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# DIGITALIZATION AS A BASE OF ACCELERATED TECHNOLOGICAL MODERNIZATION OF KAZAKHSTAN ECONOMY

**Abstract.** The topicality of the paper is stipulated by active penetration of digital technologies to all spheres of contemporary society life. The corporative and governmental structures of the world including the Republic of Kazakhstan have aware the necessity of digital transformation of economy to enhance the competitiveness in the global digital space. The methodic of the research is based on application of common scientific principles of system approach; methods of logical, factor, comparative, strategic, managerial analysis; quantitative and qualitative investigation of the main tendencies and fields of forming and development of informational-communication and digital infrastructures.

The paper is aimed at analysis of the state and problems of digital development of Kazakhstan and elaboration of recommendations on digitalization development. To achieve the set goal the contemporary tendencies of digitalization development of economics and society were revealed, the analysis of precursors and conditions of digital economics development were analyzed as well as related sectors favoring the digitalization of economics. The experience of the developed and developing countries that achieved successful results in the process of economics digitalization was studied regarding revealing the possibilities to apply its experience for Kazakhstan. The adequate research conclusions were made, and the recommendations on digital development of the country were suggested.

**Key words:** digitalization, technological modernization, information technologies, Internet, electronic commerce.

**Introduction.** The topicality of the paper is stipulated by active penetration of digital technologies to all spheres of contemporary society life. The corporative and governmental structures of the world including the Republic of Kazakhstan have aware the necessity of digital transformation of economy to enhance the competitiveness in the global digital space. The first president of the Republic of Kazakhstan, Nursultan Nazarbayev, in one of its annual Addresses to the people of Kazakhstan told on several priorities related to development of economics, and one of them is technological modernization: "We have to cultivate new industries created using digital technologies" [1]. The solution of the complex task set by the first President implies the necessity to conduct analytical and scientific-methodical elaboration of such changes implementation.

**Methods.** The methodic of the research is based on application of common scientific principles of system approach; methods of logical, factor, comparative, strategic, managerial analysis; quantitative and qualitative investigation of the main tendencies and fields of forming and development of informational-communication and digital infrastructures.

**Results and discussion.** The Program "Digital Kazakhstan" sets the priorities of digital sectors development in Kazakhstan for today. Under the priority direction of technological modernization the following cross-cutting tasks were determined:

1. Cultivation of new industries that are created using digital technologies, among them 3-D printing, online trade, mobile banking, digital services including the health care and education systems, and other.
2. Along with establishing of new sectors it is necessary to accelerate the development of traditional industries on which the economics of RK is based. These are: industry, agro-industrial complex, transport

and logistics, construction and other. It is necessary to increase the labor efficiency, continue the industrialization with emphasis on export, keep the stability of mining and smelting, and oil and gas complex, make the agro-industrial complex the economics driver, develop new logistics infrastructure throughout the continent, accelerate the development of the construction sector to support the growing urbanization.

3. Simultaneously with the two first the labor market should be also modernized. Automation of labor in the traditional sectors will result in freeing of labor resources; it means that new work places will be required in other sectors especially new ones that should become additional sources of employment [2].

To increase the volume of digitalization, first of all, it is necessary that a potential consumer could use the digital technologies. The methodology of the Statistics Committee under the Ministry of the National Economics of RK (SC MNE RK), to estimate the digital literacy, considers a share of people able to use smartphones, personal computers, tablets, standard software, Internet services, and domestic digital devices. By data of the SC MNE RK the digital literacy of the population in 2017 was 60.8%, but in 2018 this indicator increased and reached 68.1% [3]. It is impossible to judge on the dynamics confidently basing on data of two years only, but the available indicators are positive. At the same time, the share of the Internet users also increases (figure 1).


Figure 1 – The share of the Internet users in RK (%). Note – compiled by reference [4].

It is possible to state about the increase of digital technologies popularity among the population, and on the growth of its application skills. All this creates favorable conditions for further digitalization of economics as it will be possible to state that new goods and services related to digital technologies, most probably, will be applied and demanded. In addition, the growth of population digital literacy popularizes the information technologies, and consequently the demand for specialties related to them.

However, it is too early to state about the availability of the developed digital sectors as the most of goods related to the ICT is imported from other countries. And the export of such goods from RK is only 4% of the import in 2018 (figure 2), and the dynamics of export volume since 2014 is negative although it shows increase after the fall in 2015.

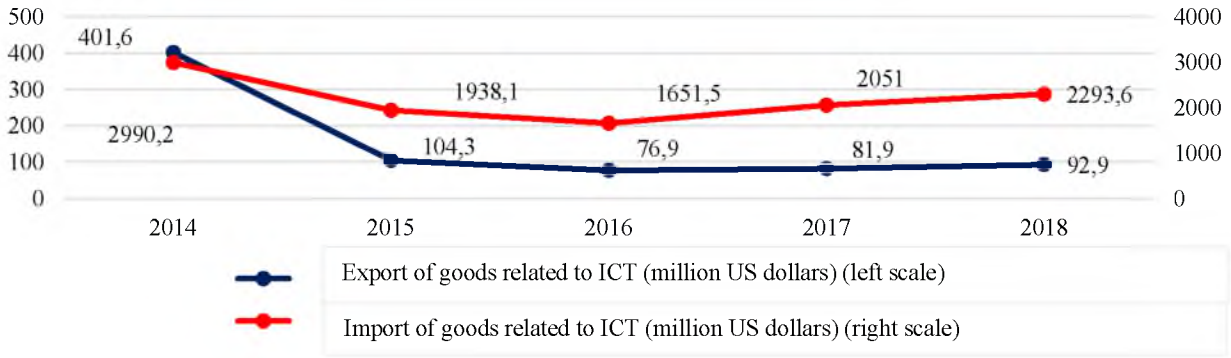


Figure 2 – Export and import of RK goods related to ICT (million US dollars). Note – compiled by reference [5].

Regarding the internal electronic trading the dynamics is positive (figure 3). This indicators is measured once in three years, and the recent result showed that the share of the electronic trading in retail sales increased by 40%, and wholesale trading – by 25%. At the same time, the share itself is still small – not more than 1.5% for retail, and 0.5% for wholesale, i.e. the most of trade is occurred avoiding the network options.

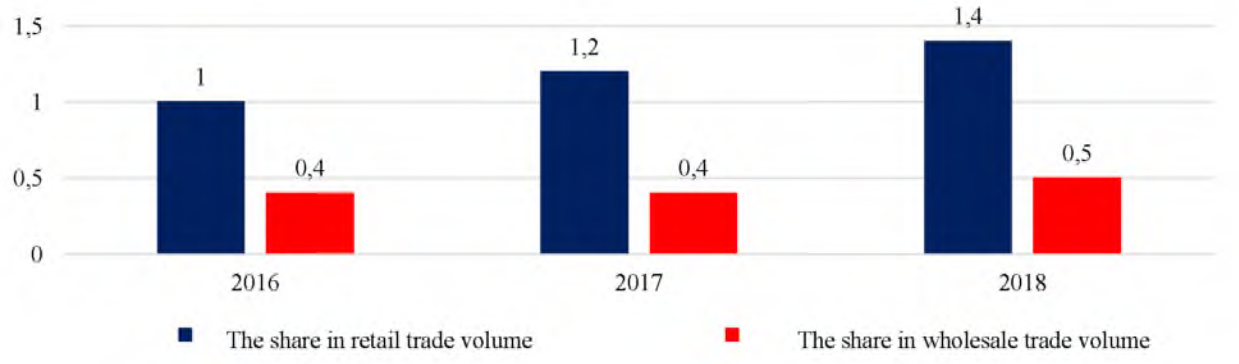


Figure 3 – The share of electronic trade in the whole trade volume (%). Note – compiled by reference [6].

One of the important fields is digitalization of interaction between the government and citizens and enterprises. The three years period, when the number of organizations using Internet for communication with the governmental bodies is observed, showed the significant increase – more than 42% (figure 4).

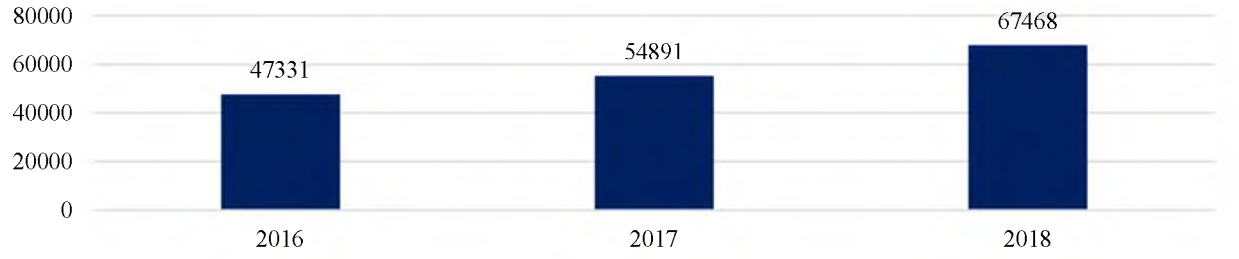


Figure 4 – Number of organizations using the Internet for communication with the governmental bodies (units). Note – compiled by reference [7].

Another indicator is automation of business processes as one of the main factors to increase the efficiency of the organization operation. For this indicator the dynamics is unstable; the whole period 2014 – 2018 showed the growth of organizations having automated internal business-processes, but the highest value was observed in 2015 and then decreased (figure 5).

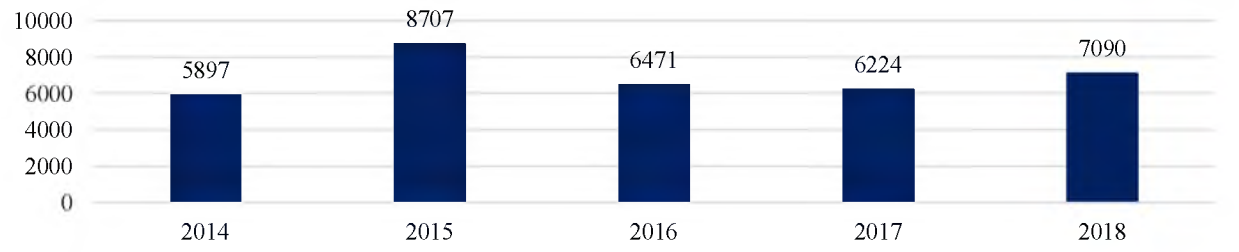


Figure 5 – Number of organizations having automated internal business-processes (units). Note – compiled by reference [8].

This value is just one of the indicators stating that today many organizations in RK are not ready technologically and organizationally for full-scale transfer to digital economics and concept "Industry 4.0" [9]. To solve this problem the useful can be the study of the international experience on introducing digital technologies into different sectors of economics. The analysis of foreign practices shows that the digital globalization determined by flows of information, ideas, and innovations has already started in the world. The global expenditures for R&D constitute about 2 trillion dollars taking into account 4% of annual growth [10]. According to McKinsey estimations the application of new technologies increases the labor efficiency by 45-55%, reduces the equipment maintenance expenses by 10-40% and machines downtime by 30-5-%, increases the indicators of products quality by 10-20% and decreases the storage costs by

20-50%. In addition, owing to new technologies introduction the period of new goods presentation in the market shortens by 20-50%, and accuracy of sales forecasting reaches 85% and higher [11]. Such indicators of economic activity improvement cannot be ignored by any State, it means that the share of digital technologies in the global economics will grow continuously, and the technologies will be introduced into the governmental, public, and business-processes.

In Kazakhstan, one of the most prospective sectors for digitalization is agro-industrial complex. The agro-industrial complex is a reserve of Kazakhstan economics digitalization which potential by date has been used less than other strategically important sectors of RK. Despite that a half of RK population lives in rural area, the share of agro-industrial complex in the GDP is less than 5%. It should be also noted that 2/3 among rural man or 1.3 million people of RK are self-employed [12], i.e. there is a significant amount of population almost not included into the digitalization processes despite that the agro-industrial sector is declared as one of the priority sectors for digitalization.

In the meantime, the developed countries pay a lot of attention to digital modernization of the agro-industrial complex. This is confirmed by generalization of the global experience on digitalization development in the agro-industrial complex [13]:

– introduction of the information technologies into the manufacture part of the agro-industrial complex allows reducing the unbudgeted expenses by 20%;

– utilization of mobile and online applications for acquisition, storage and processing of data on land sites of farms (coordinates, square, type of crops, capacity, climate etc.) allows farmers receiving exact recommendations on their activity;

– supplement of the previous point with installation of sensors on agricultural machinery, drones, production and distribution facilities allows making more effective decisions [14];

– it was found that the agricultural machinery manufactured by John Deere is already able to transmit information on the crop state. The fields survey conducted by the agro-technical machinery manufactured by this Company allows reducing the examination expenses up to 90% [9];

– in Australia there is a system on identifying and monitoring of live-stock animals and its products that allows for fast and efficient response on various diseases, if appear, and reducing the risk of infection distribution;

– it is worth to note that the investments to the agricultural sector in the developed world countries have already reached its historical peak and constitute 4.6 billion dollars. Among the most active countries that attract the investments into the agrarian startups are USA, China, India, Canada, and Israel.

The national Program "Digital Kazakhstan" states that "in the rating by the economics digitalization compiled by the Boston Consulting Group Kazakhstan is ranked 50 among 85 countries". This means that in the Republic it is time when intellectual digital solutions should help the agricultural industry to cope with problems of labor efficiency increase and sustainable development [15]. In the Republic of Kazakhstan the agro-industrial complex is still a vulnerable sector of economics that depends much on climate changes. The digitalization of the agro-industrial complex will allow reducing the risks of climate changes adaption, increasing the crop capacity, productivity of the live-stock, and in-time planning of the field works. To enhance the efficiency of the agro-industrial complex under the market economics it is necessary to take innovation measures on supporting the rural businessmen [16]. The individual specialists (particularly, the academician of NAS RK T.I. Yespolov) recommend implementing a pilot project "Digital agro-industrial complex" that will allow activating the efforts in digitalization of the country's agriculture industry.

While analyzing the global experience it is necessary to consider that every country has its own trajectory of digitalization, and it is quite difficult to repeat a success of a definite country under the conditions of another. For the same reason it is difficult to highlight an absolute leader to align with. Nevertheless, it is possible to highlight the common moments – for example, a lot of countries resort to the national programs on digitalization and development of information technologies. For example, these are the programs of digital development of Israel [17], Thailand [18], Denmark [19], and Russia [20]. The programs of digital development are also elaborated by 17 African countries [21].

These programs of digital development on the national level include such issues as development and introduction of own technologies, analysis of "large data" for social and economic processes forecasting, new types of management [22]. At the same time the programs strive to determine definite fields of

development to focus on concrete tasks, for example, creation of favorable organizational, infrastructural, legal and other conditions for digital economics development [23].

Under the digital economics conditions the data become a form of capital. Forming, accumulation and utilization of such capital require close cooperation of government and business, government and civil society, business and civil society [24].

For instance, the Russian Federation pays much attention to forming of digital infrastructure. The following large-scale projects are implemented: a project on elimination of digital inequality, creation of a unified information system of governmental procurement, unified system of governmental services, a system of medical organizations of Moscow (EMIAS), running of Moscow portals "Our city" and "Active citizen" [25]. Basing on this it can be concluded that the main goal of Russia at this stage is creation of a base for further introduction of digital technologies and transformation of traditional sectors through creation of well-developed infrastructure for data storage, transmission, and analysis.

Germany is one of the leading countries in the field of industrial innovations. For Germany as a federated State the centralization including financial flows is unusual. As a consequence, federation members have more freedom in distributing the finances including the field of digital development. The State undertakes a function of regulator setting the rules, developing the aspects moving beyond one federal member.

The Far East countries also develop actively the digitalization opportunities. The South Korea, and Japan used the similar way – digitalization by means of large digital companies that also are a source of innovations and export capacity buildup (Samsung, LG, Toyota, Sony, Toshiba, SoftBank).

China which share of digital economics is comparable with that of the USA also showed the history of successful introduction of digital technologies. Especially, it concerns the introduction of digital solutions related to export – Alibaba, Taobao platforms that are used by customers all over the world. In addition, China develops actively the digital retail trade, mainly owing to distribution of financial online-platforms and introduction of convenient, fast and safe payment methods [26].

The digital economics in the listed countries has been developed by different ways, however there are some common features – availability of favorable conditions for innovations introduction and large volumes of investments into the digital technologies and infrastructure. At the same time, the developing markets, under the digital age, acquire special advantages owing to creation of ready digital services from scratch (medical services, parking, online retail), not adapting the inherited infrastructure.

Another good example of digitalization is Australia. New South Wales State introduced a portal providing more than 800 governmental services. The portal also has on-line chat room for immediate consultations extending the opportunities on assisting the citizens and reducing the expenses on operators support services as the online operation is more effective than consultations by telephone or face-to-face [27].

In Australia, there is also a legislated regulation that all information other than State, commercial or private secret should be publicly available. This facilitates significantly the acquisition and analysis of large amount of data used by the governmental authorities for decision-making. The analog of such approach is the initiative of establishing Palantir Technologies Company in the USA under the assistance of the Central Intelligence Agency. This company develops the software able to reveal the activity of crime networks by analyzing large massifs of data [28].

It is also worth to mention the issue on the introducing of digital currency. From time to time, different countries declared the projects on introducing digital versions of its currencies. Among such countries are India [29], Japan [30], and Tunisia [31]. Digital currency introduction provides the opportunity of extended control for monetary flows on the State side, and this is obvious advantage for those countries where the share of shadow (informal) economy is high. In addition, the introduction of digital currency supported by the State will increase the reliability of electron transactions and its popularity in the population.

**Conclusion.** Summarizing the stated above it is possible to formulate the following conclusions and recommendations on digitalization development in Kazakhstan.

The digitalization is a natural process of economy development owing to technologies. It means that it is impossible to refuse of it, only possible is to choose a way of development. Choosing one or several trends is a key moment of digitalization, and Kazakhstan has already made it by adoption of "Digital Kazakhstan" program.

It is necessary to determine the base for the digitalization development depending on the most developed sectors or aspects of social and economic life. In some countries, it is a strong government machine allowing for making effective decisions and delegating them to the places. Some countries rely on business (Japan, South Korea, USA), other – on export potential (China). For Kazakhstan, the obvious base for digitalization development is industry including the traditional one. On this point the best experience is the experience of Russia that focused on the development of digital infrastructure for gradual conversion of industry functioning within the "Industry 4.0" concept. It would be also effective to delegate a part of decisions-making power regarding the financing of digitalization to the level of region/city of republican status as this will accelerate the process and increase its efficiency due to proximity of actual performers and decision makers.

The current indicators of digital development show low volume of digital trade while the trade takes about a third part of the GDP volume in service sphere. The development of digital trade could also be encouraged by infrastructure development: ability to purchase devices for receiving/making of digital payments, availability of fast, extended, safe channels for such payments.

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## ЦИФРЛАНДЫРУ ҚАЗАҚСТАН ЭКОНОМИКАСЫН ЖЕДЕЛ ТЕХНОЛОГИЯЛЫҚ ЖАҢҒЫРТУДЫҢ НЕГІЗІ РЕТІНДЕ

**Аннотация.** Қазірғі уақытта цифрландыру тек салаларды жаңғыртуды ғана емес, сондай ақ тұрғындардың цифрлық сауаттылығын жоғарылатуды, жеке кәсіпорын және жеке тұлға деңгейіндегі анағұрлым қолайлы цифрлық шешімдерге өтуді үғіттеуді, Интернет желісіп кеңінен таратуды қосатын кешенді мәселені білдіреді.

Мақала тақырыбының өзектіліғі заманауи қоғамның барлық салаларына цифрлық технолоғиялардың белсенді енуімен сипатталады. Әлемнің корпоративтік және мемлекеттік құрылымдары, оның ішінде Қазақстан Республикасы дүниежүзілік цифрлық кеңістіктегі бәсекеге қабілеттілігін жоғарылату мақсатында экономиканы цифрлық трансформациялау қажеттіліғі мойындалған. Мәселен, ҚР Тұңғыш Президенті Нұрсұлтан Назарбаев өзінің жыл сайынғы жолдауларының бірінде экономиканы дамытумен байланысты бірнеше басымдықтар туралы айтқан болатын, олардың бірі технолоғиялық жаңғырту болып табылады: «Цифрлық технолоғияларды қолдану арқылы құрылатын жаңа индустрияларды ынталандыруымыз қажет. Тұңғыш Президентпен қойылған мәселені шешу осы сипаттағы өзгерістерді іске асыру бойынша талдамалық және ғылыми-әдістемелік зерттеулер жүргізу қажет.

Зерттеу әдістемесі жүйелік тәсілдің жалпы ғылыми қағидаларын; логикалық, факторлық, салыстырмалық, стратегиялық, басқарушылық талдау әдістерін; ақпараттық-байланыстық инфрақұрылымды қалыптастыру және дамытудың негізгі үрдістері мен бағыттарын сандық және сапалық зерттеу әдістерін қолдануға негізделген.

Мақаланың мақсаты Қазақстанның цифрлық даму жағдайы мен мәселелерін талдау және цифрландыруды дамыту бойынша ұсыныстар әзірлеу болып табылады. Қойылған мақсатқа жету үшіп экономика мен қоғамдағы цифрландырудың заманауи үрдістері анықталған, цифрлық экономика дамуының алғышарттары мен шарттарына, сонымен қатар экономиканы цифрландыруға ықпал ететін аралық салаларға талдау жасалған.

Жүргізілген зерттеу экономиканы ары қарай цифрландыру үшін нақты қолайлы шарттардың бар екендігін анықтауға мүмкіндік берді, оның ішінде ақпараттық-байланыс технолоғияларын қарқынды дамыту және тарату, тұрғындардың цифрлық сауаттылығын жоғарылату, сонымен бірге цифрлық қызметтер мен өнімдерге сұраныстың артуын атауға болады.

Цифрлық экономиканың дамуы үшін алғышарттардың болуына қарамастан, авторлар дамыған цифрлық салалардың әлі де қалыптасқандығы тура қорытынды жасаған, оны ақпараттық-байланыс технолоғияларымен байланысты тауарлардың едәуір бөлігінің шет мемлекеттерден импортталатындығымен түсіндіреді. Одан басқа, жалпы сауда құрылымындағы цифрлық сауда көлемінің төменгі үлес салмағы анықталған, бұл цифрлық дамудың ағымдық көрсеткіштерінің төмендігін куәландырады. Осы орайда цифрлық экономиканың инфрақұрылымын дамыту ұсынылады, бұл ақпараттық-байланыс технолоғияларының инфрақұрылымын дамытумен қоса, цифрлық төлемдерді қабылдау және іске асыру, төлемдерді іске асырудың жылдам, қауіпсіз арналарын қамтамасыз ету үшін қажетті құрылғыларға қол жеткізу мүмкіндіктерін кеңейтуді көздейді.

Қазақстанның цифрлық дамуының көрсеткіштері мен индикаторлары қатарын талдау нәтижелері елдегі көптеген ұйымдардың цифрлық экономикаға және «Индустрия 4.0» тұжырымдамасына толықтай өтуі үшін технологиялық және ұйымдық тұрғыда дайын емес екендігін көрсетті. Бұл мәселені шешу үшін авторлар экономиканың түрлі салаларына цифрлық технологияларды енгізу бойынша халықаралық тәжірибеге жүгіну қажеттілігін көрсетеді.

Мақала аясында экономиканы цифрландыру барысында жетістікке жеткен дамыған және дамушы мемлекеттердің тәжірибесі сараланып, оны Қазақстанның шарттарында қолдану мүмкіндіктері зерттелген. Зерттеудің осыған сәйкес ұйғарымдары қалыптастырылып, елдің цифрлық дамуы бойынша ұсыныстар әзірленген. Әзірленген ұсыныстар цифрлық дамудың басым бағыттарын анықтау, экономиканы цифрландыру бойынша міндеттерді іске асыру бойынша өкілеттіліктерді мемлекеттік басқару деңгейлері арасында бөлу сияқты сұрақтарды қамтиды.

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## ЦИФРОВИЗАЦИЯ КАК ОСНОВА УСКОРЕННОЙ ТЕХНОЛОГИЧЕСКОЙ МОДЕРНИЗАЦИИ ЭКОНОМИКИ КАЗАХСТАНА

**Аннотация.** Цифровизация в современных условиях представляет комплексную задачу, которая включает не только модернизацию отраслей, но и повышение цифровой грамотности населения, пропаганду перехода к более удобным цифровым решениям на уровне предприятия и отдельного гражданина, охвата широкополосной сетью Интернет как можно большего количества домохозяйств и предприятий.

Актуальность темы статьи обусловлена активным проникновением цифровых технологий во все сферы жизнедеятельности современного общества. Корпоративными и государственными структурами мира, в том числе Республикой Казахстан, осознана необходимость цифровой трансформации экономики в целях повышения конкурентоспособности в мировом цифровом пространстве. Так, Первый Президент РК Нурсултан Назарбаев в одном из своих ежегодных посланий народу Казахстана говорил о нескольких приоритетах, связанных с развитием экономики, одним из которых является технологическая модернизация: «Мы должны культивировать новые индустрии, которые создаются с применением цифровых технологий». Решение поставленной первым президентом задачи предполагает необходимость проведения аналитической и научно-методической проработки осуществления такого рода изменений.

Методика исследования основана на применении общенаучных принципов системного подхода; методов логического, факторного, сравнительного, стратегического, управленческого анализа; количественного и качественного исследования основных тенденций и направлений формирования и развития информационно-коммуникационных и цифровой инфраструктур.

Целью статьи является анализ состояния и проблем цифрового развития Казахстана и разработка рекомендаций по развитию цифровизации. Для достижения поставленной цели выявлены современные тенденции развития цифровизации экономики и общества, проведен анализ предпосылок и условий развития цифровой экономики, а также смежных отраслей, способствующих цифровизации экономики.

Проведенное исследование позволило установить наличие определенных благоприятных условий для дальнейшей цифровизации экономики, в числе которых активное развитие и распространение информационно-коммуникативных технологий, рост цифровой грамотности населения, а вместе с ним и увеличение спроса на цифровые услуги и продукты. Несмотря на существующие препосылки развития цифровой экономики, авторы отрицают наличие развитых цифровых отраслей, объясняя это явление тем, что всё еще большая часть товаров, связанных с ИКТ, импортируется из других стран. Кроме того, выявлен низкий удельный вес объемов цифровой торговли в структуре общей торговли, что свидетельствует о низких текущих показателях цифрового развития. В этой связи предлагается принятие усилий по развитию инфраструктуры цифровой экономики, что помимо развития инфраструктуры информационно-коммуникативных технологий, предполагает расширение возможностей приобретения устройств для принятия/осуществления цифровых платежей, создания быстрых, обширных, безопасных каналов для осуществления таких платежей.

Результаты анализа ряда показателей и индикаторов цифрового развития Казахстана показали, что на сегодняшний день многие организации в стране не готовы технологически и организационно для полноценного перехода к цифровой экономике и концепции «Индустрия 4.0» Для решения этой проблемы авторы подчеркивают необходимость обращения к международному опыту внедрения цифровых технологий в различные отрасли экономики.

В рамках статьи изучен опыт развитых и развивающихся стран, добившихся успешных результатов в процессе цифровизации экономики на предмет выявления возможностей применения их опыта в условиях Казахстана. Сформированы соответствующие выводы исследования и предложены рекомендации по цифровому развитию страны. Разработанные предложения охватывают такие вопросы, как определение приоритетных направлений цифрового развития, делегирование задач по осуществлению цифровизации экономики между уровнями государственного управления.

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**REFERENCES**

[1] Accelerated technological modernization of the economy of Kazakhstan is the first priority - Nazarbayev [Uskorennaja tehnologicheskaja modernizacija jekonomiki Kazahstana javljaetsja pervym prioritetom – Nazarbaev]. URL: https://strategy2050.kz/ru/news/42385/ (available at: 04.01.2019) (in Russ.).

[2] Message from the President of the Republic of Kazakhstan N. Nazarbayev to the people of Kazakhstan. Jan. 31, 2017 [Poslanie Prezidenta RK N. Nazarbaeva narodu Kazahstana. 31 janvarja 2017 g.] URL: http://www.akorda.kz/ru/addresses/addresses_of_president/poslanie-prezidenta-respubliki-kazahstan-nnazarbaeva-narodu-kazahstana-31-yanvarya-2017-g (available at: 04.01.2019) (in Russ.).

[3] Digital literacy of the population [Cifrovaja gramotnost' naselenija]. URL: https://old.stat.gov.kz/getImg?id=ESTAT257184 (available at: 04.01.2019) (in Russ.).

[4] Share of Internet users [Dolja pol'zovatelej seti internet]. URL: https://old.stat.gov.kz/getImg?id=ESTAT095591 (available at: 04.01.2019) (in Russ.).

[5] Export and import of goods related to information and communication technologies [Jeksport i import tovarov, otnosjashhihsja k informacionno-kommunikacionnym tehnologijam]. URL: https://old.stat.gov.kz/getImg?id=ESTAT102970 (available at: 04.01.2019) (in Russ.).

[6] E-commerce Performance [Pokazateli E-commerce]. URL: https://old.stat.gov.kz/getImg?id=ESTAT222182 (available at: 04.01.2019) (in Russ.).

[7] Number of organizations using the Internet to communicate with government agencies [Kolichestvo organizacij, ispol'zujushhih internet dlja svjazi s gosudarstvennymi organami]. URL: https://taldau.stat.gov.kz/ru/NewIndex/GetIndex/19096205?keyword= (available at: 04.01.2019) (in Russ.).

[8] Number of organizations with automated internal business processes [Kolichestvo organizacij, imejushhih avtomatizirovannye vnutrennie biznes-processy]. URL: https://taldau.stat.gov.kz/ru/NewIndex/GetIndex/3772182?keyword= (available at: 04.01.2019) (in Russ.).

[9] Bajmuhametov M.F., Bajmuhamedova G.S., Ajmurzinov M.S. (2019) Technological modernization of the country's economy based on the implementation of the state program "Digital Kazakhstan" [Tehnologicheskaja modernizacija jekonomiki strany na osnove realizacii gosprogrammy «Cifrovoj Kazahstan»] // *Agrarian Bulletin of the Urals.* N 2 (181). DOI 10.32417/article_5cb0b1487b3366.31148690 (in Russ.).

[10] Jumashev F. Digitalization is a key factor in the development of agribusiness [Cifrovizacija – kljuchevoj faktor razvitija APK] // *Kazakh truth.*13 feb. 2018. P. 6 (in Russ.).

[11] Ahunbaev A. (2017) Industry 4.0 - the guarantor of the competitiveness of the MMC of Kazakhstan. [Industrija 4.0 – garant konkurentosposobnosti GMK Kazahstana] // *Mining and metallurgy industry.* N 12 (114). P. 48–51 (in Russ.).

[12] Shaukenova Z. To digitize the economy [Ocifrovat' jekonomiku] // *Kazakh truth.*17 feb. 2018. P. 3 (in Russ.).

[13] Verbinin A. Driver of economic growth [Drajver jekonomicheskogo rosta] // *Kazakh truth.* 2018. P. 1–2 (in Russ.).

[14] Beskorsaja E. Digital Agenda [Cifrovaja povestka dnja] // *Kazakh truth.* 13 feb 2018. P. 1 (in Russ.).

[15] Decree of the Government of the Republic of Kazakhstan dated December 12, 2017 No. 827. On approval of the State program "Digital Kazakhstan". [Postanovlenie Pravitel'stva Respubliki Kazahstan ot 12 dekabrja 2017 goda № 827. Ob utverzhdenii Gosudarstvennoj programmy "Cifrovoj Kazahstan"]. URL: http://adilet.zan.kz/rus/docs/P1700000827/info (available at: 04.01.2019) (in Russ.).

[16] Vanzha N. (2017) Intelligent Manufacturing Approaches [Intellektual'nye podhody k proizvodstvu] // *Mining and metallurgy industry.* N 12 (114). P. 18–19. (in Russ.).

[17] The Digital Israel Initiative: the National Digital Program of the Government of Israel. URL: https://www.gov.il/BlobFolder/news/digital_israel_national_plan/en/The%20National%20Digital%20Program%20of%20the%20Government%20of%20Israel.pdf (available at: 04.01.2019)

[18] Thailand Digital Development Government Plan. URL: https://www.eabc-thailand.org/download/DL4DKtMWMEHqyUXsEU3Z4ilgPF7HS-arLrRMlovFPak, (available at: 04.01.2019)

[19] Denmark: Towards a Digital Growth Strategy. URL: https://ec.europa.eu/futurium/en/system/files/ged/dk_country_analysis.pdf (available at: 04.01.2019)

[20] National Program "Digital Economy of the Russian Federation" [Nacional'naja programma «Cifrovaja jekonomika Rossijskoj Federacii»]. URL: http://government.ru/rugovclassifier/614/events/ (available at: 04.01.2019) (in Russ.).

[21] Korovkin V. National Digital Economy Strategies: A Survey of Africa. URL: https://www.researchgate.net/publication/334646950_National_Digital_Economy_Strategies_A_Survey_of_Africa (available at: 04.01.2019)

[22] Avdeeva I.L., Golovina T.A., Parahina L.V. (2017) Digital Technology Development in Economics and Management: Russian and Foreign Experience [Razvitie cifrovyh tehnologij v jekonomike i upravlenii: Rossijskij i zarubezhnyj opyt]. *Management Issues.* № 6 (49). URL: https://cyberleninka.ru/article/n/razvitie-tsifrovyh-tehnologiy-v-ekonomike-i-upravlenii-rossiyskiy-i-zarubezhnyy-opyt. (available at: 04.01.2019) (in Russ.).

[23] Tapscott D., Williams A.D. (2010) // *Macrowikinomics: Rebooting Business an the World.* N.Y.

[24] Sabirova R. K., Yerniyazova Zh.N., Talapbayeva G.E., Masalimova A.K. (2019) Analysis of the impact of the development of digital technologies on the labor market // *Reports of the National academy of sciences of the Republic of Kazakhstan.* ISSN 2224-5227. Vol. 6, N 328, 205–211. https://doi.org/10.32014/2019.2518-1483.190

[25] Lopatina N.V. (2014) Information infrastructure of a society: modern problems of functioning and development [Informacionnaja infrastruktura obshhestva: sovremennye problemy funkcionirovanija i razvitija] // Information resources of Russia. N 2. P. 13–15 (in Russ.).

[26] Avdeeva I.L. (2017) New forms of development of business support information systems in the context of globalization [Novye formy razvitija informacionnyh sistem podderzhki biznesa v uslovijah globalizacii] // *National interests, priorities and security. M.: Finance and credit.* T. 13, N 4. P. 760–772 (in Russ.).

[27] Marc N. (2016) Big data. Principles and practice of building scalable real-time data processing systems. [*Bol'shie dannye. Principy i praktika postroenija masshtabiruemyh sistem obrabotki dannyh v real'nom vremeni*]. M.: Vil'jams. 292 p. (in Russ.).

[28] Rudakova O.V. Poljanin A.V., Kuznecova L.M. (2016) The main priorities of Russia's innovative attractiveness [Osnovnye prioritety innovacionnoj privlekatel'nosti Rossii] // *Central Russian Bulletin of Social Sciences.* N 2 (11). P. 152–162 (in Russ.).

[29] India Unveils National Blockchain Strategy, Calling on RBI to Issue Digital Currency. URL: https://news.bitcoin.com/india-rbi-digital-currency/ (available at: 04.01.2019)

[30] Japan's Digital Yen; Visa, Plaid, and the Opportunity for African Fintechs. URL: https://finovate.com/japans-digital-yen-visa-plaid-and-the-opportunity-for-african-fintechs/ (available at: 04.01.2019)

[31] Tunisia Starts Rolling Out World's First Paper-Backed Central Bank Digital Currency. URL: https://dailyhodl.com/2019/11/10/tunisia-starts-rolling-out-worlds-first-paper-backed-central-bank-digital-currency/ (available at: 04.01.2019)