

## Difficulties in transforming the construction industry under the digital economy

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**Abstract.** Solving key tasks of economic growth and increasing the level of social responsibility of the construction industry require the use of the scientific and technical potential, implementation of long-term innovative development plans and programs, transformation of external conditions of investment and construction activities, adaptation of the construction management system to the digital economy. In this regard, management of structural elements of the construction industry and digitalization of the construction industry are crucial. The relevance of the research issue is due to the fact that in modern conditions, the innovative potential of construction companies is a key factor contributing to competitiveness in the market and transition to the digital economy. The object of research is construction companies operating within the market economy. The subject is organizational and economic relations taking shape in the process of development of the construction industry under the digital economy. The authors considered the problems of transition of the construction industry to the digital economy, analyzed the construction industry, and proposed their own definition of the digital economy in the construction industry. The factors that impede the development of the construction industry were described taking into account modern aspects of economic development, which makes it possible to identify areas of construction business management under the digital economy. The competences of an employee of the construction company in the context of the digital transformation of the construction industry were identified. The authors drew conclusions proving the need for the transition of the construction industry to the digital economy

One of the key sectors of the national economy is construction. Today, there is a need for the transition of all sectors of the economy to the digital economy - the construction industry is no exception. The construction industry is a locomotive for the development of the Russian regions, as it improves the infrastructure. The success of a construction company depends on the successful transformation of the industry, as the digital economy dictates its own rules for doing business.

According to I.A. Chekhovskaya, the private sector dominates in the Russian construction market, and the number of public organizations is decreasing [1].

A. V. Tumashova and E. O. Proshkina believe that the construction business is the riskiest one, as it depends on market changes [2].



The current realities make every entrepreneur take into account economic changes. The most important task is digitalization of business processes.

“Information” has become an engine of the economy, it caused the transformation of the economy as a whole, namely the transformation of the economy into a digital one.

The digital economy allows the implementation of new technologies in order to create a single digital construction platform [3].

The digital economy has become a ubiquitous element of everyday life in most countries. The rapid spread of the Internet has changed the way businesses operate and negotiate with consumers, citizens get public services, and public bodies work. Digitization gives rise to a new business model, a new cross-border supply chain and new risks. Products and services of the online marketing, digital content and analytics data are rapidly becoming globally traded consumer goods.

Like the Internet, the digital economy is global; it has no boundaries, and anyone can immediately gain access to markets around the world [4]. Traditional consumer protection approaches, fair contracts and information should be reevaluated. Moreover, laws, regulations, and policies governing the digital economy must work along with efforts to improve the operational environment, including IT infrastructure, services, platforms, ecosystems, and devices.

Although many factors influence the digital economy, this guide focuses on four areas: consumer protection; data protection; cybersecurity; electronic transactions, in particular electronic payments (e-payments) and electronic signatures [5]. These topics constitute a favorable environment for the digital economy and affect almost all aspects of Internet business. These issues can act as a multiplier of forces for wider reforms, and they are central to business opportunities.

Digitalization of the construction industry is a global process in which all countries aimed at developing human capital and creating a competitive economy are involved [6].

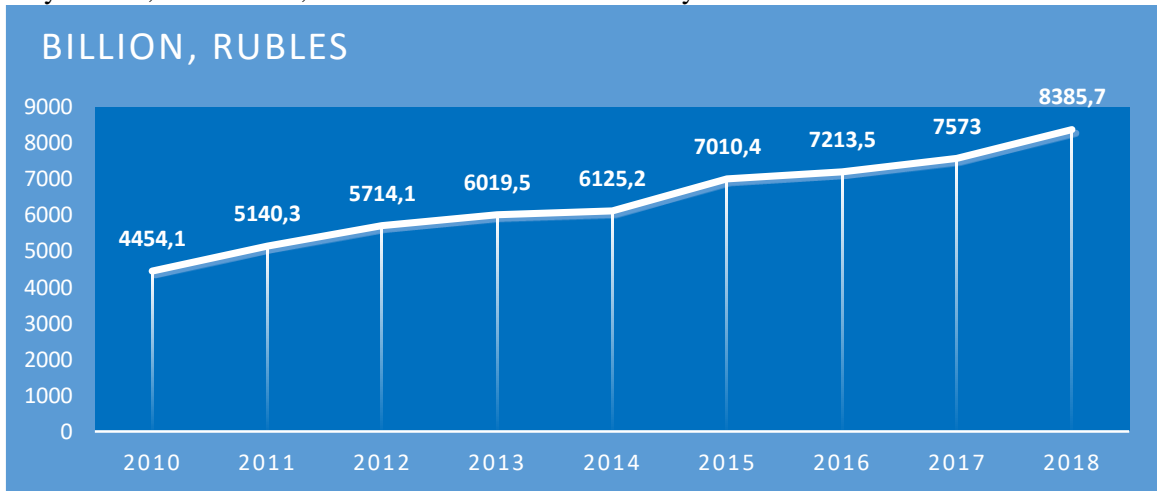
A systematic feature of the modern development of the construction business is acceleration of transformation processes that require the readiness of capital-creating industries for efficient and expedient activities [7]. The responsibility of the construction industry as a whole, as well as large construction companies in solving development problems is increasing. Figure 1 shows the dynamics of growth in the number of construction companies in Russia from 2010 to 2017. The dynamics proves the significant role and relevance of construction companies in the market.



**Figure 1.** Dynamics of the number of construction companies in Russia in 2010-2018, units

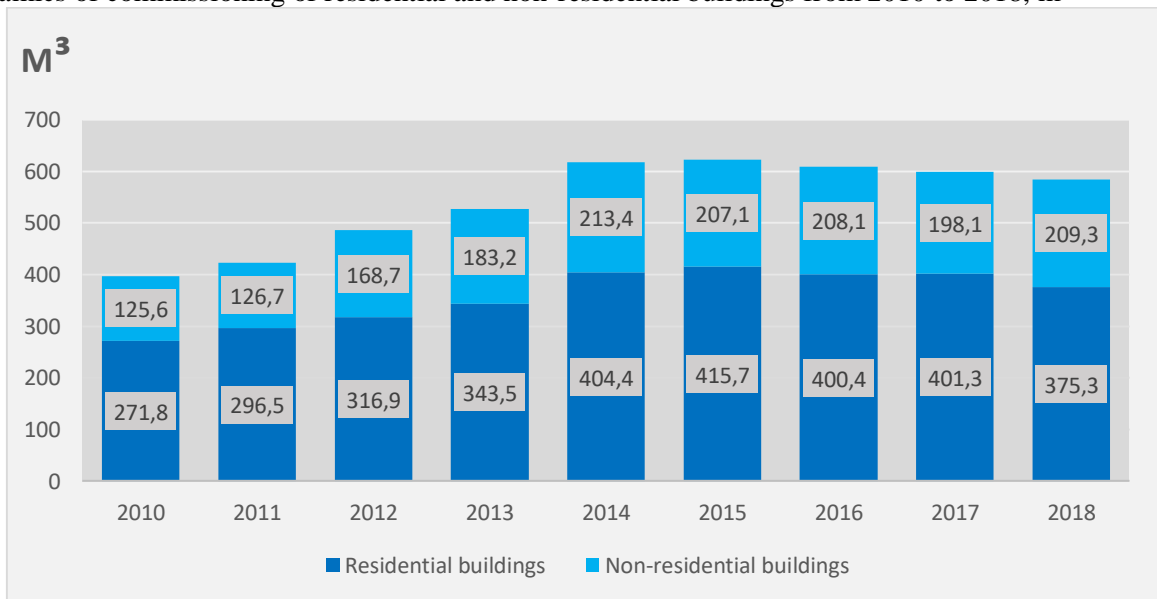
One of the indicators of socio-economic development of the country is the rate of construction volumes. First of all, the construction industry aims at satisfying housing needs [8]. The dynamics of the volume of works performed by the construction industry from 2010 to 2018 is presented in Figure 2.

Figure 2 shows that the volume of works performed by construction companies from 2011 to 2018 increased by 3118.9, i.e. 1.7 time, which indicates that the industry is in a stable state.



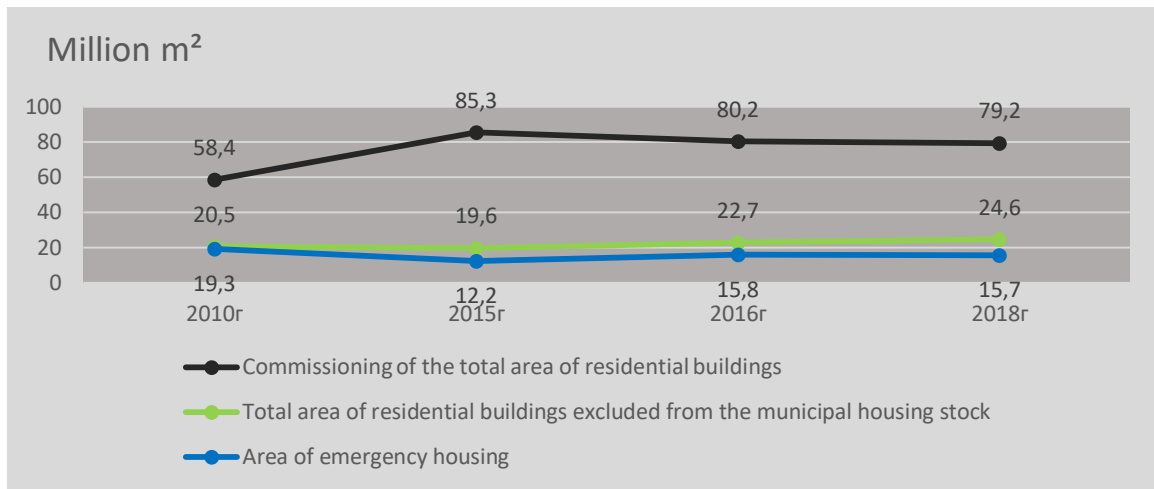
**Figure 2.** Dynamics of the volume of works performed by the construction industry in the Russian Federation from 2010 to 2018, billion rubles.

After the collapse of the USSR, a shortage of investment funds was characteristic of the Russian construction industry. The situation changed dramatically in the early 2000s, and the government maintained a positive trend. But there is no significant foreign investment in the industry. Figure 4 shows the dynamics of commissioning of residential and non-residential buildings from 2010 to 2018, m<sup>3</sup>



**Figure 4.** Dynamics of commissioning of residential and non-residential buildings in the Russian Federation from 2010 to 2018, m<sup>3</sup>

An analysis of the data showed that more than 65% of buildings are residential. This sector of construction accounts for about 80% of all investments in the construction industry [9]. Despite this fact, the level of provision of the population with high-quality and comfortable housing is low, which indicates a high demand for this product. Figure 5 shows the dynamics of the housing stock in Russia from 2010 to 2018.



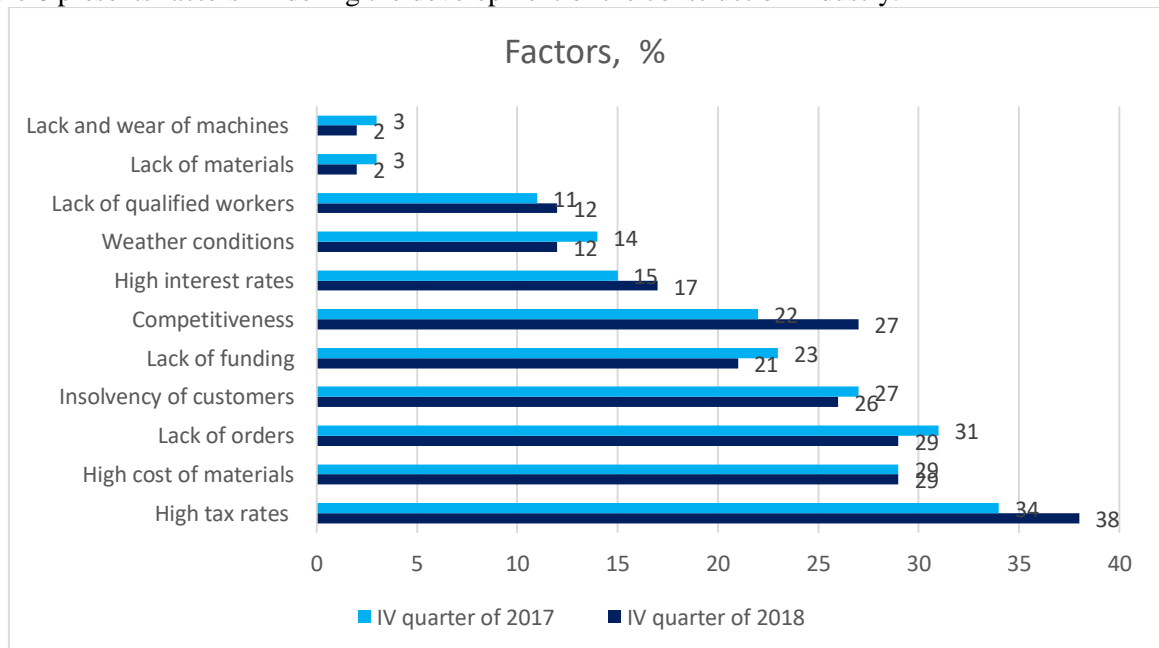
**Figure 5.** Housing stock dynamics in Russia in 2010, 2015-2018, million m<sup>2</sup>

Figure 5 shows positive results of the housing stock development. The total area of the housing stock increased 1.4 times, the volume of disposal of emergency housing increased 1.2 times in the period from 2010 to 2018.

Despite the positive growth dynamics, there are problems of transition to the digital economy.

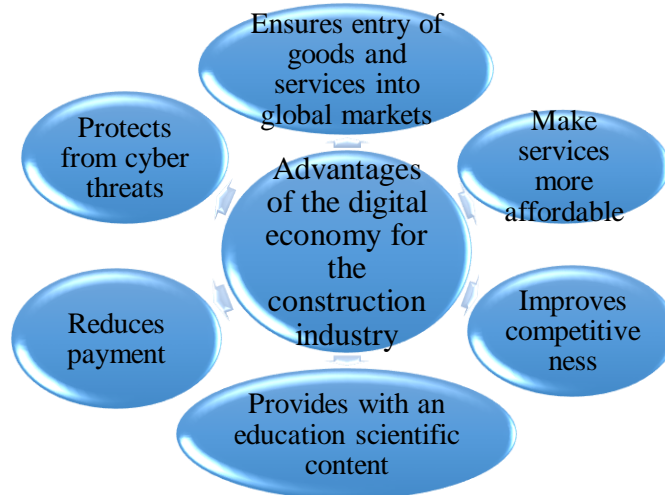
The most important problem is corruption and dishonesty in tendering [10]. A number of points are not taken into account: the cheapest project wins, it is used by organizations reselling tenders; sometimes companies do not calculate the project, do not justify prices, do not take into account the specifics of the construction industry. The result of such tenders is prosperity of companies which aim to raise more funding, which makes construction a long process or a defective result [11]. One more problem is the staff issue: the lack of highly qualified staff [12]; managers who lack knowledge of the construction industry; “cheap” labor of illegal emigrants which entails fines and arrests for violation of the legislation [13].

Figure 6 presents factors hindering the development of the construction industry.



**Figure 6.** Factors hindering the development of the construction industry in the fourth quarter of 2017 and 2018 (based on a sample survey), % of respondents

An analysis of the factors indicates that the main problem is a high level of taxes and competition. After analyzing the current situation in the construction business, the authors presented advantages of the transition of the construction industry to the digital economy (Figure 7).



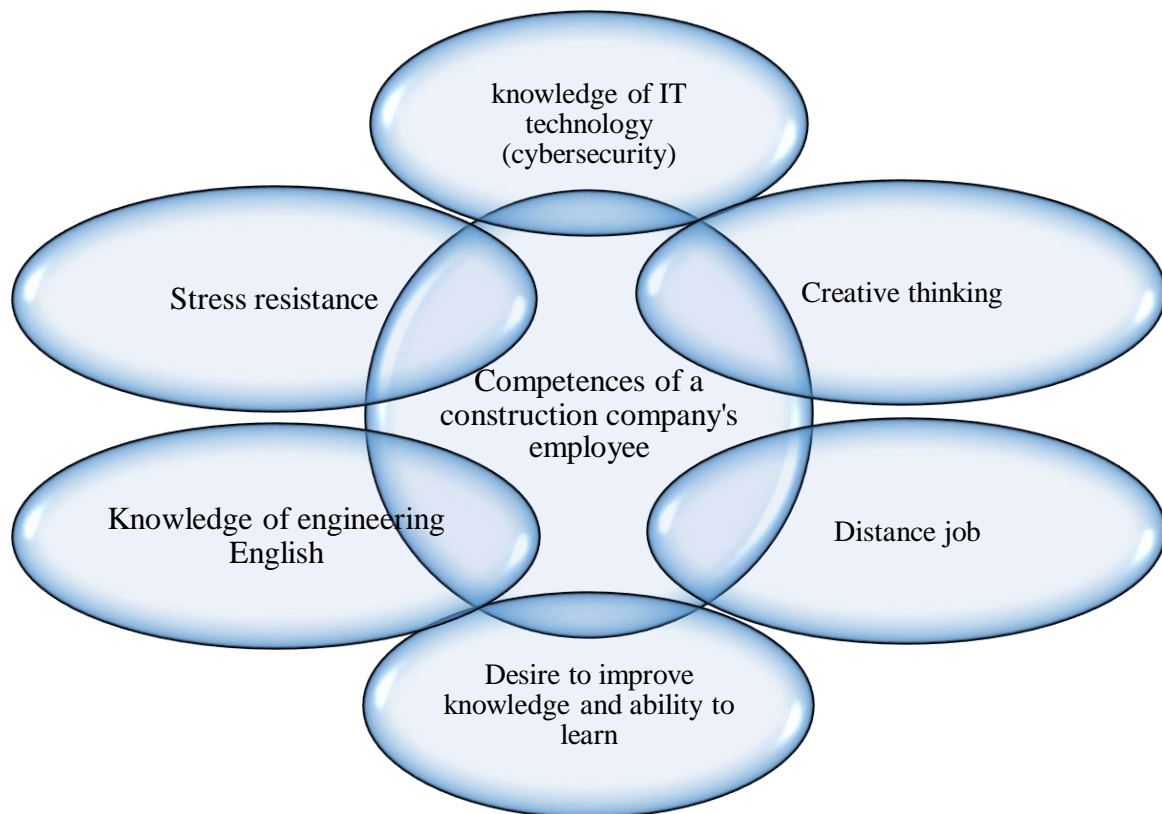
**Figure 7.** The main advantages of the digital economy for the construction industry

The digital economy allows the implementation of new technologies in order to create a single digital construction platform [14].

According to the authors, the digital economy in the construction industry is a combination of information, organizational and economic methods, forms, levers of influence on the construction business, based on an integrated approach to the large-scale implementation of digital technologies for regulating management processes in the construction industry [15].

Construction companies are aware of the importance of involving marketing as a way to adapt to changes in the industry, meet the needs of customers, remain competitive and improve their business strategy [16]. This article presents results of a quantitative and qualitative analysis of the current state of marketing in the construction industry. The study was carried out by searching for literature, processing and analyzing documents. Despite the efforts made in the last decade, it is difficult to generalize how to apply marketing in construction companies [17]. Nevertheless, there are strategies that can be used by construction companies. Knowing the needs of their customers, they will be able to choose relevant strategies.

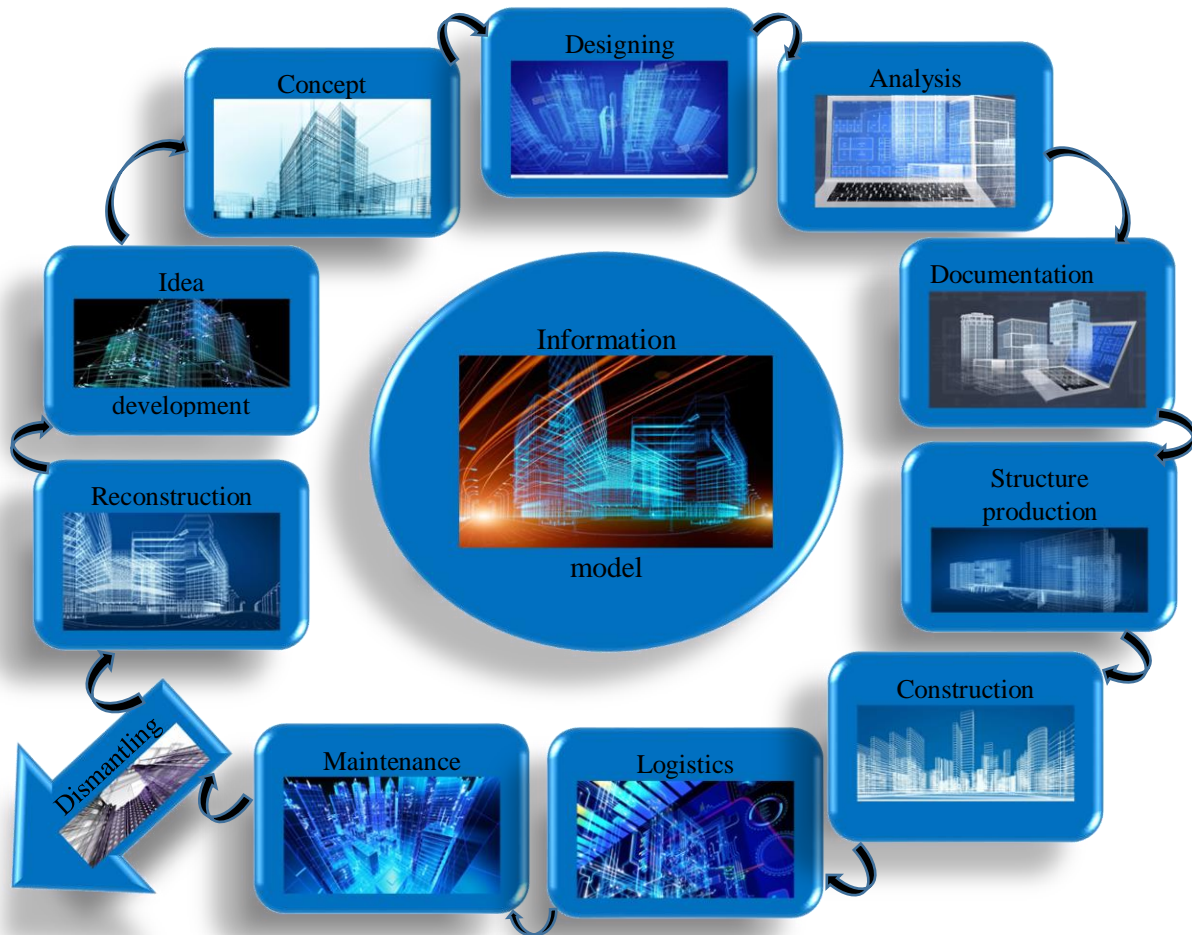
The digital economy requires qualified workers [18]. An employee of the construction company should possess qualities presented in Figure 8.



**Figure 8.** Basic requirements for a construction company's employee in the digital economy

The lack of qualified specialists may hinder the rapid transition of the construction business to the digital economy. The Government of the Russian Federation has already raised issues of IT staff shortages.

The current state of the industry was analyzed and main problems and factors that impede the development of the construction business were identified. Figure 9 presents the author's methodology for the transition of the construction industry to the digital economy.



**Figure 9.** The methodology for the transition of the construction industry to the digital economy

Given that a significant part of works is carried out by subcontractors, the creation of a digital platform will ensure the interaction of small businesses (formal and informal) with each other and large companies in order to establish contractual relationships, use experience and special skills.

Thus, the digital transformation will give positive results; new markets and businesses can be created. Reliability of control systems can improve.

It is important to note that for digital transformation, it is not sufficient to develop information technologies (digitalization); the restructuring of business processes, data processing and development of new business models and strategies, training of qualified personnel, development of digital culture and digital society are required. These processes should be interconnected, and the company's potential should be considered in the context of the ecosystem.

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