Organization of construction in the aspect of strategic development programs for the construction industry

V V Peshkov
Department of Real Estate Expertise and Management, Irkutsk National Research Technical University, 83, Lermontov Str., Irkutsk 664074, Russia
E-mail: pvv@istu.edu

Abstract. The construction complex is a multi-industry production and economic system, the level of economic and production and technical potential of which determines the conditions and state of progressive and effective development of not only the construction complex, but also the national economy as a whole. The complexity of internal technological and intersectoral relations of the construction complex turns it into a multi-criteria object of forecasting. Construction as a component of the investment and construction complex has a special role in the structural restructuring of the material base of the production potential of the regional economic complex. Given this, it is relevant to evaluate the performance and indicators of the construction complex over time, which will allow you to identify the main trends and determine the overall level of development of the country's construction complex.

1. Introduction
The construction industry, as well as the Russian economy as a whole, faces long-term systemic challenges that reflect both global trends and internal development barriers.

The construction complex of the world, as it develops, creates development trends that relate to each country. The main trends in the construction industry by 2020 include:

- Introduction of closed life cycle technologies for buildings, building structures, materials and products;
- Implementation of information modeling technologies in spatial, territorial planning, settlement planning and for all stages of the life cycle of buildings and structures;
- Implementation of augmented and virtual reality technologies [1];
- Implementation by states of harmonized international standards for “sustainable development” in construction, including standards for: - “green” construction - energy-efficient construction - affordable environment - quality of life - smart cities, houses;
- Increasing the share of eco-settlements, districts, houses [2];
- Increasing the share of settlements, districts, and houses with a barrier-free environment;
- Increase in the number of houses with zero energy consumption and “active” houses;
- Socialization of cities and virtualization of urban infrastructure elements;
- Use of digital duplicates of construction objects;
- Automation of construction technologies and application of intelligent robotic systems;
- Growing cities with digital, driverless transport infrastructure;
- Growth in high-rise construction for cities with high population density [3,4];
Development of cloud technologies in the areas of design and monitoring of the urban environment.

Thus, solving large-scale economic problems, the construction industry forms an order to search for optimal technical, technological and organizational solutions that have a multiplier effect for the entire economy. However, the construction industry annually undergoes quantitative and qualitative changes that either contribute to a more efficient solution of problems of increasing volumes of housing construction, the implementation of large-scale infrastructure projects, opening opportunities for the development of industrial-economic potential of the RF as a whole, or on the contrary reduce the development of the construction industry.

2. Definition of features
We will analyze the indicators of the construction industry for 2019 in Russia and in the Irkutsk region, which will allow us to determine the level of development of the construction industry and the degree of its readiness to implement global trends.

The outgoing year has become a turning point for housing construction — housing starts to grow for the first time since 2015. In 2019, 80.3 million m² of housing were built in Russia, which is 6.1% more than a year earlier. The commissioning of apartment buildings in 2019 amounted to 43.5 million m², which is 0.6% higher than in 2018. In addition, 36.8 million m² were built or registered for the first time m individual residential buildings (+13.5%) (Figure 1) [5].

![Figure 1. Dynamics of housing commissioning by developers and the population, million m².](image)

The indicators show that in many respects, the growth in housing starts was provided by the private sector, while the growth in the construction of multi-apartment buildings is still questionable.

3. Formulation of the problem
A comparison of the dynamics of commissioning of individual residential buildings and multi-apartment housing shows that the transition to market relations has led to a five-fold increase in the volume of individual housing construction. Current changes in the pace of economic development are reflected more quickly in the volume of individual housing construction and, with a delay, in the volume of multi-family residential buildings.

The industry as a whole, taking into account non-residential construction, remains in a state of stagnation. Since 2019, the RF has been implementing a number of national projects that set targets in various areas.
Taking into account the key indicators of the national project “Housing and urban environment”, in 2019, the final volume of commissioning is 8.8% behind the indicators of the national project [6,7]. According to the national project, it was planned that 88 million $m^2$ of housing would be built in Russia last year, including 54.8 million $m^2$ of apartment buildings and 33.2 million $m^2$ of private housing.

Among the subjects of the RF, the largest volumes of housing construction (including residential buildings built on land for gardening) were carried out in the Moscow region, where 10.7% of the total housing area commissioned in Russia as a whole was commissioned, Moscow – 6.3%, Krasnodar territory – 5.6%, Saint Petersburg – 4.3%, the Republic of Tatarstan and the Rostov region – 3.3%, the Republic of Bashkortostan, the Leningrad and Sverdlovsk regions – 3%, the Voronezh and Samara regions – 2.3%, and the Novosibirsk region – 2.2%. In these regions of the RF, slightly less than half of the total housing area introduced in Russia has been built [8].

4. Detailed consideration of the problem

The planned commissioning of housing was also not possible in the Irkutsk region. For the twelve months of 2019, 977 323 $m^2$ were commissioned, with a plan of 1 083 036 $m^2$, which is 1.3% less than in January - December of the previous year. The planned commissioning of housing in 2019 was to be provided by 40 municipalities on their territories, according to the relevant agreements concluded with them. Of the 40 municipalities in the Irkutsk region, 29 completed the housing commissioning plan. Irkutsk regional municipality provided a significant amount of housing commissioning – 473 168,3 $m^2$. This is 48.4% of the total input (Figure 2) [9,10].

![Figure 2. Commissioning of buildings and structures in the Irkutsk region by type from 2016 to 2019, thousand $m^2$.](image-url)
The trend of increasing the share of individual housing construction can be seen in the Irkutsk region. The volume of housing introduced by the population at the expense of its own and borrowed funds amounted to 586 120 m² with a plan of 462,541,7 m², which is 127% of the annual plan and 60% of the total volume of housing introduced [11]. If we do not stop the downward trend in the construction of apartment buildings in the Irkutsk region in 2020 and do not identify the necessary measures for the effective recovery of this type of construction, then the region will not be able to meet the targets of national projects until 2024.

5. Practical significance
In the Irkutsk region, the volume of construction and commissioning of apartment buildings continues to decrease annually. Compared to 2016, the fall was 200 thousand m² last year.

Despite the insufficiently high indicators for housing commissioning, the construction industry has a stable macroeconomic background. The volume of investment in real estate in comparison with 2018 increased by 1,4 times and reaches about 250 billion rubles (Figure 3) [12].

Expectations for the main indicators were met and showed a more positive result, which increased the motivation of investors to invest in real estate in Russia. Moreover, the central bank's reduction of the key rate to the lowest level since the beginning of 2014 creates prerequisites for improving the conditions for attracting debt financing, which also contributes to the motivation of investors [14,15]. In 2019, investors began to invest more in projects under construction, which include sites with projects under construction, objects under redevelopment, etc.

All the above indicators reflect the impact of national projects adopted in Russia. The national project “Housing and urban environment” implies a number of reforms aimed at optimizing the construction industry. In 2019, there were changes in law № 214-FL regulating the sphere of housing construction, according to which, from July 1, 2019, shareholders transfer money not to the accounts
of construction organizations, but to escrow accounts in authorized banks [16]. This measure is intended to protect shareholders from the actions of unscrupulous developers or bankruptcy of enterprises. In this case, the bank simultaneously acts as a guarantor of the safety of the money of shareholders and the lender of the developer. Changes in legislation in the field of housing construction were necessary, as every year questions about the problem of defrauded shareholders became more relevant. Since the reform concerning escrow accounts has not yet been fully implemented, it is not possible to draw objective conclusions. At the moment, the introduction of escrow accounts has a negative impact on the construction business, as the cost of apartments increases, the rate of issuing construction permits decreases, and the number of construction companies that can’t work in accordance with the new legislation decreases, which in the future may negatively affect the indicators of putting real estate objects into operation. This innovation has seriously affected consumer demand: in anticipation of changes in the first half of 2019, the level of sales in the primary market has increased significantly [17,18]. In 2019, the volume of sales in the primary market decreased by 22% compared to 2018. At the same time, the offer increased by 17%. Based on these two indicators, we can assume that in 2020, Russia may start a surplus of new housing.

6. Conclusion
Of course, the construction complex has the potential and all the opportunities for the development of the construction industry within the framework of the national project indicators. To do this, it is necessary to set a clear task for companies engaged in both industrial and individual housing construction, as well as provide them with an understandable planning system and use of their existing capabilities [19,20]. For the next five years, the ministry of industry and trade should work out the issue of providing mechanisms and state orders, so as not to face the problem of mechanization of construction. Russia's human resources potential is also important. In addition to the land fund and technical equipment, it is necessary to direct efforts and invest money in programs to create the necessary human resources in each subject of the RF. The construction complex needs its own professional staff, which in the future will be engaged in large-scale residential and industrial construction projects on the territory of the country. To do this, it is necessary to develop vocational education with reference to each territory, as well as to form professional programs and orders for educational institutions to create human resources for engineering and technical specializations in order to implement key indicators of national projects.

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