol to a bilateral agreement, where the agreement itself provides for areas of cooperation between states in this area (Lokteva,

2012). A protocol is a set of rules applicable to specific forms of cooperation, within the framework of which it becomes possible to resolve issues of ensuring protection and granting rights to means of individualization. For example, the Protocol between the Government of the Russian Federation and the Government of India on the protection and use of intellectual property rights to the Agreement on Scientific and Technical Cooperation (The Embassy of the Russian Federation in the Republic of India, 1994) was concluded with the aim of arising, protecting and joint application of intellectual property rights and means of individualization.

CONCLUSION

It is advisable to study the means of individualization of legal entities in civil law both as a set of information and as a qualitative characteristic of an object. The functions of the means of individualization implement the disclosure of the purpose of this object existence in circulation by bringing to an indefinite circle of persons information about the ownership of goods, work, services to a specific legal entity—their specific manufacturer (contractor). Russian legislation contains a range of tools for the protection of individualization—the general methods provided for in Article 12 of the Civil Code of the Russian Federation, as well as special methods designed to protect certain types of means of individualization. This is fully confirmed by the prevailing judicial practice, which demonstrates the consistent and correct application of the current civil law in this sphere of public relations.

The international legal regulation of economic relations is diverse, but far from all BRICS member countries have ratified. The gradual implementation of the provisions of a number of international acts in the legal systems of the member countries of the BRICS association indicates the right direction of development of legal regulation of economic relations in this association. In order to resolve conflicts and eliminate gaps in the regulation of the relations under consideration, unified international treaties should be expanded at the level of the BRICS union, satisfying the interests of each member state.

In modern conditions at the international level there are a certain number of legal acts regulating the emergence, change, termination and protection of rights to means of individualization. An acute problem in the application of these acts for the BRICS countries is the lack of a unified approach to the regulation of these relations (as a rule, the international act does not enjoy the support of all the members of the inter-State association).A way out of this situation we see a way to conclude separate regional agreements that would apply to this group of states. Moreover, the problem can and should be solved through the use of modern information technologies.

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CHAPTER 23

ARTIFICIAL INTELLIGENCE IN THE REGULATORY CONTEXT OF INDUSTRY 4.0 AND EPISTEMOLOGICAL OPTIMISM

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Numerous publications devoted to the digitalization of the economy have repeatedly emphasized that artificial intelligence (AI) can rebuild the economy, ensure the growth of labor productivity, increase its efficiency, reduce costs, and is called upon to do so. Thousands of newspapers, books, and magazine pages contain the phrase "artificial intelligence." Internet browsers respond to this inquiry with millions of links. Not only enthusiastic amateurs but quite serious scientists use the term. It appears or is implied both in rare talented, and in numerous ordinary games and animated films. It has already fallen into the content of existing legal acts. They officially designate the object, the slightest delay in the creation of which is sometimes proclaimed disastrous for the most developed states.

Russian legal science is on the verge of a large-scale study of the content and methods of regulating relations regarding categories of robotics, cyber-physical systems, electronic subjects, and others. The paper concludes whether robots with artificial intelligence are endowed with the attributes of a subject of law; whether artificial intelligence has its own will; whether any actions of artificial intelligence can indi-

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cate that it performs them in its own interest, and, finally, if artificial intelligence is an ontological gloom or epistemological optimism.

Keywords: Artificial Intelligence; Cyber-Physical System; Digitalization, Regulatory Content; Subject of Law; Legal Personality; Object of Law; Digital Economy.

JEL Code: K15, K24, O14, O33

MATERIALS

The legal framework of the study was constituted based on the Constitution of the Russian Federation (The multinational people of the Russian Federation, 2021), the Civil Code of the Russian Federation (The State Duma, 1994), as well as several other acts, in particular, Federal Law of June 28, 2014, N 172-FZ "On Strategic Planning in the Russian Federation" (The State Duma, 2014), decrees of the President of the Russian Federation dated May 7, 2018 No 204 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" (The President of The Russian Federation, 2018), dated May 9, 2017 No 203 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017–2030" The President of The Russian Federation (2017), dated December 1, 2016 No 642 "On the Strategy of scientific and technological development of the Russian Federation" (The President of The Russian Federation, 2016).

The research study some program-targeted documents, government programs, roadmaps, departmental projects in the field of artificial intelligence in the Russian Federation for the period up to 2030, in particular: "The National Strategy for the Development of Artificial Intelligence," approved by the Decree of the President of the Russian Federation on October 10, 2019. No 490; action plans ("roadmaps") of the National Technology Initiative; government programs, targeted documents; projects, ensuring the achievement of goals and performance indicators of federal executive bodies.

The theoretical basis for the study of the concept of artificial intelligence technologies rests on the works of such scientists as Yastrebov (2017); Ponkin and Redkina (2018); Franke (2019); Inshakova and Ryzhenkov (2019); and Inshakova et al. (2019).

Thanks to doctrinal studies of such authors as Laptev (2019); Arkhipov and Naumov (2017); Gurko (2017); Durneva (2019); Iriskina and Belyakov (2016); Morhat (2018a); the article analyzes the question of whether robots or cyber-physical computer systems with artificial intelligence are endowed with the features of a subject of law.

Whether artificial intelligence possesses its will, was studied based on the works of the following scientists: Oygenzikht (1983); Petrov (2007); Sarbash (2018).

The conclusion that artificial intelligence in the regulatory context of the industry is 4.0 means epistemological optimism is due to research by Palmerini et al. (2016).

METHODS

The methodological basis of the study were the analysis methods, thanks to which it was possible to comprehend the methodological aspects and theoretical and conceptual approaches to the concept of artificial intelligence in the regulatory context of Industry 4.0, to identify and clarify some of its features.

INTRODUCTION

On the Concept of "Artificial Intelligence"

The term "artificial intelligence" is usually associated with the ability to perform actions using a computer that would otherwise require human participation. Such actions include not only automated conveyor production or, for example, navigation operations, but also general areas requiring decision making and thinking or reasoning.

In works on computer science, it is noted that artificial intelligence as a term appeared in the 40s of the 20th century when the first electronic computers were created, and they began to designate a new scientific direction aimed at exploring the possibilities offered by the use of computers in various fields of human activity. It is believed that the reason for the introduction of such a term was the desire to use computers to solve logical rather than computational problems.

This commitment was discussed at a two-month seminar at Dartmouth College (USA) in 1956 (McCarthy et al., 1955).

In the ideas about the capabilities of computers, dramatic changes have taken place: from looking at computers as devices capable of performing actions indicated by a person, the world has moved to perceive them as devices capable of self-learning (machine learning) and communication.

Works devoted to the formation of artificial intelligence systems began to be published in Russian-language literature in the last third of the last century. Researchers showed especially high interest in the development of software that allows anthropomorphic communication between a computer (an intelligent system working with its help) and a person (user). Thus, the theory of question-answer and dialogue systems of such communication, developed by the beginning of the 80s of the last century, even at that early period allowed organizing an imitation of rather developed ways of computer communication with the user (Popov, 1982).

Self-education, the acquisition of new knowledge, is naturally considered the alpha and omega in the creation of artificial intelligence systems. If before solving problems with the help of computers it was necessary to create a description of the list of actions that the machine should have performed, and also to translate such a description in a language that the machine understood (that is, to carry out

programming), now the machine itself can perform the work of the programmer, synthesizing the programs required to fulfill the tasks. A user maintains communication with the machine in the same way as he does with colleagues.

RESULTS

The study of the concept of artificial intelligence technologies is ongoing. It is noted, for example, that these include technologies of "stable neural networks and cloud computing infrastructures, fuzzy systems, entropy control, swarm intelligence, evolutionary computing" and others (Ponkin & Redkina, 2018).

In this context, the call to scholars in legal science deserves undoubted support "to pay attention to the heuristic meaning and semantics of the legal categories of "artificial intelligence," "robot," "robotics" from developing their legal structures and further research" (Yastrebov, 2017).

The distinction between the concepts of artificial intelligence and software has not yet been made with the necessary clarity (Bostrom, 2016). However, in research aimed at achieving a clear understanding of the phenomenon of artificial intelligence, which operates using computer operating systems and software applications, two approaches are already distinguished.

The first one can probably be called broad. It focuses on the depth of knowledge comprehended by the machine (deep learning). Spheres such as computer vision, computer speech recognition, machine translation, and others relate specifically to "deep," "strong" artificial intelligence (Kurzweil, 2005; Morhat, 2017). It is in this area that the development of "machine mind" can, as the proponents of this approach believe, lead to either a positive or a negative outcome. A positive outcome is seen in the future considerations of a technological increase in the mental and physical capabilities of a person, in the elimination of undesirable phenomena in human existence (illness, suffering, aging, death). Proponents of the scientific trend, focused in their search for this perspective (transhumanism), see not only the advantages of new technologies, but also take into account the dangers of their use, and see overcoming or avoiding such dangers in the convergence of human and artificial intelligence, in blurring the boundaries between human and machine, between the physical and the virtual. The fusion of biological intelligence and artificial intelligence into a kind of posthuman reality called singularity makes up the meaning and purpose of technological development (Bostrom, 2005). The second approach is placed in a narrower framework and is often referred to in the literature as "narrow artificial intelligence," or is denoted by the term "weak artificial intelligence" (Nagrodskaya, 2019).

It is also noted that the issue of artificial intelligence is alarming and encourages to turn to its ethical aspects. Attention is drawn to the fact that the question of the impact of artificial intelligence on society is perceived not in the context of identifying the latter's ability to exert such an impact but in the context of stating the actual penetration of all developed modern societies by this effect (Frolova, 2016).

The issue of artificial intelligence has become a large-scale factor for scholars and the public, which is impossible to ignore because it arose as a phenomenon transforming society, economy and politics (Ulrike, 2019). Moreover, the transforming potential of artificial intelligence is such that now its natural counterpart has the task of putting artificial intelligence at the service of people and the planet.

The creation evidences the highest level of awareness of the importance of this task by the Organization for Economic Cooperation and Development (OECD) of a particular expert group on artificial intelligence, aimed at identifying the principles on which to build confidence in artificial intelligence and implement it (Expert Group on Artificial Intelligence at the OECD (AIGO)).

Attention is drawn to the proposed complementary principles, which are value-oriented for the responsible management of credible artificial intelligence. They are as follows:

1. AI should benefit people and the planet by stimulating inclusive growth, sustainable development, and well-being.
2. Artificial intelligence systems should be designed in such a way that they do not violate the rule of law, human rights, democratic values, and diversity, and they must be equipped with appropriate protective mechanisms built into them—for example, the ability to ensure human intervention if necessary.
3. The systems of artificial intelligence should be transparent, with the necessary responsibility, revealing to a person the principles for obtaining the results achieved by artificial intelligence and retaining the possibility for him to challenge such results.
4. Artificial intelligence systems must be able to operate reliably and safely throughout their life cycles, and the potential risks of their use must be susceptible to ongoing assessment and management.

It has been proclaimed that the principles mentioned above should serve as the basis for assigning responsibility to legal entities and individuals for developing, deploying, or operating artificial intelligence systems (OECD, 2019).

Artificial Intelligence as a Subject of Law

The status of a subject of law provides an opportunity to possess rights and obligations, enter into transactions, defend one's violated rights in court, and be liable for failure to fulfill one's obligations, for misfeasance of one's contract. Obtaining such a status allows, therefore, the opportunity to be a party to civil relations. It is known that the subjects of law "have fundamental responsibilities—to comply with laws and moral standards, to exercise subjective civil rights following their social purpose" (Sukhanov, 2011).

The current pace and results of technological development have led to the question of whether the legal regulation of activities conducted with the use of

artificial intelligence should allow the possibility of granting it the status of a participant in legal relations.

Sometimes this question is posed in the context of relation to specific practical cases. Concerning the issue of criminal liability, it should be noted that the fundamental admissibility of recognizing artificial intelligence as a subject to criminal liability for an act committed by it, is not rejected in the literature (Hallevy Gabriel, 2016).

In the area of civil liability for causing harm, attention is drawn to the issue of a possible collision of a car driven by an autopilot with a pedestrian. It points out, for example, difficulties in applying the existing traditional legal norms on tort liability. In one of the articles devoted to this kind of incident, it is noted, in particular, that it is difficult to find a solution to the issue of liability here by analogy with those cases when such an accident occurs with the participation of an ordinary driver (Greenblatt, 2016).

The Russian legal literature has already raised the question of whether robots (machines) or computer-based cyber-physical systems possessing artificial intelligence possess the attributes of a subject of law? (Laptev, 2019). The idea of an "electronic entity" is receiving coverage (Arkhipov & Naumov, 2017; Bernard,2018; Durneva, 2019; Gurko, 2017; Inshakova et al., 2019; Iriskina & Belyakov, 2016; Samir & Laurence,2019; Sesitsky, 2018), as well as "unit of artificial intelligence."

Supporters of the recognition of artificial intelligence as a subject, an "electronic entity," need to support the thesis that it is not necessary to be a person in order to be recognized as a subject of law because a legal entity is also not a person (Samir Chopra and Laurence White). Therefore, to empower this thesis with the power of argument, one should answer all those questions that are put forward by the concept of a legal entity: about the emergence, registration, a name, rights and obligations, responsibility, and the like. Recognizing the paradox of such a need, researchers pay attention to the presence of definite answers by industrial robots, since in practice, "for example, industrial AI-robots may have signs of a business entity. Thus, a robot can have registration (for example, in Rostekhnadzor) and an account number; possess economic competence consistent with the goals of its activities; possess a property, since the robot a priori is a material value; it can be brought to legal liability (for example, in the form of forced shutdown or finalization of the program, as well as disposal, at least responsibility)." Pointing out that an industrial robot possessing artificial intelligence has elements of a legal entity, the author notes that at the same time, "the robot acts as an object of the law, being an object of the material world and possessing value (as the property is technology)." This fact does not eliminate the perspective of a full-fledged subject being of the robot: "History knows facts when objects of the law passed into the category of subjects (for example, when slavery was abolished, slaves became full participants in social relations)."

Anthropocentrism of this approach is obvious and even emphasized: "If you pay attention to the stages of human development, then each individual at the initial stage of biological development does not have that fullness of thinking and speed of decision-making as an adult. Through training, a person over the years improves his consciousness to develop more correct decisions. A similar picture is observed with the development of artificial intelligence, which initially had the starting data for the future development of its thinking and self-improvement. Accordingly, the combination of a robot and artificial intelligence can be considered as a robotic intelligent subject of law (robo-sapiens)."

However, this kind of perspective is recognized as quite distant: "in the near future, AI-robots will be considered exclusively as an object of law in accordance with the provisions of Art. 128 of the Civil Code of the Russian Federation on the objects of civil rights. An intellectual robot, like a cyber-physical system in the form of a computer program, can be sold or otherwise disposed of, taking into account the specifics of the circulation of these civil rights objects established by law (Art. 129 of the Civil Code of the Russian Federation)" (Laptev, 2019).

The possibility of an affirmative answer to the question of the legal personality of artificial intelligence can be seen in Russian literature and reference to relations regarding the results of creative activity obtained with the help of artificial intelligence. Interpretation of the general theoretical issues in work, highlighting the civil law problems that arise in the study of the legal entity of artificial intelligence in the field of intellectual property law, is an exciting example (Morhat, 2018). In it, the concept of artificial intelligence is defined as "a fully or partially autonomous self-organized (and self-organizing) computer-hardware-software virtual or cyber-physical, including bio-cybernetic, system (unit) not living in the biological sense," which has a wide range of capabilities and abilities (Morhat, 2018), the list of which is a part of the proposed definition. The list of these capabilities and abilities includes, in particular, recognition, understanding, interpretation, and generation of images, "self-maintenance of oneself in homeostasis," self-development, and self-application of self-homologation algorithms, and alike. (Morhat, 2018a).

Even the possibility of determining the creative contribution of the "unit of artificial intelligence" to the creation of the work is affirmed, and the criteria are considered, the presence of which makes it possible to recognize the contribution of the "unit" as creative, the issue of creating a work in co-authorship with the "unit" is also considered (Morhat, 2018b).

On the Legal Framework for the Design and Use of artificial Intelligence Systems in the Russian Federation

The "National Strategy for the Development of Artificial Intelligence," approved by the Decree of the President of the Russian Federation of October 10, 2019 No 490, is devoted to the development of the landscape of artificial intelligence in the Russian Federation for the period until 2030. It defines the goals and

main tasks of the development of artificial intelligence in the Russian Federation and also measures aimed at its use in order to ensure national interests and the implementation of strategic national priorities, including in the field of scientific and technological development. It is not the first Russian legal act designed to regulate legal relations concerning artificial intelligence. It was based on the Constitution of the Russian Federation (The multinational people of the Russian Federation, 2021), the Civil Code of the Russian Federation (The State Duma, 1994), as well as several other acts, in particular, Federal Law of June 28, 2014, N 172-FZ "On Strategic Planning in the Russian Federation" (The State Duma, 2014), decrees of the President of the Russian Federation dated May 7, 2018 No 204 "On National Goals and Strategic Tasks of the Development of the Russian Federation for the Period until 2024" (The President of The Russian Federation, 2018), dated May 9, 2017 No 203 "On the Strategy for the Development of the Information Society in the Russian Federation for 2017–2030" The President of The Russian Federation (2017), dated December 1, 2016 No 642 "On the Strategy of scientific and technological development of the Russian Federation" (The President of The Russian Federation, 2016)."

The rules and regulations contained in them set the direction for the application of information technologies in the Russian Federation. Also, the Strategy should be taken into account when applying of individual special plans, programs, and projects, namely:

a. The development strategy of the information society in the Russian Federation for 2017–2030;
b. The national program "Digital Economy of the Russian Federation" and other national projects (programs), federal and regional projects, within the framework of which it is possible to use artificial intelligence technologies;
c. Action plans ("road maps") of the National Technology Initiative;
d. State programs, program-targeted documents, the implementation of which can be improved through the use of artificial intelligence technologies; and
e. Projects ensuring the achievement of goals and performance indicators of federal executive bodies (departmental projects).

An essential feature of the "Strategy" is that it contains a definition of the term "artificial intelligence": "artificial intelligence is a complex of technological solutions that allows you to simulate human cognitive functions (including self-learning and decision-making without a predetermined algorithm), and to obtain results while working on a specific task, comparable at least, with the results of human intellectual activity. The complex of technological solutions includes information and communication infrastructure, software (including using machine learning methods), processes and services for data processing and search for solu-

tions" (Clause 5a. "National Artificial Intelligence Development Strategy," approved by the Decree of the President of the Russian Federation of October 10, 2019 No 490.).

This definition is valuable not only in that it defines the signs of artificial intelligence as a real phenomenon of the information field but also in the ability to gradually eliminate the "humanized" ("intellectualized") interpretation of this concept that is inappropriately distributed in the media as a kind of analog of intelligence that a person has.

In the aspect of legal regulation, special attention should be paid to para 48—51 of the Strategies for the creation of an integrated system for regulating social relations arising in connection with the development and use of artificial intelligence technologies.

These points indicate the need to solve such problems, the complete list of which cannot be attributed either to the number of already resolved or to the number of those that can be comprehensively solved by legal means alone. First of all, we are talking about the tasks of adapting normative regulation in terms of the organization of human interaction with artificial intelligence, on the one hand, and the development of appropriate standards of ethical rather than legal content. It is also necessary to develop criteria for the redundancy of legal regulation in this area, given that it is recognized as capable of significantly slowing down the pace of development and implementation of technological solutions that develop the use of artificial intelligence.

The Strategy outlines the main directions for creating an integrated system for regulating social relations arising in connection with the development and implementation of artificial intelligence technologies. In the first place among these areas is the provision of favorable legal conditions for access to data, mainly impersonal, including data collected by government bodies and medical organizations. Detailed commentary in this area has yet to be developed. However, the approach facilitating the solution of such a difficult task is indicated in the Strategy: resort to the creation of an "experimental legal regime" (para 49 a. "National Strategy for the Development of Artificial Intelligence," approved by the Decree of the President of the Russian Federation on October 10, 2019, No 490.).

The second place in the list of the main directions of creating an integrated regulatory system stipulated by the Strategy is given to providing "special conditions (modes) for access to data, including personal ones, for the purpose of conducting scientific research, creating artificial intelligence technologies and developing technological solutions based on them" (para 49 b. "The National Strategy for the Development of Artificial Intelligence," approved by the Decree of the President of the Russian Federation of October 10, 2019 No 490.).

The third place is "the creation of legal conditions and the establishment of procedures for simplified testing and implementation of technological solutions developed based on artificial intelligence, as well as the delegation of information systems operating based on artificial intelligence, the possibility of making

individual decisions (except for decisions that may infringe on the rights and legitimate interests of citizens), including in the performance by state bodies of state functions (except for functions aimed at ensuring public safety and State) (para. 49 b "The National Strategy for the development of artificial intelligence," approved by the Presidential Decree of October 10, 2019, No 490).

The fourth is the removal of administrative barriers in the export of civilian products (works, services) created based on artificial intelligence; the fifth is the creation of unified standardization and conformity assessment systems for technological solutions developed based on artificial intelligence; the development of international cooperation of the Russian Federation on standardization and providing certification of products (works, services) created based on artificial intelligence; on the sixth—stimulating of investment generation through improving mechanisms for joint participation of investors and the state in projects related to the development of artificial intelligence technologies, as well as providing targeted financial support to organizations involved in the development and implementation of artificial intelligence technologies (provided that the introduction of such technologies will entail significant positive effects for sectors of the economy of the Russian Federation); and, finally, the seventh—the development of ethical rules for the interaction of a person with artificial intelligence (para 49 g—49 j. of the National Strategy for the Development of Artificial Intelligence, approved by the Decree of the President of the Russian Federation of October 10, 2019, No 490).

The strategy aims to ensure that the regulation of social relations arising in connection with the development and implementation of artificial intelligence technologies develops so that the legal conditions necessary to achieve its goals, solve problems, and implement measures are created by 2024. By 2030 in the Russian Federation, a flexible regulatory system should operate in this area, not only guaranteeing the safety of the population (Frolova et al., 2018) but also aimed at stimulating the development of artificial intelligence technologies (para 50–51 of "The National Strategy for the Development of Artificial Intelligence," approved by the Decree of the President of the Russian Federation of October 10, 2019 No 490.).

Prospects for the Near Future: Carpe Diém and Festina Lente

The most striking description of such prospects has already been created (Sarbash, 2017). They can be presented as a complete integration of personality into the digital space. From the moment of his/her birth, a person becomes a digital subject; his civil status (birth, marital status, change of name, death, and others) is reflected in the global network. Each person is assigned a *legass* (legal assistant), acting as a *artint* (artificial intelligence), which refers to a person as a master, giving him advice or managing various actions concerning the Internet of things, smart home, crewless vehicles, medical adviser, and others.

The interaction of the *legass* and the master is developing in stages as the technology improves: 1) the order of the master and its implementation by the *legass*, 2) the proposal of the *legass* and its acceptance by the master, 3) the self-determination of the desires of the master without the participation of the latter and their satisfaction by the *legass*. Absorbing the personality of the master, redeeming him from the inevitable routine of everyday life, the *legass* obeys the laws of Azimov's robotics. Proprietary, binding, exclusive, personal non-property, and other rights of the master are recorded by the *legass* and transferred to the global database, where they are processed by the *wornetartint* (world net artificial intelligence). Management of the rights of the master and their protection is carried out by the *legass.*

The number of objects of civil rights is replenished with their new intangible forms: knowledge, experience, sensations, artificial memories, visual images, and others, which increasingly displace material objects from commercial turnover. A virtual environment is formed that is more attractive to humans than the natural one. The turnover of intangible objects of such an environment is supported by their rating kept by *wornetartint*.

The range of things includes robots and computer programs capable of self-learning and making independent decisions in the interests of their master. Programs combine the features of an object of law and a subject of law, acquiring the status of an *elsub* (electronic subject). The self-responsibility of the *elsub* for their actions is ensured by the existing property fund managed by the *wornetartint*.

Material objects of civil rights, movable and immovable things are digitized, the change of their owners, as well as any transfer of them, is recorded by the *legass*. The copyright holder is notified by the *legass* about a possible violation of his rights or legitimate interests, and the *wornetartint* prevents such violation.

The *wornetartint* concludes, draws up, modifies, and saves transactions in interaction with the *legass*. The contract as a document is replaced by an interface. The number of disputes on the ownership of property rights and the fulfillment of obligations is radically reduced, the reliability of assessing consumer properties and qualities of things is increasing, human needs are satisfied more fully and with lower costs. The digitalization of commercial turnover increases the possibility of increasing the well-being of people (Khabrieva & Chernogor, 2018).

Such a futuristic description of the prospects of the "digitalized" being of a traditional person, who finds himself in the trans-human electronic environment created by him, is very timely and expedient. It helps to heed the reasons expressed or implied by those who are restrained by the rapid haste in the digitalization of not only economic activity, services, and alike, but also human life, that is, digitalization, which does not exclude deformation, damage, human degeneration for the sake of its conversion into a state which is existentially compatible with metahuman conditions of existence. It allows us to overcome the illusion of "humanization" of artificial intelligence and creates hopes for the possibility of avoiding the "dehumanization" of the human being himself.

A positive impression is made by the manner (still prevailing in the literature) of assuming the "legal personality" of artificial intelligence by comparing it with the legal personality of legal entities. However, the excessive conventionality of such an assumption is prominent. Real subjects of law, individuals and legal entities acquire and exercise their civil rights on their own free will and in their interest (Clause 2, Art. 1 of the Civil Code of the Russian Federation).

Does Artificial Intelligence Have Its Own Will?

It is known that the concept of "will" has become widespread in works on psychology, physiology, and philosophy, receiving divergent interpretations in them. The correct use of the term "will" in legal content is recognized as "its use in the meanings like awareness, purposefulness, overcoming obstacles, and others" (Petrov, 2007). The ability of persons to possess the will is considered to be the ability to manage their own actions (Oygenzikht, 1983). Meanwhile, the most advanced program, which has the ability to self-study and self-programming, is self-learning and self-programming, without showing any volitional efforts. It does not show such efforts, not only because it does not have the will, but also because it is not capable of making any kind of effort whatsoever. Artificial intelligence, in other words, does not have a will and is not capable of possessing it.

Can Any of the Actions of Artificial Intelligence Indicate That it is committing Them in Its Own Interest?

It is known that the term "interest" in the civil law sense is used to denote incentives that encourage individuals to enter into civil law relations. For entrepreneurs, for example, such incentives may be to reap any benefits. Thus, obtaining revenue, income, or other profit is for the subject of law the conscious need to search for a good to satisfy an existing need. Does artificial intelligence reach such a need? Does the AI realize, for example, the fact that a need-showing interest in itself does not satisfy a need, that a need is satisfied only with a good, for the sake of which the subject performs the corresponding actions, entering into various social relations? Thus, one cannot help but support the judgment made about robots in the context of the possibility of recognizing their legal personality: "A robot does not have free will and its own interest, and therefore cannot be a subject of civil law, because the latter, according to the fundamental principle of private law, operate in civil circulation, acquiring rights and obligations of their own free will and in their own interest " (Sarbash, 2018).

No evidence has yet been provided to support a positive answer to the above question. There are no grounds for the recognition of artificial intelligence as a subject of law. They are missing.

One more circumstance should be mentioned. The astonishing capabilities of computers in the broadest range of their applications often lead to the recognition

of their ability to solve problems that require thinking. Such recognition cannot but cause objections.

Thinking that the ability is to reflect reality in consciousness in generalized terms with the help of concepts, judgments, conclusions requires communication, socialization. "The thinking device cannot work in isolation. This is confirmed by the individual "natural mind" (in a meaning parallel to the term "natural language") and the secondary collective mind of culture. All the known cases of growing up of the children in complete isolation from the human collective and human texts coming from outside convince us that a physiologically perfectly functioning thinking machine in these cases remains unreleased" (Lotman, 1992). The quoted opinion of the outstanding semiotics is a convincing confirmation of the truth of the thesis we share. It boils down to the fact that the solution of numerous scientific problems that remained unresolved or are recognized as insoluble, and currently—achieved or achievable with the help of a set of technological solutions that allow simulating human cognitive functions, that is, with the help of artificial intelligence, does not mean the latter has the ability to think. Likewise, the assertion that such an ability is absent does not mean either a qualitative characterization of artificial intelligence or a reprobation of the opinions and judgments of those researchers who speak out in favor of recognizing this ability as artificial intelligence. Researchers of the category of artificial intelligence in the context of its social setting have yet to find answers to numerous questions.

About the Concern

The materials published by the Directorate for Research at the Organization for Economic Co-operation and Development (OECD Digital Economy Papers. The OECD Directorate for Science) do not ignore the public concern caused by the rapid development of the digital economy (Frolova et al., 2018) and the intensification of the work on creating artificial intelligence: "Artificial Intelligence is also fueling anxieties and ethical concerns" (Scoping the OECD AI principles. Deliberations of the Expert Group on Artificial Intelligence at the OECD (AIGO)).

In European literature, along with the benefits created by the use of artificial intelligence, there is, for example, indication of a lack of steps taken to protect against potentially dangerous aspects of such use (Ulrike Franke, 2019).

They specify, in particular, the risks of dependence on foreign-made artificial intelligence applications.

Proponents of the active development of artificial intelligence technologies believe that in Europe, it is hampered by "defensive thinking." In support of this, they cite the results of numerous surveys showing that "the European population tends to perceive artificial intelligence as not so much a chance and opportunity as a threat, and that these polls show a very high level of skepticism regarding artificial intelligence, if not outright rejection (Ulrike Franke, 2019). A good illustration of such skepticism is considered to be those polls aimed at identifying the population's willingness to use the services of "robot doctors": in Asia, the

number of respondents who expressed such readiness far exceeded the number of similar optimists in Europe (Ulrike Franke, 2019).

Lacking materials from similar surveys in the Russian Federation, the authors of this section, relying only on their own impressions of numerous publications in the economic and legal literature devoted to the digital economy and artificial intelligence, dare to suggest that these publications do not show the European–type skepticisms or complete rejections (although critical, sometimes harsh assessments of this process are found in publications of a journalistic nature).

However, the existence of such concerns is rather widely reflected in the media. In particular, much concern was expressed about the risk of committing unlawful actions. (The Story Behind the Renowned Icelandic, "Big Bitcoin Heist": From Mastermind to Execution) during the process known as "bitcoin mining."

It is known that such a process is not illegal in itself. Its essence is that the persons participating in it ("miners") solve computational problems that allow them to link transaction blocks together, that is, create chains of such blocks (hence the term "blockchain"). The solution to each such task is recognized as a service rewarded by newly created bitcoins plus transaction fees. Payment for this kind of service is possible due to the formation of the so-called "electronic money" (cryptocurrencies). The cryptocurrency network operates through blockchains created by miners; the most common types of cryptocurrencies at the moment are Bitcoins and Ethereum; their circulation is supported by a vast number of computers, working, in fact, like some computing factories. There are also "young" types of cryptocurrencies, the growth of accumulation of which (with successful "mining") is likely to compete with the ones that appeared earlier. In the Russian Federation, however, much attention is paid to the opinion of experts indicating that cryptocurrencies are not real money, that they only express systems for "counting nonexistent assets," that "in practice, cryptocurrency is not used as a means of payment, but becomes the subject of speculation" (Zhilkin, 2018).

Most notably, the most outstanding minds of humanity and the enormously successful entrepreneurs are mentioned in the media not as people who restrainedly allow the remote possibility of the appearance of AI, but as spokesmen for the acute anxiety for the fate of a human whose intellectual potential is infinitely small, compared to AI. Both Stephen Hawking and Elon Musk spoke about the potential dangers that may lie in artificial intelligence (Chung, 2015).

The opinion of the Secretary-General of the United Nations, Antoniu Guterres, was noted in the Russian media. Speaking at the UN General Assembly on January 22, 2020, on the results of the organization's work in 2019 and the tasks for 2020, he expressed deep and acute concern about the situation in the world, very dramatically likening it to the riders of the apocalypse from the Revelations of John the Theologian. He called the fourth of the riders the dark side of the digital world. A. Guteres also emphasized that the pace of technological progress is ahead of the development of a person's ability to correspond to it or even to be aware of it. "Technological advances are moving faster than our ability to respond

to—or even comprehend—them. Despite enormous benefits, new technologies are being abused to commit crimes, incite hate, fake information, oppress and exploit people, and invade privacy."

A similar concern was expressed on January 28, 2020, at the opening of the VIII Christmas Parliamentary Meetings organized by the Federation Council of the Federal Assembly of the Russian Federation. Concern was expressed about threats to the safety of information about citizens in a universal data bank; it was proposed to make the law to provide a citizen with complete control over information about his own self, to secure in it an alternative to new documents being created in electronic form, so that those who refused to receive documents and services in electronic form, were not left without a pension or preferential tickets for public transport. Attention is drawn to the fact that the lack of a right to an alternative is a question of developing adequate legal solutions (Khabrieva, 2018). The digital revolution has a major impact on social communications, and it is essential to realize that no matter what opportunities the development of civilization provides, their expediency should primarily be determined by the dignity and freedom of the human person (Fedorov, 2016).

The urgency of the problem of cybersecurity is also noted in the blogs of senators. It is known that the resolution proposed by the Russian Federation on countering the use of information and communication technologies for criminal purposes was adopted by the UN General Assembly (Resolution of the UN General Assembly A / C.3 / 74 / L.11 "Countering the use of information and communication technologies for criminal purposes"). States cannot continue to wait for the elimination of such a problem solely by the efforts of IT market participants. "Without state intervention and interstate cooperation, the development of information technologies begins to be extremely widely used to violate human rights and freedoms, and not to achieve the goals for which such technologies are created" (Klishas, 2019).

CONCLUSION

Ontological Discouragement or Epistemological Optimism?

1. The idea of intellect, created artificially, has long occupied the human mind. A.S. Kline, translating the Goethean Faust into English, found the words to convey the enthusiasm expressed by the German poetic genius for this idea: " Great aims seem foolish at the outset: But we'll laugh at Chance itself, yet, And brains, with thoughts to celebrate, In the future, a Thinker will create."

   The transfer of the analysis of this idea from the world of poetic imagery to the world of dry scientific analysis (Miroshnichenko et al., 2018) probably muffles the prophetic sound of these words and, possibly, can cause a feeling of despondency in a novice researcher. However, the concept of artificial intelligence is epistemologically impossible to

go beyond the concept of it as a complex of technologies imitating the cognitive functions of the human mind. No accumulation of an ever-increasing volume of information in Big Data systems will lead to the appearance of a mind in a cognitive simulator. Long before the appearance of such imitators, Yu.M. Lotman formulated a brilliant thesis: "The idea that a gradually improved machine "suddenly" starts to "think by itself" is as illusory as the opposite, according to which a text entered from the outside into a passive device will give rise to the phenomenon of thought" (Lotman, 1992).

2. It should be recognized, unfortunately, that the identification of the ability of a machine to think, has not yet become a priority task for legal scholars. Their efforts, however, are focused on solving of no less important and interesting problem—the development of norms and rules applicable in the field of artificial intelligence and ensuring the successful maintenance of national interests and the implementation of strategic national priorities, including the field of scientific and technological development.
3. The growing number of publications in the Russian Federation devoted to identifying the role and importance of law in regulating relations concerning the use of artificial intelligence is evidence that Russian legal science has begun a large-scale and in-depth study of the contents and methods of regulating the relations by means of rules applicable to the use of robotics, cyber-physical systems, electronic entities, and alike. The expectation of detailed, comprehensive answers to questions that retain their practically non-overestimatable value is growing. These questions relate, in particular, to liability for damage caused by the actions of the robot, to ethical imperatives that subordinate the work of creators of technologies capable to mimic human cognitive functions, and moreover constitute a compelling basis for law-making and law enforcement bodies. The optimistic expectation of prompt answers to these questions can be considered appropriate and justified.

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CHAPTER 24

LEGAL REGULATION OF DIGITAL FINANCING IN RUSSIA AND FOREIGN COUNTRIES

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The authors explore the features of the legal regulation of digital technologies for the financial services provision in the European Union, USA, China and Russia. It was revealed that: 1) the development of digital banking brings both benefits (innovation and creation of new jobs) and problems (risks of uncontrolled complexity, data leakage and threats to consumer rights); 2) The solution to the problems of the governments of the EU and US member states is found in strengthening supervision of the digital banking development, while the Chinese government until recently has taken a non-interference position; 2) since the Chinese government has been slow to issue rules for providing digital financial services, Internet Finance providers in this country have been given much more freedom to operate than traditional financial institutions; 3) in the United States and the EU, digital banking is governed primarily by regulations and precedent law relating to traditional banking; 4) Russia lags behind the world's Internet banking giants in terms of both the volume of money transactions in digital form and the quality of legal regulation of the FINTECH industry, especially in the field of consumer protection of digital financial services.

Keywords: Digital Financial Services, Digital Banking, Crowdfunding, Cryptocurrency, European Union Law, US Law, China Law, Russian Law

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MATERIALS

The scientific base of this chapter is formed on the basis of the scientific works of Russian and foreign scientists. Among the works of Russian authors who study legal regulation of digital technologies for the provision of financial services, we should mention the monograph "Resolution of financial disputes in the APR countries (Australia, Hong Kong, India, Indonesia, China, Malaysia, New Zealand, Singapore, USA, Thailand, Japan)" (2019). Frolova and Ermakova; and the scientific articles: Ermakova et al. (2018); Etko (2018); Frolova et al. (2018); Ostroushko (2019); Prokofiev (2016); Ruchkina (2017); and Vengerovsky (2018).

General issues of legal regulation of digital financial services in foreign countries are disclosed in the works of foreign researchers: Artemyeva et al. (2019); Banerjee (2019); Frolova (2018); Huang and Chiang (2019); Kaplinsky (2018); Li (2015); Mittal et al. (2016); Negreiro and Madiega (2019); Nemoto, and Store (2019); Nonaka (2019); Romero (2019); Shenglin (2018); Stamegna and Karakas (2019); Stankovic (2019); Tobin and Volz (2018); Wenhao (2018).

The empirical framework is provided for by national legislation, reflecting the characteristic aspects of the legal regulation of digital financial services in Russia, the European Union, the USA, and China.

METHODS

The scientific development of the content of this chapter of the monograph is carried out on the basis of the general scientific method of historical materialism. General scientific methods of cognition are used: dialectical, hypothetical-deductive method, generalization, induction and deduction, analysis and synthesis, empirical description. The study also used private science methods: juridical-dogmatic, statistical method, method of comparative legal analysis, other.

INTRODUCTION

The digital revolution is transforming the world as we know it at an unprecedented rate. The World Economic Forum estimates that by 2025, the combined global value of digital transformation for society and industry will exceed 100 trillion Doll. United States (Negreiro & Madiega, 2019). Digital banking or i-banking is the main component of the financial technology sector (FinTech), encompassing firms that use technological systems either to directly provide financial services and products or to increase the efficiency of the financial system" (PwC, 2016). The integration of traditional finance and fintech technologies poses significant problems in the field of legal regulation. Fintech has undeniable technological and financial advantages, but the risks of uncontrolled complexity, data leakage and threats to consumer rights require strict regulation (Shenglin, 2018). Finally, Fintech is directly related to the emergence of such a phenomenon as cryptocur-

rency. Cryptocurrencies pose a number of legal problems for lawmakers, ranging from the threat of money laundering, taxation, regulation of foreign exchange trading, and ending with their legal status as securities, goods, digital property or some other new form of assets.

The choice of countries for the study is determined by the importance of the USA, China and the European Union in the development of Internet banking. For a long time, the USA was considered the leader in Internet banking. The Internet was created in the USA in 1973 and online banking began to gain popularity in the USA in the 1980s (Banerjee, 2019). However, in 2015, China experienced a jump in mobile payments and China significantly overtook the United States. According to economists, in 2019, online banking transactions in China should reach a record amount of 4,622 quadrillion yuan (Statista, 2019). Financial analysts noted that China is the undoubted center of global innovation and fintech implementation. The European Union Financial Supervisory Authorities (ESA) have paid close attention to the development of digital banking in the last decade. March 2018 The EU Commission introduced the FinTech Action plan: For a more competitive and innovative European financial sector. March 2019 The European Banking Authority (EBA) has published its latest report on consumer trends, which emphasizes that online banking is already used by more than half of the European population (Romero, 2019).

European Union

EU law does not contain unified acts that cover all aspects of Fintech. Fintech companies providing financial services (e.g., lending, financial advice, insurance, payments) must comply with the same laws as any other companies offering these services (Stamegna & Karakas, 2019). Depending on the type of activity, different laws are applied that regulate payment services, crowdfunding, insurance, cybersecurity, etc.

Among the main EU regulations in the field of Internet banking are the following: 1) Regulation (EU) 2019/881 of 17 April 2019 on ENISA (the European Union Agency for Cybersecurity) and on information and communications technology cybersecurity certification and repealing Regulation (EU) No 526/2013 (Cybersecurity Act) (The European Parliament and the Council of the European Union, 2013); 2) Directive 2000/31/EC (e-commerce) (The European Parliament and the Council of the European Union, 2000); 3) Directive 2002/65/EC of 23 September 2002 concerning the distance marketing of consumer financial services (The European Parliament and the Council of the European Union, 2002); 4) Directive 2009/110/EC of 16 September 2009 on the taking up, pursuit and prudential supervision of the business of electronic money institutions (The European Parliament and the Council of the European Union, 2009); 5) Directive (EU) 2015/2366 on EU-wide payment services (PSD2), the second payment service directive (The European Parliament and the Council of the European Union, 2015a); 6) General Data Protection Regulation (EU) 2016/679 (GDPR) (The European Parliament and the Council of the European

Union, 2016); 7) 2014/65/EU Financial Instrument Markets Directive (MiFID II) (The European Parliament and the Council of the European Union, 2014); 8) Directive (EU) 2018/843 of 30 May 2018 amending Directive (EU) 2015/849 on the prevention of the use of the financial system for the purposes of money laundering or terrorist financing, and amending Directives 2009/138/EC and 2013/36/ EU (The Fifth Money Laundering Directive) (The European Parliament and the Council of the European Union, 2018).

The regulations listed above were developed by the financial supervisory authorities of the European Union (ESA), which include: The European Banking Authority (EBA), the European Securities and Markets Authority (ESMA) and the European Insurance and Occupational Pensions Authority (EIOPA). These bodies evaluate the progress of Fintech in the EU countries and prepare draft regulations on regulating Internet banking, cybersecurity, protecting the rights of consumers of financial services, etc.

Legal regulation of payment services: in July 2013 The European Commission has announced a new financial regulatory package, including: 1) Directive (EU) 2015/2366 on EU-wide payment services (PSD2), which repealed the PSD I Directive; 2) Regulation (EU) 2015/751 of 29 April 2015 on interchange fees for card-based payment transactions. The PSD II Directive entered into force on January 12, 2016; The deadline for application in national law was set on January 13, 2018. The PSD II Directive is designed to respond to technological changes in the payment industry (Stamegna & Karakas, 2019; (The European Parliament and the Council of the European Union, 2015b).

Cryptocurrency: January 2019 the European Banking Supervision Authority (EBA) and the European Securities Market Authority (ESMA) have published a Report on the Current and Future Regulation of the EU Crypto Asset Market (EBA Report 9 January 2019) (EBA, 2019). ESMA notes that most crypto assets qualify as financial instruments in accordance with Markets in Financial Instruments Directive (MiFID II), however, national authorities have problems interpreting and adapting existing requirements to specific characteristics of crypto assets. Meanwhile, a number of crypto assets go beyond the current regulatory framework. The earliest and most famous example of crypto assets is cryptocurrencies, a special type of virtual currency. European lawmakers have agreed to extend the scope of Anti-money-laundering Directive to virtual currency exchanges and purse providers. The Fifth EU Money Laundering Directive of 2018 contains a clear definition of the concept of Virtual Currency, which covers all types of popular cryptocurrencies. In this regard, experts call the directive a step towards tight regulation of blockchain in the EU.

Crowdfunding: since the beginning of the 2000s, crowdfunding in the EU has become an alternative to traditional financing, however, global crowdfunding statistics show that the crowdfunding market in the EU is still only part of crowdfunding in China and the United States. March 2018 The Commission made a proposal for a Regulation aimed at introducing an optional EU regime in order to

ensure the easy operation of crowdfunding platforms throughout the EU (Stamegna & Karakas, 2019).

Digital Europe program for 2021–2027: The EU will increase its support for digital transformation in the coming years, as evidenced by the recent proposal for the Digital Europe Program (2021–2027), which will be the first funding program in history dedicated exclusively to supporting digital transformation in the EU. This program has a total budget of 9.2 billion euros. Such extensive EU-level funding is expected to reach the critical mass needed to attract large private investment.

USA

FinTech companies have had a significant impact on the US financial services sector. FinTech entities (such as PayPal, Venmo, Square, Stripe, Google Wallet, and Apple Pay) provide mobile payment and digital wallet services. All these are payments that have historically been made through ordinary retail outlets and banks. The availability of online lending services offered by FinTech organizations (such as Lending Club, Prosper, OnDeck, and Kabbage) has also increased. These companies offer loan products online and through mobile applications (Nonaka, 2019).

Digital banking in the United States is governed primarily by regulations and case law relating to traditional banking. The law that defined the foundations of the US financial system was the Federal Reserve Act of 1913, which created the Federal Reserve System as the Central Banking System of the United States. Key US Federal Banking Laws: 1) Bank Holding Company Act 1956; 2) International Banking Act 1978; 3) Federal Deposit Insurance Act 1950.

A number of US banking laws have been amended. The most significant of them are: 1) Glass-Steagall Act 1933, which divided banks into commercial and Investment (President Franklin D. Roosevelt, 1933); 2) Foreign Bank Supervision Enhancement Act 1991 (Congress, 1991); 3) Gramm-Leach-Bliley Act (GLBA) 1999 (President Bill Clinton, 1999); 3) Sarbanes-Oxley Act 2002, which tightened the requirements for corporate governance and reporting (Congress, 2002); 4) Dodd-Frank Act 2009 (Congress, 2009), which secured financial instruments to protect the rights of consumers, financial institutions and systemic protections; by law, the Bureau of Financial Consumer Protection was established; and 5) the new 2018 law—Economic Growth, Regulatory Relief, and Consumer Protection Act (EGRRCPA) (Ermakova et al., 2018).

FinTech payment activities are governed by state and federal laws. The main regulators with regulatory powers regarding payments are the Consumer Financial Protection Bureau (CFPB), the Federal Reserve and state banking agencies. FinTech organizations offering financial services to US consumers must comply with several federal laws that govern the collection and sharing of information (such as the Gramm-Leach Bliley Act 1999 and the Fair Credit Reporting Act 1970) (Frolova, 2018).

Electronic money transfers are regulated in the United States by the Electronic Fund Transfer Act 1978 and CFPB Regulation E, which establish requirements for eliminating errors in the case of unauthorized transfers and increased requirements for money transfers outside the United States (Nonaka, 2019).

Crowdfunding: crowdfunding and peer-to-peer (P2P) credit platforms appeared in the USA in the early 2000s due to the increased use of the Internet and the development of financial technology for automatic credit risk assessment. As for stock crowdfunding, the United States has introduced a regulatory regime to reduce compliance requirements for platform operators and issuers of securities, as well as protect investors. In April 2012, the US government adopted the Jumpstart Our Business Startups Act (JOBS Act) to support startups. Under the new law, fundraising companies must be registered in the United States, and the company should not raise more than 1.07 million dollars. USA through crowdfunding platforms over a 12-month period. All US citizens can invest in crowdfunding, but they are subject to an investment limit based on their net worth and annual income for any 12-month period.

Cryptocurrency: in the United States, the federal government has the sole power to grant legal tender status to monetary objects. Under federal law, cryptocurrencies are not such legal tender in the United States. However, there is a small amount of case law in the United States, namely, The New York District Court ruling of August 19, 2014, in the "US v. Faiella" case and the Second Circuit Court of Appeals of the United States Second Circuit of May 31, 2017 (The New York District Court, 2014) suggest that the courts consider bitcoins (cryptocurrencies) as "money" and "funds" for certain purposes under federal law (Stankovic, 2019). In May 2019, FinCEN has issued a Guide explaining the application of FinCEN rules to business models that include convertible virtual currencies. The Internal Revenue Service has also issued guidance on taxable operations using virtual currencies such as bitcoins or other similar currencies (Nonaka, 2019).

State legislation in the field of cryptocurrency: since the US government has not used its constitutional powers to regulate blockchain and cryptocurrency technology so far, this means that States are free to apply their own legislation—and some States have already done so (Inshakova et al., 2020). For example, in Arizona in 2017, Bill No. 2417 (Arizona House Bill 2417), governing blockchains and smart contracts, was passed. The state of Vermont has passed a law recognizing the admissibility of data embedded in the blockchain as evidence in court without the need for authentication. Delaware has also taken positive steps with blockchain technology (Kalinina et al., 2019; Stankovic, 2019). Other states (including Alabama, Connecticut, North Carolina, and Washington) have enacted legislation and amended their money transfer laws to include the virtual currency (Nonaka et al., 2019).

The most recent federal event was the development of the Uniform Regulation of Virtual-Currency Business Act (URVCBA) by the Unification of Law Commission (ULC) on October 9, 2017. URVCBA is ready for adoption by state legislatures. This would create a regulatory framework for regulating business people in virtual currency (Kaplinsky, 2018).

China

China is at the forefront of various FinTech businesses, including digital payments, online lending and investment. China continues to play a leading role in

digital payments. QR codes have had a huge impact on people's lifestyles, so users can simply open WeChat or Alipay to scan a QR code and make a payment. Fingerprint identification, face recognition and other advanced verification methods additionally guarantee the security of payments. Online lending and financing activities represented by crowdfunding and peer-to-peer lending (P2P) have also developed strongly (Huang & Chiang, 2019).

However, the regulation was not in line with these changes, as many Chinese and foreign researchers have noted (Tobin & Volz., 2018). Digital banking in China is governed primarily by general regulations related to banking: The Law on Banking Regulation and Supervision 2003 (as amended in 2006); The Law on Commercial Banks 1995 (as amended 2003 and 2015); The Company Law 1993 (as amended 1999, 2004 and 2013); The Law of the People's Republic of China on the People's Bank of China 1995 (as amended in 2003); The Law on the Protection of Consumer Rights and Interests 1993 (as amended in 2009 and 2013); The Cybersecurity Law 2016 (entered into force June 1, 2017).

In China, there are a number of financial regulators in the field of Internet banking, issuing various types of by-laws: 1) China Banking Regulatory Commission (CBRC), 2) China Securities Regulatory Commission (CSRC), 3) Cyberspace Administration of China (CAC), 4) Ministry of Industry and Information Technology (MIIT), 5) People's Bank of China (PBOC).

In 2015–2017 China's financial regulators have issued a series of regulations designed to strengthen control over Internet finance. First of all, the Guiding Opinions on Promoting the Healthy Development of Internet Finance (Guiding Opinions) 2015 is the first comprehensive regulation of the Chinese government regarding Internet financing. The new rules were aimed at eliminating potential risks, while providing great support to the Internet finance sector.

P2P lending: In China, the P2P lending industry has grown faster than in any other country. The sector has remained largely unregulated for most of its history, and this has allowed the proliferation of platforms with diverse business models and varying viability. It is widely believed that the PRC government deliberately refrained from participating in this sector in order to allow it to grow rapidly and, thus, provide free access to credit for underserved sectors of the economy (Nemoto & Store, 2019). This has led to a significant expansion of population coverage (up to 40%). Today in China, all that is needed to gain access to savings and loans is a smartphone. Digital banking in China is provided by two conglomerates—WeBank (Tencent) and MyBank (Alibaba Group), which captured more than 90% of the market. With the growth of mobile payments in China, cash has gone out of circulation—despite the efforts of the Central Bank of China.

August 2016 CBRC released Interim Measures on Administration of Business Activities of Online Lending Information Intermediaries 2016. The set of rules codified a ban on guaranteed income, set borrowing limits of 1 million yuan for individuals and 5 million yuan for companies, prohibited P2P lenders from issuing securities to creditors, and required them to keep creditors' funds in Bank

accounts. The actions taken by PRC regulators have had a positive impact on the industry. Stricter regulation successfully led to the closure of risky and fraudulent platforms (Nemoto & Store, 2019).

Crowdfunding: stock crowdfunding in China is seen as an offer of securities that is strictly regulated and monitored. In accordance with Articles 10 and 13 of the Securities Act, the CSRC issued a series of acts that establish detailed requirements for public offerings (Huang & Chiang, 2019).

Total cryptocurrency ban: On September 4, 2017, seven government agencies in China published Notice regarding the Prevention of Risks of Token Offering and Financing. The notice bans all ICOs in China and requires all organizations or individuals who have previously passed ICOs to take measures, including returning token assets to investors to protect investor rights. However, some experts believe that Article 127 General Rules of the Civil Law of China 2017 recognizes the legal status of cryptocurrency as virtual property. In addition, Chinese authors emphasized that despite the ban on cryptocurrencies, the People's Bank of China publicly encouraged the use of blockchain technology to increase the convenience, speed and low cost of retail payments (Wenhao, 2019).

Online insurance: The use of FinTech in the insurance market is regulated nationally in China. In August 2014, the Council of State has published Opinions for Accelerating the Development of Modern Insurance Services. Insurance companies were allowed to actively use new technologies (cloud computing, big data, and mobile Internet) to promote insurance industry sales channels and innovations in service models (Huang & Chiang, 2019).

Russia

In Russia, "financial technologies are becoming a serious alternative to a traditional bank as a subject of the banking services market. However, in Russia, the transformation of companies into financial ecosystems like the Chinese corporations Tencent and Alibaba Group has just begun. The reason for this is the low activity of low-budget startups in the Russian fintech sector, and according to Bloomchain experts, in most cases, the Russian fintech comes down to buying ready-made technologies or teams that start working on new products as part of large companies (Ostroushko, 2019). Sberbank took certain steps in this direction, Tinkoff Bank is moving in the same direction, which, in addition to its own banking and insurance products, provides partner travel, mortgage, and brokerage services. Among the potential players of Alfa Group, which includes a bank, an insurance company, X5 retailer, Beeline mobile operator, as well as VTB Group with a bank, an insurer, an investment company, Magnit retailer and a partner represented by Russian Post (Etko, 2018).

At the same time, the development of new financial technologies raises many legal problems related to the lack of readiness for radical changes and the lack of legal support for new technological processes in the banking sector. You can support the opinion of G. F. Ruchkina that Russian legislation has a weak preventive effect

on the genesis of banking innovation. In national law, there is no system for regulating the process of creating and introducing new banking technologies" (Ruchkina, 2017). The Bank of Russia defined "Internet banking as a way of remote banking services for clients carried out by credit organizations on the Internet (including through the website (s) on the Internet) and including information and operational interaction with them. This definition is widely interpreted by the Bank of Russia. Today, the rules governing remote banking technologies are disparate and are presented in regulatory legal acts of various levels (Frolova et al., 2018).

Digital Rights: Since October 1, 2019, digital rights have become a new subject of civil rights. The law was published on March 18, 2019. These changes in the Civil Code of the Russian Federation are necessary for the subsequent adoption of laws on digital financial assets (cryptocurrency and tokens) and crowdfunding (attracting investments through electronic platforms) (Ostroushko, 2019).

Crowdfunding: crowdfunding in Russia will be settled on January 1, 2020, after the entry into force of the Federal Law dated 02.08.2019 N 259-FZ "On attracting investments using investment platforms and on amending certain legislative acts of the Russian Federation" (The State Duma, 2019a).

Cryptocurrency: The cryptocurrency turnover in Russia has not yet been regulated. However, in early 2018 the Ministry of Finance of the Russian Federation has developed the Draft Law "On Digital Financial Assets" (2018), which is under consideration by the State Duma of the Russian Federation.

However, the presence of a large number of regulatory legal acts regulating remote banking services leads to contradictions in the current legislation, and, consequently, to problems of ensuring security and protecting the interests of bank customers and the credit institution itself. In addition, the current legislation does not contain the concept of remote banking services (Vengerovsky, 2018).

CONCLUSION

Based on the study, the authors came to the following conclusions:

1. The development of digital banking brings both benefits (innovation and the creation of new jobs) and problems (risks of uncontrolled complexity, data leakage and threats to consumer rights). The solution to the problems of the governments of the EU and US member states is to strengthen supervision of the development of digital banking. Until recently, the Chinese government has held a position of non-interference.
2. Since in China the government was in no hurry to issue rules for the provision of digital financial services, Internet finance providers in this country received much more freedom to work than traditional financial institutions. It should also be emphasized that, despite the ban on private cryptocurrencies in China, the People's Bank of China has publicly encouraged the public use of blockchain technology.

3. In the United States, digital banking is governed primarily by regulations and case law relating to traditional banking. At the federal level, there is no regulation of new Fintech industries, for example, cryptocurrencies. However, at the state level, the situation is different. The Uniform Regulation of Virtual-Currency Business Act (URVCBA) was published on October 9, 2017 (National Conference of Commissioners on Uniform State Laws, 2017).
4. In the European Union, depending on the type of activity, various regulatory acts (regulations and directives) are applied that govern payment services, crowdfunding, insurance, cybersecurity, etc. The Fifth EU Money Laundering Directive of 2018 contains a clear definition of the concept of Virtual Currency, which covers all types of popular cryptocurrencies. This directive can be called a step towards tight regulation of blockchain in the EU.
5. Russia lags behind the global giants of Internet banking both in terms of the volume of monetary transactions in digital form and in the quality of legal regulation of the Fintech industry, especially in the field of protecting the rights of consumers of digital financial services. However, one cannot fail to note a number of steps in this area: Law dated March 18, 2019, N 34-FZ on amendments to the Civil Code of the Russian Federation enshrined a new object of civil rights—"digital rights," and law dated August 2, 2019 No. 259-FZ—regulated crowdfunding (The State Duma, 2019b).

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CHAPTER 25

ENSURING MINIMUM STANDARDS OF FAIR TRIAL IN THE ERA OF THE FOURTH INDUSTRIAL REVOLUTION

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The research goal of this scientific research is to identify changes in legal proceedings in the era of the industrial revolution 4: 0. The widespread introduction of innovative digital technologies completely changes the social paradigm. People who do not have access to information and communication technologies may be restricted in exercising their rights, including judicial protection.

It is proved that: 1) the Introduction of digital technologies makes it necessary to consolidate social guarantees in legislation; 2) conditions Should be created to ensure the availability of digital justice to all citizens and organizations; 3) the result of the introduction of digital technologies will be the widespread use of artificial intelligence; 4) the need for legislative regulation of the use of digital technologies in legal proceedings; 5) the Procedure for implementing procedural actions using digital technical means requires changes in the direction of simplification; 6) the Need to create a single information space (platform) on which all the resources necessary for obtaining judicial protection would be placed.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 323–332.

A positive result of the study is the conclusion that the active introduction of digital technologies can violate the basic rights of citizens and organizations. Achieving a balance between private and public interests is possible if social guarantees of citizens are provided by law.

The author substantiates the need to create social programs that cover all institutions of society that must implement the digital agenda of the Russian Federation, as well as conduct an information policy that explains the importance of introducing information technologies in life, including the judicial form of protection of rights.

Keywords: Digital Justice; Legal Proceedings; Platform; Social Guarantees; Network-Internet; Technical Means; Information Security; Public Services; Internet Court; Cyber Attack; China; Japan; Singapore; Russian Federation.

JEL Code: K24, K40, K41, D18

MATERIALS

The basis of the regulatory framework of the research consists of: 1) the Civil procedure code (The State Duma, 1994), 2) Arbitration procedure code of the Russian Federation, Federal law of July 18, 2019 No. 191 "On amendments to certain legislative acts of the Russian Federation" (RG, 2019), these normative acts have enabled a comparison of the process of implementation of technical means in the civil procedure of the Russian Federation, 3) the decree of the President of the Russian Federation from May 7, 2018 No. 204 "On the national goals and strategic objectives development of the Russian Federation for the period up to 2024"(The President of the Russian Federation, 2018a) and 4) the Order of the Judicial Department at the Supreme Court of the RF dated 27.12. 2016 "On approval of the procedure for submitting documents in electronic form to Federal courts of General jurisdiction (The Judicial Department at the Supreme Court of the RF, 2016), including an electronic document, 5) "The concept of information policy of legal proceedings for 2020–2030 dated December 5, 2019 (Garant, 2019).

The doctrinal positions that formed the theoretical basis of the study were studied on the basis of scientific works devoted to the phenomena of digital (electronic, virtual, network) development, which has become a part of everyday life, that reflected in the legal consolidation: Tarakanov et al., (2019), and Ekaterina et al. (2019).

The influence of the digital economy on the state of civil society is reflected in the works of such authors as: Khabrieva (2018); Akhyadov et al. (2019); Gaivoronskaya et al. (2019).

The authors studied the procedural foundations of legal proceedings in the following work: Inshakova & Kazachenok (2018).

METHODS

There were used general and specific scientific methods of objective reality cognition in the research work. The process of implementing digital technologies in various spheres of public life, including legal proceedings are studied. A detailed analysis of the current legislation regulating the procedural order, information technology and security are carried out, and based on this, conclusions are drawn about the possibility of simplifying a number of procedures related to the implementation of their digital rights, as well as mandatory consolidation of new social guarantees.

On the basis of the comparative legal method, the author analyzes the foreign experience of introducing innovative technical means into the civil process, as well as gives practical recommendations for borrowing this experience into the Russian reality.

INTRODUCTION

Today, digitalization has transformed from one narrow area to a large-scale change in traditional models of public relations, which has also affected the judicial form of protection of rights. The introduction of high technologies in the spheres of society's life is one of the most important tasks facing all countries of the world (Rusakova et al., 2019). Resolving issues of legal support for the digital transformation of international relations within the framework of economic integration is a necessary factor for the progressive development of cross-border trade, services, capital flows and the effectiveness of the judicial mechanism of rights (Tarakanov et al., 2019).

Countries in the Asia-Pacific region are leaders in the digital transformation of public relations. In countries such as Japan and Singapore, state programs for creating a digital state have remain in stance for many years (Gaivoronskaya et al., 2019). China and South Korea have adopted their own programs for introducing digital technologies into many social institutions: the state and the family, culture and science, law and education, and others.

Japan has followed the path of adopting the basic principles of society based on information and communication, and has also taken steps to build a digital society and a digital state (Akhyadov et al., 2019). Australia has established online courts where proceedings are conducted through digital and Internet technologies.

However, one of the most progressive countries is China, which has gone even further by creating special Internet courts that deal with disputes related to online sales of goods and services, lending, copyright and related rights violations, domain names, and violations of personal or property rights on the Internet. As a rule, all legal proceedings in Internet courts are conducted online, including the study of legal documents, the presentation of evidence to the court, and the stages of dispute resolution as in a normal process (Guodong & Meng, 2019). Electronic

evidence is legally established as one of the means of proof. But it is important in this process to maintain a balance between private and public interests.

RESULTS

Legal Basis of the State's Information Policy

However, such innovations require special regulations, as well as the creation of special conditions for the introduction of digital technologies in public relations. It is necessary to fix one of the social guarantees at the legislative level—the provision of free technical assistance to those persons who cannot provide themselves with the necessary means to exercise the basic rights guaranteed by the Constitution of the Russian Federation. Special mechanisms should be created for their implementation throughout the Russian Federation.

On January 15, 2020, Russian President Vladimir V. Putin, in an address to the Federal Assembly, in almost every topic, drew attention to digital technologies, starting with school education and ending with ensuring the availability of the Internet throughout the Russian Federation. These tasks require establishing responsibility for all persons responsible for their implementation.

In the Russian Federation, as part of the implementation of Presidential Decree No. 204 of May 7, 2018 "on national goals and strategic objectives for the development of the Russian Federation for the period up to 2024" (The President of the Russian Federation, 2018b), the national program "Digital economy of the Russian Federation" (Ministry of Digital Development, Communications and Mass Media of the Russian Federation, 2021).

However, having studied the procedural legislation, it is premature to talk about digital legal proceedings, since currently only some actions can be performed in electronic form, namely, the electronic form of submitting procedural documents to the court and conducting legal proceedings via video conferencing is fixed.

Drawing on the experience of China, the most effective step is to create Internet courts where legal proceedings are fully conducted in a digital format. It is not only about video conferencing and the possibility of submitting procedural documents to the court online via the Internet, as in the Russian Federation, but also using specific means of proof, making an electronic judgment and conducting all stages of the process.

First of all, these all about the fact that the scientific community has not identified a unified approach to developing legal principles on the basis of which it should be implemented, as well as evaluating digital justice from the point of view of implementing the functions of justice and for the further development of Russia as a legal social state.

The ongoing procedural reform contains provisions related to the introduction of digital tools. The judicial form of legal protection has long needed to be reformed in order to increase efficiency, and one of the methods to achieve this goal

is the introduction of modern technical means to simplify, speed up and reduce the cost.

Digital Actions Are Carried Out in Civil Proceedings

In the procedural codes of the Russian Federation, there are separate rules regulating digital methods of performing actions. However, in judicial practice, there are many controversial issues related to their application and evaluation by the court. The concept of creating e-justice in the Russian Federation has not yet been implemented, and is only at the stage of formation.

Submission of a claim to the court via the Internet is possible if the person has an enhanced qualified electronic signature. Order of the Judicial Department of the Supreme Court of the Russian Federation dated 27.12. 2016 "on approval of the procedure for submitting documents in electronic form to Federal courts of General jurisdiction, including an electronic document" establishes the need to create a personal account on the Internet portal of gas "Justice" with a confirmed ESIA individual account and an existing enhanced qualified electronic signature. Access to this service is complicated, since in order to obtain an enhanced qualified signature, you must contact an accredited certification center, and account confirmation takes place in a Unified identification and authentication system through a portal that provides public services. This procedure causes a lot of difficulties for ordinary citizens, so it is necessary to simplify it and to achieve the goals of the digital agenda of the Russian Federation and consider providing it for free. In addition, it is necessary to create an opportunity for remote access to this service, so that a citizen can do it without leaving home, and for organizations in the registration process.

The parties to the process through their personal account carry out the process of submitting procedural documents to the court, the order of the Supreme court of the Russian Federation sets certain requirements for them and determines what an electronic document is. An electronic document is a document that is created electronically or scanned and must be signed with an electronic signature. All documents in the form of an electronic image must be scanned in PDF format, being the most secure from making changes to it, have an exact name and an indication of the number of sheets, and must contain the electronic signature of the person indicated by the signer in the text of the document.

The law provides for the possibility of filing in electronic form: a statement of claim, evidence, an application for securing a claim, a request to suspend the execution of a court decision, a complaint and a submission.

Despite the small list of procedural actions in electronic form, in practice there are a lot of controversial issues. The person who uploaded the electronic document must make sure that they did it properly. this means that all documents must be fully downloaded, a strong or simple electronic signature must be uploaded that has passed verification (for example, whether the certificate has expired), and procedural deadlines are met (the date and time are recorded in the system

automatically in Moscow time). The procedure for completing the submission of documents ends with sending a notification of receipt of documents to the information system.

However, in order to attract to the court case printed: copy of the appeal to the court received in electronic form, information about the results of checking the certificate enhanced qualified electronic signature, and, if necessary, and other documents. At this stage, events often occur due to the "human factor," when the necessary documents are not available in the case, which were attached in electronic form.

In the era of transformation of the judicial form, it is necessary to exclude such situations by introducing special technical means in this process, without human participation.

Expected and/or stimulated is the introduction of artificial intelligence in the sphere of relations arising between the participants of the process and the court. At present, attempts have begun to meet this need for regulating private law relations, and in a fairly wide range: from the adoption of legal acts on the use of artificial intelligence to increase the level of automation of decision-making processes and reduce the response time to incidents, from departmental regulations concerning the solution of tasks for recognizing situations based on artificial intelligence with the issuance of an alarm indication on monitors, to official forecasts, linking the prospects for successful structural adjustment of the Russian industry with the possibility of an effective and comprehensive solution of such a range of tasks, which will include the creation of hardware and software complexes for artificial intelligence systems.

Electronic record-keeping is quite complex and requires the applicant to have special knowledge and skills, so most of the appeals to the court are submitted, so far, in the usual form-in writing.

Concept of Information Policy of Legal Proceedings

The basis of the information revolution of legal proceedings is also the approved Concept of the information policy of legal proceedings for the years 2020–2030, dated December 5, 2019. The goals of the program are to introduce modern information and communication technologies in court proceedings, to improve the technical equipment of courts, to constantly improve the official websites of courts and state bodies operating on the same platform, from which the judge could receive data online to check the submitted documents, as well as to improve the efficiency of legal proceedings. This practice has existed for many years in foreign countries. In Russian legal proceedings, the time frame is often delayed when it is mandatory to obtain the necessary information, the court makes a request, and the response can sometimes wait more than a month or longer. If this mechanism is created, it will reduce the cost and speed up the judicial process, the parties will not have to wait for the beginning of the process to apply for the required evidence.

Many countries that are leaders in this process, such as Japan and Singapore, have had government programs for creating a digital state for many years. China and South Korea have adopted their own programs for the introduction of digital technologies in many social institutions: the state and the family, culture and science, law and education, and others. Japan has followed the path of adopting the basic principles of society based on information and communication, and has also taken steps to build a digital society and a digital state. Singapore has established online legal platforms where registered organizations or individuals have access to online legal proceedings in courts of General jurisdiction, family courts, and the Highest court, as well as other online services.

The concept envisages the modernization of the information policy of the judicial system: 1) harmonization of relationship between the judiciary and society; 2) openness and publicity of legal proceedings; 3) improving ways of access for citizens, organizations, public associations, bodies of state power and bodies of local self-government, representatives of the media to information on courts' activities; 4) objective coverage of the activities of courts in the media; 5) creating a favorable image of the judiciary; 6) increase the level of confidence in the judicial system.

The Concept sets out the main principles on which justice in the Russian Federation should be based: ensuring access to justice for citizens; openness and transparency, independence and objectivity, publicity and transparency of legal proceedings.

It is possible to ensure access to the court for citizens by simplifying the procedure for obtaining a qualified electronic signature, as well as the process of applying to the court. However, achieving this depends on the availability of the Internet and the quality of the service provided.

It is necessary to consider the possibility of transferring some types of proceedings in civil proceedings completely to an online format, which will be another step to solve this problem. There are a number of types of disputes in which there is no dispute about the right or the parties apply for a simplified procedure for consideration of the dispute. their proceedings must be made digital, but first ensure that every citizen can obtain all the necessary funds to exercise their right to judicial protection.

A new principle of transparency of legal proceedings has appeared in Russian legislation, however, this principle has not been implemented yet in practice, since it involves tracking the entire course of the process, but at the moment only persons participating in the case have access to this information. In foreign practice, in the Internet courts of China, any person, except if the dispute is considered in a closed session, can connect to the court's network and turn on its broadcast, so that his presence in the court session is carried out.

The implementation of these principles should help to solve the main tasks-to increase the confidence of citizens in the courts, as well as to prevent corruption in this branch of government.

The policy of openness of the judiciary to the public should guarantee the information security of the participants in the process, so it is necessary to develop a mechanism for maintaining a balance of interests between all interested parties by searching for technical means of protection.

Court databases should be well protected from leakage of personal data of participants in the process, changes in information and its dissemination. The creation of a single information space is now simply necessary and all the necessary conditions exist for this, which do not contradict Russian legislation.

Abroad, cloud technologies have long been used to store a large amount of information on special servers, with data encryption, the ability to remotely delete information, and protection from third parties. the Main advantages of using cloud technologies are: 1. Security—this technology allows you to provide a high level of control over information when it is transferred to the cloud compared to traditional methods of storing it; 2. Low cost—the user of cloud services pays only for using the cloud itself, but does not pay for its IT support; 3. Availability of information-by placing information in the cloud, the user can use it anywhere in the world, if they have access to the Internet.

Currently, video and audio recordings made in court proceedings require the court to have the technical means to implement them, as well as special media for each specific case where they were used, and this requires additional material costs, so the quality often suffers from this. According to the procedural legislation, the conduct of court proceedings is possible through video conferencing, as well as recording of court sessions using audio recording tools (audio recording).

The concept sets out the basic principles of the information policy of the judicial system: legality, scientific validity, consistency and efficiency.

The principle of legality means that the process of digitalization of legal proceedings should not violate the legal regulation of the judicial system, the protection of information and personal data.

It is obvious that it is necessary to ensure the security of information entering the court's database, since disputes may contain commercial, personal or other secrets, and we must not forget about the protection of personal data (Frolova et al., 2018).

For implementation this task, an essential role plays and other government specialized agencies in the Ministry of internal Affairs of the Russian Federation, the Federal security service of the Russian Federation and others that have time to respond to cyber attacks or hacker attempts to hack websites or databases of state bodies and other institutions. All these activities will be ineffective if special divisions responsible for the safety of courts are not created in the system of courts. In an era of constant international cyber threats, all incoming information must be stored on Russian servers, and Russian Telecom operators must be used to transmit such data.

CONCLUSION

In addition to the need to develop a theoretical framework for the implementation of digital justice. There are also problems in the public understanding of the need to introduce digital technologies in public life, especially in such an important institution as the court (Inshakova & Kazachenok, 2018).

It is necessary to prepare social projects for citizens and organizations, for example: regular free classes to improve the skills of using digital technologies; conduct events in schools and other educational institutions in order to increase the attractiveness of the judicial form of protection of rights using digital technologies; create training courses for students of the legal profession and persons with higher legal education on the use of digital technologies in the judicial process, and others.

It is necessary to state the fact that most of the population of the Russian Federation does not have the opportunity to use digital technologies for a number of reasons, so it is necessary to fix social guarantees to citizens at the legislative level for the possibility of realizing the right to digital justice (Khabrieva, 2018). For example, the creation of a special free service at the courts, which should work with the population and provide all assistance related to the use of digital technologies or the provision of such services online, as well as at all levels to fix this electronic security as one of the social guarantees.

The entire judicial system needs radical changes. It is necessary to simplify many procedural actions in court, and most importantly access to it. One solution to this problem may be the introduction of online judicial proceedings, but the main thing here is to ensure that all individuals, especially the less protected segments of society, can achieve social equality in the exercise of the right to judicial protection. The introduction of digital technologies will reduce the judicial burden due to faster and more efficient production, as well as the burden on the budget.

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CHAPTER 26

INDUSTRY 4.0 AS THE BASIS FOR THE TRANSFORMATION OF SOCIAL RELATIONSHIPS IN THE FIELD OF LABOR AND EMPLOYMENT IN THE EEU COUNTRIES

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"Industry 4.0" or the new technological revolution as a result of the world globalization is intended to transform social relationships in all aspect of human interaction, including labor and employment spheres. The strengthening of integration links among the Eurasian Economic Union (hereinafter—EEU) countries and common vectors of social-economic and migration policy, implemented by the member states of the EEU, demand fundamental studies of the most significant and at the same time "risky" aspects of the oncoming transformation. The latter ones may be structured in the following manner:

1. The single EEU market of labor and human resources due to global automation and robotization of manufacture, agriculture and services sector will in the next decade face the substitution of traditional employment by its non-traditional

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 333–345.

forms (remote labor, outsourcing, working at internet-platforms, etc.). The rejection of HR in favor of smart robots will entail a high degree of competition between a robot and a human being and thus will lead to critical technical unemployment;
2. The creation and introduction of AI demands solving the issue of stabilization on labor markets, which will be transformed owing to the matter of providing legal capacity to smart robots. This will mean the rejection of earlier principles of legal regulation of the labor and employment spheres or their significant alteration; and
3. "Industry 4.0" demands for relevant legalization of updated social relationships in the field of labor and employment; for the definition (in the national legal acts and international ones) of the essence, conceptual framework and application scope of those relationships. For the EEU countries this will be the most relevant development vector in the nearest decade, as the process of technological revolution is impossible without harmonizing and integrating effective legal systems.

The authors motivate the necessary development of conceptual legal acts, oriented towards "risk mitigation" in response to boosting automation and robotization processes in the fields of labor market, employment and unemployment protection in both the EEU counties and at the international arena.

Keywords: Labor Relationships, Employee, Labor Market, HR, Robot, AI, "Industry 4.0," Robotization, EEU.

JEL Code: I24, K31, F22, F66, J14, O15

MATERIALS

The grounds for the present research of legal base include the effective legislation of the EEU and its countries (including Russia), which regulates relationships in the field of labor and employment, HR migration and other relationships, connected directly with the research subject and engulfed in legal regulation of conceptual basis for the robotization of various human activity spheres.

As the example of program documents of strategic and recommendation nature, devoted to the matters of digitalization in the EEU countries in the frames of modern technological development, the following acts have been taken and evaluated: 1) the Doctrine of Information Security of the Russian Federation (approved by the Order of the President of the Russian Federation of December 5, 2016 No. 646) (President of the Russian Federation, 2016); 2) the Strategy of Information Society Development in the Russian Federation for 2017–2030 (approved by the Order of the President of the Russian Federation of May 9, 2017 No. 203) (President of the Russian Federation, 2017); 3) the State Program of the Russian Federation "Information Society (2011–2020)" (approved by the Regulation of the Russian Government of April 15, 2014 No. 313) (The Russian Government, 2014); 4) the Program "Digital Economy of the Russian Federation" (approved by the Directive of the Russian Government of July 28, 2017 No. 1632-p) (The

Russian Government, 2017); 5) the Strategic Development Plan of the Republic of Kazakhstan until 2020 (approved by the Order of the President of the Republic of Kazakhstan of February 1, 2010 No. 922), the State Program "Digital Kazakhstan" (President of the Republic of Kazakhstan, 2010); 6) the Decree of December 21, 2017 No.8 "On the Development of Digital Economy" (President of the Republic of Belarus, 2017); 7) the State Program for the Development of Digital Economy and Information Society for 2016–2020 (approved by the Regulation of the Council of Ministers of the Republic of Belarus of March 23, 2016 No. 235) (President of the Republic of Belarus, 2014); 8) the draft Concept of Digital Transformation "Taza Koom" of Kyrgyzstan (Government of the Kyrgyz Republic, 2017). 9) the draft long-term Strategy "Digital Agenda of Armenia 2030" as well as the integration documents of the mentioned countries, in particular the EEU Treaty (signed in Astana in May 29, 2014, amended in March 15, 2018)—hereinafter—the EEU Treaty (Eurasian Commission, 2014).

The doctrinal positions of the theoretical basis for the current research have been analyzed owing to scientific works, devoted to the digitalization in the field of labor, employment and the use of new technologies at labor markets: Tikhomirov, Nanba, Antonova, and others, Kostyan et al. (2017), Zemtsov (2018), Schwartz (1995), Ford (2015), Hawken et al. (2013), Schwab and Davis (2018), Beljaeva, Kashevarova, Tsomartova. etc. Kashevarova et al. (2018), Keeley (2015), Pashentsev et al. (2019), Tikhomirov and Nanba (2019), and others.

The methodological grounds for researching the digitalization processes are disclosed in the works of Khabrieva. (2018), Chernogor (Khabrieva & Chernogor, 2018); the automation and robotization processes—in the works by Tikhomirov, Nanba, Antonova. and others (Legal Concept of Robotization, 2019); Schwab and Davis (2018); Ford (2015), Scholten et al. (2016), Frey and Osborne (2017), (European Parliamentary Research Service, 2016), and others.

METHODS

The grounds of the research made include traditional legal scientific methods (formal-legal, system-structural, comparative). By the means of these methods it was possible to analyze the dynamics of the legal normative system, which regulates the modern relationships in the field of labor and employment in the EEU and its member-states.

INTRODUCTION

The basis of the EEU Treaty includes a tight and deep level of integration, i.e. the creation of a single market upon the four "freedoms"- free movement of goods, services capital and labor. Favorable migration policy serves as a basis for the integration unity of countries and it also allows using all capabilities of the approximation taking place. As B. Keeley notes, "migration has always been and will be a part of human history. It is possible that in future more and more people

will be willing to migrate constantly or temporary in order to seek new opportunities" (Keeley, 2015).

In the conditions of the "Industry 4.0" the first place is taken by the issues of labor migration. At the same time the distinctive features of a new technological behavior obliges the EEU member-states to consider the following factors in determining basic vectors of social and economic policy:

1. Unlimited capabilities of robotic technologies, neural networks, cloud and quantum technologies allow business community to derive significant benefit by substituting human workers with smart robots (so the salary, taxation, social contributions over generally accepted social risks and certain other matters become outdated).
2. The remaining part of human resources (human natural resources, not replaced with smart robots and blockchain technologies yet) (Tapscott & Tapscott, 2016) will expand educational potential in the field of artificial intelligence and understanding the work of modern computer technologies, seek alternative employment and attempt to master intellectual or professional skills.
3. The requirements to the system of education and qualification upgrading will rise (will change) almost in all human-available traditional sectors—manufacture, agriculture, services—which shall demand the state to take steps aimed at the development and implementation of related national and international development plans, concepts, programs, roadmaps and legal documents (Frolova et al., 2018; Inshakova & Goncharov, 2019). This process shall pertain to new economic sectors, professions or jobs.
4. In the EEU frames it will be necessary to adopt integration acts and treaties (considering latest technological tendencies and development vectors) which wouldn't contradict effective basic documents—particularly the EEU Treaty.

Not a single state has a united legal base, which would directly regulate the use of robotic technologies, robots or AI. However certain legislators of the leading countries were able to formulate relevant development vectors of legislation, which may serve as a good example for the EEA countries—i.e.: 1) the "Robot Ethics Charter" 2007 (Ministry of Commerce, Industry and Energy, 2007); 2) the law on "Intelligent Robots Development and Distribution Promotion" 2008—in South Korea (Elaw, 20080; 3) the "Robotics Industry Development Plan (2016–2020) and the Global state development program "Made in China 2025" (2015)—in China (Metrix, 2015); 4) the "Multi-Annual Roadmap—Robotics 2020," developed by SPARC and the European Parliament resolution of 16 February 2017 with recommendations to the Commission on Civil Law Rules on Robotics (2015/2103(INL) (EU-Robotics, 2017); 5) the "National Robotics Initiative" 2011 (v.2.0) and the "Roadmap for US Robotics" 2011—in the US (NSF, 2011).

All these and certain other conceptual legal acts will gain more significance along with the introduction of higher technologies at labor markets and with the necessary support of employment levels and social protection of human workers.

RESULTS

In recent years the EEU member states have been making experimental studies over the upcoming modernization of labor markets involving leading business-representatives, which provide short-term and middle-term development plans (plans for the development of new markets, production output, new technologies, etc.).

Thus in Russia in 2014 the Almanac of new professions (the "Atlas of new professions," hereinafter—Professions Atlas) was introduced. It was developed by the experts of Skolkovo Institute for Science and Technology over the Research "Foresight of Competence 2030" (Agency for Strategic Initiatives, Skolkovo, 2014) in cooperation with business representatives. The initiatives to develop similar profession atlases were introduced in other EEU member-states: Kazakhstan, Kyrgyzstan, Belarus and Armenia.

The Professions Atlas as one of the few experimental studies upon the upcoming transformation of labor markets in the nearest future illustrates the advanced 19 economy sectors and relevant professions for the nearest 15–20 years. According to the forecast made by the Skolkovo experts, by 2030 due to automation and robotization processes in basic economy sectors of labor markets 186 new professions will arise, while 57 "retired" professions will disappear. This will hit hard most specialists with medium skills, oriented at performing multiple monotonous actions. The reasons for those professions getting outdated are shown in the formulas, calculated by an American economist David Author (Author's Curve) in order to assess employment changes in US industry sectors from 1980 till 2005 according to worker qualification (the Atlas of new professions: Agency for Strategic Initiatives "Skolkovo," 2014). Thus in order to explain most risks in relation to medium-qualified workers, two aspects have been introduced against high and low-qualified workers. The first one implies that the medium-difficulty tasks are greatly influenced by automation—they consist of monotonous actions and do not complicate the introduction of new technologies. The second one presumes that the medium-qualified professions have generally reached a fair highly-paid limit, which allows businessmen to benefit economically from the implementation of automation processes.

The retention of earlier conditions on labor markets for low and middle-qualified workers becomes available by gaining new, universal "super-professional" skills, aimed at interdisciplinary interaction and capable of enhancing professional activities. The acquisition of such skills may be seen as a compensatory mechanism for "labor market losses" due to possible unemployment (Kapelyushnikov, 2017; Zemtsov, 2018).

Among those "super-professional" skills the Professions Atlas names i.e.: system thinking, skills of interdisciplinary communication, abilities to manage projects and processes, IT solution programming, managing automated complexes, maintenance of AI, multi-language and multi-cultural skills (free knowledge of English, knowledge of a second language, comprehension of national and cultural traditions of partner countries, comprehension of work peculiarities in other countries), etc.

Such skills will be recognized as the most relevant in various spheres of activity from the list of 186 new professions (medicine, transportation, aviation, space, nanotechnologies, IT, robotics and machinery, ecology, social security and education, etc.)

For human workers this will mean acquiring education for at least two professions (occupations), including vocational training over one profession (occupation), which will in future lead to the revision of the principles for making federal state educational standards (FSES) in order to give scholars new, "super-professional" skills, abilities and knowledge. At the same time along with the sophistication of innovative technologies, true leadership will be taken by the skills and abilities connected with managing complex automated systems and smart robots, including interaction with AI (Dudin et al., 2017; Putilo et al., 2020).

The list of 57 professions, getting outdated or "retired professions" from the Professions Atlas is represented chronologically by two periods: 1) 2013–2020; 2) 2020–2030.

During the first period (2013–2020) the following intellectual (white collar) professions will retire: budget calculator, stenograph-writer and decoder, copy- or ad writer, tourist agent, lector, librarian, paperwork manager, record keeper, tester, any key (jack-of-all-trades) IT specialist. Talking about blue-collar professions, the following ones will retire: ticket controller, parking attendant, call-center employee, elevator engineer, and postman.

During the second period (2020–2030) the following white collar professions will retire: notary, lawyer, analyst, pharmacist, broker, real estate agent, secretary, receptionist, municipal worker, logistics specialist, dispatcher, bank processing operator, journalist, diagnostician, IT system administrator. The following blue-collar professions will retire: driller, janitor, miner, cargo train operator, road-traffic inspector, digger, packer, welder, construction taskmaster, tailor, shoemaker, taxi driver..

The Professions Atlas also outlines that along with the modeling of professions obsoleting processes it is necessary to consider a number of factors, which have various degrees of intensity. Those are the factors which "subtract work" partially (robots, programs—such as blockchain, migrant workers) and the ones which "subtract work" totally—outsourcing, bacteria, 3d printing) (Legal Concept of Robotization 2019, pp. 11–21).

The model of labor market upgrading, presented by the Skolkovo experts, shows that the least risk-vulnerable workers are the ones, possessing medium

qualification, as they are more resilient to the implementation of innovative technologies. This will imminently lead to the extinction of a large number of professions, lacking super-professional (interdisciplinary) skills with a simultaneous expansion of high-qualification vacancies, which shall compensate losses appearing due to possible technological unemployment. At the same time the demand for IT specialists, maintaining complex automated systems, smart robots and AI programs will rise along with the implementation of new innovations (Zemtsov, 2017).

The Atlas of new professions, being an indicator of the main threats for the employment sphere in the next decades (i.e. robotization, and smart programs such as blockchain and others) is unfortunately unable to foresee all possible social and economic implications or risks of extinction and emergence of professions. On one hand the robust complication of robotization processes shows that neither education nor skill mastering will save us from unemployment as the main threat to labor markets in the future. On another hand we may not ignore the mechanisms for the employment transformation: the emergence of new vacancies in new sectors, the possible introduction of technological, financial, legal and other restrictions of automation and robotization in relation to working places (Briody, 2013; De Vos M. 2018; Eidenmueller, 2017; Ford, 2015; Frey & Osborne, 2017; Schwab & Davis, 2018; Tapscott & Tapscott, 2016).

For the large regions of heterogeneous countries such as Russia, China, Brazil the social implications of technological changes will have clear geographic (regional and urban) distinctions. They will also bring major migrations in the social and economic spheres (Kapelyushnikov, 2017; Zemtsov, 2018). In regions and cities with a high degree of automation and robotization certain "old industrial" or "old service" districts with high social anxiety may appear.

For the EEU countries, including Russia the mentioned tendencies actually represent the risks of a new sphere of possible technological exclusion of citizens from regional economy—"economy of ignorance," "society of ignorance" (Putilo et al., 2020; Vatoropin et al., 2017; Zemtsov, 2017). For today the EEU countries possess a relatively low level of integration of industrial robots—much lower than most developed states and the low cost of work force in comparison with the costs for robot integration (especially, taking into account increasing migration into the EEU form less developed states). According to experts, only in Russia there is only one industrial robot per 1000 human workers, while worldwide this number is around 69. At the same time the proportion of potentially automated vacancies in the EEU countries, including Russia reaches 44% without extraneous part-time workers (Zemtsov, 2018). According to more modest assessments robotization will only reach 15% while the other workers, jeopardized by unemployment will orient themselves towards more creative and intellectual jobs in frames of their professions, after reskilling.

If the economies of the EEU countries will develop along with the global tendencies for labor efficiency increase and for implementing labor-saving tech-

nologies, then in order to secure employment we shall need the development and implementation of massive professional reskilling programs, the promotion of creative industry and business initiatives (Vishnevskaya, 2019). At the same time it is vital that the governments of the EEU countries and the single labor market will respond quickly to technological challenges, as the implementation of new educational programs and the development of innovation companies will take time. In this case a gap between the growing number of unemployed people and the emergence of new vacancies may appear.

In some of the most sensitive and thus most vulnerable regions of the EEU states an even more dangerous situation of a long term (and in certain cases—permanent) employment reduction is possible. It is well known that long-term unemployment severely cuts chances of a person to participate in economic activities in the future, which entails massive international and interregional migrations or creates unpredictable challenges for regional social policies (Schwartz, 1995; World Economic Forum 2016).

We may agree with the Russian experts that—in order to decrease the amount of potentially excluded from economy employed people and equalize inevitable processes of robotization in society, we should strengthen the following four factors: education levels, income levels, ICT implementation levels, and entrepreneurship development levels (Vatoropin et al., 2017, Zemtsov, 2017).

The potential dynamics in the field of labor and employment will eventually demand for the adjustments of the legal base. The search for the means and models of legal regulation goes on in the EEU countries on both national and integrative levels. In 2017 the Supreme Eurasian Economic Council approved the Basic vectors for the implementation of the EEU digital agenda until 2025. This document determined the goals, aims, principles and interstate cooperation vectors in the digital sphere. The governments of the EEU countries together with the Eurasian Economic Commission were entrusted with working out the initiatives at the first stage of Eurasian digital integration.

The Russian Federation has been the chairman in the EEU authorities since 2018. In this context on January 18, 2018 Vladimir Putin addressed his message to the EEU member states, which included the development of the EEU "digital agenda" from the viewpoint of quick implementation as one of its points. That also meant the implementation of high technologies into state management, industry, customs regulation and other spheres if human interaction; and the launch of joint competitive, innovative and science-driven industrial projects (Inshakova & Inshakova, 2020).

The governments of the EEU countries along with the development of Union legal documents and acts should keep in mind the importance of economic benefits from the high level of innovations development, which makes the law flexible, while the innovation development should not be accompanied by the rejection of former guarantees of social and labor rights for all society members. This postulate was acknowledged by the Global Commission on the Matters of Future in

the Labor Sphere of the International Labor Organization (ILO) in the process of working out relevant recommendations over the increase of investments into the development of human abilities, labor market institutes, fair and stable employment (International Labor Conference, 2019).

The implementation of the sought ILO recommendations has already been initiated by the governments of the EEU countries at their national levels in the forms of digitalization programs, strategies, and national technological initiatives, which have been analyzed in the present study as an example of program documents of strategic and recommendation nature (see: Materials section).

At the same time the real need to develop and adopt conceptual acts, oriented towards mitigating "risks" of emerging robotization and automation processes in the single labor and employment market (including unemployment protection) has arisen (Frolova et al., 2018). In the process of forming the relevant legal base, the governments of the EEU countries should consider the following factors:

- The birth of a new professional environment: new professions demanding super-professional interaction or the development of super-professional skills;
- The demand for constant education with the use of online technologies and dual education; the formation of business universities capable of preparing HR, making applied research and creating innovation companies thereupon;
- The demand for improving security standards due to the coexistence of a human being and an AI on alternative working places;
- The demand for creating legal norms for new economic sectors, which shall introduce technological, financial, legal or other restrictions for the automation and robotization of working places and give privileges to human workers; and
- The need to prevent or cease discrimination, connected with various availability of new innovative technologies to workers, allowing them to reach work results better and faster compared to other workers, which are unable or fail to gain and master those technologies, including the "society of ignorance."

CONCLUSION

The research made shows that the EEU countries already have the necessary conditions—program documents and mechanisms for the successful implementation of digital technological initiatives at national and integrative levels.

In the process of reforming labor markets due to the new technological behavior we might need certain restrictions over autonomous robotized systems and interaction rules between robots and human beings where the labor is alternating (Putilo et al., 2020).

With a due legal approach of the governments of the EEU countries to the transformation of labor relationships, the status of human workers on a single labor market would be greatly beneficial. AI will not be able to fully replace the human resource. The functionality of the machines will be used mainly on works based on clear algorithms. The benefits mentioned would include the delegation of certain functions to smart robots and programs, which shall save time and shorten terms for the works, made by human workers. The spare time could be freely used by workers to master new professions (occupations): professional education, reskilling and qualification upgrading with direct employer participation or upon a decision made by employment agencies. It is also important to keep in mind that the fundamental transformation of social relationships will firstly affect education, culture and sports, which shall demand amending legal acts of the EEU countries and EEU acts or treaties.

The legal base of each EEU state and the EEU itself, prepared with due attention to the mentioned peculiarities should provide relevant legal regulation of newly emerging social relationships (i.e., labor and employment spheres) including such matters as definitions, essence and aims of such relationships. This process would be impossible without further harmonization and integration of the legal systems of the EEU countries and the system of common values, which shall endow the "Industry 4.0" with new opportunities for everyone.

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CHAPTER 27

DIGITAL MEDICINE TECHNOLOGY DEVELOPMENT

Protection of the Rights and Legal Interests of Patients in the Context of Integration

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The research goal is to identify the main legal characteristics of telemedicine as an essential element of healthcare digitalization.

It is being proved: 1) the digitalization process is an inevitable feature of the transition to a post-industrial society; 2) digitalization affects the implementation of social rights of citizens; 3) telemedicine should be considered as part of the global process of using new technologies in the provision of medical care; 4) the digitalization of the provision of medical and social services requires an adequate legal impact; 5) the introduction of digital technologies in the social sphere requires the development of new mechanisms for protecting the rights of patients and citizens—recipients of social services in general. .

Digital healthcare is considered as a set of legal norms and organizational mechanisms covering all aspects of the information exchange system in healthcare through information and communication technologies.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 347–361.

It is being proved that digital includes: 1) means of advanced training for medical workers (teleconferences, training programs, online training, etc.); 2) means of transmitting information as part of patient counseling; 3) means of electronic interaction between subjects of the healthcare system (electronic cards, electronic recording, electronic prescriptions) 4) electronic means of monitoring the patient's health, providing direct monitoring of the patient by the operator of information systems or the attending physician directly (electronic bracelet); 5) a special information environment (special sites created by public organizations to inform and advise patients and medical workers); 6) online trade of medicines and medical devices.

It is proposed to consider telemedicine as an element of digital healthcare, which includes a set of activities in which remote technologies are used to ensure the interaction of medical workers, patients, and other people, mainly in the form of counseling, training and external management of the diagnosis and treatment process.

It is proved that the understanding of telemedicine technologies in the legislation of the Russian Federation and the legislation of the Eurasian Economic Community (EAEC) member states is different from that used in acts of international organizations and modern foreign practice, and the stock of electronic devices used by the market for medical care is immeasurably limited compared to those that can be used by the public health system.

Keywords: Digital Medicine, Digital Health, Mobile Health, Telemedicine, Telehealth, Control Sources, Diagnostics, Medical Documentation, Electronic Document Management, Online Trading, Electronic Prescription.

JEL Code: I18, F15, F63, J14, O15, O32, O35

MATERIALS

The basis for a comprehensive analysis of the legal regulation of relations in the field of telemedicine was formed by acts of supranational law, acts of the Russian Federation, as well as acts predictive and strategic in nature. Based on the provisions of these acts, the established practice of legalizing of telemedicine in general and its individual elements was assessed: an electronic prescription, an electronic document, an online pharmacy, etc. While analyzing the laws and other acts of the Republic of Belarus, the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Armenia, the Republic of Azerbaijan, and the Republic of Tajikistan a separate attention was paid to the rights and obligations of citizens in connection with the appearance of new technologies in medical care and medical supply.

The doctrinal positions that constitute the theoretical basis of the study were studied on the basis of works related to the general problems of digitalization and their legal consequences for citizens (Klang & Murray, 2005; Aznagulova & Popova, 2018; Kovler, 2019; Bondar, 2019; Khabrieva & Chernogor, 2018; Vaipan, 2017; Dudin et al., 2017a), dedicated to the use of electronic resources in healthcare (Bogdanovskaya, 2007; Shaffer et al., 2002; Dudin et al., 2017b), tele-

medicine experience in selected countries (Buell, 2011), Zanaboni & Wootton, 2016; Chin, 2003), background (Berlage, 1997; Frolov et al., 2018), telemedicine potential for certain territories and categories of citizens (Cherdantsev, 2017), the use of teletechnology in certain types of medical care (Ashley, 2012; Mills, 2019; Al-nassar et al., 2011; Deryugina et al., 2019; Hygen, 2019; Putilo, 2019; Poledna & Gächter, 2019), and others).

METHODS

The main points of the study were system analysis methods (which allowed to compare information in a historical retrospective and in relation to various legal systems), structural and functional analysis methods (used to differentiate positions and group them according to various classification criteria), hermeneutics method (contributed to the identification of concepts and approaches present in the studied texts, including texts of legal acts), as well as the method of comparative law (allowed the analysis to be homogeneous institutions and with similar content rules used to regulate relations in the field of telemedicine in the law of different states).

INTRODUCTION

Opinions about digital medicine are diverse: from a cautious attitude to recognizing that digital medicine is potentially more accurate, more effective, more experimental, more widespread and more egalitarian than current medical practice (Shaffer et al., 2002). A cautious attitude to telemedicine is the reason that its full legal regulation in the Russian Federation started after the Federal Law of July 29, 2017 No. 242-FZ (The State Duma, 2017a) entered into force.

One of the results of the study is the recognition of the concept of "telemedicine" as an emerging, dynamically changing concept. While in 2009 WHO did not include mobile healthcare in its research on telemedicine, in 2015, mobile healthcare was recognized as an essential part of e-health (Mobile Healthcare, 2011), because it provides convenient access for citizens in real time to information and services using portable devices.

Instead of the variety of terms that are widely used today at the international level ("Digital Medicine," "digital health," "mHealth (mobile health)," "telemedicine," "telehealth," digital doctors), Russian law operates mainly with two terms: "Telemedicine" and "information technology in healthcare" (medicine). Relatively recently, a new design appeared—the "digital health care circuit," but its use is still very insignificant and is limited by the Decree of the President of the Russian Federation (2019) and the decree of the Government of the Russian Federation No. 380 (Minzdrav, 2019).

In The State Duma (2011), telemedicine is considered as a system for exchanging information of medical nature through the means of information and communication technologies. The elements of this system are: 1) means of training tools

for medical workers (teleconferences, training programs, online training, etc.); 2) means of transmitting information as part of patient counseling; 3) means of electronic interaction between subjects of the healthcare system (electronic cards, electronic appointment, electronic prescriptions); 4) electronic means of monitoring the patient's health, providing direct monitoring of the patient by the operator of information systems or the attending physician directly (electronic bracelet); 5) a special information environment (special sites created by public organizations to inform and advise patients and medical workers); 6) online trading of medicines and medical devices.

In other acts of Russian law, telemedicine is considered as a set of organizational, financial and technological measures that are necessary for remote consulting medical services (Government of the Russian Federation, 2014) and as part of information technology in healthcare along with an electronic medical history and information health structure.

In order to create a universal understanding of telemedicine in the context of active integration processes with the participation of the Russian Federation, it is necessary, first of all, to focus on the experience of WHO, where "telehealth" refers to the remote provision of health services (From innovation to implementation eHealth in the WHO European Region World Health Organization, 2016). It includes making a clinical diagnosis and monitoring the patient's condition on a distance (as is the case in telemedicine), as well as a wide range of non-clinical functions, including prevention and promotion of health, the use of various electronic tools and methods for managing the health care system, and research and health education

RESULTS

A Brief Overlook Into the History of Regulation of Relations in the Healthcare Sector Using Information Technologies (Russian and Foreign Experience, Including the CIS countries, the EAEC)

Telemedicine is an important component of the global health informatization process. Undoubtedly, its appearance is directly related to the development of modern telecommunication technologies (The State Duma, 2017b). However, there are also medical and social reasons to telemedicine technologies being more and more actively used.

Firstly, the need for highly qualified medical care is increasing, including among the population living in areas geographically remote from medical centers. Secondly, digital technologies are a convenient means of storing data and exchanging information about the health status of patients, which is necessary when specialists jointly develop a decision on further methods of treatment for a patient. Thirdly, the need for continuous training of medical workers in the context of the rapid growth of new knowledge and the amount of medical technology requires the use of mobile, flexible resources for remote communication. Fourthly,

telecommunication technologies provide the opportunity for prompt adoption of coordinated management decisions, monitoring their implementation.

In general, telemedicine technologies are aimed at ensuring the availability of medical care and improving its quality. Obviously, the development and widespread use of telemedicine will help to save the budget of medical organizations and ensure the economic efficiency of organizations in the health sector.

The use of individual elements of telemedicine and the consolidation of relevant standards at the level of regulatory acts are processes that occurred at different times. According to some authors (Al-Nassar et al., 2011), the beginning of the telemedicine era can be considered the 1880–1890s, when the idea of using punch cards in the census to count for individual citizens, and machines for their tabulation.

1905 is also distinguished (Vorobiev et al., 2015) due to the fact that at that time V.Eintkhoven (founder of the ECG) attempted to transmit a cardiac signal via telephone.

Since the 1930s, telemedicine has used radio communications: in Sweden since 1922 and Italy since 1935, radio consultations began for sailors that were sailing (Vorobiev et al., 2015).

However, most often the 60s of the XX century is referred to being a begin the history of telemedicine. Not only because in 1965, cardiac surgeon Michael Ellis DeBakey, via satellite, advised the process of the operation in Geneva. It is this period that is considered (Dashyan, 2007) to be the methodological foundations of telemedicine technologies in the framework of space research, the practice of consulting astronauts via telephone was implemented.

One of the first countries where telemedicine began to be widely used in medical practice was Norway, where in 1987 they began to implement the project "New technical development in the North," and in 1991–1992 telemedicine studios appeared in the three northern provinces of Norway (Buell, 2011). The necessity for telemedicine was dictated by the need to provide medical care to residents of the northern territories of Norway. Even then, telemedicine included: 1) telephone consultations of specialists; 2) teleconferences, discussion groups, the creation of common databases, including video and audio fragments, graphics, etc. Currently, consultations, examinations and treatment carried out by means of videoconferences are recognized as telemedicine consultations in Norway. Such consultations can only include consultations conducted with the support of special equipment in real time, provided that the doctor (a specialist providing telemedicine services) and the patient are in two different places (Zanaboni & Wootton, 2016). Such consultations are equivalent to ordinary outpatient medical services, but telephone and SMS consultations are not considered telemedicine.

Active regulation of relations in connection with information technologies in the health sector using the term "telemedicine" began at in the XX-XXI centuries; until that time, the term has not been used in regulatory legal acts. It is significant in this regard that initially only certain elements of telemedicine were enshrined

in law without adopting independent, thematically dedicated telemedicine acts. So, in the USA at the federal level, the reference point for telemedicine is considered (Bogdanovskaya, 2007) 1996—the year of adoption of the Health Insurance Portability and Accountability Act (HIPAA), which in only one of the sections (the provision on the simplification of administrative procedures) required setting national standards for e-health operations and national identifiers for providers, health insurance plans and employers.

A special law on telemedicine was adopted in 1997 in Malaysia (Htapah, 1997). There it defines telemedicine as medical practices using audio, visual communications, and data transmission. This type of medical activity is certified and a certificate for telemedicine services is issued, usually for a period of 3 years. The law defines the persons providing telemedicine services, the rights of patients in connection with the provision of such services, the procedure for certification of telemedicine services, etc. In 2003, the law on telemedicine was adopted in India. In Australia, the introduction of telemedicine technology with the adoption of the 2015 Electronic Health Act (Health Legislation Amendment (APH), 2015) has resulted in changes to a number of acts and the tightening of personal data protection.

The most active process of using the term "telemedicine" is in various kinds of standards, recommendations, instructions, methodological documents of the medical community.

The Core Operational Guidelines for Telehealth Services, developed by the American Telemedicine Association (2014), defines telemedicine as the sharing of medical information through telecommunications to improve patient health. Telemedicine includes all the variety of applications and medical services using video, email, smartphones, wireless technologies and other telecommunication technologies, but telemedicine is not considered by the management as a separate medical activity.

In Europe, a special standard—"Health informatics—Telehealth services—Quality planning guidelines" (ISO/TS 13131: 2014, 2014), created taking into the account the Directive No. 2011/24/EC of the European Parliament and the Council of the European Union "On the rights of patients in cross-border medical care" (European Parliament and of the Council, 2011). The Directive clearly states that: 1) the place of provision of telemedicine services is the territory of the EU Member State where a medical organization providing these services is established; 2) the costs of telemedicine as well as the costs of medical services are reimbursable; 3) healthcare technologies should be considered as medical products, medical devices, medical or surgical procedures, preventive measures, diagnostics or treatment of diseases used in healthcare. The intended course towards standardization of regulation consists of the development of European electronic reference networks, harmonization of requirements for medical records and other information, development of general measures of identification and authentication.

In the European Union, since 2013, in the revised version the European Code of Practice for Telehealth Services (2012) is used. In it, telemedicine refers to the use in healthcare of technologies and services that provide patients with access to medical services regardless of their location (when physically the patient and the doctor are not in the same place). The telemedicine areas of the Code include: teleconsultation of doctors, lifestyle monitoring, healthy lifestyle training, mobile applications used in healthcare, emergency call systems, etc.

In almost all CIS countries, issues of legal regulation of telemedicine began in the late 90s of the last century—the beginning of the 20th century. Thus, in the Republic of Uzbekistan, in accordance with the decision of the Republican Commission on the organization and control of the implementation of the State Program for Reforming the Health Care System (President of the Republic of Uzbekistan, 2003), a concept for the development of telemedicine in 2000–2005 was developed. By order of the President of the Republic of Azerbaijan (2003), the National Strategy for Information and Communication Technologies for the Development of the Republic of Azerbaijan for 2003–2012 was approved. By the Decree of the President of the Republic of Tajikistan (2003), the state strategy "Information and communication technologies for the development of the Republic of Tajikistan" was approved. In the Kyrgyz Republic Parliament (2013), a draft law "On Telemedicine Services" was developed by a member of the Parliament, but was not adopted.

In Russia, the practical experience of using telemedicine technologies dates back to the mid-1990s, when video consultations began to be practiced at the Military Medical Academy (St. Petersburg) (Cherdantsev, 2017). However, in some studies, the count of the start of telemedicine in Russia from the appearance of space medicine: the telemetric electrocardiography data of Soviet astronauts are considered as the forerunner of modern telemedicine monitoring of the physiological state of the body (Zyuzina et al., 2016). Since the 2000s, videoconferences of leading Russian medical research centers have become an everyday tool of activity; subsequently, telemedicine centers were created both at the federal level and at the level of the constituent entities of the Russian Federation.

Certain elements of telemedicine were also mentioned in acts of the Soviet period, but in the Russian Federation the term "telemedicine" was legally enforced with the approval of the Concept for the Development of Telemedicine Technologies in the Russian Federation (Council of the Ministry of Health of the Russian Federation, 2000). The concept was developed by the Telemedicine Coordinating Council of the Ministry of Health of the Russian Federation and approved by Order No. 444 of the Ministry of Health of the Russian Federation (2000). The adoption of the Concept intensified the efforts of the constituent entities of the Russian Federation to introduce telemedicine technologies into practice. Thus, in St. Petersburg in 2001–2004, the target program "Telemedicine Network of St. Petersburg for 2001–2004" was active, which provided for the creation of a communication network of medical, preventive, educational and scientific medical

institutions; equipping institutions with computer and other equipment; formation of a telemedicine consultation system, etc.

Telemedicine ("medicine on a distance"), according to the above-mentioned Concept, includes diagnostic and treatment consultations, managerial, educational, scientific and educational activities in the field of healthcare, implemented through telecommunication technologies. The main areas of telemedicine application: 1) telemedicine consultations (tele-mentoring); 2) telemonitoring of functional indicators; 3) telemedicine lecture/seminar; 4) telemedicine meeting/concilium/symposium; 5) Internet medicine (websites, information databases, reference and advisory systems); 6) distance education in the field of healthcare, etc. Thus, the initial understanding of telemedicine in Russian legislation was based on a broad approach, covering all areas of the possible application of telecommunication technologies in healthcare.

The Law of the Republic of Kazakhstan (Zakon,2017) introduced the concept of "telemedicine"—a set of organizational, financial and technological measures that provide for the implementation of remote medical consultation services in which the patient or doctor directly conducting an examination or treatment of a patient, receives remote consultation of another doctor using information and communication technologies. The Law of the Republic of Armenia (The National Assembly of the Republic of Armenia, 2016) introduced the concept of "prescription in electronic form."

In Russia, after the legislative concept of "telemedicine" was enshrined in 2017, The State Duma (2017c) developed an understanding of telemedicine not only as a remote interaction (medical workers among themselves; patients and other persons), but also as areas of identification and authentication of these individuals and areas of medical documentation (primarily electronic cards and electronic prescriptions). The conditionally listed areas of telemedicine can be distinguished into electronic medical workflow and telemedicine (remote) medical care. The last one covers all types of care: primary health care, specialized (including high-tech), emergency and palliative care (order of the Ministry of Health of Russia No. 965n, 2017).

Such a "purely medical" approach to a certain extent simplifies the task of the legislator in normative regulation of telemedicine, however, it does not cover all those elements that characterize modern healthcare and which can rightfully be included in the concept of "digital healthcare." Outside the current approach to the definition of telemedicine, there are remote educational technologies in healthcare, management decision-making, medical reference systems, online pharmacies and other components of modern healthcare. In the context of the digitalization of the economy (Tarakanov et al., 2019), it seems logical to introduce the concept of "digital healthcare," which would cover all aspects of the application of information technologies in the field of protecting public health and would create the basis for further modernization of the healthcare system of the Russian Federation taking into account modern needs and technological capabilities.

Medical documents are the most visible element of telemedicine. A significant number of countries in 2010–2013 switched from traditional paper medical documents to electronic (Australia, the Netherlands, Brazil, Portugal, Slovenia, etc.). Electronic medical documents (EHR) in Russia in some constituent entities of the Russian Federation began to be introduced in early 2011. So, back in 2001, by order of the Ministry of Health of the Republic of Tatarstan (Minzdrav, 2001), it was envisaged to create a special electronic individual card for pregnant women and women in childbirth, but the process has not yet been completed nationwide.

One of the main tools for introducing digital healthcare into the practice of the Russian Federation should be the Unified State Information System (Government of the Russian Federation, 2018), which includes such components as: the federal register of medical workers; federal register of medical organizations; federal electronic registry; integrated medical record; federal patient registers for selected nosologies; information system for monitoring and controlling the procurement of drugs; register of reference information, etc.

Predicted changes in legal regulation, taking into account the introduction of new rights and obligations of the patient and improving the mechanism for protecting their rights and interests

The digital age, which began in 1939 with the creation of the first computer, has led today to the fact that digital technologies have a greater impact on our lives than ever since its development. The global digital environment requires a rethinking of the concept of human rights and the mechanisms for their implementation. Digital technologies—this is the resource that creates those new paths, following which the person realizes the right to health. Today, it should be recognized that telemedicine has led to significant positive changes, especially in the field of access to medical care: if initially it was a question of mass use of the achievements of high-tech medicine with the help of information and communication tools, today almost all types of medical services (Berlage, 1997) are covered by telemedicine.

Today it is no longer necessary to get in contact with either the doctor, the administrator, or the insurance agent. The tasks associated with the possibilities of processing big data and the increasing public nature of personal information do not look so threatening for personal freedom if, as a result of processing and analysis of huge amounts of information (including voluntarily provided), non-infectious chronic diseases will be defeated (Alzheimer's disease, Parkinson's disease, etc.).

The problems of confidential patient data, the impossibility of creating algorithms for all medical actions, information overload, as well as changes in the relationship between the doctor and the patient are noted by J. J. Chin (Chin, 2003). Regarding the last aspect, J. J. Chin notes that the change in the relationship between the doctor and the patient is that correspondence via e-mail, participation in a teleconference or online communication cannot replace tactile contact, leveling out the importance of touch and sense for diagnostics. This deprives patients

of the "healing effect of the doctor," and the doctor himself does not turn into a healer, but a technical specialist with the appropriate education. Therefore, electronic communication between doctors and patients should be used wisely and carefully as an addition to traditional communication, and not for diagnostic and therapeutic purposes.

Recognizing the existence of these problems, we believe that in the conditions of modern civilization (technogenic, post-industrial, informational), one should not exaggerate the informal nature of the relationship between the doctor and the patient, elevate the medical worker to the rank of a friend or family member of the patient. Some authors (Chin, 2003; Davis, 2000) believe that doctors are actually well-trained and caring friends who provide healing and comfort. However, at least Russian law is based on the purely professional, rather than personal, nature of such relationships.

Digitalization of healthcare is a process of gradual spread of telemedicine technologies to those types of medical activity and those types of medical care that previously assumed only direct contact of a medical (social) worker with a patient. So, even with regard to palliative care, the need to use the remote method of providing medical services, services of the pharmaceutical sector is recognized. Already today, Pallative Care e-Shift (e-Shift), a palliative care model (Ashley, 2012), introduced to meet the needs of palliative patients and their families at home, is being implemented in some provinces of Canada. Its creation was caused by difficulties in receiving palliative care in rural areas: the lack of nursing services that provide specialized night care to families of palliative clients has led to increased emergency calls and more frequent use of hospital resources. The attracted personal workers (personal support workers) are not medical workers, but undergo appropriate training, and their smartphones are connected to a special application that allows them to be in constant contact with medical personnel. The technical innovations used (electronic medical records, sensors transmitting information, mobile devices, etc.) can reduce the burden on carers (Mills, 2019) and reduce the attendance of medical organizations.

Thus, in the field of various types of medical care, telemedicine is an effective means of overcoming distance barriers to receiving such care, but with an important clarification: the use of telemedicine technologies is an addition rather than the main way to receive medical care, i.e. does not imply a complete replacement of face-to-face visits with a doctor.

CONCLUSION

"The geographic features of the Russian state, new global challenges (including pandemic) require the closest attention to the development and fast practical implementation of information technologies, as one of the most important tools for ensuring the constitutional right of citizens to health protection and affordable medical care. The digitalization process is an inevitable feature of the transition to a post-industrial society, which concerns not only the social rights of citizens, but

also the effectiveness of public administration. The last point mainly depends on the orientation on the best foreign practices, on the synchronization of integration processes not only at the global level, but also at the level of specific issues such as: increase in the qualifications of the medical workers; transfer of information as part of patient counseling; electronic interaction between subjects of the healthcare system and monitoring the patient's health; the creation of a special health information environment; online trade of medicines and medical devices.

The use of information technologies in Russian healthcare is somewhat behind the best foreign telemedicine practices, that necessitates an analysis of the global experience in digitalization of medicine, which is constantly enriched with new techniques, mechanisms, and capabilities. It is necessary in order to adapt such experience to Russian reality. If earlier it was a question of ensuring the availability of medical counseling for hard-to-reach regions and territories, and this task is being tackled in the Russian Federation, nowadays foreign telemedicine has other goals. Among them: preventing hospitalization, reducing the number of adverse reactions to drugs, reducing duplication of trials, more effective coordination of care for people with chronic and difficult conditions. In the Russian Federation, such goals are only being comprehended so far; their practical attainability is currently not considered as a priority.

At the same time, the development of telemedicine in Russia should take into account the dynamics of integration processes. In this regard, we should note that digital health care at the level of the EAEU law is recommended to understand the whole set of legal norms and organizational mechanisms for all aspects of information exchange in healthcare through information and communication technologies. Such a broad understanding, which is already being used today in acts of international organizations and modern foreign practice, will expand the boundaries of the unified market for medicines and medical devices created within the EAEU through information systems, technologies, and electronic devices.

According to foreign researchers (Digital Health: Scaling Healthcare to the World By Homero Rivas, 2018), the latter include miniature personalized devices, individual sensors, innovative technologies (3D printing, virtual and augmented reality, unmanned robots and vehicles, including unmanned aerial vehicles).

The actions of the EAEU Member States in the field of health should also be aimed at achieving basic standards of care, including ensuring the availability of medical care for patients living in rural areas, in places with a lack of doctors providing high-tech care. This requires the creation of internet hospitals, digital health centers, the unification of pharmaceutical, medical companies with technology firms that create software and new technical solutions for developed countries (Mills, 2019). The development of engineering and telecommunication systems is capable of raising the medicine and the sphere of social services to a new level, however, with any success of telemedicine, decisions about life and death should not be delegated to machines (UN, 2019).

Such aspects of telemedicine should be taken into account both in the legislation of the Russian Federation and the legislation of the EAEU member states: in addition to "telemedicine" as an area for the remote provision of medical services and the transfer of medical information, the terms a) "telehealth"—a broader concept encompassing both telemedicine and the information and services that go beyond the purely clinical (medical) field, b) "digital healthcare," where in addition to telemedicine and telecenters, there are many similar activities related to health care, but not health care (for example, mobile healthcare, the use of large dates, the management of medical organizations, the promotion and prevention of healthy lifestyles, etc.) should be used.

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CHAPTER 28

BLOCKCHAIN TURNOVER OF SECURITIES PLACED FOR FINANCING FOREIGN TRADE TRANSACTIONS BY THE BUSINESS ENTITIES UNDER THE JURISDICTION OF THE EEU AND BRICS

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In this Chapter of the monograph, the author explored the modern possibilities of the distributed ledger technology when completing securities transactions (blockchain turnover), posted for funding foreign trade transactions by the business entities under the jurisdiction of the EEU and BRICS.

The process of transition from conventional stocks and bonds to more convenient and transparent digital investment crypto records certifying the rights of investors will last a maximum of 10 years. In turn, for the participant of foreign trade activities under the jurisdiction of the EEU and BRICS, serving as investment organizers,

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 363–373.

it will allow overcoming many existing collisions in the securities legislation and other forms of investment activities.

For successful digitization of financial instruments within a single retail space of the EEU and BRICS, it is necessary to come up with a single approach to the definition of the legal nature of tokens and crypto-objects, as well as the legal regime for their issue and turnover between investors and investment organizers. The author relied on the materialistic world view and the general scientific method of historical materialism; in the research, he used general scientific and specific scientific methods, which allowed him to implement a comprehensive approach to the subject of research.

Special emphasis is placed on blockchain registration of transactions with stocks or bonds, which is a transparent and self-sufficient system, and under which the parties to transactions are register with the distributed register; as assets are sold or purchased, they confirm that they have sufficient funds on their account to make a transaction in the distributed ledger.

It is suggested that a digital investment platform be created; it should be a stock exchange of digital investment crypto records that are listed, included in the quotation list and traded on this platform. The business entities under the jurisdiction of the EEU and BRICS become participants in the digital investment platform. It is suggested that digital investment crypto records—"tokens"—be issued to both the largest corporations and medium-size companies for smaller-scale projects. Both individuals and legal entities from any jurisdiction are entitled to invest in projects.

Keywords: Blockchain, Stocks, Bonds, Transactions, Digital Investment Crypto Record, Foreign Trade Activities, Funding, EEU, BRICS.

JEL codes: K10, K15, K2, K120, K150

INTRODUCTION

The government of the Russian Federation has been implementing a set of national projects which make provision for the expansion of export of commodities of national producers. In particular, on December 24, 2018, the passport of the national project "International Cooperation and Export" (Government, 2018) was approved; its purpose is to increase the volume of exports of non-resource non-energy goods, increase the share of exports of manufacturing products, agricultural products and services, form an effective system of division of labor and industrial cooperation within the EEU to increase the volume of trade between the member states of the Union and ensure the growth of volume of cumulative mutual investments (http://static.government.ru). Moreover, in accordance with the decree of the President of the Russian Federation No. 497 of 14.10.2019, the government of the Russian Federation is requested to draw up an instrument that would regulate the terms and conditions of activities of 50 representatives in foreign countries in

order to serve the interests of Russia in the agricultural sector (President of the Russian Federation, 2019).

The partner countries of the BRICS Association formed recommendations on the main areas of ensuring legal, financial and technical growth of exports. According to the fifth annual report of BRICS, working groups in the relevant areas recommend: to improve the joint development of the digital economy, facilitate the adaptation of business units to the digital economy, promote private and public sectors of economy to invest in the projects with the use of digital technologies; it is recommended that the states create a regulatory framework guaranteeing the rights and legitimate interests of investors (BRICS Business Council, 2017).

The measures taken will undoubtedly help attract investors, as well as increase in volumes of Russian deliveries abroad, which, in turn, aggravates the need for the modernization of the instruments of financing current capital of the business entities effecting foreign trade transactions. Modern electronic digital technologies fully answer the expectations of entrepreneurs; crypto records which mediate investment in real projects, are arguably the most interesting records. A more reliable and progressive method of data transfer, storage and accounting (blockchain) is responsible for the simplification of interaction in the financial market, which is a natural result of the neoindustrial revolution 4.0. The financial glut of the ICO in the digital crypto sphere has already passed; transition to IEO is expected in the near future. According to experts, during 2017, 4 billion US dollars was invested in projects for which funds were raised according to ICO procedures. By 2019, about 64.5 billion US dollars was raised in various ICOs, however, 89% of projects turned out to be unprofitable, and the profitability of their tokens is plummeting (https://www.rbc.ru/crypto/news/). On the one hand, new financial instruments are in demand by high volume exporters and importers; on the other hand, they are still understudied from the perspective of jurisprudence. Their legal characteristics and elaboration of legal nature are required, since they are similar in functions and goals with the turnover of uncertificated securities placed under the well-known IPO procedure, which undergoes noticeable changes under the influence of new information technologies.

MATERIALS

The material has been scientifically elaborated on the basis of a set of regulatory, doctrinal and other sources. The authors of the paper used the federal legislation of the Russian Federation, legal papers of the EEU and BRICS. The authors analyzed: 1) Civil Code of the Russian Federation (The State Duma, 1994); 2) Federal Law No. 39-FZ of 22.04.1996 "Concerning the Securities Market" (The State Duma, 1996); 3) Federal Law No. 208-FZ of 26.12.1995 "Concerning Joint Stock Companies" (The State Duma, 1995); 4) Federal Law No. 325-FZ of 21.11.2011 "On Organized Bidding" (The State Duma, 2011); 5) Decree of the President of the Russian Federation No. 497 of 14.10.2019 "On Representatives of the Ministry of Agriculture of the Russian Federation Abroad" (President of the Russian

Federation, 2019); 6) BRICS Johannesburg Declaration of July 26, 2018 (BRICS Business Council, 2017).

Doctrinal sources are represented by academic papers of domestic legists and economists, as well as foreign scholars, including: Goncharov, A.I., Goncharova, M.V., Inshakova, A.O., Kalinina, A.E., Lagutin, I.B., Suslikov, V.N. Huckle S., Bhattacharya R., White M., Beloff N., Janssena M., Weerakkodyb V., Ismagilova E., Sivarajah U., Irani Z., M.L. Marsal-Llacuna.

METHODS

The content of this Chapter of the monograph has been elaborated based on the materialistic world view and the general scientific method of historical materialism. The general scientific methods of cognition have been used: dialectic method, hypothetico-deductive method, generalization, induction and deduction, analysis and synthesis, and empirical description. In addition, specific scientific methods were used in the research: dogmatic, comparative legal, hermeneutic, structural and functional, etc.

RESULTS

A study of foreign experience confirms that in countries where ICO has been used for 7 or more years, lawmakers and law enforcers divide the term "token" into three components: "electronic monetary funds," "utility tokens" and "investment tokens" as such, allowing exchanging material assets in a digital environment based on the distributed ledger technology (Lagutin & Suslikov, 2018). The definition of a token in the draft law "On digital financial assets" (https://www.minfin.ru), as a digital and financial asset is erroneous. In the tangible world, a man will never be able to touch digital objects which are only perceived by people from the monitor screen in the form of digits; therefore, there are no grounds to call digital objects assets. These are the encrypted entries in a special table (ledger), which certify the rights of an entity for the digital equivalent of monetary funds or other tangible things. "Token" should be read as a digital crypto record—an offer (equity securities equivalent). We have justified a more correct term—digital investment crypto record (Goncharov & Goncharova, 2019).

A distinctive feature of ICO as an innovative way of investing activities is its functioning on the blockchain, which adds such features as decentralization, cross-border accessibility, user anonymity, transparency and controllability of transactions with monetary funds; in addition, fiduciary approach to participants and technology. Since each transaction creates a new block in the chain and is duplicated in the address of each entity, and its execution is only approved by the investor by activating the crypto key, then in the future the transaction cannot be changed, replaced, corrupted or deleted from the system.

The modern stock market of Russia can be described as a well-established and stable system in which each element operates smoothly. The turnover of uncer-

tificated securities is regulated by the principal provisions of: 1) Civil Code of the Russian Federation (The State Duma, 1994); 2) Federal Law No. 39-FZ of 22.04.1996 "Concerning the Securities Market" (The State Duma, 1996); 3) Federal Law No. 208-FZ of 26.12.1995 "Concerning Joint Stock Companies" (The State Duma, 1995); 4) Federal Law No. 325-FZ of 21.11.2011 "On Organized Bidding" (The State Duma, 2011); 5) acts of the Central Bank of the Russian Federation.

In Russia, the Moscow Stock Exchange Group is a multifunctional stock trading platform; this group, in addition to PJSC "Moscow Stock Exchange" includes the Central Securities Depository NPO JSC "National Settlement Depository," a clearing center of the NPO NCC JSC, which allow handling a full range of securities transactions. In view of smooth operation of all professional market actors and transaction conclusion mechanisms, we do not expect any revolutionary changes in the securities market accessible for investors. For example, opening a brokerage account, managing personal account through mobile applications provided by leading banking and financial institutions (Sberbank Investor, Tinkoff Investments, VTB My Investments, Finam Trade, Forcerank, Yahoo Finance etc.); storage and processing of data on liabilities associated with equity securities form the foundation of all financial transactions in the capital market. However, the existing means and methods of storage use fragmented and complex IT infrastructures, often not standardized according to general rules. As a result, it is necessary to constantly verify information with massive data through duplication of processes, which is included in costs and increases the time required to complete transactions.

The transition of the stock market to the distributed ledger technology (blockchain technology) will allow modernizing and improving the quality and speed of transactions in the uncertificated securities market. Stocks and bonds that exist outside the tangible envelope can be fully integrated into the block chain entered in special electronic digital registers. We agree with our foreign colleagues that thanks to the recently growing interest in the Internet of things and blockchains, it is possible to create many exchange applications, for example, automatic payment facilities, currency platforms, applications for management of digital rights and assets (Huckle et al., 2016).

The blockchain registration of equity or bond transactions is a transparent and self-sufficient system, in which the parties to the transaction initially register with the stock exchange, and, as assets are sold or purchased, they confirm that they have sufficient funds on their account to make a transaction. Counterparties jointly "sign" a transaction by activating crypto keys to unlock assets and monetary funds, and then transfer ownership of them using the public key. Information about the completed transaction is immediately transferred to the distributed ledger in automatic mode, where it is confirmed, recorded and displayed in an updated form (Kalinina et al., 2019).

There are several advantages of this approach. First, advanced data encryption methods are used to ensure the security and anonymity of confidential data in a shared environment. Second, two-way verification of data authenticity is carried out, which allows making coordinated changes to the databases, eliminating the risk of entering false data at any time without the participation of the regulatory agency. Third, there is a universality of sources of information that is distributed, synchronized and stored simultaneously between all participants. Fourth, the distribution of transaction records allows storing data as a "standard"; as a result, it will be possible to abandon the existing monitoring and accounting systems for various investments and transactions; there will be no more need to request centralized databases in order to coordinate information. Fifth, it is quite reasonable to use a smart contract, which is a program code loaded into the ledger and programmed for the automatic fulfillment of the terms of transaction regardless of the actions of the parties. Sixth, there is an obvious improvement of the effectiveness of transactions processing, thanks to which all participants will be able to have uniform data, cash transactions will be made more promptly, since transactions will be considered to be completed at the moment of synchronized refreshment of the information unit associated with the transfer of title to assets. It will allow abandoning confirmation after the transaction and clearing during the settlement cycle. This will reduce the risk of errors, discrepancies, delays, and will accelerate the overall functioning of the uncertificated securities market.

Also, as for advantages, it should be noted that for investors, the technology entails a decrease in operational costs and expenditures connected with securities servicing. In addition, the entire range of investors can interact with each other, having the guarantee of real trade settlement at the open bidding. The functions of dealers will continue to be necessary; however, their role will shift from providing market access to the functions of pricing, transaction counseling, assistance in trade settlement. On the trading platforms, the usual mechanism will be preserved with the difference that it will be easier to identify prices and select contractors, since the cryptographic transaction records contain information that is necessary for calculations, increase the efficiency of the trading platform. For operations with assets that are carried out in real-time mode for cash, and for which clearing procedures are required, the risk of errors by clearing institutions and a malfunction in the system when offsetting claims and liabilities will be reduced. By neutralizing this process, the blockchain will allow investors to be sure in advance of each other's ability to discharge obligations in full and in a timely manner; moreover, all payments are settled almost instantly. Functions that are exercised by central depositories will be preserved, but it is very likely that additional functions of operative management, coordination of development of ledger protocols, management of the issue and exchange of assets, interaction with the regulator, may be assigned to them. In view of the above, the task of trust managers can be reduced to storing keys, managing investment information, and controlling the

proper implementation of automated securities servicing transactions, which will eliminate a number of optional services and reduce the possibility of cross-selling.

In the special academic literature, the author has identified a number of factors that accompany the positive development of blockchain technology; we shall highlight the following factors among them:

Technical Factors. The authors of certain literature sources draw our attention to the existence of technical problems of the blockchain, in particular, the period of time required to process a transaction Janssena M., Weerakkodyb V., Ismagilova E., Sivarajah U., Irani Z., 2020). In this regard, some scholars believe that the problems of scaling and market risk associated with heavy expenditures connected with maintaining the functioning of distributed ledger systems are the main barriers to the use of the blockchain in the financial sector of economy (Biswas & Gupta, 2018).

Economic Forces. The use of blockchain—technologies in foreign trade activities by commercial organizations will change the traditional market structure and the procedure for concluding international contracts for the sale of goods, provision of services, and performance of works. Since smart contracts are able to substitute signing of contracts in writing, ensure the fulfilment of obligations on an automatic basis, the terms regarding the mode of jurisdiction and court may be included in the program code of the smart contract. The financial market under the influence of the modernization of foreign trade activities will undergo major changes as well. According to the report of the European Securities and Markets Authority, one of the potential risks of the use of distributed ledger technology (DLT) is the increase in market volatility due to the uncertainty about the safety of smart contracts. Provided that the volume of capital investments in digital securities will increase due to built-in automatic triggers that cause a unidirectional market reaction during the stagnation of economy and the financial crisis (https://www.esma.europa.eu/market-analysis/financial-innovation).

Institutional Factors. In foreign economic ties between the business entities under the jurisdiction of various legal systems, it is necessary to establish clear rules of interaction of one party with another party as well as interaction of parties with third parties and public authorities. Two directions can be distinguished in the group of institutional factors: general norms of society (culture) and legal issues. The first direction includes the issue of social perception of blockchain technologies associated with the attitude of people to the innovative type of digital communication. Users need to get used to electronic transactions, to make sure of their reliability and safety. The participants of market relations based on traditional ways of economic activity derive their profits from the existing customer base. New participants using digital technologies face poor demand for their supply, but eventually acquire a new customer base. The newly-created system is decentralized, transparent and accountable to each entity, which creates the conditions under which the role of controllers and intermediaries is reduced (Marsal-Llacuna, 2018). Millard C. believes that blockchain as a technological innovation

will eventually undermine established legal principles and result in the collision between the rules of interaction of entities inside the blockchain and legal norms (Millard, 2018).

Approaches of public authorities to digital objects differ depending on the legal system. Thus, for example, the Court of Justice of the European Union found that no VAT should be applied to cryptocurrency turnover transactions, considering cryptocurrency as monetary funds (http://curia.europa.eu). It is worthy of note that changes were introduced in the tax legislation of the Republic of South Africa concerning the obligation of taxpayers to include all proceeds, including those from the ownership, use and disposal of digital objects, in their tax return. Nevertheless, the civil legislation of the Republic of South Africa does not yet contain the terms "Digital Rights," "Token" or "cryptocurrency," which implies that cryptocurrency and other digital objects are not monetary funds or objects of law from the civil perspective (https://www.resbank.co.za). In China, by contrast, individuals and legal entities were legislatively banned from participating in ICO and organizing them. At the same time, China has developed the most favorable conditions for the introduction of IT technologies, as evidenced by fast-growing fintech markets, which include the largest number of mining pools in the world (for example, F2Pool, AntPool, BTCC). Intensive growth of incorporated cryptocurrency business can be observed. However, according to the results of our analysis of the legal system, no comprehensive approach to both civil regulation and administrative-state regulation has been identified.

It is suggested that peculiarities of trade of tokens certifying the rights for equity securities (stocks and bonds) be formalized in Articles 9 and 10 of the Russian draft law on digital financial assets. Digital objects that were issued, for example, by a joint-stock company, which certify the rights for the stocks of the company, can be transferred to the investor when the project goal is achieved, or rights can be granted for the enforcement of rights certified by the stock itself, where the rights are exercised via the operator or the information system (investment platform). The rights are recognized by the operator opening a personal account to which the stocks certified by tokens are transferred, with the registrar of stocks. A nominal bank account is opened, the beneficiary of which is a joint stock company to which the investor pays monetary funds in exchange for tokens. The investor can use a personal account in the information system to monitor the number of tokens to be purchased, the stocks they certify; however, he does not acquire any corporate rights and does not become the company participant. Hence, a new investment vehicle appears, which is a digital mode of investment in corporate activities. The advantage of this method is its openness and cross-border accessibility.

So far, the current national legislation of the EEU and BRICS member countries contains no provisions that would regulate relations between business entities with respect to the ownership, use and disposal of digital objects, just like tokens and cryptocurrency are not classified as the independent objects of civil

law rights. BRICS Johannesburg Declaration of July 26, 2018[1] is the only legal paper in the field of legal regulation of digital technologies; it determined the direction toward "digital industrialization, innovativeness and inclusiveness; as well as investing for the maximization of opportunities and resolution of challenges emerging as a result of the Fourth Industrial Revolution" (BRICS Business Council, 2017). Strategies have been identified to reduce the digital gap, including by means of provision of assistance to people in assimilation of technologies and technology transfer mechanisms. In the meantime, the analysis of international norms shows that there are no regulatory legal acts regulating particular legal relations in this field. We can only acknowledge the presence of general program documents. In this context, there is an obvious need for the modernization of private norms for regulation of transactions based on new information technologies, including the harmonization of national and international private law in the investment field.

CONCLUSION

We have already put forward a proposal to create the web portal "Foreign trade activities of BRICS online." This web portal, displaying vehicles and their routes in real-time on TV screens and computer monitors, will allow representatives of public authorities and heads of the business entities to analyze and coordinate the implementation of foreign trade transactions through existing international export and import channels. It is quite reasonable to provide for the functioning of the digital investment platform as part of the information and communication options of the web portal, which can help the business entities carry out blockchain turnover of securities as investment organizers, placing them among an unlimited scope of persons to attract financial resources for export and import foreign trade transactions.

For a more effective interaction of the business entities under the jurisdiction of the EEU and BRICS, it is suggested that a digital investment platform be created; it should be a stock exchange of digital investment crypto records that are listed, included in the quotation list and traded on this platform. The business entities under the jurisdiction of the EEU and BRICS become participants in the digital investment platform. It is suggested that digital investment crypto records—"tokens"—be issued to both the largest corporations and medium-size companies for smaller-scale projects. Both individuals and legal entities from any jurisdiction are entitled to invest in projects. In order to develop and form a positive business environment in this digital investment platform, it is necessary to develop a legal framework for digital investment. The advantage of the digital investment platform consists in the fact that distributed ledger technology allows integrating stock trading, the conclusion of smart contracts on foreign trade transactions, the

[1] Johannesburg Declaration of the 10th BRICS summit of 26.07.2018 Available at: http://kremlin.ru/supplement/5323

control over their implementation, and therefore, continuous monitoring of the implementation of each capital investment project, into a single system.

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CHAPTER 29

THE IMPACT OF DIGITALIZATION OF FOREIGN ECONOMIC ACTIVITY ON THE CIVIL LIABILITY LAW OF SUBJECTS OF THE BRICS COUNTRIES

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The development of information and communication technologies, the digitalization of relations irreversibly bring economic interaction in foreign trade to a new level of relations. The objective of cooperation between the BRICS countries is, among other things, the growth of trade turnover. Moreover, most transactions are concluded through information platforms, which entails the need to create a single legal regulation of such legal relations.

When creating a system of legal regulation, relations built using information and communication technologies, some problems are identified that are related both to

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 375–382.

the heterogeneity of the civil legislation of the BRICS countries and systemic issues of legal regulation arising from the impossibility of establishing the actual location of the parties and as a result, the difficulty of determining nationality and law subject to application. All these problems can be attributed to the issues of civil liability regulation in the BRICS countries.

Using the methods of general scientific methods of dialectical knowledge, analysis, synthesis, et al., private, scientific methods of comparative law, systemic, formal legal, et al., normative acts of the BRICS countries are analyzed, the norms of the internal legislation of the BRICS countries regarding civil liability are examined.

Based on the analysis, problems of the impact of digitalization of foreign economic activity on the civil liability law of the BRICS countries are identified and systematized. Two sides of the issue are studied related to international interaction using information and communication technologies, and problems arising from the membership of the legal systems of the BRICS countries in different legal families. Conclusions are drawn on the approximation of the legal systems of the BRICS countries and the orientation of common law countries on continental law. The necessity of unifying the principles of civil liability is substantiated, which will create the necessary basis for building a unified system of legal regulation. It does not indicate the need to develop universal concepts, a centralized system of limits and restrictions, as well as the development of supranational law of the BRICS countries.

Keywords: Digitalization Civil Liability; BRICS Countries; Principles Of Responsibility; Liability Issues; Information Technology; State Law

JEL Code: K12, K13, K33

MATERIALS

Both international and domestic acts of the BRICS member states are devoted to the problems of digitalization of foreign economic activity, civil liability issues of subjects of relations related to the BRICS countries. International acts include the Communique on expanding cooperation in the field of telecommunications and information and communication technologies (Communique, 2015), the Xiamen declaration of the leaders of the BRICS countries (2017), the main ideas of which are cooperation in the economy, telecommunications, innovation, et al.

The internal regulatory legal acts of the BRICS countries establish the rules for the use of information and communication technologies in specific participating countries. In particular, this: a statement of the principles, rights and obligations of Internet users in Brazil (Brazilian Civil Code, 2003); The Law of the People's Republic of China "On Cybersecurity" (China Adopts General Provisions of the Civil Law, 2017), the Federal Law "On Amending Certain Legislative Acts of the Russian Federation regarding the Specification of the Procedure for Processing Personal Data in Information and Telecommunication Networks" (Civil Code of the Russian Federation N 14-FL (part two), 1996).

The sources of legal regulation of civil liability are the legislative acts of the BRICS countries: Civil Code of the Russian Federation (Civil Code of the Russian Federation, 1996), Law of the People's Republic of China "On Tort liability" (Law of the People's Republic of China, 2009), Civil Code of Brazil (Brazilian Civil Code, 2003), etc.

However, a single mechanism for the legal regulation of liability issues when entering into foreign economic relations of entities from the BRICS countries has not been developed.

The problems of the emergence and bringing to civil liability, the use of information and communication technologies when entering into foreign economic relations, are the works of Russian and international authors: Inshakova et al. (2020); Rusakova et al. (2019); Bruggemeier (2011); Costa Lazota and Martins (2014); Evstigneev (2017); Karhalev (2016); Troyanovsky (2017); Puchkov (2018); Jing (2010); Startsev (2015); Hakobyan et al. (2015); and others.

METHODOLOGY

When identifying and analyzing a complex of problems related to the impact of digitalization of foreign economic activity on the civil liability of BRICS countries, general scientific methods of dialectical cognition, formal logical analysis, analysis, synthesis, et al. were used. In preparing and substantiating the findings, private, scientific methods of comparative law, systemic, formal legal, etc. were used.

INTRODUCTION

In the era of globalization, the development of information and communication technologies, the digitalization of all spheres of social activity, non-institutional governance structures are becoming increasingly important, which should include the cooperation of the BRICS countries. The united countries directed their resources to the creation of polycentric international relations, including in foreign economic activity. Using the interchangeability of various sectors of the economy of the BRICS member countries, the participating states see the need for building a new architecture of foreign economic activity as the primary vector of reform, with the decisive role played by the informatization and digitalization of all processes (Inshakova et al., 2020).

However, without resolving several legal issues relating to the regulation of relations arising from the implementation of foreign economic activity, digitalization, civil affairs, in general, and issues of responsibility, in particular, further development is impossible.

When building a system of legal regulation of relations, it is essential to understand the range of problems that exist both in the sphere of foreign economic activity, its digitalization and in the realm of a possible unification of legal regulation. So, of course, a complicating factor is the affiliation of the BRICS member

countries to different legal families, which in turn leads to various mechanisms of legal regulation of similar legal relations.

Since 2006, BRICS countries have been actively developing cooperation in various fields. Sessions are held annually on the foreign economic activity of states where issues of using information and communication technologies also occupy a prominent place. In this area, several essential documents have been developed and adopted aimed at regulating the digitalization process in all areas, including civil liability (Rusakova et al., 2019).

In 2015, at the first meeting of ICT ministers, a communiqué was adopted on expanding cooperation in the field of telecommunications and information and communication technologies (Communiqué, 2015). In 2017, China passed the Xiamen Declaration of BRICS Leaders (2017), the main ideas of which are cooperation in the economy, science, technology and innovation, as well as the development of entrepreneurship. According to forecasts of Russian scientists, by 2022, the interaction between business entities of the BRICS countries will almost wholly go to Internet resources (Goncharov & Goncharova, 2019). In this regard, the problem of the onset of civil liability of business representatives of the BRICS countries is becoming relevant.

However, despite the constant development of relations between the BRICS countries, there are some interdependent problems. These include the desire of the countries participating in the organization to maintain their uniqueness and independence in the economic sphere, independently determining the priorities of their economic, informational, legal development—these are subjective factors. The objective trends include various commercial structures of the BRICS countries, liquidity of the currency, multiple levels of competitiveness, et al. Objective factors include the need to change the classical forms of foreign economic cooperation.

RESULTS

Problems Associated With the Digitalization of Economic Activity and the Emergence of Civil Liability in the BRICS Countries

An analysis of the problems associated with the digitalization of economic activity and the onset of civil liability makes it possible to classify them into two main groups. The first group is the systemic problems associated with the use of information and communication technologies in the local circulation, which arise regardless of the affiliation of a business entity in a particular jurisdiction. The second group of problems, on the contrary, is directly dependent on the subject of which country enters into legal relations. In this case, the second group can be divided into two subgroups. The existence of the first subgroup is due to the different approaches of the BRICS countries to the regulation of civil liability issues; the second group is related to the degree of legal control of relations arising using the Internet.

At the same time, the level of development of legal regulation of relations related to information and communication technologies varies in BRICS countries. For example, in Brazil, there is still no law on the protection of personal data, but there is a regulatory act that sets out in detail the principles, rights and obligations of Internet users. In 2016, the Law on Cybersecurity was adopted in the People's Republic of China, which entered into force on June 1, 2017 (the Law of the People's Republic of China on Cybersecurity, 2016). Which, compared to the similar Russian law (PRC Law on Cybersecurity, 2016) is more aimed at regulating relations using the Internet than at establishing binding, as in the Russian regulatory act.

As for the problem of different approaches to civil liability, it is caused primarily by different legislative and doctrinal approaches to the regulation of civil law relations. The BRICS countries belong to different legal families: South Africa and India are common law countries, and Russia, China and Brazil belong to continental law (BRICS: contours of the multipolar world 2015). The states of continental law are closest in terms of compensation for harm. In particular, the principle of equivalent benefit (WIPO, 2009) is of crucial importance in China, the principle of solidarity in Brazil (Bezbach & Ponki, 2013), and the principle of full compensation for harm in Russia (The State Duma, 1994). The principle of general tort is reflected in the legislation of Russia (The State Duma, 1994) and Brazil (ato ilicito). At the same time, both the legislation of Russia (Article 1064 of the Civil Code of the Russian Federation) and the legislation of Brazil (Article 927 of the Civil Code of Brazil 2003) contain a rule that the damage is compensated by the person who caused it. In Brazil, redress is only possible if the violated right relates to a protected law and order (Bruggemeier, 2011). Moreover, if we consider the general trends in changes in Brazil's civil law, a significant increase in the powers of the courts should be noted (Costa Lazota & Martins, 2014), which led to the rise in the role of judicial discretion in deciding on civil matters. However, when resolving issues of bringing to civil liability, the primary regulatory function is reserved for the legislator.

In China, civil liability will come not only for violation of individual rights but also for interests protected by law (WIPO, 2009), while their list remains open (Evstigneev, 2017). As in Russian law, responsibility is divided into contractual and tort, and the main methods are compensation for losses/harm, payment of forfeit, et al. However, unlike Russian law, Chinese does not know the division into measures of responsibility and means of protection (Karkhalev, 2016). At the same time, the institute of pre-contractual liability was developed in China (Troyanovsky, 2017).

When deciding on the exemption from civil liability, a country with codified law differs from countries in a case law system. In particular, excusable ignorance of foreign law is not recognized as the basis for exemption from liability in countries with case law. In India, for example, such ignorance is regarded as a legal fact-state that does not exempt from liability (Puchkov, 2018).

In the event of civil liability arising from concluded agreements between subjects, representatives of various jurisdictions, there is also the problem of the applicable law. So, in Russia, the parties to the contract can agree on the application of a particular lawyer, provided that its rules do not affect the mandatory requirements of Russian civil law (The State Duma, 1994). Similar provisions are provided for in Indian law; in the PRC, parties to a contractual relationship have the right to choose a legal system that will optimally resolve the link (Zheng, 1986); on the contrary, Brazil has no right to choose (Startsev, 2015).

Systemic Problems of Using Information and Communication Technologies in Foreign Trade and Bringing to Justice

The use of digitalization processes, the development of information and communication technologies, the possibility of entering into civil circulation using the Internet accelerates and simplifies the interaction of legal entities. However, at the same time, there are some problems associated with the features of virtual space. In particular, the impossibility of establishing the physical location of an entity entering into a foreign economic transaction entails, in essence, the levelling of the regulatory functions of law. Moreover, in the material world, the legislator, when creating a system of legal regulation, uses such lawful means as restrictions and limits, the establishment of which in the virtual world is possible, but their effectiveness is minimal, because, as we noted above, it is impossible to establish the physical location of the subject.

Entities entering into foreign economic relations using the Internet may be physically located in various states, which creates problems of determining jurisdiction. At the same time, it is also impossible to use the established postulates of private international law, since the problem is also the determination of the place where the contract was concluded. In this regard, the issue of bringing to civil liability is challenging, since it is often impossible to establish either the place of the civil offence or, accordingly, the applicable law.

It complicates the emerging foreign economic relations with the use of information and communication technologies and the multiplicity of persons involved in the construction of the communication system of the subjects. These are system operators, organizations that register domain names, certification authorities, et al.

The solution to all these problems lies in the plane of supranational legal regulation of legal relations. More and more often, scientists point to the need to create a polycentric law (Rassolov, 2009). We believe that such supranational legal regulation will make it possible to solve a number of the above problems of responsibility of subjects of foreign economic activity.

CONCLUSIONS/RECOMMENDATIONS

The study of the problems of legal regulation of civil liability of subjects of foreign economic activity of the BRICS countries using information and communi-

cation technologies makes it possible to systematize them into two main groups. The first—systemic problems associated with the use of information and communication technologies in local circulation, which arise regardless of the affiliation of a business entity to a particular jurisdiction. The second—issues that are in direct depending on the subject of which country enters into legal relations.

An analysis of the legal regulation of civil liability issues shows general trends aimed at approximating the rule of law of the BRICS countries concerning prosecution. An essential feature of the reform of the civil legislation of the BRICS countries of recent decades is also an orientation to the leading European law and order, which makes it possible to unify the legal regulation of civil liability relations. These trends need to be developed.

When reforming national law, a standard system of principles for bringing to civil liability should be used; to develop a single categorical apparatus related to the digitalization of foreign economic activity and bringing to civil liability; formulate general limits and limitations.

For the further development of foreign economic activity using information and communication technologies, it is necessary to create a supranational system of law.

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CHAPTER 30

THE NEO-INDUSTRIAL PARADIGM OF PROTECTING BUSINESS ENTITY'S RIGHTS ON MEANS OF INDIVIDUALIZATION IN THE EAEU

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In this chapter of the monograph, the authors consider the concept of regulating the protection of the rights of economic entities of the EAEU jurisdictions on means of their individualization in the context of neo-industrialization.

In the era of the fourth industrial revolution, the recognition of commercial organizations and the wide popularity of their individual brands are of great importance for successful doing of business activities. The positive response of buyers to a product will be assured and will increase when buyers, while consuming high-quality products, become accustomed to the appropriate producer brand, over time, associating the brand with the necessarily high quality of the product. At the same time, unscrupulous entities quite often use these laws in their own selfish interests, acting ille-

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 383–392.

gally. In such business frauds with goods falsified by the original, special attention is paid only to the quality of reproduction of the brand of the famous manufacturer on the product and its packaging. At the same time, fake goods themselves in high quality, as a rule, do not differ. Based on the materialistic worldview, the general method of historical materialism the authors used for research general and particular scientific methods, which allowed us to implement a systematic approach to the subject of study.

The main attention is paid to the construction of the concept of legal prevention of violations of the rights of economic entities on means of individualization in the jurisdictions of the EAEU, which provides a set of measures that complicate as much as possible and ideally prevent the illegal use of means of individualization by third parties. As a result, the prerequisites for possible violations of the rights of economic entities to the means of their individualization are reduced to a minimum; there are practically no judicial conflicts on these occasions.

It is proposed to introduce in the EAEU jurisdictions an inter-jurisdictional blockchain for registering, storing and identifying original means of individualization of business entities from countries participating in this integration association. There is also a need for smart-chip marking of each unit of goods, which would be inseparable from this unit of goods and could be instantly identified with the original brand using crypto technologies and mobile communications by sending crypto requests via the Internet information and telecommunication network Internet to the inter-jurisdictional blockchain. The indicated smart-chips of the goods must function continuously throughout the entire service life of the goods, providing control over its proper use, the terms of its service, trouble-free operation.

Keywords: Neo-Industrialization, Inter-Jurisdictional Blockchain, Product, Brand, Identification, Smart-Chip Marking, Crypto-Technologies, EAEU.

JEL codes: K10, K15, K2, K120, K150

MATERIALS

The scientific development of the material was carried out on the basis of a set of regulatory, doctrinal and other sources. The article examined the norms of the Civil Code of the Russian Federation, legal documents of the Eurasian Economic Union. The enforcement acts of the Intellectual Property Rights Court were analyzed.

Doctrinal sources are represented by scientific publications of domestic jurists and economists, including: Inshakova A.O., Kalinina A.E., Goncharov A.I., Goncharova M.V., Dolinskaya V.V., Zhernova M.V., Medvedev D.A., Rozhkova M.A., Tarakanov V.V., etc.

METHODS

The development of the content of this chapter of the monograph is based on the materialistic worldview and the universal scientific method of historical material-

ism. The general scientific methods of cognition are applied: the dialectic, hypothetical-deductive method, generalization, induction and deduction, analysis and synthesis, an empirical description. The study also used private scientific methods: dogmatic, comparative legal, hermeneutic, structural and functional, etc.

INTRODUCTION

The fourth industrial revolution does not negate the need for commercial organizations to be recognizable and widely known through the continuous promotion of manufactured goods in the markets, accompanied by the use of means of individualization. In conditions of neo-industrialization, for the successful conduct of entrepreneurial activity, means of individualization of economic entities are as important as always. Consuming high-quality goods, customers get used to the corresponding trademark of the manufacturer, eventually associating for themselves this particular brand of the company with the certainly high quality of this product. However, dishonest subjects of commodity circulation quite often use these laws in their own selfish interests, acting illegally. In such business-frauds with goods falsified by the original, special attention is paid only to the quality of reproduction of the brand of a well-known manufacturer on the product and its packaging. At the same time, fake goods themselves in high quality, as a rule, do not differ.

Conflicts of business entities regarding the illegal use of a company name, commercial designation, appellation of origin, trademark and service mark, domain name are difficult, costly and lengthy. Moreover, if such a conflict is cross-border, when the counterparties are residents of different jurisdictions, for example, the EAEU. In the context of neo-industrialization, efforts should be made, first of all, to ensure the legal prevention of violations in this sphere.

RESULTS

The Eurasian Economic Union arose from the establishment of the Treaty on the Eurasian Economic Union in 2014 (Order of the Council of the Eurasian Economic Commission No. 13, 2016). An important feature of the Treaty on the EAEU in terms of intellectual property is Section XXIII, dedicated to intellectual property and means of individualization. EAEU Treaty recognizes the effects of international law and international treaties. The participating countries have two important tasks: 1) harmonization of the legislation of the participating countries in the field of protection and protection of rights to intellectual property; 2) protection of interests of holders of intellectual property rights of member states. These tasks determine the goals of existing legal norms, both of an integration association and of national legislation.

In general, legislation on intellectual property and means of individualization is maximally synchronized with international legislation. A number of international treaties extend to the jurisdiction of the EAEU. Among them: 1) The Berne

Convention for the Protection of Literary and Artistic Works of September 9, 1886 (as amended in 1971) (WIPO, 1886); 2) Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure of April 28, 1977 (WIPO, 1977); 3) World Intellectual Property Organization Copyright Agreement of December 20, 1996 (WIPO, 1996); 4) Treaty of the World Intellectual Property Organization for Performances and Phonograms of December 20, 1996; Patent Law Treaty of June 1, 2000 (WIPO, 2000); 5) Patent Cooperation Treaty of June 19, 1970 (WIPO, 1970); 6) Convention on the Protection of the Interests of Phonogram Manufacturers from Unlawful Reproduction of their Phonograms of October 29, 1971 (WIPO, 1971); 7) The Madrid Agreement Concerning the International Registration of Marks of April 14, 1891 (WIPO, 1891); 8) The Protocol to the Madrid Agreement Concerning the International Registration of Marks of June 28, 1989 (WIPO, 1989); 9) International Convention for the Protection of Performers, Producers of Phonograms and Broadcasting Organizations of October 26, 1961 (WIPO, 1961); 10) Paris Convention for the Protection of Industrial Property of March 20, 1883; Singapore Trademark Treaty of March 27, 2006 (WIPO, 2006). Even if a member state is not a party to these international treaties, it must accept the obligation to accede to them.

Of great importance in the development of legislation on the protection of intellectual property rights and means of individualization is the establishment of the Advisory Committee on Intellectual Property under the board of the EAEU Commission. The Advisory Committee is composed of expert representatives from Member States. It is planned to establish a Subcommittee for coordination of actions to protect the rights to intellectual property, which will include representatives of law enforcement and administrative bodies of the Union states (Zhernovoi, 2017).

The EAEU countries, within the framework of Article 89 of the EAEU Treaty, agreed to "introduce a system for registering trademarks and service marks of the Eurasian Economic Union and appellations of origin of goods of the Eurasian Economic Union" (Order of the Council of the Eurasian Economic Commission No. 13, 2016). This is proposed to be fixed in a regulatory act that is being prepared by the EAEU Commission—the Agreement on Trademarks, Service Marks and Appellations of Origin of the EAEU, which is undergoing approval.

We identified two problems associated with the protection of rights to means of individualization. Firstly, the Court was created at the EAEU, but the judicial practice in cases concerning the protection of rights to means of individualization remains inaccessible to legal experts. However, it is not known how this practice is analyzed, what are the judicial statistics in this sphere of public relations. In our opinion, the Commission at the EAEU should regulate the work of the EAEU Court in detail, only then will its legal role increase, as a result, of the entire Union as a whole. Colleagues express similar opinions (Rozhkova, 2019).

Secondly, it is necessary to express categorical disagreement regarding the development of new regulatory legal acts on the protection of intellectual property rights within the EAEU, which violate the principle of freedom of contract in intel-

lectual property law. Such draft laws should not infringe on freedom of contract, this is contrary to international legal acts, laws of the participating countries and the principles of the World Intellectual Property Organization, as well as the laws of the EAEU jurisdictions. So, there are proposals for the codification and unification of the rules governing contractual relations in the field of intellectual property (Amangeldy, 2019). In our opinion, interference with freedom of contract is unacceptable.

Appendix No. 26 to the Treaty on the EAEU regulates the resolution of disagreements in the field of intellectual property rights in the participating countries, establishes the procedure for managing copyright and related rights in the territory of the EAEU in cases where the exercise of rights individually is not possible or when the legislation of the participating countries is permitted without the consent of the copyright holders with payment of remuneration (http://www.eurasiancommission.org). Undoubtedly, the adoption of Appendix No. 26 to the EAEU Treaty is a significant step in the development of legislation on the protection of rights to means of individualization of economic entities of the EAEU. However, cases of misinterpretation of substantive law by the courts are frequent, as indicated by the Intellectual Property Rights Court (Resolution of the Intellectual Property Court No. C01-521, 2019).

At the same time, despite its youth in comparison with the EU, the EAEU has certain achievements in the field of codification of intellectual property standards. First of all, in the Treaty on the EAEU, while Section XXIII and Appendix No. 26 to the Treaty, the Protocol on the Protection and Protection of Intellectual Property Rights contains detailed provisions on the protection of intellectual property. Moreover, general provisions, starting from the types of protected objects and ending with the particularities of the legal regime of each of the objects, as well as law enforcement measures to protect the rights to them (Medvedev, 2019).

With the development of digital technologies, the globalization of the Internet, as well as a sharp increase in the volume of information, serious difficulties arose in the field of protecting the rights of business entities to means of individualization (Tarakanov et al., 2019). The availability of computer technology has made the Internet the main source of distribution of special software that allows you to fake, in particular, trademarks, service marks of companies so precisely that the distinction between fakes and originals is becoming increasingly difficult. Such hacker programs can be relatively inexpensive and fast to buy on the Internet, by paying a certain amount of crypto-funds to a certain anonymous electronic wallet, and get a link to download the specified software.

To solve the above problems requires the most modern and reliable solutions. Undoubtedly, ensuring the legal protection of the interests of copyright holders who have been fighting for the positive promotion of their brand for years, creating a positive image and business reputation should also be based on using the latest advances in computer software technologies (Goncharov & Goncharova, 2019).

It is not enough to develop only the technology of obstruction of illegal copying. For example, Digital rights management (DRM) is software and hardware

that intentionally limits or complicates various actions with copyright and related rights objects in electronic form (copying, modification, viewing, etc.) after they are sold to the end user. The term DRM was originally coined to combat online copyright infringement and keep revenue from the sale of digital copies regular, but DRM currently brings significant inconvenience to legitimate customers and helps large companies slow innovation and competition. With the help of software technologies, copyright holders destroy the doctrine of fair use of works and persecute those (including through criminal law measures) who try to circumvent the restrictions on legal use that they impose by software. In particular, DRM technology does not make it possible to transfer legally acquired books from one format to another, or to reproduce / read them in another jurisdiction in which the copyright holder does not provide appropriate support and service. Today, DRM technology is used by many foreign companies in the field of digital content sales, including Amazon, Apple Inc., Microsoft, Electronic Arts, Sony, 1C, Akella, etc.

Copyright protection is connected with the proof that a person has an exclusive right with respect to the result of intellectual activity. Rights to a work arise from the moment of creation, this eliminates the need for their mandatory registration, but does not ensure the public reliability of the exclusive right. Therefore, the author of the work in a controversial situation will have to prove that it was created by his creative work. The most obvious way to use blockchain for copyright protection is to register them as soon as possible to confirm authorship. This allows you to make information about copyright holders and licensees as transparent as possible. It seems that the author receives indestructible evidence from an independent depository, and after such registration, information about the copyright holder and transactions with this object of intellectual property cannot be lost or changed.

Is it possible to build a system of preventive and preventive measures for means of individualization, similar to the system of protection of copyright objects? In this regard, four options for registering rights to a work can be distinguished: 1) the creation of a work by the author, as a result of which the right is acquired by a person in accordance with the law; 2) registration of the right by making the work public, indicating its authorship; 3) transfer of the exclusive right to a work to a third party for the purpose of further "registration of rights"; 4) granting the right to use the composition.

In the first and third cases, the following enforcement problems arise. So, when creating a work in the Russian Federation, there is no documentary evidence of the rights of a person, since its issuance is not provided for by law, as a necessary action. In turn, when transferring the rights to a work to a third party, there is a high risk of this or that abuse of the rights to a work by that person. The use of blockchain technology at the stage of creating works would completely eliminate such probable legal problems. At the stage of work on the next work, the authors could register the pilot names of their objects in the distributed registry, then, upon their readiness and completion, register the official date of their creation and the author's priority on them in the blockchain. In addition, among the problems to be resolved: the authorship of the work; determination of the order and amount of payments to the author

of the work; accounting for the use of the work by third parties. Among the features of the functioning of the technology: creating an information data array; protection of this data by cryptographic algorithms; assignment of unique codes to records; preparing a record of a specific copyright object for transfer; a record of the fact of such a transfer; transmission of transmission record and codes.

Unlike copyright objects, legal copies of which are necessary for modern circulation, copying of means of individualization is not required at all. Therefore, the above technical solutions can not give any effect. At the same time, it would be quite acceptable and useful to foresee the appearance of watermarks on an electronic copy of the brand image, which was made illegally from the original means of individualization of a business entity.

Usually, if the copyright holder encounters a violation of his rights, he must protect them; such protection necessarily needs evidence. Undoubtedly, it is easier to regulate such relations in the material world, however, the modern Internet environment has practically no tools for monitoring and solving such problems. An inter-jurisdictional blockchain may become a special preventive and prophylactic method that allows right-holders to confirm ownership of a particular means of individualization, as well as the fact that they were the first to create (legally acquired) this intellectual property (Kalinina et al., 2019).

Blockchain is an information technology for transmitting and storing data, which is a self-forming and growing registry of information about operations with any kind of information array, characterized by the impossibility of changing the data previously recorded in this registry. Moreover, the "operation" is understood solely as adding a new array of information. Changing the information stored in it by blockchain technology is fundamentally not allowed. Functionally, it is most often implemented as the ability to use cryptographic hashes, as a permanent and publicly available way of recording and storing information. This information can always be obtained using search engines and indexes. Entering into distributed register information about a particular means of individualization of an economic entity is necessary and useful for a number of purposes, including facilitating the receipt by users of content of information about the copyright holder.

When using this technology, complete transparency of actions performed with the original means of individualization is ensured. Blockchain technology tools can serve as an effective basis for the prevention of civil conflicts and litigation, for other legal issues. Among them, the most significant are, firstly, crypto hashes. A hash is used to confirm the existence and contents of any digital object without actually revealing the contents. Since any documents can be certified, unique hashes can be created for each individual object of intellectual property—means of individualization. Secondly—timestamps. They certify that the copyright holder was the first to receive priority on the object of intellectual property—a means of individualization, fixing the exact time of this fact.

The properties of blockchain technology allow copyright holders to certify their means of individualization, being absolutely sure that no one will be able to steal them in the future, and also be sure that the information in the blockchain

will be permanently stored. So, when the intellectual property is registered in the block chain, all information about the copyright holder remains available upon request. When a recording is made, it is not disclosed. This is important when registering both the images of the means of individualization and official documents about them. After registering in a distributed registry, data, including a hash and a timestamp, cannot be changed or deleted. This ensures the security of data storage and their authenticity. No censor, moderator or other regulatory authority is required. Any version of the image means of individualization can be certified; authentication of the content will be much cheaper for the copyright holder certificate of registration of a trademark: the user is only charged for the operation on the blockchain specified in the rules for using this distributed registry.

Therefore, when using blockchain technology, it is possible to create and operate a distributed registry with any kind of data, including the Register of means of individualization of business entities—residents of the EAEU. Accordingly, among the capabilities of this technology is a complete display of the actions of copyright holders on means of individualization without restrictions on their nature, source and time of completion. It is also possible to use blockchain technology to track the operation of franchising agreements. As a result, the prerequisites for possible violations of the rights of economic entities to the means of their individualization are reduced to a minimum; there are practically no judicial conflicts on these occasions.

The proposed inter-jurisdictional blockchain implements the functions of a universal repository (interstate distributed registry) of original images of means of individualization of business entities that are members of the EAEU association, for the main purpose of remote identification of these brands by processing crypto requests and sending positive or negative answers to these requests to interested applicants over the Internet. The advantage of blockchain technology is the exclusion of intermediaries from the protection of copyright holders and the transition from jurisdictional to individual management of rights to means of individualization. If this is required by the copyright holder, the blockchain will directly connect him and the potential user, for example, with a trademark under a franchise agreement.

Blockchain does not have an official status in the legal systems of the EAEU and BRICS countries, but the legislation (including regarding rights to means of individualization) each state has its own. We believe that it would be possible to start work by creating on the Internet the Register of means of individualization of business entities—residents of the EAEU and BRICS. In this context, we note the need to create a single universal interstate Internet-portal of the EAEU countries, into which new services and applications could be added as the information and technological development.

CONCLUSION

The conceptually neo-industrial paradigm of regulating the protection of the rights of business entities on individualization means in the jurisdictions of the EAEU and

BRICS should, first of all, provide for the legal prevention of the illegal use of trademarks and other intellectual property. Modern information technology tools make it possible, firstly, to prevent the theft of original images of individualization devices with the help of block-chain technology, secondly, to ensure the rapid remote identification of the original and the actual means of individualization that is available on a particular unit of goods. In addition, it is necessary and expedient to initially produce goods with an inseparable microchip operating in the smart marking mode, and through technology of the functioning of the specified microchip should be applied—in conjunction with the corresponding smart-contract (Inshakova et al., 2020). In addition to the elementary remote identification of the original and actually existing brand on the product, the smart-label should work like a beacon to track the position and transport of goods, as an archive of electronic documents recording the passage of goods by port, customs terminals, warehouses, stores, as a transmitter of signals to the manufacturer, service centre about the technical condition, terms of routine maintenance, quality of the product.

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CHAPTER 31

CONCLUSION

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According to the results of the research, the dualism of the idea on the 4th industrial revolution or, in other words, industry 4.0, is expressed both in its conceptuality and institutionality. At the same time, institutional quality allows creating a basis for a number of initiatives including legislative ones made by an interested person. Key technologies of industry 4.0 are currently actively implemented in the practical activities of business entities and have an impact on the relevant social relations but the degree of their impact varies, since some of them have already been implemented and have successfully proven themselves while others are just being tested (See Part I). In particular, it is obvious that the expansion of the use of robotic devices in various spheres of public life creates the need to analyze the content of the legal regime of the robot and its relationship with the legal status of subjects of civil law. The Internet of Things, which is now implemented in many areas of life, including industry, causes the need for the formation of preventive measures of protection, both for business entities and consumers. Cloud computing, integration of IT systems and augmented reality are currently viewed as promising tools for optimizing business activities, the implementation of which should also have science-based approaches including their legal regulation. At the same time, cybersecurity is a prerequisite for the successful implementation and operation of industry 4.0 technologies.

Principles of Responsible Management Education (PRME) in the Age of Artificial Intelligence (AI)—Opportunities, Threats, and the Way Forward, pages 393–405.

In this regard, the main task of the theoretical research was to develop a conceptual framework for legal regulation of industry 4.0 technologies, while the applied task was realized through suggestion of conclusions, proposals and specific recommendations for creating an appropriate regulatory framework for economic activities in the period of neoindustrialization. The results of the interdisciplinary, intersectoral research focuses primarily on the formation of the preventive measures which can minimize violations of the rights of economic entities, taking into account possible and obvious gaps in the legislation (See Part II) as well as the priorities of development of international integration processes within the foreign cooperation, regional unions such as the EU and associations with the participation of Russia—the EAEU and BRICS (See Part III).

The scale of the task is determined by the fundamental formulation of the question, the significance of the results obtained for the successful legal regulation of economic activities of business entities during neo-industrialization. The complexity of the task is explained by its focus on finding solutions to closely interrelated problems of an economic and legal nature. In addition, the complex nature of the research task of the project is proved by the specificity of the research object which is expressed in the fact that its content consists of dynamic and closely interrelated social relations which are developing in new and rapidly changing technological conditions, and arising due to the creation, implementation and operation of industry 4.0 technologies. These circumstances allow to assert that the task of the present study has been completed and has no analogues in the world practice of economic and legal research.

The conclusions reflecting the scientific novelty of the research on the basis of a comprehensive economic and legal interdisciplinary analysis allow to say that proposals on the formation of an integral legal concept of neo-industrial modernization of contemporary Russia have been developed. Besides, certain legal mechanisms for ensuring public private law relations arising in the sphere of civil circulation as the main form of economic circulation in the context of industry 4.0 and improving the legal infrastructure of key areas of the national technology initiative are proposed.

The results of the research include determination of specificity, needs and peculiarities of the public relations development in industry 4.0; identification of factors with possible negative impact of the 4th industrial revolution on contemporary social development as well as priority directions in transformation of economic and legal relations which are appropriate to large-scale processes of digitalization and implementation of the newest neoindustrial technologies. Besides, they involve clarification and addition of categories in legal regulation of the transition to the new scenario of economic development in terms of the 4th industrial revolution; a systematic comparative legal analysis of Russian and foreign legislation in order to define and organize the emerging conceptual approaches to the legal regulation of conditions of economic activities of business entities in the period of neo-industrialization. It should be mentioned that the present research

results in the identification of drawbacks and gaps existing in the Russian civil-legal mechanism of protection of the rights of subjects of legal relations, based on the technologies of industry 4.0; formation of strategy and main directions of economic and legal regulation of technologies of the industry 4.0 development considering the priorities of international integration including the participation of the Russian Federation (BRICS, EAEU); evaluation of the traditional system of realization of rights and interests in compliance with the new requirements in terms of the 4th industrial revolution; the formation of a preventive legal mechanism, which includes the most effective means of protection of the rights of businesses in the context of industry 4.0. The authors' study leads to determination and development of means for eliminating of gaps in legal regulation and in theoretical legal interpretation of the transformation processes of social relations in the context of industry 4.0; identification of key points of improvement in law enforcement of the Russian Federation in its evolution within the implementation of innovative technologies of economy management; development of proposals on legislation improvement in the key technologies implementation of the 4th industrial revolution: autonomous robots, big data, Industrial Internet of Things, artificial intelligence, cloud computing, etc. In addition to the above-mentioned, the results include formation of strategy and main directions of transformation of the legal regulation of neo-industrial relations in terms of penetration of the industry 4.0 technologies in all spheres of contemporary public life; the formation of the concept of favorable, adaptive legal environment necessary for the implementation of the "Digital economy of the Russian Federation" national programme; development of methodology and legal mechanisms for the establishment and implementation of the legal concept of neo-industrial modernization.

The process of technological convergence is one of the main conditions for neoindustrialization of the economy and plays a key role in initiating innovative structural changes which necessitates their analysis, evaluation and monitoring. As a result of the economy transformation and the emergence of new technologies, structural changes occur. They, in turn, are the reason for a number of new industries, structural relationships between elements of the system that leads to new quality management practices, the purpose and function of management and development that comes to structural changes in the economy at the macro and micro levels. The formation of a new techno-economic paradigm as well as the problem of development and implementation of new technologies determines the necessity of setting the task to estimate modern technologies, their impact on the existing economic structure to predict future states of socio-economic systems, new trends and regularities of their development, the conditions and factors of functioning of economic systems in the new terms and scenario creation of economic activity development. The accumulated contradictions and system potential which operates within the existing technological paradigm, initiate the formation of the new one. The core of the 6th TP is NBIC-technologies which are the interpenetration of nano-, bio-, info- and cogno-technologies (See Chapter 1).

The basic approaches to the interpretation of structural shifts are analyzed and the mechanism of their formation in conditions of development of convergent technologies is systematically represented. The research categories of structural changes are added with such characteristics as power, impulse, intense of structural changes as well as main transformation processes of the transition to new technological paradigm are identified. Taking into account the author's concepts of impulse and intense of structural changes, the effectiveness of measures aimed at initiating positive ones such as the ratio of intense to impulse, is determined See Chapter 2).

It is proved that each of the methods for evaluating structural shifts and structural changes has its advantages and disadvantages. To analyze the changes in the structure of economic systems is challenging due to the absence of criteria and principles for applying any of the methods. Each research method is applied in accordance with specific goals and depends on the properties of the studied object and the availability of information about it. To conduct a comprehensive analysis of the process of structural shifts in the context of convergent technologies, it is reasonable to use a set of methods based on the assessment of the structure in the framework of main activities of economic systems, econometric analysis, calculation of integral indicators and indices of structural shifts (See Chapter 3).

The system of indicators designed by the authors for assessing structural shifts in the economy within convergent technologies, is based on the use of innovative and technological potential, integration of parameters for the formation of NBIC-technologies, which allows aggregating the power, impulse, and intense of structural shifts, as well as the cumulative effect of the use of technologies and innovations.

According to the authors' method, the block of indicators of the impulse of structural shifts is characterized by two subsystems: 1) formation of the technological platform and demand for technologies; 2) resource support for technological development. The block of indicators of intense of structural shifts, according to the study results, also includes two subsystems of indicators: 1) the level of technology implementation activity; 2) the result of cumulative development of technologies and innovations.

To estimate the relationship between the selected blocks of indicators of impulse and intense of structural shifts, the authors conducted a canonical analysis which indicates a rather strong relationship between the variables of the two sets and confirm the feasibility of including the selected indicators for evaluating the impulse and intense of structural shifts (See Chapter 4).

The analysis of structural differences carried out by the authors allows assessing the structural shifts and the economy structure of economic systems in relation to the processes occurring in other regions of the country's economy or economic entities as a whole as well as to identify the features of the economic structure and its changes. Estimation and analysis of the economic structure of countries and their regions are necessary for a balanced reduction of uneven economic develop-

ment and the technological component of structural transformations in particular. Qualitative analysis and assessment of the differentiation of the economic space of the country, its regions and their technological development lead to prerequisites for creating effective recommendations to public authorities to smooth imbalances and inequalities as well as the sustainable use of innovative and technological potential for positive structural and shift processes (See Chapter 5).

The authors have analyzed the impact of economic processes of neoindustrialization on the sphere of cross-border economic relations of businesses that is manifested in the convergence of the relevant legal regulation. It is concluded that vertical integration as an essential feature of neoindustrialization has the greatest influence on the legal regulation of cross-border economic relations and leads to a dissonance between relatively sustainable and conservative regulatory legislation and the constantly evolving needs of transnational corporations. Neoindustrialization processes attach particular importance to the convergence of legal regulation, however, merging does not necessarily lead to the creation of unified norms. The coherence between national and international legal systems can be a result. It is proposed to develop a unified approach to the definition of international (cross-border) commercial transactions. In this case, the determining criterion should be the location of the parties' commercial enterprises. It is to be noted that the international community pays more attention to the "neutral" legal order even through the development of model clauses referring to non-state codified acts and standardized contracts as well as by granting arbitration the right to use soft law sources as a regulator of the parties' relations at its sole discretion. It is proved that from a formal legal point of view, sources of non-national regulation are not under the concept of "law," therefore, they can be applied by state courts only through direct reference to them in a contract, i.e. as its term obligatory for the parties. At the same time the concept of "law" is being transformed in international commercial arbitration and expanded due to inclusion of transnational norms of non-state origin. That shows the convergence of legal regulation of cross-border economic relations of business entities (See Chapter 7).

Tendencies related to the use of digital technologies in the dispute resolution process between businesses are identified. Trade cooperation between countries is the first to feel the changes related to the transition to electronic interaction, and therefore needs a clear and predictable mechanism to protect the interests of the subjects involved in this process (See Chapters 8, 9, 15, 16, 17, 18, 19, 20, 21).

There are evidences that the legal regulation of the use of technical means as methods of protecting rights and legitimate interests often does not correspond to current realities. It is proved that the creation of a single information space that would connect market participants as well as mechanisms for resolving commercial and other disputes related to business activities, can significantly increase economic cooperation. The implementation of new modern technologies, such as artificial intelligence and "smart" technologies increase the efficiency of the dispute resolution process. This is also facilitated by the transition to use not only

online (Internet, electronic) alternative dispute resolution methods, but also online (Internet, electronic) judicial form of legal protection.

For successful economic cooperation, it is necessary to create a single digital space within the framework of international trade cooperation between the countries (EAEU, BRICS, APEC, and SCO). However, it is noted that such goals affect not only the private interests of investors, but also the public interests of these states. That is why, achieving a balance is extremely difficult. Close economic cooperation should also be provided with modern innovative mechanisms for dispute settlement.

In addition, it is proved that new technologies penetrate directly into the sphere of law and change its formal parameters. Many legal actions are subject to automation which raises the question on creating a machine-readable and algorithmized law. The question on the effective application of such law in the sphere of economic relations still remains open. First of all, new technologies change a lot of basic parameters of law. Then they expand the range of subjects of law enforcement and change the role of law itself in regulating public relations in the economy. Providing the possibility of making smart contracts, such technology as "blockchain" allows businesses to make deals without the right. In certain cases, the authors state the emergence of new subjects of law enforcement-robots. The use of such subjects leads to a situation of uncertainty and unpredictability that can also affect economic stability. In addition, the development of digital technologies in some cases allows participants of economic circulation to build their relationships beyond the existing legal regulation. The making of smart contracts using the "blockchain" technology ensures the fulfillment of obligations, without resorting to law possibilities (See Chapters 7, 8, 9, 10).

As a result, there is a risk of emerging of an entire economic sector that is not subject to legislation. In fact, this refers to a new model of regulating economic relations based on new technological and non-legal regulators. Researchers underline that this change in the role of law in public relations entails certain risks for economic stability (See Chapter 9).

The book studies the ways Industry 4.0 changes institutional environments of economy and law by introducing present-day technologies including artificial intelligence. It distinguishes problems for the business in general as well as for small and medium enterprises during the neoindustrialization period. The research specifies individualism theory as the methodological starting point for analyzing economic subjects in the digital environment. Besides, it describes the impact of AI agents on the society, the importance role external knowledge of companies plays for implementing innovations and cases of successful convergence as institutional changes based on the blue ocean strategy and its framework (raise, eliminate, reduce, create). Also, it points out institutional problems of developing countries and defines the role of the state and institutional paradigms of economic and legal transformations in the neoindustrialization period (See Chapter 11).

Problems resulting from economy digitalization and affecting its destabilization, e.g. usage of cryptocurrencies, are analyzed in the context of existing legal basis for human rights. The study distinguishes key factors of intensive development in this area in the European Union legislation and compares with similar legal regulation in the integration union involving the Russian Federation—the EEU (See Chapter 12).

The research conclusions were formulated considering the fact that new social relations and previously non-existent objects of legal interaction make it necessary to reform current system of legal regulation. It also accounts factors that hinder development of a new system and addresses an important task of establishing specific rules of conduct for creation and effective implementation of end-to-end technologies in various spheres of Russian economy in the context of legal obstacles elimination. Issues of legal regulation methodology were addressed in order to form the legal matrix of end-to-end technologies as part of the national technological initiative. A conclusion is made that presently legislators do not provide guidelines that could become the starting point for new legal standards. Legal acts often mention possible methods (foresight method, proactive methods, etc.) but they have no relation to legal regulation methods (See Chapter 13).

Terms and definitions are being developed that would enable a unified interpretation of standards and rules of conduct, stipulation of rights and obligations of legal relation participants (See Chapter 2, 13, 24); solution of problems related to legal limitations (See Chapters 13, 25). A conclusion is made that introduction of the "digital rights" notion in its present status to civil legislation does not seem reasonable and classifying these rights as civil law objects seems illogical. For now many modern models of economic and technological relations have not been fully formed in the economic practice, this is why it seems premature to legally codify the basic notions of digital economy (including digital rights) in the Civil Code of the Russian Federation because they have not been established not only in legal theory and practice but in the economy as well (See Chapter 24).

Given the fact that Russian legal science is on the threshold of a large-scale research of methods and content for regulating relations involving robotics, cyberphysical systems, electronic subjects, etc., this study raises the relevant issue of the AI legal status, delving into matters of legal responsibility for AI activities, in particular for damages caused by artificial intelligence systems to third parties. The research found the conceptual problem related to defining legal status of artificial intelligence in its interaction with humans and responsibility for damages caused by AI implementation. The authors concluded that standardization of responsibility models analyzed in this research and applicable to the AI must be performed on the global level surpassing national limitations and aimed at achieving the AI legal regulation paradigm that would enable sufficient protection of human and civil rights and freedoms, follow social and state interests and basic ethical norms (See Chapter 25).

The readers of this book will find out if robots possessing artificial intelligence have attributes of a legal subject; if artificial intelligence has its own will; if any AI activities can be seemingly performed for its own benefit; and whether artificial intelligence is an example of ontological depression or epistemological optimism. The authors conclude that for now distinguishing machine cognitive abilities is not a priority task for law theorists. They focus on solving an equally important and exciting task of developing rules and regulations applicable to artificial intelligence that follow national interests and strategic priorities including scientific and technological development. According to the authors' estimations, it is no coincidence that Russian legal science launched a large-scale and profound study of notions and methods for regulating relations involving robotics, cyberphysics, electronic subjects, etc. Prioritized results expected by the scientists would provide definitive answers for practically valuable questions, such as responsibility for damage caused by robotic activities, ethical imperatives for developers of technologies imitating human cognitive abilities as well as an imperative basis for legislation and legal application to such technologies. Optimistic expectations of quick responses to these questions seem reasonable and appropriate (See Chapter 28).

This research provided arguments proving that vertical integration as notional attribute of neoindustrizaliation has the biggest influence legal regulation of transnational economic relations. In particular, international mechanisms for protecting human environmental rights are significantly changing and trying to adapt to the new sixth technological paradigm. The global problem noted by the researchers concerns lack of proper scientific expertise and assessment of environmental damage. The study underlines the necessity for legal regulation of new environmental damages as a consequence of the sixth technological paradigm. Foreign practices were analyzed. As an alternative to activities of European and inter-American regional systems for human rights protection, the authors offer emerging quasi-judicial activities of committees on international agreements aimed exclusively on following environmental human rights (See Chapter 26).

International commercial arbitration is undergoing a transformation of the notion of law by including transnational standards of non-governmental origin. This is an example of convergent legal regulation of transnational relations between economic subjects (See Chapters 7, 17). It was proved that settling the disputes both by parties (independently or with a mediator) by the arbitration court may to some extent involve information technologies, while the digitalization range of alternative methods for dispute settlement varies from using electronic communication means only for simplifying and accelerating the settlement to applying artificial intelligence as a means to settling the dispute.

The authors analyzed the technologies that enable to come to settle a dispute by means of computer analysis of parties' arguments that make it necessary to acknowledge an equal status of agreements made by online settlements and by traditional settlement procedures. This research considers the possibility of no-

tarial verification of agreements made via online mediation that would involve a representative of the company administering the online platform. It is noted that given the high potential of AI capacity to categorize disputes, analyze and generalize judicial practice, accurately forecast court decisions, legal proceedings would inevitably adapt itself in terms of acknowledging and entering into force of automated arbitration resolutions. In case of the parties clearly and unambiguously express their will to online arbitration resulting in an automated resolution, it seems inappropriate to deny obligatory fulfillment of such a resolution only due to lack of procedures for it. However, this approach needs respective legal and technological guarantees. Establishing a legal basis for AI implementation and setting boundaries for automated data processing while maintaining submission of arbitration decision to the state court (including definition of reasons for non-fulfillment of automated resolution due to malfunction, unsanctioned external involvement) are the necessary conditions for protecting human rights while delegating the dispute-settling function to artificial intelligence. Algorithmizing and automatization of making a legally relevant decision by the state court is possible for case categories with pre-established fact in issue and evidence, i.e. the court only performs only verification and certification functions. Such cases primarily include summary procedures.

The authors believe that no attempts to completely substitute human judges with artificial intelligence for studying and settling disputes, evaluating evidence presented by the parties etc., should be supported. In general, prospects of such approaches in terms of justice delivery disavow the principle of court proceedings based on the guarantees of rights protection, lawfulness and fairness of law enforcement and legal defense activities performed by the court, not the machine. The authors proved that the lawmakers must take special protective measures for establishing and maintaining the register of robots identifying their owners as well as for banning creation of "killer bots" and their programming for damage infliction (See Chapters 25, 28).

The results of scientific and technological progress as well as positive experience of active digital technologies involvement during formation and development of material legal relation determined one of the most important legislative tendencies regulating delivery of justice—the extended usage of electronic technologies in state court proceedings. Argument were provided stating involvement of digital technologies in court proceedings must be a careful and well-planned planned decision. Besides, social guarantees must be codified and provided for achieving digital justice availability, otherwise efficiency of this process becomes questionable. Active introduction of digital technologies to court proceedings and other means of settling disputes creates a balance of interests between economic subjects and the state. Aims and objectives of dispute-settling processes are changing because of digital platforms that make proving and consideration of disputes faster, more transparent and simplified (See Chapters 18, 19, 30).

Adoption and implementation of strategic programs mentioned above may attract large investments in the economy. This why the authors studied rights protection of digital financial service consumers and concluded that excessive regulation makes supplier companies opt for other countries with milder regulation or no regulation whatsoever. For example, in 2018 the US government had to repeal several overly strict provisions of the Dodd-Frank Act of 2010. On the other hand, China demonstrated that excessively soft regulation of digital banking services and their distribution can lead to numerous online banking frauds. Meanwhile, consumer trust in a well-functioning financial service market promotes long-term financial stability, growth, efficiency and innovativeness. Consumer protection is becoming one of the main objectives for supervising agencies going beyond the scope of financial stability. Russian lawmakers must account these factors while preparing a new legislative act—Consumer Right Protection Code that is planned to be adopted in 2023 (See Chapter 16).

The study points out advantages of online investing, the main of which is the opportunity for faster and less bureaucratically burdened financing of projects. Lack of any geographical or distance limits is another upside compared to other means of capital attraction. It was proved that this distant online algorithm of retail investment financing enables to attract capitals from all over the world for a price matching the project return rate (See Chapter 23).

The authors of this book include scientists from the Republic of Belarus who performed a comparative study of legal regulation sources and found differences in legislative approaches to interpreting the notion of investment in different investing areas. Arguments were provided that the model of investment regulation through investment online platforms must be based on balance of private and public interests, with priority given to guarantees of invertor rights and investment protection that shape beneficial investment climate of national economies (See Chapters 22, 33).

It was proposed to establish "BRICS foreign economy online" portal. This online platform will provide real-time monitoring of cargo transporting vehicles and their routes enabling representatives of state agencies and economic subject management to analyze and coordinate international export and import deals online. It seems rational for this online recourse to have a digital investment platform as an ICT option providing blockchain turnover of securities and their placement for unlimited number of persons in order to attract financial resources for international foreign and export deals.

For a more efficient integration of EEU and BRICS economic subjects, we propose to establish a digital investment platform—an exchange of digital investment cryptoentries listed, included in quotation list and traded on this platform. Investment digital cryptoentries—tokens, can be emitted by large corporations as well as by medium companies for lesser-scale projects. Individuals or legal entities or any jurisdiction can invest in the projects. Development and formation of a positive business environment on this digital investment platform require a

regulatory basis for digital investment. An advantage of digital investment platforms is its distributed ledger technologies that can create a unified system for securities turnover, making smart contracts on foreign economy deals, controlling their fulfillment, and consequently providing non-stop monitoring of each investment project.

The authors studied present-day regulation of intellectual property turnover in the Internet focusing on copyright protection vie distributed ledger technology (blockchain). Difficulties of authorship proving was highlighted. It was noted that blockchain saving can be applicable for recording legal fact relevant for authors. An analysis was performed for Proof of Existence, Emernotar, Deponent—online hashing services recording a unique file implant (a hash) to an information chain. This record contains timecodes and cannot be changed. In case of a dispute, hashing is repeated and the new result is compared to the blockchain hash. If they match, this means the file was registered at a specific moment in the past. Inputting data on a certain work can be compared to copyright registering or deposit. Sufficiency of this evidence is debatable because this technology is still developing and has no legal status. Another legal uncertainty concerns status of DLT operators, their responsibility for accuracy of register information. The authors support the initiative of Skolkovo Foundation, WIPO and other organizations on establishing IPChain Association developing standards, technologies and tools for digital interaction of intellectual property market participants. The Association announced on technical introduction of blockchain to copyright—IPhub platform. There copyright owners can publish works and set their application terms. The platform is a sort of a market or fair for intellectual property deals. Thus, blockchain enables authors and consumers to make their interactions more transparent, eliminate unnecessary mediation and reduce financial costs while making intellectual property turnover more intensive (See Chapter 20).

The study analyzes legal grounds of quest entertainment popular among young audience aged 12–30, emphasizing relation of quests' promotion and functioning to information technologies. Quests are advertised mostly in the Internet on their official websites and independent reviewing platforms. Official websites and quest aggregators become platforms for making agreement between quest organizers and participants. Besides, organizers often require advance payment via electronic payment systems. The authors note this fast-growing part of entertainment industry does not get sufficient attention of the lawmakers. It is recommended to use a poly-subject legal blockchain for the quest industry that would prevent any conflicts in these public relations, save institutional, financial, labor, time and psychological resources as well as protect rights of consumer who become a weak, non-defended party in agreements on paid entertainment services provision (See Chapter 21).

Problems analyzed in Part III of this book are all related to economic and legal development of Industry 4.0 *given international integration processes.*

The authors were interested in telemedicine and specifics of healthcare digitation management. They noted a gradual transformation of telemedicine objectives. New telemedicine elements include individual mini devices and sensors, innovative technologies (additive manufacturing, virtual and augmented reality, unmanned robots and vehicles including UAVs). It is forecasted that online hospitals, digital health centers will develop, pharmaceutical and medical companies will unite with tech companies developing software and other solutions for developed countries. The authors note that in developing countries digital healthcare efforts are aimed at achieving basic service standards including medical availability patients in the countryside and areas lacking personnel providing high-tech medical assistance. However, the authors underline that no matter how successful telemedicine becomes, life or death decisions must not be delegated to machines. Thus, apart from the notion of telemedicine as a means to distant provision of medical services and medical data transfer, we propose a broader usage of such terms as a) telehealth—a broader notion covering telemedicine and information and services beyond the scope of clinical (medical) area, b) digital healthcare that includes telemedicine, telehealth and multiple other activities that are connected with medical assistance but cannot be classified as such (e.g. mobile healthcare, big data usage, management medical organization, healthy lifestyle propaganda etc.). It was proved that telemedicine technologies are understood by legislations of Russian and EEU member states differently compared to international organization acts and foreign practices, while the range of electronic devices for medical assistance offered by the market is extremely small compared to those that could be used by state healthcare system.

Researching legal regulation problems of civil responsibility of foreign economic activity of BRIC subjects involving ICT enabled to divide them in tow systematized groups: systemic problems related to ICT usage in public turnover that happen regardless of business subject and its jurisdiction and problems that directly depend on the subject's jurisdiction to a certain country. It is recommended to reform the national legislation using a common system of civil and criminal prosecution; to develop a common category apparatus related to digitalization of foreign economic activity and prosecution; to formulate common scopes and limitations. For further development of foreign economic activities involving ICT, it is prosed to establish a non-governmental legal system.

It seems reasonable to analyze means of individualizing legal entities in the civil legislation both as a data set and a qualitative attribute. Means of individualization function to reveal the purpose of economic subject existence in the turnover by making available to an unspecified number of people information on belonging of goods, works and services to a specific legal entity—their provider or manufacturer. Russian legislation contains tools appropriate in volume and content for protecting individualization means—general means provisioned by Article 12 of the Civil Code of the Russian Federation as well as specific means protecting separate individualization types. This is proved by legal practice that

demonstrates consistent and correct application of civil legislation for this area of public relations.

The authors studied ratified international legal regulation of economic relation in all BRICS countries and distinguished a certain number of international-level legal acts regulating appearance, change, revocation and protection of rights for individualization means. The main problem that arises when BRICS states try to apply these acts is the lack of common approach to regulating these relations (as a rule, international act does not get supported by all member states of a union). The authors believe a possible solution would involve making specific regional agreements applicable only to a certain group of states. Meanwhile, the problem can and must be addressed by using modern information technologies.

The authors think that conceptually, the neoindustrial paradigm regulating individualization rights of legal entities in the EEU and BRICS countries must first and foremost provide legal prevention of illicit usage of trademarks and other intellectual property objects. Modern IT tools enable to use blockchain for preventing theft of individualization means origins as well as providing prompt distant identification of the original individualization means and an actual one on a production unit. Besides, it seems necessary and reasonably to manufacture products with an unremovable microchip functioning in smart marking mode; this microchip must function in relation to other technologies, i.e. a respective smart contract. Apart from providing basic distant identification and comparison between the original and actual brand marks, a smart label must acts as a tracker showing product location and transportation, an electronic archive of port, customs, warehousing and store document, a transmitter of signals on item technical condition and quality to the manufacturer and the service center.

The authors and editors of this book are convinced that their interdisciplinary collective study will make its contribution to theoretical and practical development of economic and legal regulation for public relation transformations in terms of Industry 4.0 and will help to prepare an adaptive infrastructure of the fourth technological revolution.

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