

# Digital technologies transforming the real estate market in terms of digitalization

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**Abstract.** In the article the authors examine the transforming role and the place of digital technologies in the world economy and its separate segments (the real estate market). The article states that the world economy is at the threshold of the revolution of decentralization and establishment of the joint consumption economy, which has initiated development of the blockchain technology built on the institute of trust. For the purpose of determining the digitalization impact on the business system, the article uses I. Ansoff's classical model of turbulence (ESO model). The authors have carried out its critical analysis and determined the digitalization impact on the value-conscious paradigms of the business system participants, the strategic supporting point and possible trends of transformation (potential of actions and potential of impact). The authors specify the classical value-conscious paradigms of the business system participants as applied to the terms of digitalization. The article gives an extended interpretation of the value-conscious paradigms related to the digital technologies. It uses the classification of digital technologies existing in the professional community (in order of possible impact on transformation of business) as applied to the real estate market. The authors state that in terms of digitalization and globalization of the world economy the real estate market is an element of the open economy and presents an expanded cooperation between mutually dependent partners under terms of confident relations regardless of time and territorial borders. With the purpose of identifying the digitalization impact on the real estate market, the authors carried out their own investigation using the method of expert evaluation. As a result, they state that digitalization is a determining vector of developing the present-day real estate market. They generalize the practice of using digital technologies in the real estate market that have a strong transforming impact on the business system participants at the stage of development and introduction.

Formation of a new economic platform of the world economy is affected by numerous trends, the most important of them is digitalization, which corresponds to the ideas of a widely-spread theory of evolutionary and revolutionary influences of technologies on the social progress (“change of technological modes”) [1, 2, 3, 4].

In transforming the industrial society into the network society, the global industrial economy practically completes the transition to the digital economy. These changes touch upon all key subjects (economic entities, households and communities) in all segments of the world economy (production, services, finance, real estate, and others). As estimated by the Accenture Agency, an increase of the digital density only by 10 points can increase the gross domestic product of the world leading economies to 2.3%. By 2020, China, due to the digitalization, will add \$418 bln to its GDP, the USA - \$365 bln, Japan - &114 bln. Introduction of digital technologies in Russia by 2025 will allow to provide the average annual additional GDP increment from 0.4 to 0.9%. At that, a potential effect of digitalization is expected to be 4.1-8.9 trillion rubles (19-34 % of the general GDP increase) [5]. The main resources of the GDP increment due to digitalization, according to the experts, are: multifactorial increase of labor productivity (from 1.5-4.6 trillion rubles) and increase of benefit from industrial and non-material assets (from 0.4-1.4 trillion rubles) and increase of labor efficiency due to use of digital platforms (from 2.1-2.9 trillion rubles) [5]. In terms of digitalization of the world economy, **the real estate market** is not a local market, it steps out as segment of the open market and presents itself as an expanded cooperation between mutually dependent partners on the terms of trustful relationships not dependent on time and territorial borders. Creation of a corresponding information infrastructure of data exchange, that include a great number of organizations and systems, presupposes a univocal understanding of the information transferred by all participants of exchange on the real estate market. The digital transformation leads to the entrance to the real estate market of the companies with innovative business-models and technologies, which creates for them considerable competition advantages. Thus, on the USA market during the period of 2010-2015, the average digitalization growth rate on the real estate market was 15% of GDP during one year, while in the construction sector it was only 4%, which is explained by the stagnating productivity in the industry [6].

If the first epoch of the digital economy was based on a combinatorial set of communicative and computing technologies, the second one is based on addition to this list the ideologies of information and economic behaviors which have led to appearance of new value-conscious paradigms. One can state that in the capacity of first basic message of the new economic platform of the world economy there steps out the institute of trust – as a new value-conscious category.

All this determines the topicality of the theme of this article.

The purpose of the article is investigation and identification of digital technologies that have a strategic and transforming impact on the real estate market in terms of digitalization of the society.

The end of purpose determines the necessity of solving of the following tasks:

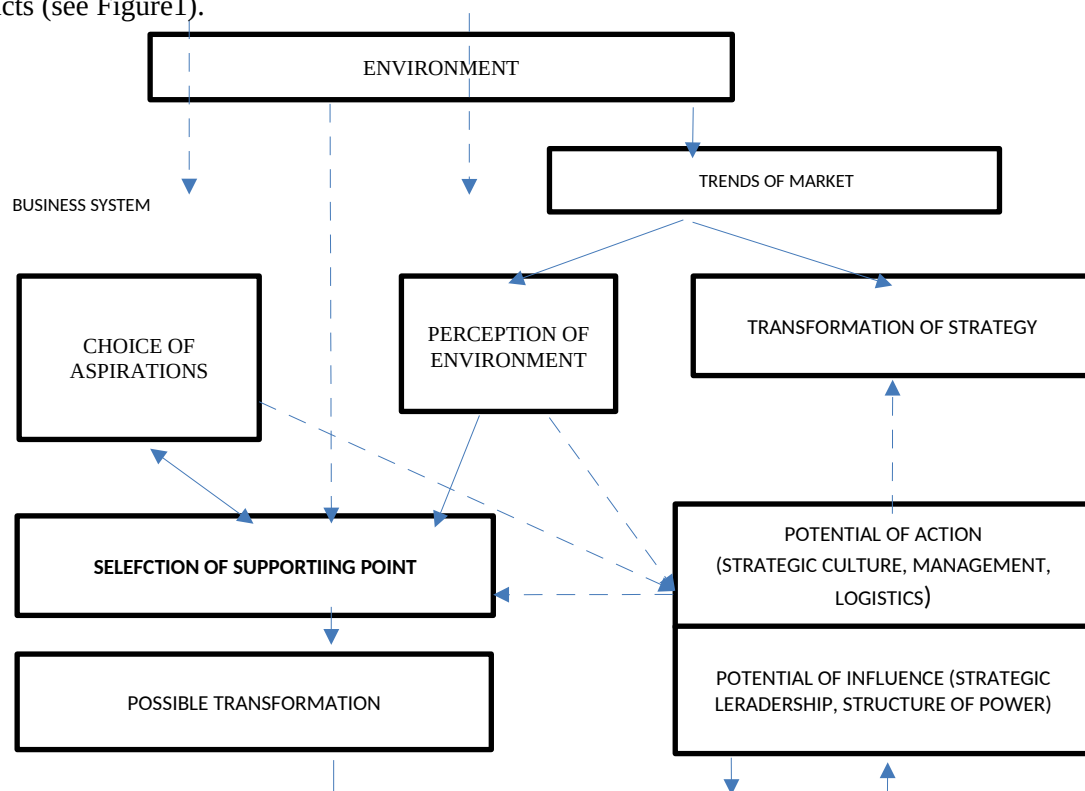
1. To examine the impact of digitalization on the value-conscious paradigms and selection of the strategical supporting point of business system participants (on the basis of the Ansoff's model (ESO);
2. To identify the digital technologies that have a strategic and transforming impact on the real estate market on the basis of the selected strategical supporting point - the institute of trust.

The methodological basis of the investigation is a complex of general scientific and special methods of economic analysis (including the methods of grouping, ranking, expert assessments). As an information base of investigating the problem under consideration, the article uses resources of specialized literature, data from websites of federal authorities and statistical digests, as well as the authors' investigations obtained by surveying and interviewing the real estate specialists.

Digital transformation is not only the process, the world business undergoes to adapt to the new realias of the digital economy, but this is also the change of thinking and culture in the society itself. The use of the ESO Ansoff's model [7] allows to take into account the turbulence of the external environment caused by digitalization and move to joint cooperation, as well as to see and evaluate the strategic set of priorities (value-conscious paradigms) for further development.

The model (ESO — Environment-Serving Organization) presents itself as an approach that considers the participants of the business system as an organization servicing the needs of the life environment, which main activity is to deliver goods and/or services for the life environment (see Figure1). In its basis there lies Alfred Chandler’s hypothesis of “strategy – structure”, which presupposes the necessity of strategic changes on the basis of external interaction between the life environment turbulence and that which got the name “strategic supporting point” [8].

Igor Ansoff, depending on the external environment resources, identifies five types of strategic offensives: stable, reactive, warning, investigative and creative [7, p. 123]. The creative entrepreneurial model of strategic behavior presumes creation of new technologies, innovatory products (see Figure1).



**Figure 1. Ansoff’s ESO Model.\***

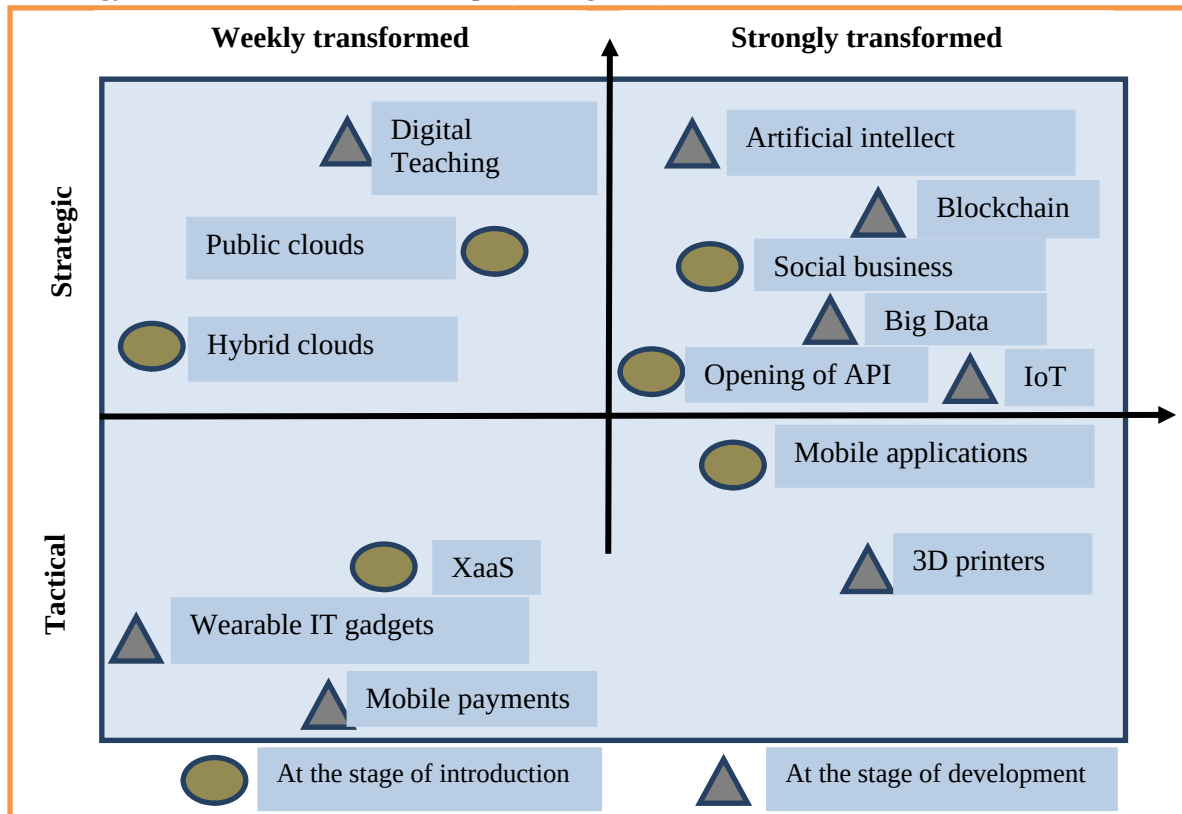
\*Compiled on materials of the resource [7, p. 59]

Using the model of ESO, the authors identify the impact of the external environment (digitalization) on value-conscious paradigms of the business system participants and selection of the strategic supporting point [7]. Under the digitalization impact, such traditional values as competitiveness, efficiency, client-orientation and teamship will not disappear, but they will transform into client-centricity, partnership and collaboration, competence, introduction of innovations [9]. As a result, a new strategic supporting point will be formed for all participants of the business system in terms of a creative entrepreneurial strategy – **the institute of trust. The digital blockchain platform** contributes to capitalizing all business system participants due to the new value-conscious paradigms.

1. *The strategic leadership is performed on the principle of management decentralization (on the basis of blockchain technology, which results in the fact that concentration of power in the business system in the hands of the monopolistic oligarchical participants is transferred to the centers of multiple power. The industrial gigantism is increasingly perceived as a threat to economic efficiency of production (because of monopolization) and democracy (due to the tight liaison of the government*

and the business). In the trend of development there are horizontal (“turquoise”) partner relationships, based on trust [10].

2. *The technology*, that has a strategic and strongly-transforming impact on the business system participants, especially at the stage of development, is, according to the experts [11], the block-chain technology based on the trust relationships (see Figure 2).



**Figure 2.** Classification of digital technologies in order of possible influence on transformation of business (following Dion Hinchcliffe [11]).

Blockchain is a revolutionary technology built on combination of mathematics, encrypting and economy of behavior. Block-chain is public and eliminates the possibility of divergence in interpreting facts, which allows to reach a consensus without domination in volumes and terms of stay in transaction networks. It is first in the history of humanity, when there appears **trust to the results** regardless of the participants’ behavior, which opens great opportunities for mass joint cooperation and mutual activities.

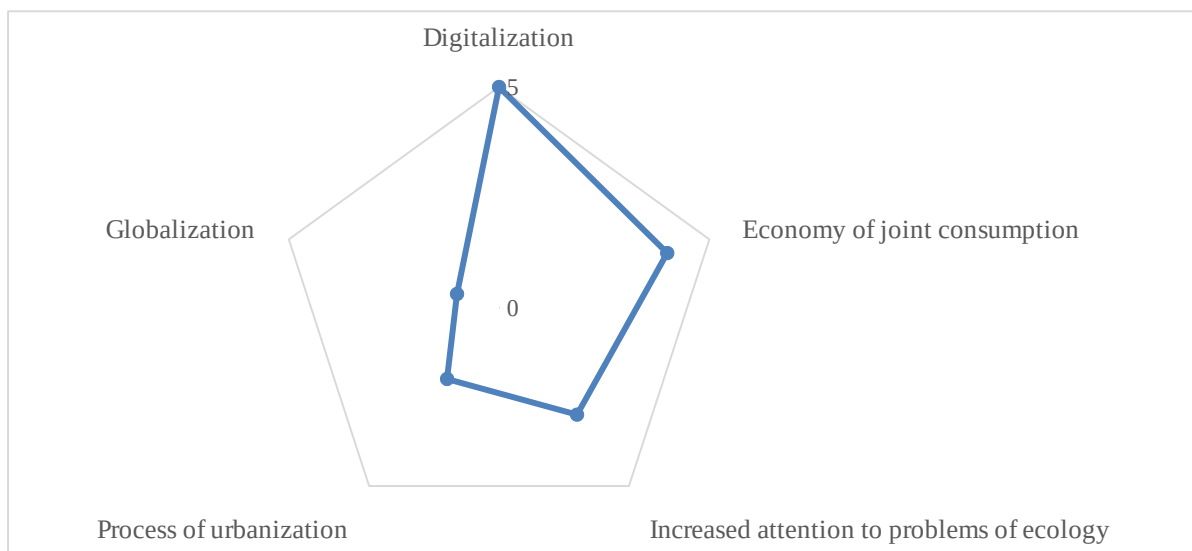
### 3. Innovative joint culture.

Creation of the digital platform triggers a necessity of *preventive* teaching, what’s more, regardless of the organization’s system of activity and scale of its business. That’s why, there arises a demand for the so-called T-shaped workers, whose abilities combine marketing and technological aspects of business.

The real estate market, according to a number of authors, is at present characterized by low labor productivity, slight production profitability, insufficient investment attractiveness for investors [12, 13, 14, 15, 16, 17, 18, 19]. At this, it possesses a high growth potential in the field of technological changes. Digitalization renders a new vector of development to the real estate market. The market participants, by implementing the above-mentioned creative entrepreneurial model of strategic offence in terms of turbulence, form innovatory products, for example, new formats of living (co-workings, campuses, communities, and others), change the typology of real estate objects, invest into new markets (ICO), create new technologies (on the base of the block-chain platforms). Digitalization lays

down new fundamental notions: financial technologies (FinTech), technologies into real estate (PropTech), and others. According to the professionals, the term property technologies (PropTech) “is simultaneously both the industry and a set of innovations, called for to change, to reshape the real estate market” [20].

With the purpose of identifying and evaluating the main trends on the real estate market, the authors carried out a polling by surveying and interviewing the real estate market specialists in Irkutsk Oblast. They offered to rank in terms of significance five main trends of development within the real estate market, selected by a method of expert assessments: globalization, ecology, economy of joint consumption, urbanization. The group of experts involved managers, deputy managers, financial directors, heads of development departments of construction companies, and real estate agencies in Irkutsk Oblast. The choice of the experts was determined by opportunities of making, due to their official duties, decisions of strategic character at real estate companies in Irkutsk Oblast. Thirty-six real estate market experts evaluated the impact of the selected development trends on the real estate market. Processing of the data obtained made provisions for using a proportionate scale from 1 (the lowest degree of impact) up to 5 (the highest degree of impact). The final stage of assessing the degree of impact was identification of the average final index for each trend from the five ones presented by the method of average arithmetic ranks. For this, first of all, a calculation was made for the sum of ranks awarded to each trend. Then, this sum was divided into the number of the experts, and as a result an average arithmetic rank was calculated for each indicator. The final rank, according to the average arithmetic indicator, was determined by means of a simple round-off up to the integer value. Thus, the final ranking was built, following the principle – the less the final average rank is, the less the degree of impact of the trend on the real estate market is, and vice versa, the bigger the final average rank is, the bigger the degree of impact of the trend is. The results of this assessing the degree of impact of the development trends on the real estate market are presented in Figure 3.



**Figure 3.** Results of evaluating the degree of impact of development trends on the real estate market. (prepared by the authors on the basis of the investigation conducted)

The investigation conducted showed that the biggest degree (5 points) was given by the experts to digitalization, and the lowest result (1 point) was given to globalization of market. That's why, the authors consider that the impact of globalization on the real estate market is insignificant, while digitalization exposes the biggest impact on making strategic decisions, in particular, on selection of the strategic supporting point transforming the real estate market.

According to the classification, considered earlier (see Figure 2), and the polling of experts, the authors identified the main strategic transforming digital technologies on the real estate market in

accordance with the selected strategic supporting point - the institute of trust. The digital technologies examined, have, in the authors' opinion, the biggest impact on transformation of the real estate market both at the stage of development and at the stage of introduction.

This group involves: big data, artificial intellect, systems of distributed register, virtual and added realities. The generalized experience of using these technologies confirm the conclusion of transformation of the real estate market due to digital technologies (table 1).

**Table 1.** Fields of digital technology applications, “strongly-transforming” the real estate market.

Type of technology	Field of application	Examples
BIM – technology	Creation of three-dimensional models of building («digital twin»)	Settlement “Donskoy” (Russia) <a href="https://vc.ru/flood/24359-socialmedia-sales-realty">https://vc.ru/flood/24359-socialmedia-sales-realty</a>
AR и VR technologies	Cartographic services; geomarketing; virtual excursions, tours and panoramas	1. Google Cardboard. <a href="https://arvr.google.com/cardboard/">https://arvr.google.com/cardboard/</a> 2. HTC Vive. <a href="https://www.vive.com/ru/">https://www.vive.com/ru/</a>
Internet of things (IoT)	IoT-systems (network of clever gadgets).	Technical maintenance, repair and installation of equipment, and others. <a href="https://www.rbc.ru/trends/industry/5db96f769a7947561444f118">https://www.rbc.ru/trends/industry/5db96f769a7947561444f118</a>
Big Data	Profiling, integration of data, metadata, network analysis analytics.	Services Google Trends, Yandex, Wordstat (for Russia and CIS) <a href="https://www.calltouch.ru/glossary/big-data/">https://www.calltouch.ru/glossary/big-data/</a>
Block-chain Technology	Registration of transactions with real estate (Record and registrar functional)	ArabianChain (Dubai), Propy и Ubitquity (USA), Digital Street (Great Britain), ChromaWay Postchain (Sweden) <a href="https://sdlit.io/cases">https://sdlit.io/cases</a> State Register (Russia) <a href="https://lenta.ru/news/2018/05/25/plutnik_ivanov/">https://lenta.ru/news/2018/05/25/plutnik_ivanov/</a> Public Register of new housing (Russia)
	Consulting functional (intermediation)	Project «Ubitquity» (USA) offers service to its own SaaS. <a href="http://www.ubitquity.io/">http://www.ubitquity.io/</a>
	Block-chain forums for purchase and sale of real estate using smart-contracts (peer-to-peer transaction without intermediaries and guarantors)	Projects ATLANT и Propy (creation of block-chain forums). Forums LiquidSpace, Blandlord, Airbnb, Rentberry, or Bee Token (leasing of real estate without a intermediaries) <a href="https://merehead.com/ru/blog/top-benefits-blockchain-real-estate/">https://merehead.com/ru/blog/top-benefits-blockchain-real-estate/</a>
	Payment operations Investments	Payment and account operations, transfers Electronic mortgage bond (Russia, Raiffeisenbank) <a href="https://www.raiffeisen.ru/about/press/releases/71080/">https://www.raiffeisen.ru/about/press/releases/71080/</a>
	Tokenization of real estate	Algorand. <a href="https://bits.media/assetblock-nachinaet-torgovlyu-tokenizirovannoy-nedvizhimostyu-na-blokcheyne-algorand/">https://bits.media/assetblock-nachinaet-torgovlyu-tokenizirovannoy-nedvizhimostyu-na-blokcheyne-algorand/</a>
Artificial intellect	Technologies: “Clever House”, “Clever Town”	Project «Silvertown» - House Maintenance System (London, Great Britain). <a href="http://www.besmart.su/article/pochemu-stoit-sdelat-vash-dom-umnym">http://www.besmart.su/article/pochemu-stoit-sdelat-vash-dom-umnym</a>

\*Compiled by authors on the basis of internet resources.

The conducted analysis of publications and opinions of the participants of the real estate market and business communities [21, 22, 23] confirm the readiness of transition to the new blockchain technologies and forthcoming changes.

The experiments of the Agency for Housing Mortgage Lending (AHML) (Dom RF) together with the State Registry proved the readiness of the state for participation in digitalization of the real estate market. The chain of the participants can be actively expanded already in the nearest time. The

integration of the blockchain technology using the initiatives of protection of the product consumers' rights on the real estate market allow to get rid of the existing problems in the sphere of real estate (including fraudulent schemes).

The review of foreign resources shows that through the institute of tokenization (ICO issue) the cooperation of the initiative holders can simultaneously be joined by small-budget investors and households with projects, contract constructions and guarantees of similar information transparency. This can sharply increase the number of private and collective participants in the sphere of real estate.

Thus, the experience of foreign countries and our first complex experiments prove the ability of the digital technologies for effective transformation of the real estate sector in the Russian Federation.

1. Digitalization is the main world trend which has a transforming impact on the business systems, with that, it changes their value-conscious paradigms, as well as leads to the change of the strategic supporting point, which in terms of the modern development is based on the blockchain technology.

2. As a hypothesis for the character of including the blockchain technology in the process of transformation of Russia's real estate market, a model of strategic behavior of the participants in the business system was selected by using Igor Ansoff's theory of interaction of multiple centers of power, which of each seeks to implement its own expectations in terms of the ECO activity (an organization servicing its life environment).

3. The article specifies the transforming value-conscious paradigms of the business system participants (client-centricity, partnership, collaboration, competencies) and substantiates a new strategic supporting point – the institute of trust. As the result, there arouses the transformation of the business system under the impact of the decentralization, expanding the borders of information availability, the universal nature of technologies, the decrease of the threshold for the starting scale of the investment capital to enter the market.

4. It is identified that in the real estate sector the main intentions, collecting the participants of the complex business systems and collective scenarios into the business system, are the equally directed value-conscious paradigms and confident relationships - they considerably accelerate the processes of the initiation, including the investment ones (through ICO tokenization) and performance of the business processes.

5. Due to the digitalization, the business systems of the real estate market are subject to self-regulation and rectification from ineffective participants, first of all, from intermediaries. In regard of the blockchain projects, the value-conscious levelling has the highest potential of rectifying the document circulation, decrease of costs for control and transactions, acceleration of general length of business process aggregates. This parameter is extremely crucial and can make from 1-2 % of transaction costs and up to 3-5 % of construction costs.

6. The potential of the world real estate market is extremely high (according to various estimations, about \$ 200 trillion), and entrance to this market for the countries and investors, which so far have less reliable and transparent information, legislative and cultural barriers concerning the entrance, can be sufficiently increased due to the trust and universality of the conditions of entrance to the market.

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