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THE FEATURES OF IMPLEMENTATION THE EVALUATION METHODS OF DIGITAL INFRASTRUCTURE REALIZATION IN THE REGIONS OF KAZAKHSTAN

Abstract. The article considers the features of information technologies and digital transformation in modern conditions based on digital information, in all technological changes, and the main factors of ensuring the competitiveness of individual enterprises and at a high level of associations. Currently, the method of forming the digital infrastructure of the regions of Kazakhstan, determining the main opportunities for increasing the level of innovative development of new economic zones and prospects for developing the potential of science and innovation in the region has been fully studied. The most promising methodological issues of forming and evaluating the service infrastructure and information infrastructure in connection with the development of the economy and the change of the technical regime were also outlined. In General, infrastructure is a part of the material and technical base. Its allocation in the structure of the national economy will allow us to determine the elements that provide the General conditions in terms of effective functioning for the development of economic and social processes and the creation of objective material opportunities for social work. In addition, we can talk about a direct relationship between the prospect of transferring the economic regime and the level of infrastructure development – in accordance with the level of its preparation, the possibility of introducing innovations in the production process is open. The analysis of the vector of development of information technologies, changes in the technological structure due to the introduction of innovations, assessment of the role of information infrastructure in terms of prospects for economic transformation, research of the effectiveness of the digital infrastructure of the region. The basics of combining system properties and quality of classical and system analysis are considered. As a result, the experience of obtaining a typology of digitalization of regions based on the study of the stages of information infrastructure formation is revealed.

Key words: Digital economy, region, infrastructure, innovation, factors, resources, information.

Introduction. Last ten years the whole world was moving fast to new economical model which is formed by digital technology. Information technologies and digital transformation in modern conditions on the basis of digital information are the main factor and condition for ensuring competitiveness not only at the level of individual enterprises, but also at the level of associations at the level of nations and countries, and restoring economical and production processes, increasing productivity and improving the quality of goods and services as well as reducing costs. Expanding the role of information technology in the work of the private and public sectors is the basis for the transition to the digital state. According to the world's leading experts, by 2020 about 25% of the global economy will be digital, and the introduction of digitalization technologies into the economy, which will allow the government, business and society to mutually beneficial actions, will become a more wide scale and dynamic process.

Methods. Digital technologies play an important role in the economic development of modern countries. It lasted for at least five years and every year it gets stronger. The concept of “digitization” is replaced by the word “transformation”, which nowadays becomes the motto “digitization - or you will forever be left behind the world” from the peloton, striving for the economy of the 30 most successful countries in the world. “Digital Kazakhstan” is a new state program, according to which the state takes

control of all digital processes in the country and acts as a customer for most of them. The national digitalization program is not only a Kazakhstan invention, but such strategies have been adopted in more than 15 countries of the world.

Results. Most developed and developing countries are beginning to feel “digitalized”, as they understand that future changes are inevitable. Today, the United States and China, the so-called informal leaders of digital games, have announced their first orientation. Subsequently, relevant programs were adopted in England, the European Union, Australia, Belarus, Kazakhstan and other countries. [1].

And the forecast of the state program “Digital Kazakhstan” by 2021 can be seen below:



The state program "Digital Kazakhstan"

Forecast for 2021: 81%- Share of Internet users; 81,5% -Digital literacy rates;
80% - The share of public services received in electronic form of the total volume of public services;
6,3% -Productivity growth in the mining and quarrying sector;
5,9% - Productivity growth in Information and Communications Technology

The number of employed people in the industry of Information and Communications Technology is 110 thousand people. According to this forecast, it is safe to say that some of the goals were performed. Currently, the formation of a digital infrastructure in Kazakhstan is the basis for the disclosure of the main paradigms of the “regional” output: quasi-government zone; region as a quasicorporation; - the region as a market; production system as region; region as a society. When describing a region as a quasi-government, it is considered relatively small as a separate state. As for the region as a quasi-corporation, it is primarily the use of a number of approaches to commercial companies. The concept of quasicorporation involves the idea of the proper use of domestic resources for global competition and regional development. In this case, the result of successful competition is a change in the financial situation in the region. In accordance with these rationales, be opportunities are emerging for the development of regions of the Republic of Kazakhstan.



The event, which is held in the Kyzylorda region of the Republic of Kazakhstan, will open the way for new opportunities in all regions of the country. In the concept of the region, special attention is paid to creating favorable conditions for economic activity in a certain territory within the market. The territorial boundaries of territorial markets in some cases coincide with the administrative boundaries of the regions - subjects of Kazakhstan, and in some cases combine several zones [2].

Aims of the study. Analysis of approaches to the assessment of digital infrastructure in Kazakhstan and the introduction of methods of analysis and formulation. The main results of the study. As part of a sustainable production system in the region, it shows that, along with the end-to-end production cycle in the region, it is viewed as an open subsystem of the country's socio-economic complex, with particular emphasis on the stages of its production. With regard to the public concept of the district, pays special attention to the public healthcare, education and culture. In addition, the region is considered a science and innovation space. According to the scientist of M.A. Gusakov, science and innovation space "there is space for interdisciplinary and scientific-innovative fields of activity in the field of science and innovations, which are separated by economic factors for the implementation of scientific and innovative processes in the institutional environment" [3]. Therefore, one of the main opportunities for increasing the level of innovation development of new economically regions is the dissemination of scientific results, their adaptation, transmission and involvement of regions in long-term innovation activity, as well as expansion of the innovation development space.

According to Gusakov, the effectiveness of space expansion is manifested in the formation of regions on the path of innovative development, the most active changes in the institutional environment, socio-economic development, as well as in the formation of disproportions in the level of regional development. As a way to determine the prospects for the development of scientific and innovative potential in the region. A. Gusakov proposes to define the boundaries for the innovative development of the region, as well as to establish contacts between groups in the field of the scientific and innovative process, which represent different and higher levels of innovative development [4]. The main reason for the emergence of scientific and innovation space is the incompleteness of regional innovation systems and the lack of interconnection between them. In this regard, firstly, it is necessary to integrate the scientific and innovative activities of the regions, and secondly, it is necessary to shape such areas of transformation as the integration of regional activities to increase the degree of innovative development through the development of the structure of the national innovation system in the country and regions at all stages scientific innovation process. It should be noted that "infrastructure industries", such as transport, transport, health care, science, will open the way. However, the concept of infrastructure and other aspects, such as the infrastructure of a country, a region, a settlement, and industries, is legal. This term can be understood as all technical and technical means that provide favorable conditions for the normal operation of an object. Therefore, it is logical to call this type of infrastructure the scale of the object of action and the production system: international, national, regional, local, sectoral.

Infrastructure proposed by J. Toshchenko - part of the material and technical basis, the division of which the structure of the national economy makes it possible to identify elements that provide general conditions for the effective functioning of economic and social processes, development and creation of objective material possibilities for the public [5]. "Infrastructure is a collection of buildings, systems and services necessary for the functioning of the branches of material production and the sustenance of society. Infrastructures: industrial (roads, channels, ports, warehouses, systems, communications, etc.) and social networks (hospitals, theaters, stadiums, etc.)" [6]. All such routes should be analyzed separately. It can be concluded that the infrastructure does not produce products in a material form, but only creates the necessary conditions for the production of products. I believe that the thesis is an important feature of most elements of the infrastructure. Thus, the infrastructure is the basis of the production processes of the economic system. It is reasonable to assume that due to the development of the economy and changes in the technical order, the infrastructure that serves it will also change. In addition, it can be said that there is a direct relationship between the degree of economic transformation and the level of infrastructure development - innovations can be introduced into the production process in accordance with its level of readiness. Knowledge and creativity in an innovative economy is a key factor in production. It can be said that such an economic structure is very necessary for the system of regional institutions responsible for the production of information, as well as for its translation and use. In this regard, from the point of view of the institutional approach, we can consider the information infrastructure as an integral part of the

innovation economy of the region, as well as the information infrastructure. We believe that information support for the formation of elements of the innovative economy is a key factor determining the potential of the economy in the region. In the context of globalization, the leading world economies will be able to reorient the leading economies to the innovation model, as well as to promising, methodological issues of forming and evaluation the information infrastructure in the regional economy in the context of the development prospects and competitiveness of the region. When studying the genesis of the information infrastructure, we saw the need to improve the storage, processing and transfer of education associated with the development of science, technology and transport. These changes are commonly referred to as "information revolutions." Academician A. I. Rakitov on his own experience, concludes about six revolutions, which are based on the principle of storing and transmitting information and qualitative change in the coding process [7]. In fact, the appearance of words, letter and the invention of the publisher of the book made it possible to correct and disseminate information. Then, along with the formation of industrial production, communication tools such as the telegraph, telephone and radio were invented, made it possible to spread information more widely. The subsequent information revolution occurred due to the advent of electronic computers, which have the capacity and processing speed of information that is inaccessible to people. Due to creation of global information and communication networks allow mass media access to information from any point of the planet. In our opinion, today's level of development of information technology is not limited to "global" definition, as communication can be exchanged with objects which are far away from the earth. According to the materials of Mars One, in 2025 for the first time in the world history expedition to the planet Mars, participants will be able to access the Internet [8]. By the way, the analysis of the vector of information technology development gives us grounds for the formation of the seventh information revolution. In our opinion, its value is not quantitative, that is, fast processing and rapid dissemination of information, computer performance (even though indicators are constantly increasing) and the quality is the intellectualization of the information space and as a result, the development of full technological features. The typology of zone digitalization can be obtained from studying the stages of the information infrastructure, because we believe that the transition to a new level of development depends on the objective and ever-growing needs for storing and disseminating information, that is, tools that are more advanced to the elements of infrastructure. The development of productive forces based on scientific and technological revolutions has become a historical prerequisite for the emergence of an information infrastructure. It began to develop as a system with the development of the market. It not only participated in the economic activity and the movement of goods, but also provided information on the flow of goods. This was due to the process of exchanging goods and services, and since the system of relations between market actors was becoming more and more complex, it had to deal with a large number of intermediaries. Traditionally, along with the infrastructure, which is connected with transport, warehousing logistics, communications, etc., the individual sectors that provide information flow, known as information infrastructure, have become distinctive structures [9].

The technological structure defines "all stages of managing resources and a macroeconomic cycle of reproduction that incorporates incompetent nonproductive consumption". Integrated technological components of the complex components are based on the basic technological structure. The sum of technological innovations that form the basis of the technological structure is called the main factor, as well as areas that actively use the key factor and play a leading role in the development of a new technological structure.

The concept of wave characteristic of the spread of innovations is very interesting to T. Hagerstand. According to T. Hagerstand the spread of innovation can be of three types: expansion of diffusion (uniform distribution of innovation), diffusion of movement (distribution in a certain direction) and mixed form. According to the scientist, each generation of innovation consists of four stages: formation, diffusion, accumulation and saturation [10].

Due to the introduction of innovations, changes in the technological structure will result in qualitative changes in the international division of labor, and the consequences will have a direct impact on competitiveness. Given this thesis, it is difficult to overestimate the role of information infrastructure in the context of economic transformation. The economy has five technological structures. The first (1770-1830) was based on the development of the textile industry, which was characterized by the mechanization of labor and the production of wastewater; the second major factor in the technological structure is the

steam engine, the third is the development of heavy engineering, and the fourth is the internal combustion engine. The fifth technological structure (since 1980) is based on information and communication technologies, computer science, new types of energy, and achievements in robotics. In developed countries, this structure has entered a phase of excellence, which made it possible to proceed to the sixth stage, which began in 2010. Its core is nanotechnology and global information. Special attention should be paid to the level of development of the information infrastructure required by the Sixth Technological Structure. Moreover, if the level of recent developments is not very high, then it cannot be transferred. The Internet-based products of the fifth generation, quantum computers, non-flying vehicles and airlines, programmable matter and other conceptual stages of development at the various stages have one integrative quality - in general they all have based on a certain degree of general information and communication capabilities. The growth in demand for information infrastructure is due to the fact that the use of information is combined with all economic trends. It should be noted that this type of infrastructure ensures the functioning of consumers and commodity producers, as well as their intermediaries that is infrastructure sectors. The latest information technologies have become a unifying factor for various information infrastructure infrastructures. The integration is carried out in the process of evolution and exchange of free information between these institutions, in the result information infrastructure has acquired a new qualitative character, which has become an important and rapidly developing component of the economy. In this regard, we can define the concept of digital infrastructure. It should also be noted that depending on the method or the role of the infrastructure in certain historical periods, several different conclusions can be drawn. However, science is not sustainable, and in the economic literature it is relatively rare. In the one of the earliest research scientists gave explanation of “information infrastructure” and defined as “the ability to make education and information accessible and to disseminate this knowledge and information, ability to use knowledge in the workplace” [11]. Compared to many definitions, which include a simple translation of components or functions of a particular type of infrastructure, this approach includes describing the information infrastructure as its potential for developing information accessibility, transforming it among economic operators and using this information in the production process. It is especially important to note that the infrastructure between the subjects is a guide, a broker. The main reason for the dependence of elements of digital infrastructure on the level of economic development as a whole is as follows: “Digital infrastructure provides a complete set of tools (material, technical, software, etc.) through its elements and components” [12].

We define digital infrastructure as an institutional basis for an effective information flow in the process of meeting the information needs of the community, often identifying the potential for generating new knowledge and, as a result, justifying the level of innovation in the economy.

The effectiveness of the region’s digital infrastructure is largely dependent on how well its elements are coordinated with the rest of the infrastructure. Technological advances of the latest information revolution, as well as the spread of network information technologies, have increased the efficiency and effectiveness of the information infrastructure, which is the cause of structural changes in the innovation infrastructure and ultimately reduces transaction costs. It can be said that the items will be determined by the informational costs to the field. [13]. It can also be concluded that the effectiveness of a regional economy depends on the level of digital infrastructure, based on the fact that “a decrease in average transaction costs is associated with increased productivity and sustainable economic growth” [14]. For this reason, it is worth noting that digital infrastructure has become the main focus of investment. Therefore, this principle is based on the need to more actively stimulate its development for the effective functioning of the economy. This is a task not only for the public sector, but also for the private sector. Based on the above definitions and using systematic analysis, we offer the basic parameters of the digital infrastructure in the region. Digital infrastructure is a collection of elements that interact with each other as a system, not specific to each element, but with a certain integral quality. Classical and systematic analysis is based on the combination of the system of each system and its system properties. In accordance with the system analysis algorithm, you can determine the following system parameters: A - elements and their layers; a - relations between elements, their functional interaction; B - system functions and its integral quality; Y - additional system constraints: space, time, etc. b.

Thus, the classification can be summarized as follows: $S = f(A, a, B, Y)$

With the help of this method, you can place system parameters on the digital infrastructure.

Structure a system of digital infrastructure

System parameters	Characteristics
A	Information resources. Subjects of digital infrastructure: information producers and consumers, custodians, mediators, information / formations / owners (mass media, statistical bodies, databases, archives, laws, computer and telephone networks)
a	Functional relations and relations between subjects of the information infrastructure in the process of information flow
B	The use of innovative structures and economic entities through the storage, collect, processing and dissemination of information
Y	Optimization of economic processes by improving efficiency and competitiveness

Analyzing these approaches from the table, we can note the following attributes of the region's digital infrastructure:

- The basis of digital infrastructure is information as a factor of production;
- The specificity of the digital infrastructure is determined by information about the properties of the product;
- the principle of its development will increase the flow of information flows;
- its impact on the economy can be characterized by an increase in the speed and efficiency of resource allocation;
- One of the main criteria of efficiency is the influence of participants in economic relations on the level of transaction costs.

As we have already mentioned, information factors in the modern theory of factors of production are taken into account in the system of productive forces of society. In context, this issue is crucial because of the specificity of the production factor, the relationship between interrelated institutions and the effective work of the respective functions. It should be noted that the information factor is integration. All production factors are capital, and the movement of capital of a certain type creates a structure and appropriate infrastructure. Another important aspect is the mechanism of economic relations between the subjects of the digital infrastructure of the region, which are determined by its own characteristics, so sometimes they do not fall under the generally accepted rules of economic relations. Persons engaged in the creation, transmission and use of the information are subject to digital infrastructure, as well as subjects of public administration, organizations, public organizations and citizens. A wide range of digital infrastructure in the region is designed to ensure interaction and communication between all participants in economic relations, especially those mentioned above. In this regard, it is advisable to introduce a classification of all subjects of the digital infrastructure [15].

The formation and differentiation of regions is a long-term process, which indicates the essential need for constant monitoring and taking into account the socio-economic reality at the regional level as a basis for predicting the future development of the structure that the region is part of [16].

Conclusion. The above problems undoubtedly determine the need to prepare a set of measures for the formation of a digital infrastructure. In our study, we concluded that digitalization has a great impact on economic development, we presented a model for assessing the state of information and communication technologies, as well as the importance of introducing information technologies in all spheres of life in terms of the formation of an innovative economy and competitiveness in the global market. After analyzing the general way of studying these theses, we are faced with serious problems. This shows that we can expand the development of the concept of the seventh information revolution by the example of the concept of the information revolution, and then transfer it to a qualitatively new level. In this case, we presented the idea of technological features of the intellectualization of the information space. Traditionally, this term is defined as “a city in which information and communication technologies are used in all key elements of public life and infrastructure to create the most interactive and open urban information environment.” In general, if investments are made in human capital and information infrastructure, in this case it is recommended to call the city “smart”, which will allow more efficient use of resources. Let's briefly look at the concept of a smart city in order to identify key elements that are part of it, which will allow us to develop a set of measures for building information infrastructure as a factor for each of them.

In our opinion, the prospects for the development of digital infrastructure and, accordingly, the prospects for the development of all high technologies in the field of information technologies are determined by the state policy vector in this matter. Only within the framework of the sixth technological direction, the development of a regional economy is possible only if the information and communication technology sector is the engine of growth for the entire economy and is recognized as one of the key factors of regional competitiveness. This justifies the need for a new IT industry development strategy and was implemented as part of this study. Based on all the above conclusions, no state has a clear understanding of what a digital economy is and what its results will be. Nevertheless, the digital economy explains the new form of communications and payments for consumers, and most countries deal with digitalization, and not with the digital economy. This activity is not a form of a realistic, purposeful process of creating a digital economy, regardless of experience.

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ҚАЗАҚСТАНДАҒЫ АЙМАҚТАРДЫҢ САНДЫҚ ИНФРАҚҰРЫЛЫМЫН ҚАЛЫПТАСТЫРУДА БАҒАЛАУ ТӘСІЛДЕРІН ЕНГІЗУ ЕРЕКШЕЛІКТЕРІ

Аннотация. Мақалада сандық ақпаратқа негізделген қазіргі жағдайдағы ақпараттық технологиялар мен сандық трансформацияның барлық технологиялық өзгерістердегі ерекшелігі мен жекелеген кәсіпорындардың жоғары бірлестіктер деңгейінде де бәсекеге қабілеттілікті қамтамасыз етудің негізгі факторы қарастырылған. Қазіргі кезде Қазақстандағы аймақтардың сандық инфрақұрылымын қалыптастыру, жаңа экономикалық тұрғыдағы аймақтардың инновациялық даму дәрежесін арттырудың басты мүмкіндіктерін және аймақтағы ғылым мен инновацияның әлеуетін игеру перспективасын анықтау тәсілі толықтай зерттелген. Сонымен қатар, экономиканың дамуына әрі техникалық тәртіптің ауысуына байланысты оған қызмет көрсететін инфрақұрылым мен ақпараттық инфрақұрылымды қалыптастыру мен бағалаудың неғұрлым перспективалы әдіснамалық мәселелері көрсетілген. Жалпы, инфрақұрылым дегеніміз – материалдық-техникалық базаның бір бөлігі, халық шаруашылығы құрылымында оны бөліп қарау экономикалық және әлеуметтік үдерісті дамыту үшін тиімді қызмет ету және қоғам еңбегі үшін объективті материалдық мүмкіндіктер жасау тұрғысынан жалпы жағдайды қамтамасыз ететін элементтерді анықтауға мүмкіндік береді. Бұдан басқа, экономикалық тәртіпті ауыстыру перспективасы мен инфрақұрылымды дамыту деңгейі арасындағы тікелей тәуелділік туралы айтқан жөн, атап айтқанда, оның дайындық деңгейіне сәйкес өндірістік үдерісіне инновация енгізілу мүмкіндігі айқындалған. Ақпараттық технологияларды дамытудың векторын, инновацияларды енгізудің арқасында технологиялық құрылымның өзгеруін талдау, экономиканы трансформациялау перспективалары тұрғысынан ақпараттық инфрақұрылымның рөлін бағалау, аймақтың сандық инфрақұрылымының жұмыс істеу тиімділігін зерттеу жүргізілген. Классикалық және жүйелік талдау сапасымен, жүйелік қасиеттерін біріктіру негізі қарастырылды.

Қазіргі кезде Қазақстандағы аймақтардың цифрлық инфрақұрылымын қалыптастыру «аймақ» тұжырымының негізгі парадигмаларын ашып көрсетуге негіз болады: квазимемлекет ретіндегі аймақ; квазикорпорация ретіндегі аймақ; нарық ретіндегі аймақ; өндірістік жүйе ретіндегі аймақ; қоғам ретіндегі аймақ. Квазимемлекет ретіндегі аймақты сипаттаған кезде оны салыстырмалы түрде мемлекеттің оқшауланған шағын жүйесі түрінде қарастыру көзделді. Квазикорпорация ретіндегі аймақтың үлгісіне келсек, ол, ең алдымен, коммерциялық компанияларға тән бірқатар тәсілдерді қолданудан тұрады. Квазикорпорация тұжырымдамасы жаһандық бәсекелестік пен аймақтарды дамыту үшін ішкі ресурстарды дұрыс пайдалану идеясын қамтиды. Мұндай жағдайда табысты бәсекелестік күрестің нәтижесі аймақтағы қаржылық жағдайының өзгеруі болып саналады.

Шаруашылық қызметке қатысушылар ақша мен тауарлардың қозғалысын жүзеге асырудан бөлек, өнім туралы ақпаратпен қамтамасыз етіп отырды. Бұл жағдай тауар мен қызметтер алмасу үрдісіне байланысты жүзеге асты және нарық субъектілері арасындағы қатынастар жүйесі қиындаған сайын көптеген ақпараттарды дәнекер өңдеді. Сонымен қатар, дәстүрлі түрде көлік, қойма логистикасы, байланыс және т.б. инфрақұрылым салаларымен қатар, оқшауланған құрылым ретінде ақпараттық инфрақұрылым деп аталатын ақпараттық ағын үдерісін қамтамасыз ететін жеке салалар ерекшелене бастады.

Аймақтың сандық инфрақұрылымның қызмет ету тиімділігі көбінесе оның элементтерінің әрекеттері басқа инфрақұрылымдық үлгілермен үйлесімділігіне байланысты. Соңғы ақпараттық төңкерістердің технологиялық жетістіктері, сондай-ақ желілік ақпараттық технологиялардың таралуы ақпараттық инфрақұрылымның тиімділігі мен өнімділігін едәуір арттырды. Бұл құбылыс инновациялық инфрақұрылымдағы құрылымдық өзгерістердің себебі ретінде танылады.

Жоғарыда келтірілген анықтамаларды негізге ала отырып, әрі жүйелік талдауды пайдалану барысында біз аймақтың сандық инфрақұрылымының негізгі параметрлерін ұсынамыз. Сандық инфрақұрылым жүйе ретінде әрбір элементке жеке тән емес, белгілі бір интегралды сапасы бар, өзара іс-қимыл жасайтын элементтердің жиынтығы.

Қорытындысында аймақтарды цифрландырудың типологиясы ақпараттық инфрақұрылымды қалыптастыру кезеңдерін зерттеу негізіндегі тәжірибелері айқындалған.

Түйін сөздер: сандық экономика, аймақ, инфрақұрылым, инновация, фактор, ресурс, ақпарат.

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ОСОБЕННОСТИ ВНЕДРЕНИЯ МЕТОДОВ ОЦЕНКИ ФОРМИРОВАНИЯ ЦИФРОВОЙ ИНФРАСТРУКТУРЫ РЕГИОНОВ В КАЗАХСТАНЕ

Аннотация. В статье рассмотрены особенности информационных технологий и цифровой трансформации в современных условиях, основанных на цифровой информации, во всех технологических изменениях и основные факторы обеспечения конкурентоспособности отдельных предприятий и на высоком уровне объединений. В настоящее время полностью изучен способ формирования цифровой инфраструктуры регионов Казахстана, определения основных возможностей повышения уровня инновационного развития новых экономических зон и перспектив освоения потенциала науки и инноваций в регионе. Также были изложены наиболее перспективные методологические вопросы формирования и оценки обслуживающей инфраструктуры и информационной инфраструктуры в связи с развитием экономики и сменой технического режима. В целом, инфраструктура – часть материально-технической базы, ее выделение в структуре народного хозяйства – позволит определить элементы, обеспечивающие общие условия с точки зрения эффективного функционирования для развития экономических и социальных процессов и создания объективных материальных возможностей для общественного труда. Кроме того, можно говорить о прямой зависимости между перспективой переноса экономического режима и уровнем развития инфраструктуры – в соответствии с уровнем его подготовки открыта возможность внедрения инноваций в производственный процесс. Проведены анализ вектора развития информационных технологий, изменения технологической структуры благодаря внедрению инноваций, оценка роли информационной инфраструктуры с точки зрения перспектив трансформации экономики, исследование эффективности функционирования цифровой инфраструктуры региона. Рассмотрены основы объединения системных свойств, качества классического и системного анализа.

В настоящее время формирование цифровой инфраструктуры регионов в Казахстане является основой для раскрытия основных парадигм концепции «регион»: как квазигосударственный регион; как квазикорпорация; как рынок; как промышленная система; как регион как общество. При описании территории как квазигосударственного предусматривается его рассмотрение относительно обособленной подсистемы государства. Что касается модели региона как квазикорпорации, то она состоит, прежде всего, в применении ряда подходов, присущих коммерческим компаниям. Что касается модели региона как квазикорпорации, то она состоит, прежде всего, в применении ряда подходов, присущих коммерческим компаниям. Концепция квазикорпорации охватывает идею правильного использования внутренних ресурсов для глобальной конкуренции и развития регионов. В этом случае результатом успешной конкурентной борьбы является изменение финансового положения в регионе.

Участники хозяйственной деятельности не только осуществляли движение денег и товаров, но и обеспечивали движение информации о продукции. Это было связано с процессом обмена товарами и услугами, и чем сложнее система отношений между субъектами рынка, тем больше информации пришлось обрабатывать посредникам. Кроме того, традиционно в области инфраструктуры, к которым относятся транспорт, складская логистика, связь и другие, в качестве обособленной структуры стали выделяться отдельные отрасли, обеспечивающие поток информационных потоков, так называемых информационной инфраструктурой.

Эффективность функционирования цифровой инфраструктуры региона во многом зависит от того, насколько согласованы действия ее элементов с остальными образцами инфраструктуры. Технологические достижения последних информационных революций, а также распространение сетевых информационных технологий значительно повысили эффективность и производительность информационной инфраструктуры, что является причиной структурных изменений в инновационной инфраструктуре. Основываясь на приведенных выше определениях, и используя системный анализ, мы предлагаем основные параметры цифровой инфраструктуры региона. Цифровая инфраструктура как система представляет собой совокупность взаимодействующих элементов, имеющих определенное интегральное качество, не свойственное каждому элементу индивидуально.

В итоге выявлен опыт получения типологии цифровизации регионов на основе изучения этапов формирования информационной инфраструктуры.

Ключевые слова: цифровая экономика, регион, инфраструктура, инновации, факторы, ресурсы, информация.

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