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DIGITALIZATION IN THE SOCIO-ECONOMIC SPHERE: CONTENT OF DEVELOPMENT, FOREIGN PRACTICES AND RESULTS

The article presents the main aspects of the development of digital technologies in the framework of social and economic development, outlines modern trends in the development of digitalization in these areas, their impact on the conditions of human life. The work also examined the issues of digitalization of the public administration system, reveals the experience of foreign countries actively implementing digitalization processes. An important aspect of the study was the problem of digitalization in the field of human resources management, justified by the increased demand and the selection of competent employees. The article discusses promising areas of research and development in the digital economy, identifies relevant problems, shows the "pros" and "cons" of this process, taking into account the domestic specifics of public administration in the scientific field.

The article also discusses international practices of state support for the development of the digital economy; different points of view and assessments on the development of the digital economy and digitalization in general.

Key words: digital economy, human resources, digitalization of science and education, business models, digital technologies, artificial intelligence, economic and social development.

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Әлеуметтік-экономикалық саладағы цифрландыру: даму контенті, шетелдік тәжірибе және нәтижелер

Мақалада қоғамдық және экономикалық даму аясындағы цифрлық технологияларды дамытудың негізгі аспектілері, осы салаларда цифрландыруды дамытудың заманауи бағыттары және олардың адам өміріне ықпалы қамтылады. Сондай-ақ, мемлекеттік басқару жүйесін цифрландыру мәселелері және цифрландыру үдерістерін белсенді түрде жүзеге асырып жатқан шет мемлекеттердің тәжірибесі қарастырылады. Адам ресурстарын басқару саласындағы цифрландыру мәселесі зерттеудің маңызды аспектісі ретінде сараланып, жоғары сұраныс және білікті қызметкерлерді іріктеу мәселелері негізделеді. Мақалада цифрлық экономикадағы ғылыми зерттеулер және талдамалардың болашақ бағыттары сараланып, оған қатысты мәселелер анықталады, сондай-ақ, ғылыми саладағы мемлекеттік басқарудың отандық ерекшеліктерін ескере отырып, осы үрдістің артықшылықтары және кемшіліктері көрсетіледі. Сонымен қатар, цифрлық экономиканың дамуын мемлекеттік қолдаудың халықаралық тәжірибесі талқыланып, цифрлық экономика және жалпы цифрландыруды дамыту бойынша әртүрлі көзқарастар сарапталады.

Түйін сөздер: цифрлық экономика, адами ресурстар, ғылым және білімді цифрландыру, бизнес-үлгілер, цифрлық технологиялар, жасанды интеллект, экономикалық және әлеуметтік даму.

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Цифровизация в социально-экономической сфере: контент развития, зарубежные практики и результаты

В статье представлены основные аспекты развития цифровых технологий в рамках общественного и экономического развития, обозначены современные тренды развития цифровизации по данным направлениям, их влияние на условия жизнедеятельности человека. В работе также проработаны вопросы цифровизации системы государственного управления, раскрывается опыт зарубежных стран, активно внедряющих процессы цифровизации. Важным аспектом исследования выступили проблемы цифровизации в сфере управления трудовыми ресурсами, обосновываются повышенный спрос и подбор компетентных сотрудников. В статье рассмотрены перспективные направления развития исследований и разработок в условиях цифровой экономики, выявлены соответствующие проблемы, показаны «плюсы» и «минусы» данного процесса с учетом отечественной специфики государственного управления в научной сфере.

Также в статье рассмотрены международные практики государственной поддержки развития цифровой экономики; различные точки зрения и оценки на развитие цифровой экономики и цифровизации в целом.

Ключевые слова: цифровая экономика, кадровый потенциал, цифровизация науки и образования, бизнес-модели, цифровые технологии, искусственный интеллект, экономическое и общественное развитие.

Introduction

The proliferation of digital technologies over a long period determines the paths of socio-economic development, which ultimately leads to fundamental changes in human life.

At the present stage of socio-economic development, the digital economy begins to play a dominant role in public life, having a significant impact on almost all of its components. The “digital trend” implies that human activities in the production, exchange, distribution and consumption of public goods are directly associated with the creation, processing and use of a large array of information and knowledge presented in digital form.

In recent years, there has been a clear trend in digitalization models in business and the social sphere, caused by the advent of a new generation of digital technologies, which received such names as artificial intelligence, robotics, Internet markets for goods and services, wireless technologies, etc. Widespread adoption of new digital technologies estimates of foreign organizations that can increase labor productivity in companies by 40%; and their effective use is to determine competitiveness both within individual companies and at the country level (WEF, 2018a).

Thus, what the World Bank determines, thanks to the development of digital technologies in the economy and social sphere, there will be an increase

in labor productivity, competitiveness of companies, lower production costs, creation of new jobs, reduction of poverty and social inequality (World Bank, 2016).

Important challenges have also become that the development of the digital economy is one of the priority areas for most countries - economic leaders, including the USA, Great Britain, Germany, Japan, etc. These countries are characterized by a long period of implementation of priorities in organizing digitalization - from building a basic information and communication infrastructure until the formation of a coordinated policy in this area and support programs for the widespread adoption of digital technologies (NRU WB, 2019).

Today, at a new stage in the development of digital technologies, one of the main challenges are various transformations that will require people to have new skills and competencies, a willingness to use new technologies in everyday life.

Literature review

There are numerous studies of the problematic issues of digitalization and its development, the impact on the living conditions of man and society as a whole, including the positive and negative aspects of this process. In this regard, the definitions of the meaningful characteristics of digitalization, the justification of content in order to indicate

government support and promising areas for the development of the digital economy are significant.

So, in international practice, there is still no unambiguous definition of the digital economy. When describing the digital economy, most foreign sources focus on digitalization technologies - either specific types of technologies, or trends in economic processes in the field of digitalization. The following are examples of determining the content of the digital economy in foreign practice. Digitalization is determined as a global network of economic and social activities supported by platforms such as the Internet, as well as mobile and sensor networks (Australian Government, 2009).

We cannot ignore the fact that the digitalization of the economy is linked to markets based on digital technologies that facilitate the trading of goods and services through e-commerce on the Internet (Fayyaz, 2018). In another view, the digital economy is one that can provide high-quality information technology infrastructure (ICT infrastructure) and mobilize ICT capabilities for the benefit of consumers, business and the state (The Economist, 2014).

There are a number of other definitions, among which the digitalization of the economy is defined as the economy based on digital technologies, which to a greater extent means the implementation of business operations in markets based on the Internet and the World Wide Web (British Computer Society, 2013). Other content of the digitalization process rests on the presence of a complex structure consisting of several levels (layers), interconnected by an almost infinite and constantly growing number of nodes (European Parliament, 2015).

A broader interpretation is the digitalization of the economy as a form of economic activity that arises from a billion examples of networking between people, enterprises, devices, data and processes. The basis of the digital economy is

hypersensitivity, i.e. the growing interconnectedness of people, organizations, and machines, shaped by the Internet, mobile technology, and the Internet of things (Deloitte, 2019); in other words, European experts add, this is an economy dependent on digital technologies (European Commission, 2014).

One cannot disagree with the opinion of World Bank experts assessing the digitalization process as a new economy based on knowledge and digital technologies, within the framework of which new digital skills and opportunities are emerging in society, business and the state (World Bank, 2016a).

It should also be noted that the digital economy is characterized by reliance on intangible assets, massive use of data, the widespread adoption of multilateral business models, and the difficulty of determining the jurisdiction in which value creation occurs (OECD, 2015a). Another position rests on the fact that the digital economy is the main source of growth, which will stimulate competition, investment and innovation, which will lead to better services, more choice for consumers, and creation of new jobs (European Commission, 2018a).

From the above analysis it follows that the universal concept of the digital economy does not yet exist, although in the above definitions you can isolate the keywords related to the digitalization process - this is a new economy; business operations in markets based on the Internet and the World Wide Web; economic activity and improving the quality of services; mass use of data; widespread adoption of multilateral business models; high-quality information technology infrastructure; a form of interconnectedness of people, organizations, machines, etc.

Materials and methods

The study of the digital economy is accompanied by the need for processing and analysis of

Table 1 - Descriptions of content in relation to the conceptual apparatus for digitalization *

| Definitions | Content |
|-----------------|--|
| 1 | 2 |
| Digital economy | Activities to create, disseminate and use digital technologies and related products and services; Digital technologies are technologies for the collection, storage, processing, search, transmission and presentation of data in electronic form. |
| Neurotechnology | Cyberphysical systems that partially or completely replace / supplement the functioning of the nervous system of a biological object, including those based on artificial intelligence. |

| Definitions | Content |
|--|--|
| Artificial Intelligence | A software and / or hardware system capable of perceiving information with a certain degree of autonomy, learning and making decisions based on the analysis of large amounts of data, including imitating human behavior. |
| Distributed Registry Technologies (Blockchain) | Algorithms and protocols for the decentralized storage and processing of transactions, structured as a sequence of related blocks without the possibility of their subsequent change. |
| Quantum technology | Technologies for creating computer systems based on new principles (quantum effects) that allow radically changing the methods of transferring and processing large amounts of data. |
| New manufacturing technologies | Digitalization technologies for production processes that increase the efficiency of resource use, design and manufacture of individualized objects, the cost of which is comparable to the cost of mass-produced goods. |
| Additive technology | The technology of layer-by-layer creation of three-dimensional objects based on their digital models («doubles»), allowing to produce products of complex geometric shapes and profiles |
| Supercomputer Technology | Technologies providing high-performance computing through the use of the principles of parallel and distributed (grid) data processing and high throughput |
| Cross-cutting digital technology | Technologies used for the collection, storage, processing, search, transmission and presentation of data in electronic form, which are based on the use of software and hardware and systems that are in demand in all sectors of the economy, creating new markets and changing business processes. |
| Big data | Technologies for the collection, processing and storage of structured and unstructured arrays of information, characterized by a significant volume and rapid rate of change (including in real time), which requires special tools and methods for working with them. |
| Augmented Reality Technologies | Visualization technologies based on adding information or visual effects to the physical world through the imposition of graphic and / or sound content to improve the user experience and interactive capabilities |
| Virtual reality technology | Technologies for computer modeling of a three-dimensional image or space through which a person interacts with a synthetic («virtual») environment, followed by sensory feedback. |
| 5G | Fifth generation wireless technologies, which are characterized by high bandwidth (at least 10 Gb / s), network reliability and security, low data transfer latency (not more than one millisecond), making it possible to use big data effectively |
| Wireless technology | Data transmission technology through a standardized radio interface without using a wired network connection |
| Sensory | Technologies for creating devices that collect and transmit environmental information through data networks |
| Robotics components (industrial robots) | Production systems with three or more degrees of mobility (freedom), built on the basis of sensors and artificial intelligence, able to perceive the environment, control their actions and adapt to its changes |
| Industrial Internet | Data transmission networks connecting devices in the manufacturing sector, equipped with sensors and capable of interacting with each other and / or the external environment without human intervention |
| Computer engineering | Technologies for digital modeling and design of facilities and production processes throughout the life cycle |

* Note: compiled on the basis of data (NRU WB, 2019)

information on digitalization, which is associated with a description of the content in relation to the conceptual apparatus (Table 1):

The conceptual apparatus for digitalization presented in Table 1, the content of concepts and a description of terminological boundaries will allow building a unified multifunctional system of statistical measurement of the digital economy for its full-scale monitoring, substantiation and evaluation of policies in this area. The need to develop a system of key definitions, to consolidate the terminological description of its content is associated with achieving the goal of developing methodological approaches to assessing the digital transformation of socio-economic sectors.

Discussion and results

Digital services and a modern approach to the development of “smart” spaces are changing the human condition for a more comfortable one. A “smart” space is a physical or digital environment in which people and technological systems openly interact in connected intelligent ecosystems. Examples of this kind include smart cities, smart homes, digital workplaces and factories (NRU WB, 2019).

The digital economy sets the path for the transformation of traditional sectors of the economy, the emergence of new markets and niches. New business models are customer-oriented, which completely determines their structure: from a value proposition aimed at solving the predicted needs of the client, timely delivery (just-in-time) and revenue streams based on the time the client used the product.

The key source of value creation is high-speed processing of big data, as transactions occur in real time and often simultaneously. Customer data is becoming the main asset of digital companies, and access to large arrays of them increases the assessment of market value. In the financial sector, the implementation of this concept is the Open Banking system, which provides third parties with the opportunity to analyze or use data, integrate various applications and services, thereby improving the quality of customer service (Rusbase, 2017).

New digital technologies expand business opportunities to optimize many processes and improve decision-making. Thus, the Internet of things market optimizes data collection and storage, and machine learning technologies and methods allow for deep processing, construction of behavior algorithms and predictive models (Tesco, 2019).

Applications of the Internet of things market are also a driver for the development of a model for optimizing service services, as they allow us to evaluate the parameters of product use and the effects achieved. This principle is based on the popular Rolls-Royce TotalCare model, under the program of which aircraft engines are supplied to customers, but payment is made for the hours during which the engine is running. The service provided includes monitoring of work from the Rolls-Royce data center and engine maintenance (BCG, 2017b).

On the example of the introduction of digitalization in the industry, it should be noted here that, despite the success of many enterprises in the automation of production processes, the implementation of distributed control and monitoring systems, most companies do not yet sufficiently realize the potential of big data analytics and artificial intelligence (AI) decision-making algorithms. At the same time, AI technologies have the greatest transformational potential in industry, which is especially important for companies with significant tangible assets. According to a survey, almost 50% of industrial companies rated AI as a critical element on the path to success over the next five years. The development of the appropriate infrastructure requires the creation of innovation centers at enterprises, attracting highly qualified specialists, and a significant increase in investments in cybersecurity (Forbes, 2018).

Another example: a production management system integrated with user experience data allows you to track information throughout the entire product life cycle. As a result, manufacturers provide customers with comprehensive personalized services, and pricing is possible based on the result.

Consider the experience of digitalization of the economy, using the example of the Russian platform solutions market, namely Yandex and Mail.Ru, which seek to create their own ecosystems that can compete with such major companies as Amazon, Apple, Facebook, etc., including by joining capital of high-tech startups.

For example, the largest Russian Sberbank, in addition to introducing new elements of the digital economy into its business model (crowdfunding and crowdfunding platforms), is improving its ecosystem by developing digital e-commerce and sharing platforms (providing customers with unified access to all platforms through the bank’s mobile application)

The foreign practice of digitalization of industrial production involves the integration of a number of breakthrough technologies: virtual modeling, the

Internet of things, robotics, artificial intelligence, big data, etc. Digitalization is carried out both within the framework of production process control systems and further maintenance (NRU VB, 2019).

The technology of "digital doubles", combining the industrial Internet of things and digital modeling, is actively introduced in developed countries at all stages of the product life cycle (GC) - from development to operation. By 2021, approximately half of the large industrial companies in the world will use this technology (Medium, 2018). The introduction of "digital doubles" for modeling and evaluating various scenarios will reduce the number of equipment failures by an average of 30% (PTC, 2019).

The decline in the cost of technological solutions over the past decade has become a significant incentive for the widespread penetration of digital technology. The cost of sensors, which is one of the most significant components of the Internet of Things systems, has shown a steady decrease from \$ 0.95 in 2008 to \$ 0.44 in 2018 (IoTONE, 2016). The cost of industrial robots has also halved over the specified period, and its further decline is expected (ARK 5 Internet of things, Internet of things. Invest, 2017).

There are examples of the introduction of digital technologies in such a socially significant sphere as medicine. Thus, the introduction of new technologies and radical changes in the life sciences (bioinformatics, synthetic biology, etc.) make it possible to modernize and personalize modern medicine by constantly monitoring the health status of each person, increasing the speed of medical care and selecting individual therapy options. All this makes it possible to treat previously incurable diseases; the development of bioinformatics allows the analysis of new DNA or protein sequences only through innovative methods, which significantly reduces the time and material costs of experiments.

Such models in medical practice as neurotechnologies help not only to create systems similar to the human brain in algorithms, but also to study the mechanisms of behavior and the potential for brain development. In the future, this will contribute to the development of a person's cognitive abilities, increase his working capacity, and overcome the negative consequences of stressful situations (Tremblay et al., 2017).

Organ-on-a-chip technology (Wyss Institute, 2018), which is an artificially created biomimetic system that mimics the functions of human tissues, will accelerate drug safety testing and will eliminate the use of experimental animals for these goals. In the future, such technologies may serve to restore

the lost functions of individual organs, and other examples of digitalization in the medical industry.

Digitalization is causing technological complication and the disappearance of a number of traditional professions due to the automation of the corresponding labor operations and at the same time the emergence of new professions and the growing demand for highly creative work. A significant part of labor relations and entire segments of employment is moving into the virtual environment, the flexibility of forms of which is significantly increased (the share of non-standard, partial and unstable, one-time employment, etc.). The digital economy is a large set of opportunities for creating conditions that significantly facilitate certain types of activities through the use of information technology. But the more humanity strives for relief, the more difficult it is to regulate relations in which the digital economy often takes place and the more the need for their legal regulation increases (Loshkarev A.V., Tarasov V.V., 2018).

The Republic of Kazakhstan adopted a number of regulations aimed at the development of the digital economy: Plan of the nation "100 concrete steps" (Plan of the nation "100 concrete steps", 2015), Message from the President of the Republic of Kazakhstan to the people of Kazakhstan "Third modernization of Kazakhstan: global competitiveness" dated January 31, 2017 of the year (Message of the President of the Republic of Kazakhstan to the people of Kazakhstan "Third Modernization of Kazakhstan: Global Competitiveness", 2017), the State program "Digital Kazakhstan" was developed, Decree of the President of the Republic of Kazakhstan dated February 1, 2010 No. 922 "On Strategic Plan e development of the Republic of Kazakhstan until 2020 "(Decree of the President of the Republic of Kazakhstan " On the Strategic Plan for the Development of the Republic of Kazakhstan until 2020 ", 2010), the State Program " Information Kazakhstan 2020 ", approved in 2013 (State Program " Information Kazakhstan 2020 ", 2013) , Message of the President of the Republic of Kazakhstan N.A. Nazarbayev "Growth of the welfare of Kazakhstanis: increasing income and quality of life" dated October 5, 2018 (Message from the President of the Republic of Kazakhstan N.A. Nazarbayev "Growth of the welfare of Kazakhstanis: increasing income and quality of life, 2018).

The state program "Information Kazakhstan 2020", approved in 2013, became the foundation for the digital transformation of the country's economy and contributed to the development of the following factors: the transition to the information society,

improving public administration, the creation of “open and mobile government” institutions, and the increase in the availability of information infrastructure only for corporate structures, but also for citizens of the country. The state program “Information Kazakhstan 2020” includes 83 target indicators and 257 events. According to the results of three years of implementation of the State program “Information Kazakhstan 2020”, 40% performance has already been achieved. However, the rapid development of information technology on a global scale dictates its own rules and requires an adequate and timely response from our government. Therefore, it is necessary to take the next step - to initiate in time the process of transformation of key sectors of the national economy, education, healthcare, as well as the sphere of interaction between the state and society and business.

At the end of 2017, the state program “Digital Kazakhstan” was adopted, according to which the share of electronic commerce should grow to 2.6%, electronic government services - up to 80%. At the same time, due to digitalization, it is planned to create 300 thousand new jobs. And all this - by 2022. As Nursultan Nazarbayev noted, “due to digitalization, the Kazakhstani economy should increase by 30%, in monetary terms this will amount to more than 2 trillion tenge” (State program “Digital Kazakhstan, 2017).

The purpose of the State program “Digital Kazakhstan” is to improve the quality of life of the population and the competitiveness of the economy of Kazakhstan through the progressive development of the digital ecosystem. The program aims to develop the following areas:

1. The Digital Silk Road - the creation of a high-tech digital infrastructure by providing broadband Internet access in rural areas; development of a telecommunication hub; ensuring information security; building data centers, etc.

2. Creative society - the development of human capital by increasing the digital literacy of the population, improving the skills of specialists in the field of information and communication technologies, developing creative thinking, etc.

3. Digital transformations in economic sectors - the development of the digital industry by automating the country's transport and logistics system; introduction of digital technologies in agriculture, industry; implementation of analytical systems in the field of energy conservation and energy efficiency; e-commerce development; improving mineral accounting systems; ensuring the safety and accessibility of geological digital

information; implementing technologies to create smart cities.

4. A proactive state - the formation of digital government through the further development of electronic and mobile government; increase in public services provided in electronic form; the formation of an open government; developing a national spatial data infrastructure, etc.

The program was developed in accordance with the Message of the President of the Republic of Kazakhstan N. Nazarbayev to the people of Kazakhstan “Kazakhstan's path - 2050: Common goal, common interests, common future”, short-term anti-crisis strategy “100 steps”, infrastructure development program “NurlyZhol”, laws of the Republic of Kazakhstan “On electronic document” and electronic digital signatures”, “On Communications”, “On Informatization”. According to these documents, improving the quality of life of citizens, developing the economic, socio-political and cultural spheres of society, as well as improving the public administration system are the main principles and vector for the development of digital transformations offered by this Program.

Currently, the e-commerce market in Kazakhstan is regulated by the Rules for the implementation of electronic commerce, approved by order of the acting Minister of National Economy of the Republic of Kazakhstan dated November 25, 2015 No. 720 (Rules for the implementation of electronic commerce. By the order of the acting Minister of National Economy of the Republic of Kazakhstan, 2015) .. It should be noted that in Kazakhstan, transactions concluded in the process of electronic commerce are regulated by the same documents as traditional transactions.

The World Bank names three important categories of problems that are signs of the possibility of digital transformation: legal regulation, the availability of skills among the population and the creation of appropriate digital management institutions.

Having analyzed the regulatory documents, we can identify the problems of the digital economy in Kazakhstan:

- The issues of the existing technological lag of individual sectors of the economy and the social sphere and the ways to eliminate it from the point of view of the introduction of digital technologies have not been worked

- the problems of regional differentiation of the level of readiness for implementation and the potential for using the capabilities of the digital economy have not been studied;

- the personnel potential for digitalizing the

economy of Kazakhstan requires the introduction of new educational programs.

To improve the regulatory regulation of the digital economy of the Republic of Kazakhstan, it is proposed to adopt the Law "On the Digital Economy", standards for the development of the digital economy, and a digital code. With the adoption of these documents, barriers to existing legislation will be removed.

It is also necessary to create a state body that directly performs such functions as: monitoring the use of acts in the field of the digital economy, developing programs to clarify the provisions related to the application of legislation in the field of the digital economy and establishing posts in accordance with various areas of the digital economy (for example, a specialist on cybersecurity with this body). Therefore, in order to transform the economy into a digital one, it is necessary to create an appropriate regulatory framework for electronic business, reform the education system and involve citizens in government through electronic services, transparency and control over the spending of budget funds.

The digital economy in the Republic of Kazakhstan should be implemented in areas that include: the digital transformation of traditional industries, the development of human capital, the digitalization of government bodies, the development of digital infrastructure. This will ensure in the Republic of Kazakhstan the transition to digital governance of the state and the economy on the basis of a unified system of intellectual

knowledge, advanced information technologies and special software systems as the most important factor in solving existing socio-economic problems of the country, increasing the efficiency of the public administration system, and carrying out the necessary reforms in education science and economics.

Thus, the formation and development of the digital economy in Kazakhstan can be achieved through the creation of a digital environment, the development and approval of regulatory documents, the translation of legal norms into algorithms and databases for specific areas of activity in various sectors of the economy.

Analysis of the development of the digital economy in the Republic of Kazakhstan.

The main driving force for the formation of the digital economy is the level of development of the information and communication technology industry. In 2016, Kazakhstan ranked 52 out of 175 in the key global ICT Development Index (ICT Development Index), without changing its position since 2015. As a result of the implementation of the Program and other strategic measures, the country should rise in ranking to 30th place by 2022, 25th place by 2025 and 15th place by 2050 (Liu Z, 2001). To assess the degree and direction of the impact of the processes of digitalization of the economy on the results of its effectiveness, it is necessary to compare and conduct a comparative analysis of the performance indicators of the ICT industry and general indicators of the national economy (Table 2):

Table 2 – Average annual growth rate of the main indicators of the functioning of the ICT industry in Kazakhstan *

| Indicators | The analyzed period, years | Average annual growth rate, % |
|--|----------------------------|-------------------------------|
| Total costs of information and communication technologies, mln. tenge | 2007-2017 | 109,8 |
| Volume of electronic retail trade, mln. tenge | 2013-2017 | 118,2 |
| Volume of electronic wholesale trade, mln. tenge | 2013-2017 | 106,4 |
| The number of transactions conducted outside of Kazakhstan through the Internet using payment cards of Kazakhstan issuers, units | 2013-2017 | 136,8 |
| The volume of transactions conducted outside Kazakhstan through the Internet using payment cards of Kazakhstan issuers, mln. tenge | 2013-2017 | 131,4 |
| The number of computers in organizations, units | 2004-2017 | 111,9 |
| Number of organizations using the Internet | 2004-2017 | 113,7 |
| The volume of industrial production in the field of information and communication technologies, mln. tenge | 2007-2017 | 102,7 |

| Indicators | The analyzed period, years | Average annual growth rate, % |
|--|----------------------------|-------------------------------|
| The volume of industrial production in the field of information and communication technologies, mln. tenge | 2007-2017 | 99,5 |
| Share of the total volume of manufacturing industrial products, % | 2007-2017 | 97,7 |
| Volume of information and communication technology services in actual prices, mln. tenge | 2005-2017 | 116,9 |
| The volume of information and communication technology services at basic prices, mln. tenge | 2005-2017 | 111,9 |
| * Note: compiled by the author | | |

For the period from 2007 to 2017. the share of ICT industry products in the total manufacturing output decreased from 0.42% to 0.26%. In the ICT industry, the volume of output at current prices is

increasing annually by an average of 2.7%, but at base prices (base - 2006) there is a decrease by an average of 0.5% per year. (Varavin I.V., Samusenko E.A., 2013) - Table 3:

Table 3 - the Dynamics of ICT costs from 2007 to 2017

| № | Year | Amount, mln. Tenge |
|--------------------------------|------|--------------------|
| 1 | 2007 | 53 485,8 |
| 2 | 2008 | 78 159,4 |
| 3 | 2009 | 126 597,2 |
| 4 | 2010 | 147 538,3 |
| 5 | 2011 | 214 179,7 |
| 6 | 2012 | 309 821,2 |
| 7 | 2013 | 220 847,7 |
| 8 | 2014 | 237 079,4 |
| 9 | 2015 | 375 600,4 |
| 10 | 2016 | 269 526,7 |
| 11 | 2017 | 349 943,6 |
| * Note: compiled by the author | | |

For the period from 2007 to 2017. an average annual increase in costs in the information and communication technology industry.

The summary table 3 presents the indicators of

the total population, the number of Internet users, as well as the growth rate of Internet users in the context of five countries (Table 4):

Table 4 - The number of Internet users, taking into account the population of 2010-2019

| Year | Total population | Number of users | The number of users per 100 people | Internet users growth rate (%) |
|------------|------------------|-----------------|------------------------------------|--------------------------------|
| Kazakhstan | | | | |

| Year | Total population | Number of users | The number of users per 100 people | Internet users growth rate (%) |
|------------------|------------------|-----------------------|------------------------------------|--------------------------------|
| 2010 | 16310624 | 5154157 | 32 | 75,9% |
| 2011 | 16554305 | 8376478 | 51 | 62,5% |
| 2012 | 16821455 | 8968471 | 53 | 7,1% |
| 2013 | 17099546 | 9233755 | 54 | 3% |
| 2014 | 17371621 | 9535283 | 55 | 3,3% |
| 2015 | 17625226 | 9784837 | 56 | 2,6% |
| 01.06.2016 | 17855384 | 9961519 | 56 | 1,8% |
| 31.12.2017 | 18403860 | 14063513 | 76 | 41,1% |
| 31.12.2018 | 18 608 079* | 14,669,853 (06.2018) | 79 | 4,3% |
| 2019 (estimated) | 18,592,970 | 14669853 (30.06.2019) | 79 | - |

* Note: compiled by the author

The small increase in subscribers is explained by the lack of coverage in extremely remote areas.

A number of other basic annual indicators are summarized in table 5:

Table 5 - Indicators characterizing the infrastructure of the information technology sector

| Country | Mobile subscription (units/per 100 people) | Bandwidth of international Internet connection Bit/s per each Internet user | Households with computers (%) | Households with Internet access (%) |
|------------|--|---|-------------------------------|-------------------------------------|
| | 2017 | 2017 | 2017 | 2017 |
| Kazakhstan | 145,4 | 69,8 | 76,2 | 84,9 |

* Note: compiled by the author

The analysis shows a lack of digital security development in the studied region, and a correspondingly reduced level of consumer confidence in Internet commerce, which is a constraining factor for the development of electronic commerce.

The most important elements of the digital economy are: e-commerce; electronic banking; electronic payments; Internet advertising; internet games. In most countries, today the most developed (judging by the cost indicator of turnovers) such type of digital economy as electronic commerce. For the successful operation of electronic commerce in Kazakhstan, it is necessary to have a comprehensive impact, one legal mechanism is not enough, as logistics, infrastructure and the development of IT technologies (domestic) are poorly developed

(I.V.Varavin, 2013, E.A.Samusenko, 2013)

As noted in the Digital Kazakhstan state enterprise in the long run, the successful implementation of measures will lead to a gradual change in the structure of the economy, with an increasing role for e-commerce, ICT and the financial sectors, as well as the sectors of the “new economy” (Svetunkov I.S., 2019).

Weaknesses in the implementation of electronic commerce in Kazakhstan:

- lack of competition as such in the domestic (domestic) market for electronic commerce;
- incomplete awareness of business entities about new ways of electronic commerce activities.

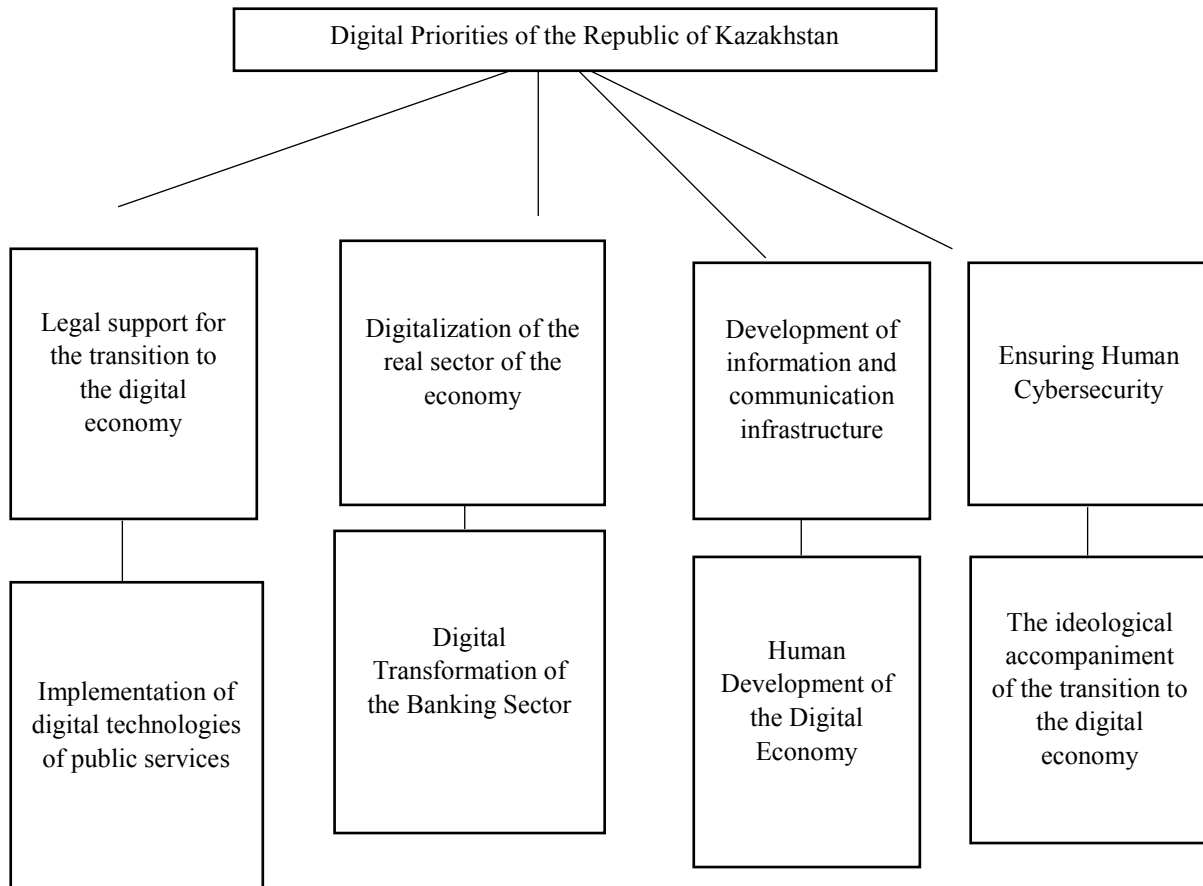
From the foregoing, conclusions and suggestions follow, which is necessary:

- training;

- adoption of the concept “Kazakhstan model of electronic commerce” with a clearly regulated form of protection for all participants in electronic commerce, regardless of their country of origin;
- an increase in the growth of the number of domestic, online stores, retail and wholesale online sales;
- establish transport logistics for the timely delivery of goods to consumers;

- expanding the consciousness of society by increasing open access to the Internet, ensuring an effective information society, while maintaining information security (Kozhakhmetova S.G., 2019).

In this regard, we will determine the priorities for the development of the digital economy for the Republic of Kazakhstan (Figure 1):



* Note: compiled by the author Figure 1 - Priority areas for the development of the digital economy *

The widespread introduction of new technologies and the chosen path to the digital economy will provide the country with increased efficiency and transparency in government, in the field of employment, as well as improve quality in education and healthcare, and will improve the investment climate.

Conclusion

Despite the fact that the introduction of digital

technologies over the past decades in many countries has acquired the status of a “traditional” direction of development both at the state and corporate levels, the current stage of the digital economy is creating fundamentally new technological and organizational and managerial challenges.

As for the transformation of human living conditions, it should be noted here that digitalization provides fundamental transformations in all spheres of human life and activity. Technology is becoming not only an engine for the development

of new industries, but also gaining important social roles, making a significant contribution to solving social problems, such as aging populations, social stratification, environmental problems and climate change. With the help of advanced science and technology, a “smart” society arises, based on new

values of orientation to human needs, flexibility, creativity.

Under the influence of digitalization, the labor market, healthcare, education, and spatial development are radically changing (NRU WB, 2019).

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