On the development of a united digital platform in the construction industry

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Abstract. Currently, in the the world economic system, company development models are transforming. One of such transformations is active development of digitalization, which contributes to the system development and implementation of digital technologies. At the same time, digitalization is being implemented into different spheres of human life - government, economy, industry, education, construction, etc. Today the construction industry has a sufficient number of information and communication technologies which are the basis for creating digital (volumetric) models of buildings, correcting projects and managing the processes of construction and maintenance of buildings during their life cycles, including managing the engineering infrastructure of capital construction objects. The main task of digitalization of the construction industry is to create a united digital platform.

1. Introduction

Currently, the world is undergoing continuous changes in the economic system. The transformation increases the influence of innovation, advanced technology and digitalization on various aspects of human, social and business activities. At the same time, digitalization is an integral part of the national economies.

Currently, digitalization is a global process that involves a huge number of countries focused on the development of human capital, a competitive and efficient economy, and improvement of living standards. It contributes to the transformation of the world economy in general and national economies in particular. In fact, historically developed economies are changing within the new technological, digital vector, and there are examples of the digital economic systems in various industries and enterprises.

From a historical point of view, the concept “digital economy” was introduced into circulation by the American computer scientist Nicholas Negroponte in 1995. He compared the process of transforming the old economy into a new one by formulating the concept of electronic (digital) economy. [1, 5, 13]

Today the digital economy can lead to a noticeable growth of the global economic system, increase labor productivity, and create new areas. Professor of St. Gallen University (Switzerland) W. Brenner argues that “the aggressive use of data transforms business models, contributes to the production of new products and provision of new services, creates new processes, generates great utility and introduces a new management culture” [2, 3].
Therefore, the transition to the digital economy is one of the main directions in most countries, allowing them to remain competitive and diversify the economy.

2. Materials and methods

According to the study conducted by the international consulting company Accenture, the digital economy accounted for 22.8% (or $17 trillion) in the global GDP in 2016, and by 2021 it is planned to increase the GDP by 1.9% (Figure 1). In 2010-2016, the share of the digital economy in the GDP of developed countries increased by 1.2% (from 4.3% to 5.5%), and in the GDP of developing countries, it increased from 3.6% to 4.9%. The Boston Consulting Group predicts that the volume of the digital economy will reach $16 trillion by 2035. [4, 8, 9]

![Figure 1. The share of the digital economy in the world GDP.](image)

Thus, the digital economy exists in all developed countries, including Russia, for which it is one of the priorities of the Strategy for scientific and technological development, allowing them to develop industries and markets based on breakthrough innovative technologies.

In Russia, the digital economy is rapidly developing. According to the studies conducted by the international consulting company McKinsey, in 2011-2015, the share of the digital economy increased by 59% (nine times faster than the national GDP) and reached 3.9% of GDP in 2015 [6].

The national course is directed towards the implementation of the digital model proposed by V.V. Putin in his message to the Federal Assembly in 2016. In 2017, the Government of the Russian Federation developed and approved a program aimed at creating conditions for the transition to the digital economy, according to which the digital economy is a key area of development of the Russian Federation until 2030. Initially, the program “The Digital Economy of the Russian Federation” included five key areas: regulation, personnel training and education, development of research competencies and technical backlogs, information infrastructure and information security.

In February 2019, the Prime Minister of the Russian Federation Dmitry Medvedev signed a decree that cancels the program “The Digital Economy of the Russian Federation”. The national project “The Digital Economy of the Russian Federation” was developed. It entered into force in December 2018.

The Decree of the President of the Russian Federation of May 7, 2018 No. 204 “On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024” (paragraph 11) contributed to the implementation of the national program “Digital Economy of the Russian Federation”.

The main objectives of this project are as follows:
- creating the stable and secure information and telecommunications infrastructure for high-speed transmission, processing and storage of large amounts of data accessible to all organizations and households,
- using domestic software by federal, regional and local authorities and organizations.

The digitalization will affect most sectors of the economy: education, medicine, energy, agriculture, construction, etc.

Figure 2 shows the intensity of using digital technologies by organizations in 2018 (the percentage of organizations using digital technologies in the total number of organizations).
Figure 2. Intensity of the use of digital technologies by Russian organizations in 2018.

Government authorities pay attention to the issues of digitalization, since the digitalization of the Russian economy will become a platform for qualitative changes in its structure and long-term capabilities. In addition, the strategic orientation of the development of the digital economy is important. It will be the basis for the development and implementation of relevant documents of sectoral strategic planning. [10, 11]

3. Results

The construction industry is one of the key industries of the Russian economy. With the development of science and technology, construction projects have become complex. They involve ongoing technological processes and meet increased human needs. A modern construction object is a multi-level system with a large number of internal and external relations. Moreover, due to the changed guidelines caused by the development of the digital economy, increasing market requirements for technical and economic offers in construction, increased possibilities of architectural and construction practices and human needs, it is necessary to implement practices of digital construction. The modernization of the design and construction industry is active. For example, the section “Digitalization of the construction industry” is included in the draft strategy for the Development of the Construction Industry until 2030, and digital construction is another federal project within the Digital Economy program. Thanks to this project and achievements in the development of information technology in 2022, all federal objects will be built using digital modeling technologies (BIM, Building Information Model).

In general, the government has specified areas of digitalization in the construction industry:
- using an electronic format for implementing urban planning procedures;
- using an electronic database for storing documents of urban planning activities;
- collecting digital statistical data making it possible to process and publish data by extracting them from information systems;
- developing search and reference platforms;
- implementing information modeling technologies for capital construction projects at all stages of their life cycles;
- registering lands in the form of electronic documents (unless this scheme was registered by a citizen), etc.

The main directions of digitalization of the construction industry are presented in Figure 3.
Figure 3. Directions of digitalization of the construction industry.

Thus, the construction industry cannot be not involved in the large-scale digitalization process, which is the strategic goal of the government, businesses and society as a whole.

Modernization of the construction industry aimed at improving construction quality is one of the main tasks of the government reflected in the Order of the President of July 19, 2018. No. Pr-1235. It suggests using BIM technologies. The main features of BIM technologies are shown in Figure 4. [8, 12]

Figure 4. Key features of BIM technology.

Digitalization of the construction industry is aimed at automating all the stages of the life cycle of an object, including management of the life cycle of capital construction objects. According to experts, by 2024, when BIM-technologies will have been implemented, construction costs will decrease by 20%, the amount of design errors will decrease by 40%, and the project implementation time will decrease by by 30%. In addition to the above advantages, information modeling technologies will contribute to the maximum openness of the construction business to all its participants. [7, 14]

Figure 5 presents target results of digitalization of the construction industry.
Figure 5. Targeted results of digitalization of the construction industry.

Figure 5 shows that digital technologies will serve as one of the main factors in the innovative development of the construction industry, and the use of modern software and digital technologies will contribute to the more effective monitoring and regulation of the entire construction process.

4. Conclusion

The digital technologies are being implemented in the construction industry. Therefore, most construction enterprises have already designed objects using information modeling technologies. For other enterprises, the only rational solution is implementation of the BIM technologies.

To digitalize the construction industry, economic incentives to implement new technologies are required. There should be no regulatory restrictions on individual solutions.

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