Digital economy: requirements for developing technological digital environment

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Abstract: the article deals with the issues on digital economy and its requirements for organizing, developing technological digital environment. As it's known that, for successful functioning of a business, three elements or components are required in the digital economy: infrastructure (Internet access, software, telecommunications), e-business (conducting business through computer networks), e-commerce (trade, distribution of goods via the Internet). We can say that these are electronic business technologies, internal driving forces. But the development of the digital economy directly depends on the introduction of such "external", advanced science-intensive technologies as nano-technologies, biotechnologies, energy systems technologies, quantum technologies, etc. Conversely, the further development of ICT, including: cloud computing technologies, big data processing technologies, mobile technologies, Internet of things technologies, geolocation technologies, technologies of distributed communication networks, gives impetus to the development of science-intensive technologies in the real "traditional" economy.

Key words: digital economy, modern technologies, communication networks, government agencies, business, computing technologies.

Interest in the digital economy has grown significantly due to significant changes in society and the economy. Modern technologies and platforms have helped businesses and individuals reduce costs by minimizing personal contact with customers, partners, and government agencies, as well as making interactions faster and easier. The result is a network-based, digital or electronic economy.

The word "digitalization" is actually a new term that refers to the involvement of IT solutions in the process of innovative management and office work, resulting in the use of information technology in all systems, from the Internet to e-government. The government is taking large-scale measures to develop the digital sector of the economy, introducing electronic document management systems, developing electronic payments and improving the regulatory framework in the field of e-commerce. The digital economy, which operates on information technology platforms, is developing rapidly, which necessitates the creation of new models of such platforms.

Blockchain technology (distributed registry technology), artificial intelligence, the use of supercomputers, as well as crypto-assets are among the areas of development of the digital economy in many countries around the world. Blockchain technologies are gradually being introduced not only in many sectors of the economy, but also in public administration and other public relations.

The main source of the digital segment of the economy is the growth of the traction sector. In developed countries, this figure is more than 70% of GDP, and includes public administration, consulting and information services, finance, wholesale and retail trade, as well as services (communal, private and social).

The higher the diversification and dynamics of the economy, the greater the flow of unique information within and outside the country, and the greater the weight of information traffic within national economies. As a result, the digital economy is evolving rapidly in markets with large numbers of participants and IT services.

In particular, it creates endless conveniences for transport, trade, logistics and other industries that are actively working with the Internet. According to some researchers, the share of the

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electronic segment in them is close to 10% of GDP, providing employment to 4% of the population. Most importantly, these figures are growing steadily.

Clearly, the effectiveness of the digital economy is affected not only by the coverage of information technology and the availability of infrastructure, but also by standard economic criteria such as the business environment, human capital and successful management tools. Consequently, economic development relies on them, which means that these criteria continue to play an important role in the development of the digital economy.

In many countries, the process of transition to the digital information society is given special, close attention. This is confirmed by the adopted state strategies and programs for the development of the digital economy. For example, in Denmark such a strategy was adopted in 2000, in Singapore - in 2005, in Australia, Hong Kong, Great Britain, New Zealand - in 2008, in the EU countries - in 2009, in Canada - in 2010, in Malaysia - 2012, in South Korea - in 2013, in India and Kazakhstan - in 2015 and in the Russian Federation - in 2017. Statistics show that for another ten years, 18% of the world's population had access to the global Internet. In 2020, in the context of a pandemic, the spread of a new coronavirus infection and the introduction of lockdowns, about 3 billion people. (43% of the world's population) was included in the Network for Interaction [5].

The most developed in terms of the application of information technologies is the city-state of Singapore, where digitalization of all sectors and spheres of life of society has been carried out, the entire list of public services has been transferred to electronic format, thus, the Smart Nation concept is in full swing (after the successful implementation of the Smart City and Smart Region).

The modern legal regulation of the digital economy is based mainly on the regulation of the traditional, but not the digital economy. To date, a significant array of regulatory and legislative acts has been formed, the novelties of which can be applied and are already being applied in the framework of expanding the areas of the digital economy. At the same time, special acts were also adopted in order to regulate the digital economy and take into account its specifics.

To solve the problems of large-scale systemic transformation of the economy of a new technological generation based on the all-round use of infocommunication technologies (ICT) and digitalization of the processes of production and consumption of goods and services, an appropriate infocommunication infrastructure is needed, the requirements for which are determined by the laws of digital development [2, 3].

The essence of development consists in such a movement and change of nature and society, which contributes to the transition from one quality of the state to another, from the old to the new. Development is most often understood as five essential categories: an increase in the complexity of the system and the scale of the phenomenon, an improvement in adaptability to external conditions, a quantitative growth of the economy and a qualitative improvement in its structure; social progress. Since digital development encompasses both economic and social objects and phenomena, its essence includes all of the listed categories.

Digital development should be understood as fundamental changes in the technological order in society and society, consisting in an increase in the complexity and interconnectedness of the socio-economic system based on an increase in the scale and depth of penetration of ICT into production and social life of people, which contribute to economic growth, qualitative improvement of production factors, increase resource efficiency and social progress. As a result of digital development, there is a transition from a post-industrial society to an information society through the formation of a digital economy of a harmonious society during a sequence of stages of infocommunication development [4, 5].

It is noted that ICT is one of the key innovations of scientific and technological progress related to the type of general purpose technologies (GPT), which are widely used and adapted to various sectors of the economy and society, significantly changing existing technologies and products. Therefore, ICTs form a new technological paradigm for the digital development of the economy and society. The penetration of ICT into economic activity and society contributes to a change in the nature of work (increasing the role of intellectual creative work), employment

(remote, virtual activity), business processes that become integral, global and virtual (online) [7], increasing requirements for the level of education and professional competencies.

The development of communication networks is characterized not only by high rates of change of generations of technical means and network construction topology, but also by convergence with informatics, which occurs both in depth (technology) and in width (networks, types of communication, services) [7]. The convergent nature of the development of communications and informatics has led not only to the emergence of the industry of infocommunications. The merger of networks, technologies, communication services and informatics has led to an increase in the convergence of the activities of various sectors of the economy, deepening intersectoral and transnational organizational and economic processes [10].

With the development of the digital economy, the load on the infocommunication infrastructure, which is based on networks and communications, increases many times over. Users need not just communication, but broadband access to various platforms, services and services in electronic form. The very concept of "user" is changing dramatically, since in the context of digital transformation, this category includes not only people, but also connected technical devices of the industrial Internet of things, the number of which is many times greater than the number of people. Thus, the load on communication facilities and networks and their throughput must exceed the existing ones by several orders of magnitude.

Obviously, the construction of communication systems and networks that meet these kinds of requirements cannot be solved through the hardware implementation of network functions, leading to exorbitant costs and cluttering the networks with equipment. The problem can be solved by the digital transformation of the communication systems themselves ("digitization of numbers"), the transition to software implementation of network functions.

A very promising technical solution is a next-generation software-defined mobile network with virtual implementation of network functions, unlimited scalable cloud resources and the possibility of operational big data analytics. The approach to the software organization of the digital infocommunication infrastructure will make it possible to efficiently analyze the available data, protect the network from hacker attacks and automate processes as much as possible.

The development of communication systems and the reduction of the cost of telecommunications should also contribute to the development of the Internet of things [6]. The Industrial Internet of Things is a network of networks consisting of uniquely identifiable objects (devices, sensors, switching equipment) that can communicate with each other without human intervention via a / P connection. The use of the industrial Internet of Things implies the creation of an integrated solution that combines information processes with production, logistics and security systems based on sensors and intelligent systems.

The main task at the stage of transformation of the economy and society is to improve the technological platforms of information systems, the ubiquity of digital communication networks, ensure information security of digital economic systems, and the general digitalization of society. The introduction of cyber-physical systems and technologies of the Internet of Things has a dramatic effect on the economic model of the information society through the transition to individual production of goods and services for the individual requirements of a consumer or a specific customer. Due to the individual interaction of economic agents, economic activity in the production of goods and services becomes more efficient due to the rational use of resources and optimization of supply and demand.

The development of infocommunication infrastructure and communication networks has a systemic effect on the economy and society, and ICT has a catalytic effect on the sectoral structure and economic growth of the country and regions. Therefore, the essence of digital development should be considered from the point of view of both the depth of penetration of ICT into economic activity and society, and their spatial prevalence. At each stage of digital development, different tasks are solved and different goals and criteria are used. The focus of Russian state policy on informatization at the first stages ensured a high technological level of infocommunication

infrastructure, broadband access of businesses and citizens to information resources and the Internet, involvement of business and citizens in the electronic space of the public administration system, electronic services and social networks.

However, to ensure the processes of digital transformation of the sectors of the economy and society, active and purposeful work is still needed:

• firstly, bringing the infocommunication infrastructure to the level of full availability of communication facilities, high-quality bandwidth (in terms of volume and speed), stability and security of information transfer, territorial proportionality of the development of ICT and networks (including rural areas, hard-to-reach and remote regions) to the requirements of the subjects and institutions of the digital economy;

• secondly, the transfer of all sectors (industries) of the economy from local digital platforms to integrated inter-industry digital platforms, to the electronic form of providing services and performing part of production functions, taking into account the development of non-digital factors of production;

• third, the creation of a single information space for the production of goods and services, the implementation of public administration and social life based on the integration of industry and departmental solutions, the integration and globalization of business, the formation of a single platform with an integrated database.

Digital components include digital infrastructure: communication networks providing access to the Internet, cloud services; industrial Internet of things networks; ensuring information security, ecosystems of business and government, as well as shared digital platforms (transactional, investment, integrated, etc.) [8].

The high rates of digitalization of the economy and society in the country, the interests of ensuring national security, public administration and socio-economic development dictate the need for further development of the infocommunication infrastructure [9].

CONCLUSION

Thus, the construction of the digital economy is accompanied by a twenty-fold increase in the volume of global data transmission, an increase in the use of data in mobile networks. In this regard, high requirements are imposed on networks in terms of peak data transmission rate, spectral efficiency [5], density of subscriber devices, reliability and quality of traffic. Another subtlety of the digital industry is that the development and implementation of complex digital systems requires a serious and detailed approach. It may seem strange to you, but often programming (on its own) is not really a technological phenomenon. As a result, the programmer who solves your problems depends in many ways on how he understands the task. Most important solutions are left unexplained in the process because each party thinks they are self-explanatory.

Software-related documents are sometimes fragmented. As a result, in the process of working with the product, the customer loses control over the development, which he ordered and paid for. The budget for information projects does not include service costs, although they are significant.

Because the digital economy is global, any government project on informatization and digitization must be studied comprehensively and on the basis of a single coding system, identifying information related to economics and management.

The most important aspect of the development of the digital economy, and at the same time the most difficult stage, is to simplify the business environment and minimize the cost of communication between people and businesses with the state.

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