SECTION 3. ECONOMICS AND MANAGEMENT OF THE NATIONAL ECONOMY

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3.1 Development of the rental housing market through the prism of digitalization of the construction sector

The development of the construction sector is characterized by the active implementation of digital technologies, which results in transformational changes in traditional approaches to the design , construction, and operation of real estate objects, and this generally contributes to increasing the efficiency of construction processes and positive dynamics of real estate sales.

Digital technologies and digitalization of the construction sector are important factors influencing the increase in efficiency, transparency, availability of real estate and sensitivity to market fluctuations. Digitalization of the construction sector is the basis for the development of the rental housing market, its development is characterized by the integration of advanced technologies that streamline processes and improve the interaction of stakeholders and a number of features and objective conditions. And this generally indicates the growth of a number of trends in economic development of both the construction sector and the economy as a whole. The following are positive trends:

- transformation of the modern construction sector through the reorientation of economic priorities in the context of the russian-Ukrainian war through the use of reengineering and digital formalization of the operational space of construction sector entities [19];

- accelerating the integration of advanced technologies into construction business processes based on the implementation of design principles in construction and digital technologies. This is essential for reducing the likelihood of poor housing construction processes [19];

- a decisive influence on the level of effectiveness of strategic management in the construction sector, in particular in the case of using financial leasing as a tool for providing the population with housing [22];

- a decrease in housing sales. Thus, sales on the primary market decreased from 45.7% in 2013 to 31.0% in 2023, in contrast to the growth in sales on the secondary market [21];

- ensuring effective interaction between the state and business structures in order to increase the level of involvement of business entities in transformational changes in the context of digitalization of the economy and, as a result, increase the volumes of the real estate market in general and rental in particular [22].

the new categories that operate in the digital sphere [23]:

1. Digitization – digitization, conversion of analog information into "digital".

2. Digitalization – improving processes using digital solutions. When all decisions begin to be made based on the data available in the company.

3. Digital transformation – an approach to solving problems through technology. Digital transformation in construction involves the integration of digitized processes throughout the construction value chain, from design and engineering to procurement, construction and maintenance.

Digitalization of companies leads to significant advantages, in particular, an increase in the quality of cost estimates by 96% [23]. However, despite the obvious advantages, digitalization as a process occurs with significant difficulties, characterized by technological adaptation and an insufficiently developed regulatory framework. And this generally does not allow the full realization of the potential for the development of the real estate market in general and rental housing in particular through the use of digital tools, such as social media resources, the impact of which, although recognized as significant on the level of coverage of potential buyers, on sales or rentals is quite limited [21].

The state of war between russia and Ukraine from 2014 to the present has deepened disparities in the development of various sectors of the economy, had a negative impact on the labor market, exacerbated those problems and negative phenomena that have been occurring in the economy for many years and have been brewing for a long time, and are now reflected in all spheres of state activity and macroeconomic indicators, and therefore, in the level of economic security of the state [24].

The main obstacles in the process of implementing digitalization of the construction industry include those characteristic of any sector of the economy, which generally characterizes its connection with other economic categories and interdependence [25, 27-29]:

– insignificant amounts of investment in fixed assets and financial risks associated with this;

– significant initial costs for the implementation of digital technologies, which is one of the important reasons for the insufficient level of their implementation;

– lack of an effective digital strategy for the development of construction sector entities, which is especially noticeable in the initial stages, as they cannot competently assess their strategic impacts;

– lack of digital competencies and knowledge in this area. In Ukraine, there is an acute shortage of qualified personnel to work with the latest digital solutions, in particular BIM;

– an insufficiently high level of innovation culture, resulting in an insufficient level of digital and cultural changes to the business models of construction sector entities, which generally does not contribute to the success of digital transformation;

– the duration of restructuring production and business processes. In Ukraine, this is complicated by the lack of a clear understanding of economic effects at all levels of company management due to a lack of experience and sufficient information about best global practices;

– compatibility problems, manifested in the fact that different digital technologies may have different data formats, which complicates the compatibility of their use at different stages of the project;

– shortcomings in standardization – a consequence of the lack of a single standardization system for the use of digital technologies in the construction sector, which can complicate the processes of information exchange between project participants. This is partially solved within the OpenBIM concept through the interaction of large teams without being tied to a specific software;

– different levels of digital maturity of market participants from large construction companies to small and medium-sized ones, etc.

“If construction companies invest in digitization, while continuing to use new materials and implementing digital technologies, they can achieve a 50-60% increase in their overall productivity” – McKinsey Global Institute [23].

Digitalization of construction consists in converting all processes in construction into digital format and using modern technologies to reduce terms and improve the quality of construction [25-26]. It contributes to increasing productivity, the level of quality control, reducing the number of errors and increasing the level of safety of construction works themselves and is effective in the context of ensuring the environmental friendliness of construction itself [25, 27] and thus contributes to achieving sustainable development goals.

In the context of the development of the real estate market, the introduction of BIM technologies (Building Information Modeling) for real estate design and management allows to improve the quality of construction, reduce costs and improve the operational characteristics of residential complexes. The implementation of smart building platforms allows for real-time monitoring and coordination between various stakeholders, which leads to improved resource allocation [20].

Digital technologies contribute to the optimization of processes at all stages of the life cycle of construction objects, which, in turn, contributes to the creation of new opportunities for the development of the rental housing market. The main areas of digitalization in this context include:

- automation and digital management of rental properties based on cloud platforms and mobile applications, which facilitates interaction between tenants, landlords and service companies;

- Internet of Things (IoT) and smart homes, which help reduce operating costs, increase the level of comfort and safety of residents;

- blockchain technologies and smart contracts to ensure transparency of rental relationships, automate financial transactions, and protect the rights of the parties;

- the impact of digitalization on the rental housing market by developing the rental housing market through: optimizing costs for construction, operation and management of residential facilities, which reduces the cost of rent and increases its accessibility for the population; increasing the level of trust and reducing risks – the use of smart contracts and digital identification helps to increase the level of trust between market participants, minimizes fraud and simplifies legal procedures; flexibility and personalization of rental services – the development of digital platforms allows for the formation of personalized offers for tenants, adapting living conditions to their needs and financial capabilities; construction of environmentally sustainable housing – the integration of energy-efficient solutions, smart resource management systems and environmentally friendly materials into the construction process contributes to the formation of a sustainable rental housing market, which allows for the formation of new rental models that meet the requirements of modern society and the challenges of the economic environment.

The impact of digitalization is significant during the russian war, especially considering the significant damage inflicted on Ukraine. Thus, according to KSE data Institute, as of November 2024, direct damage to Ukraine's infrastructure as a result of russia's full-scale invasion reached almost $170 billion, which is $12.6 billion more than at the beginning of 2024. In particular, damage to industry, construction, and the service sector is estimated at $14.4 billion, as of November 2024, almost 500 large and medium-sized private and state-owned enterprises have been destroyed or seriously damaged [30].

Ukraine's losses from the war with russia are multifaceted, covering economic, demographic, humanitarian and other aspects. In general, the complete and partial destruction of infrastructure facilities caused losses in the hundreds of billions of dollars, in particular in such regions as Kharkiv, Donetsk, Luhansk, Kyiv, Mykolaiv and Zaporizhzhia [31]. In Ukraine, an active process is underway to examine the facilities destroyed and damaged as a result of the actions of the aggressor country – russia, to determine the possibilities of their restoration, further operation, restoration work or dismantling [32].

Such a situation could not but negatively affect internal changes in the structural and sectoral dimension of the economy, the real and financial sectors and the real estate market (as a satellite of the economy and one of the most significant segments of the financial market and an important component of the system of economic relations of the state) and, accordingly, its important component – the housing rental market. The housing rental market in such conditions acts as an unofficial indicator of economic sentiment in the state - it reflects the expectations of the economically active part of the population regarding changes in the situation in the country and of business entities regarding the prospects for the development of business activity in a particular market [33].

Historically, rent regulation and tenant protection were among the earliest responses to the housing crisis after the First and Second World Wars in Western Europe and the United States [34].

Given the socio-economic consequences of the shock induced by the full-scale war, changes in the housing rental market are catalysts for organizational and legal transformations in the state, in particular, regarding issues related to the further development of the real estate market and the state as a whole in both the post-war and post-war periods. The process of restoring the country requires significant efforts to rebuild infrastructure, restore human capital and overcome demographic challenges [33]. The introduction of digital technologies also has a significant impact on the housing market. The importance of digitalization in this context is difficult to overestimate; it actively transforms all spheres of society, is actively manifested in the processes of purchase, rental and financial leasing, creates new opportunities for market participants, facilitates access to housing and optimizes financial transactions. Its role becomes especially significant in the conditions of russia's full-scale war against Ukraine. Financial leasing as a mechanism for purchasing housing is quite popular in such circumstances, and its connection with digitalization contributes to a more effective use of digitalization tools to simplify this process and accelerate the recovery of Ukraine's economy in the post-war and post-war periods [33].

Given the essence of financial leasing of housing as a mechanism by which an individual or legal entity receives the right to use real estate with the possibility of its subsequent redemption after the end of the leasing term and which, unlike a classic mortgage, does not require immediate registration of ownership of housing, which makes it attractive for those who cannot immediately pay the full cost of the object, this approach is an effective solution for countries with low access to bank lending and, accordingly, Ukraine, taking into account the significant losses inflicted by russia as a result of the war [33].

Digitalization of the housing market under financial leasing helps simplify the processes of concluding agreements, automate document flow, and use analytical tools for researching the real estate market. This creates new opportunities for both lessors and lessees, making the housing market more accessible and efficient. At the same time, for the further development of digitalization, important issues to be addressed are cybersecurity and the digital divide to ensure equal access to digital services for all market participants [33].

It is important to take into account the possibility of close interconnection of ideas, actions, initiatives and programs and their integration into national, regional, sectoral development strategies and programs and the appropriate use of political, socio-economic and information and communication tools to implement effective interaction between the state and society and the development of the economy and modernization of all its spheres on the basis of continuous improvement. The above can be considered as a response to new challenges and confirmation that the reason for changes in the processes of developing state policy (which in its evolutionary development requires both a rethinking of traditional management approaches and the use of new service-oriented mechanisms for its formation and implementation) is the low level of digitalization of the economy as a system-forming tool for adapting to the conditions of the external environment [35].

Given the above, it should be noted that the digitalization of the construction sector plays an important role in the development of the rental housing market, contributes to increasing its transparency, efficiency and sustainable development of the economy as a whole [36-37].

The integration of advanced technologies into the processes of construction, operation and management of residential facilities contributes to the formation of new rental models that meet the requirements of modern society and the challenges of the economic environment.