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INNOVATION IN THE MODERN ECONOMY

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Digitalization of the Russian Economy: Between East and West

Olga B. Digilina[1], Alexey M. Chernyaev[2] ✉

[1] RUDN University,
6 Miklukho-Maklaya St, Moscow, 117198, Russian Federation
[2] Vladimir Law Institute of the Federal Penitentiary Service of Russia,
67E Bol'shaya Nizhegorodsakaya St, Vladimir, 600020, Russian Federation
✉ a.m.chernyaev@yandex.ru

Abstract. In this paper, the authors consider models for building digital economy systems in foreign countries. The relevance of research is primarily due to the need to develop a clear and coherent understanding of the optimal scheme of digital construction in the economy of the Russian Federation, which at the initial stage is impossible without analyzing the experience already existing in the world. It is necessary to identify both stimulating and inhibiting factors that influence the effectiveness of the digital transformation of foreign economic systems. The purpose of the study is to identify the strengths and weaknesses of the most successful global models of building a digital economy, followed by the development of an understanding of their applicability in Russia. Thus, in this paper, the authors offered their answer to the question: "Can the Russian Federation successfully apply the already proven strategy of digital transformation of the economy or is it necessary to develop unique own solutions?" To do this, the authors examined statistical data characterizing the economy of advanced states from the point of view of digital transformation, regulatory documents regulating state policy in this area, as well as the positions of researchers working in this direction. The use of the statistical analysis method made it possible to compare the factors of influence and the results of digital construction. Within the framework of a formal and logical approach based on the study of the provisions of strategic planning documents of foreign countries, the authors formulated some possible scenarios for the further development of the digital transformation of the economies of Europe, the United States and China. As a result of the conducted research, the authors

concluded about the possibility of using certain digital construction tools used abroad, in Russia, and also assess the degree of effectiveness of the introduction of foreign models of digital transformation into the practice of the domestic economy.

Keywords: digitalization, digital transformation, digital economy, China, Europe, USA, digitalization strategy

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Цифровизация экономики России: между Востоком и Западом

О.Б. Дигилина[1], А.М. Черняев[2] ✉

[1] Российский университет дружбы народов
Российская Федерация, 117198, Москва, ул. Миклухо-Маклая, д. 6

[2] Владимирский юридический институт Федеральной службы исполнения наказаний,
Российская Федерация, 600020, Владимир, ул. Большая Нижегородская, д. 67Е

✉ a.m.chernyaev@yandex.ru

Аннотация. В настоящей работе авторы рассматривают модели построения систем цифровой экономики в зарубежных странах. Актуальность исследования обусловлена, прежде всего, необходимостью выработки четкого и стройного понимания оптимальной схемы цифрового строительства в экономике Российской Федерации, которое на начальном этапе невозможно без анализа уже сложившегося в мире опыта. Необходимо выделить как стимулирующие, так и тормозящие факторы, оказывающие влияние на результативность цифровой трансформации зарубежных экономических систем. Целью исследования является выявление сильных и слабых черт наиболее успешных мировых моделей построения цифровой экономики с последующей выработкой понимания степени применимости их в России. Таким образом, авторы предложили свой ответ на вопрос: «Может ли Российская Федерация успешно применить уже апробированную стратегию цифровой трансформации экономики или необходима выработка уникальных собственных решений?» Для этого авторы рассмотрели статистические данные, характеризующие экономику передовых с точки зрения цифровой трансформации государств, нормативные документы, регулирующие государственную политику в этой области, а также позиции исследователей, работающих в рассматриваемом направлении. Применение метода статистического анализа позволило сопоставить факторы влияния и результаты цифрового строительства. В рамках формально-логического подхода на основе изучения положений документов стратегического планирования зарубежных стран авторы сформулировали некоторые возможные сценарии дальнейшего развития цифровой трансформации экономики стран Европы, США и Китая. В результате проведенного исследования авторы приходят к выводу о возможности применения отдельных инструментов цифрового строительства, использованных за рубежом и в России, а также дают оценку степени эффективности

внедрения иностранных моделей цифровой трансформации в практику отечественной экономики.

Ключевые слова: цифровизация, цифровая трансформация, цифровая экономика, Китай, Европа, США, стратегия цифровизации

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Introduction

One of the founders of the digital economy concept is Nicholas Negroponte (Pavlinov, Skodorova, Pavlinova et al., 2019), who in 1995 in his work "Being digital" analyzes the advantages of information trading over the traditional exchange of physical goods and comes to the conclusion that "change from atoms to bits is irrevocable and unstoppable" (Negroponte, 1995).

The course for building a digital economy has already been set by many countries. The United States and China are recognized as world leaders in the field of digitalization. According to the report of the UN Conference on Trade and Development on the digital economy, they are achieving the fastest pace of introduction of new generation communication technologies, the share of these two countries accounts for more than 90 % of the total volume of business initiatives (startups) in the field of artificial intelligence over the previous 5 years, 70 % of the leading scientists in this field as well as about 90 % of the capitalization of the largest corporations in the digital industry. The volume of the US digital economy, which occupies a leading position in this area, is 13.6 billion US dollars. In China, the same figure is 5.4 billion US dollars. At the same time, in terms of the dynamics of the growth of the digital economy, the first place belongs to China, which has an annual increase in this area by 9.6 % (Belozyorov, Wang, Liu, 2022). In certain areas of digital development, the leading positions are occupied by European countries, among which Switzerland stands out, which, as already noted (Chernyaev, 2022), is a leading country in terms of innovation and technological economy according to the annually published "Global Innovation Index".

The difference in the historical context of the development of world leaders in the field of digitalization, differences in the legal system, economic, social and cultural structure, in climatic conditions, resources, and so on make it very difficult to form a unified strategy for the success of digital transformation. For Russia, which is located at the junction of the Western and Eastern worlds, during the initiation of the processes of building a digital economy, it is especially important and relevant to develop an understanding of the strengths and weaknesses of existing digitalization models and determine its own priorities for digital economic construction.

Literature review

In their research, domestic authors (Asanov, 2016; Babkin, Burkal'ceva, Kosten', Vorob'ev, 2017; Beslaneev, 2023; Bondarenko, 2020; Gasanov, T.A., Gasanov G.A., 2017; Gretchenko, 2018; Lapidus, 2017; Polovyan, Sinicyna, 2020; Rodionov, Skhvediani, Bondarev, 2017; Starodubceva, Markova, 2018; Tishchenko, 2022; Turko, 2019; Yudina, Tushkanov, 2017; Zharkova, 2022) offer many approaches to understanding the essence of the digital economy and the concept of its construction in the Russian Federation.

In the works of foreign authors (García-Herrero, Xu, 2018; Jiang, Murmann, 2022; Kwilinski, Vyshnevskyi, Dzwigol, 2020; Lyu, 2022; Marino, Pariso, 2021; Milošević, Dobrota, Rakočević, 2018; Russo, 2020; Tang, Lu, Tian, 2021; Tao, Zhi, Shangkun, 2022; Thelen, 2018; Weresa, 2017; Xun, Guanghua, Jiajia, Zongyue, 2020; Zhang, Chen, 2019) the features of digital construction in certain foreign countries and regions are considered, the factors determining the successes and failures of the digital transformation of the economy are described.

Researchers are interested not only in the national, but also in the global aspect of the digitalization of the economy. In the works of scientists (Bataev, Sitnik, 2017; Bukht, Heeks, 2017; Chohan, 2020; Elovskaya, 2022; Koshevenko, 2018; Liu Z., Liu J., Osmani, 2021; Mezenceva, Leont'eva, 2023; Murthy, Kalsie, Shankar, 2021; Pan, Xie, Wang, Ma, 2022; Rytova, 2018; Teoh, Mahmood, 2017; Titova, Bursaeva, 2020; Watanabe, Naveed, Tou, Neittaanmäki, 2018) the effect achieved by increasing the efficiency of economic communications using digital technologies is analyzed.

In addition to scientific and analytical literature, the research is based on statistical data, as well as strategic planning documents that characterize models for creating digital economies abroad.

The methodological basis of the study was made up of general scientific methods, such as observation, empirical, logical, statistical, as well as legal analysis.

The results of the study and their discussion

Naturally, leadership positions in the field of digitalization are based on significant funds allocated to the development of innovations. However, the absolute volume of investments is not a determining indicator in this case. Thus, the United States spends about 10 times more on innovations than Switzerland, but this does not allow them to take the first place in the rating. The authors concluded that "the analysis of the relative share of innovation costs in the total gross domestic product (GDP) is more indicative. Despite the lower absolute volume of investment in research and development in Switzerland, this country is the leader in the share of related costs in total GDP" (Chernyaev, 2022).

The issue of economic security for each state is even more complex and specific. For example, according to the rating of the state's economy's resilience to external threats "External Vulnerability and Resilience ratings" compiled by the European rating Agency "Scopes Rating", the United States ranks below the middle of the list

of 95 countries, while Switzerland retains a leading position. This suggests that along with indicators of the volume of investments and their share in GDP in particular and the state of the economic system as a whole, it is necessary to consider organizational, managerial, legal, socio-historical and regional aspects of the construction of the digital economy. The experience of world leaders deserves attention, because on its basis any state has the opportunity to build its own course for the creation of an effective innovative economic system, taking into account advanced achievements, focusing on the achieved indicators and making adjustments to measures that did not bring the desired effect.

As for Switzerland, the digitalization of the economy contributes to the strengthening of the country's powerful financial sector. Big data technologies and high-speed communications contribute to expanding the potential of monetary operations, Switzerland's external credit accounts for almost 100 % of GDP. At the same time, a significant risk that has a negative impact on the stability of the economy is the high creditworthiness of domestic banks in foreign currency.

According to I.V. Danilin (Danilin, 2019), two main factors favor the development of the digital economy in the United States. The first is the historical nature of the digital development of the economy. Exploiting the trends that emerged in the 90s of the 20th century as a result of the explosive development of the Internet, the United States became the ancestor of many innovations. The second is the organic nature of innovation activity. New technologies in the USA are an element of the next stage of the evolution of existing economic relations, providing an opportunity to create a symbiosis of traditional economic interactions and new technologies and business models (Danilin, 2019).

Based on the results of the analysis of the activities of the United States in building the digital economy, A.V. Keshelava (Keshelava, 2017) identified 4 key stages of this work. First, it is the formation of a favorable environment for the development of appropriate infrastructure, institutions and relations. This process is based on the regulatory framework. Secondly, the creation of pilot management projects in the conditions of digitalization in those industries that have the greatest prerequisites for this. Thirdly, the identification of the most successful experience on the basis of competition with its subsequent introduction into the broad practice of the industry. And finally, the dissemination of the most effective and successful solutions throughout the entire economic system.

This strategy fully fits into the market approach to building a digital economy. The role of the state in this case is minimal, although it is quite important. To form a legal basis for digital economic relations, it further plays the role of an observer, one might say, a moderator, correcting, if necessary, deviations in the economic behavior of subjects. The entire main burden, including research and development, testing, diffusion and replication of technologies and products, is borne by non-state participants in the economic system.

Such a path of development is optimal for the United States due to the peculiarities of the economic system. American multinational corporations have the resources to ensure advanced technological development. At the same time, the spread

and introduction of innovations is carried out with the help of a high share of private business in the country's economy.

Despite the advantages of such a strategy, among which A.V. Keshelava (Keshelava, 2017) attributes, first of all, a relatively low burden on the state budget, it is not perfect or ideal. A serious disadvantage of this method of building an economic system is the reduction of its manageability. The main beneficiary is a business for which profit is the only measure of success. In such a system, the threats of the transition of managerial and goal-setting functions from the state to large corporations are particularly acute. One of the embodiments of these threats is the "commercialization" of social policy in the country, a skew in the systems of health, education and social security towards the monetary component.

In addition, the decentralized nature of the economy creates the effect of multidirectional development, which significantly slows down the creation of a unified infrastructure necessary for the uniform progressive movement of the entire economic system.

Separately, it should be noted that the main focus in the Western model is on stimulating consumerism. Industrial solutions look secondary, serving the needs of the consumer market. We are not talking about the development of the real sector of the economy, the main share falls on the service sector and the financial sector.

Thus, the digital economy in the United States is the next stage in the development of the economic system, associated primarily with the introduction of information and communication technologies in the sphere of consumer behavior and the support and expansion of consumer activity of citizens by increasing the availability of services, based on the activities of private business with a regulatory framework role of the state.

A kind of manifesto of digital transformation in Europe is the Digital Decade Policy Programme for the period up to 2030.[1] It defines the key indicators of the digital development of the European Union countries. It is stated that the key to the success of digitalization of European countries is organized close cooperation between the European Union and the participating states within the framework of interstate projects aimed at increasing the capacity and potential of the use of digital technologies in four key areas: public services, skills and competencies, infrastructure and entrepreneurship.

By interstate projects, the authors of the Digital Decade Policy Programme for the period up to 2030 understand large-scale projects created to help achieve the target indicators of the digital transformation of the European Union and the restoration of industrial production. According to the plan of the developers of the program, they should concentrate pan-European, public and private resources to ensure such a pace of development of critical areas that the State party is not able to achieve independently.

With the help of interaction within the framework of interstate projects, it is planned to achieve the share of the adult population owning at least basic digital skills in 80 %. According to the information published by the European Commission as part of the Digital Economy and Society Index, this indicator is 54 %. The leaders

[1] The Digital Decade policy programme 2030. Retrieved May 16, 2023, from https://ec.europa.eu/newsroom/dae/redirection/document/79267

in this area are Finland and the Netherlands with results close to 80 %, the outsiders are Bulgaria and Romania (32 and 28 % respectively).

One of the problematic issues slowing down the formation of the digital economy in Europe is the shortage of specialists in the field of information and communication technologies. Their number is 8.9 million people or 4.5 % of the total labor force. More than half of all enterprises with relevant vacancies face difficulties in recruiting staff. The target indicator of the labor market by 2030 is the employment of 20 million specialists in the field of digital technologies. The greatest contribution to the implementation of this task is made by Sweden, where the share of ICT workers is 8 % of the total workforce, and Finland with an indicator of 7.4 %.

Within the framework of infrastructure projects, it is planned to provide coverage of 100 % of households with a gigabit data transmission network, to extend a high-speed mobile communication network (at least according to the 5G standard) to 100 % of populated territories. The figures for the beginning of 2023 are 70 % and 66 %, respectively. At the same time, there is a significant lag in the quality of communication in rural areas, where only 38 % of households are provided with high-speed communications. Among the lagging countries in this area is Greece with an indicator of 20 %, the leaders are Malta, Luxembourg, Denmark, Spain, Latvia, the Netherlands and Portugal, which provided more than 90 % of populated territories with communications according to advanced modern standards.

In addition, the Digital Decade Policy Programme for the period up to 2030 provides for a twofold increase in the volume of semiconductor production in the territory of the European Union and bringing the share of own production of these products to 20 % of the world value.

As part of the digital transformation of business, it is planned to increase the share of enterprises using cloud computing, big data and artificial intelligence technologies to 75 %. The basic indicators are significantly lower than the targets. Cloud computing is used by 34 % of enterprises, artificial intelligence — 8 %, and big data technologies — 14 %.

According to statistics, only 55 % of all small and medium-sized businesses have reached the basic level in the use of digital technologies. The leaders in this area are Sweden and Finland with indicators of 86 and 82 %, respectively, Romania and Bulgaria close the rating with a result of less than 10 %. To achieve the goals of digital transformation, it is necessary to increase the level of the indicator under consideration to 90 %, as well as doubling the number of so-called “unicorns”, that is, companies whose market value is estimated at more than 1 billion US dollars.

As for public services, this basic indicator of their accessibility is 75 % for citizens and 82 % for enterprises. The target level for both indicators is 100 %.

Analysis of strategic planning documents and statistical reporting shows that ensuring stability and sustainable economic development in the context of digital transformation in European countries relies on private capital with the assistance of the state. The greatest attention is paid to small and medium-sized businesses, involvement in e-commerce, the use of digital solutions and software packages. The role of the State

is characterized extremely sparsely only as one of the possible sources of resources for the implementation of transnational projects.

The digital transformation of the economy in China is carried out within the framework of a different strategy. In his speech to the Political Bureau of the Central Committee of the Communist Party of China, Chinese President XI Jinping stressed that the development of the digital economy should be carried out by introducing technological innovations into real sectors of the national economy, while calling for all measures to stimulate digitalization in the industrial sector, agriculture and services.[2]

It is noteworthy that in China, the real sector of the economy plays a significant role in digital transformation. Researchers from the Central University of Finance and Economics in Beijing note that building a digital economy in China is primarily associated with the comprehensive development of digital infrastructure, deep integration with the real economy (Li, Zhang, 2022). A.V. Keshelava (Keshelava, 2017) identifies two main directions of digitalization of the PRC economy. This is, firstly, the "digitization" of production processes using industrial Internet technologies. And, secondly, the use of the potential of Internet technologies to increase trade turnover and market expansion.

Such a strategy for building a digital economy includes four key elements. This is a comprehensive broad digitalization of the production cycle and logistics processes, the formation of a legal framework, the introduction of digital management technologies and the integration of digital platforms into a universal integrated system. An integrated approach to building digital infrastructure became the basis for the formation of the concept of the "Digital Silk Road", the key elements of which were the creation of a single online platform for intercultural communication, the development of the digital economy and cyber security, as well as the expansion of digital government services (Cheng, 2022).

Interestingly, historically, the main factor in the progressive dynamics of the digital sector of the Chinese economy was, according to I.V. Danilin (Danilin, 2019), "the suboptimality and "failures" of the service sector against the background of growing solvent demand" (Danilin, 2019). He argues that it was not the presence of high digital competencies or the established market culture that led China to the path of digital development, but rather the presence in the business and consumer environment of an unsatisfied request for a wide range of services, the market of which was not developed at the proper level, unlike the United States. That is, digital transformation has become for China not so much an organic continuation of development in a natural direction, as a way to solve existing problems.

At the same time, in the study of I.V. Danilin (Danilin, 2019), state support is defined as an important, though not the only reason for success. On the one hand, the policy of protectionism stimulated the development of the digital component of the domestic market, on the other hand, at a later stage, it was targeted state investments that created conditions for accelerated technological development.

[2] Digital leader. How China "digitizes" its economy. *RIA Novosti.* Retrieved May 16, 2023, from https://ria.ru/20211229/kitay-1766052437.html

The factors that have become the driving force of the digital transformation of the Chinese economy have determined the leadership positions of the PRC in the fields of financial technologies (fintech), electronic payments and e-commerce.

Using the example of China, it can be argued that the planned model of building a digital economy allows creating a technological basis for digital development in a short time, but at the same time it is much more costly and narrowly oriented, that is, aimed at innovative development in a limited range of industries.

Li Shujuan (Li, 2021) names three main problematic issues standing in the way of the digital transformation of China's economy. Firstly, there is a lack of a unified digitalization strategy in the manufacturing industry. Since the development of digital technologies was based primarily on demand, it is in the field of customer-oriented technologies that the main competencies are concentrated. There are not enough specialists and infrastructure in the industrial production sector to successfully integrate into the processes of digital transformation.

In parallel, the second problematic question requires an answer. "The digital transformation of enterprises is focused on the consumer side, not production as such. In general, the development of China's digital economy has not yet formed a trend for top-down management or a powerful platform for integrating resources and coordinated development." (Li, 2021). There is an urgent need for the development of the industrial internet as a means for the formation of a single information industrial space, ensuring the unity and manageability of production and logistics processes, as well as determining the universal vector of industry development.

The third danger is common to all subjects of the digital economy. This is a problem of information security, the formation of an effective cyber defense strategy and the implementation of full-fledged measures to build an effective threat response system.

According to the statement of the General Directorate of the State Council of the People's Republic of China, in order to eliminate these threats to digital security and further develop the digital economy, China will be guided by the Fourteenth Five-year Plan for National Informatization.[3]

The digital transformation of infrastructure according to the Chinese scenario provides for an increase in the number of Internet users from 989 million people to 1.2 billion. With a population of 1.4 billion people in China, the increase in the share of residents of the network will be sixteen percentage points from 70 to 86 %. At the same time, we are not talking about having any skills, unlike the European model.

China's target for the use of 5G networks for 2025 is ten percentage points lower than the European baseline. At the same time, if the European Union plans to increase the coverage of high-speed communication networks by less than twice by 2030, then China faces the task of almost fourfold growth in this area in five years.

[3] 14th Five-Year Plan for National Informatization. Retrieved May 16, 2023, from https://digichina.stanford.edu/wp-content/uploads/2022/01/DigiChina-14th-Five-Year-Plan-for-National-Informatization.pdf

As part of the development of e-government, it is planned to increase the share of online processing of administrative licenses at the provincial level from 80 to 90 %, the number of users of e-government services from 400 to 800 million people, the number of applications for an electronic social insurance card from 25 to 67 %, the share of proceedings carried out in electronic form, from 18 to 30 %.

In contrast to the Digital Decade Policy Programme for the period up to 2030, the Fourteenth Five-year Plan for National Informatization of the People's Republic of China provides for the expansion of innovation opportunities through increasing, first of all, the scientific component. It is expected that the number of patents for inventions in the field of new generation information technologies per 10,000 inhabitants will increase from 2.7 to 5.2, that is, almost twice (Reshetnikova, 2020). The volume of investments in high-tech projects in the total volume of investments in fixed assets should increase from 3.5 to 5.8 %, and investments in research activities in the production of computer, telecommunications and other electronic equipment should increase from 2.35 % to 3.2 %. As a result of the increase in the volume of investments in research and development work should increase the number of high-tech enterprises in the whole country from 275 to 450 thousand.

The digital transformation of industry according to the strategy of the People's Republic of China includes economic growth in five indicators. The share of value added of the main branches of the digital economy in GDP should increase from 7.8 to 10 %, and the share of fully digitized enterprises in the most important operating sectors should grow from 48.3 to 60 %. The volume of online retail trade, according to the drafters of the Fourteenth Five-year Plan for National Informatization, will grow from 11.76 to 17 billion yuan, the consumption of information goods and services — from 5.8 to 7.5 billion yuan.

Thus, the Chinese model of building a digital economy is a set of measures aimed initially at eliminating the problems of economic interaction that have evolved in order to form an innovative economic system based on targeted state incentives for the development of key industries in the field of information and communication technologies.

Conclusion

A comparison of the western and eastern models of building a digital economy, as well as practical actions of countries in the field of solving problematic issues and eliminating threats to economic security allows us to draw the following conclusions.

None of the models is pure market or planned in the classical sense. It is more correct, in our opinion, to classify them as business-oriented, state-oriented and centrist. The main criterion for assigning a specific digital transformation strategy to a particular category is the ownership of the capital underlying the model.

Further, without state participation, any digital transformation strategy is untenable, since it is it that implements the functions of long-term goal-setting, integration and systematization, as well as regulatory regulation and, not least, security.

And finally, the degree of involvement of the state in the processes of formation and functioning of the digital economy may differ depending on specific socio-economic and historical-geographical prerequisites. Only the amount of state participation is subject to assessment, the expediency of such in general is beyond doubt, as well as the impossibility of digital transformation of the economy without the participation of private capital.

Projecting the experience of implementing foreign digital transformation strategies on the Russian economic reality, we note that, in our opinion, the Eastern model is more applicable. In Russia, the main driving factor of economic development is traditionally strong state influence. The role of business, as a rule, is to ensure its own private needs and local interests.

Ensuring economic security in the conditions of the digital economy in Russia, first of all, should be based on strengthening technological sovereignty through the formation of their own competencies in the scientific and technical sphere. The implementation of this principle of development is fully possible on the basis of systematic state planning, targeted stimulation of research and development work, as well as public-private partnership in the field of technological innovations.

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Bio notes / Сведения об авторах

Olga B. Digilina, Doctor of Economics, Professor, Professor of the Department of Political Economy, Faculty of Economics, RUDN University. ORCID: 0000-0002-9148-6776. E-mail: o.b.digilina@mail.ru

Alexey M. Chernyaev, Senior Lecturer of the Department of Humanities and Socio-Economic Disciplines, Vladimir Law Institute of the Federal Penitentiary Service. ORCID: 0000-0001-6631-5716. E-mail: a.m.chernyaev@yandex.ru

Дигилина Ольга Борисовна, доктор экономических наук, профессор, профессор кафедры политической экономии экономического факультета, Российский университет дружбы народов. ORCID: 0000-0002-9148-6776. E-mail: o.b.digilina@mail.ru

Черняев Алексей Михайлович, старший преподаватель кафедры гуманитарных и социально-экономических дисциплин, Владимирский юридический институт Федеральной службы исполнения наказаний. ORCID: 0000-0001-6631-5716. E-mail: a.m.chernyaev@yandex.ru