Enhancement of the Level of Innovation Activity of Construction Companies

E Yu Gorbachevskaya

Irkutsk National Research Technical University, Russia

E-mail: eugorbachevskaya@mail.ru

Abstract. The solution of key tasks of economic growth and enhancement of the level of social responsibility of construction enterprises are based on scientific and technical resources, long-term innovative development plans and programs. The problem of managing structural elements of innovation activities (the innovation infrastructure of enterprises) is crucial. Currently, enhancement of innovation activities of construction enterprises is a key factor which can improve the market competitiveness. The article aims to study the development and transformation of innovative activities of construction enterprises. The process of developing and implementing innovative technologies in the construction industry was systematized and improved. Stages of the innovation process were described. It allowed for more detailed studies of project directions, adjustment of economic efficiency indicators, minimization of possible risks and achievement of strategic goals of innovative development. External and internal factors affecting the development of innovation activities were systematized; structural components of the innovation potential and components of the innovative strategy for construction enterprises were identified. Conclusions proving the effectiveness of innovation activities in the construction industry were drawn.

1. Introduction

One of the key factors influencing the efficiency of structural economic changes is an increasing role of innovation activities [1,2]. Construction is the least innovative industry due to the lack of significant innovation resources. The priority task of construction enterprises is to develop, increase and activate the innovation potential which predetermines the level of innovation activity. The problem of innovative development of the construction industry has been studied by many scientists [3,4,14,16]. One of the factors constraining the innovative development of the construction industry is conservatism [10,19].

Innovations can initiate structural changes and affect positions of construction companies, their organization and hierarchy, the construction industry and market and the economy as a whole. However, powerful strategic innovation resources and their consequences are difficult to account for [20]. The higher the innovation rank, the stricter are the requirements for science-based innovation management and innovation potential development.

2. Innovative potential of enterprises in current economic conditions

The concept “innovative potential” was introduced by K. Freeman who defined it as an opportunity, funds and stocks that can be used to create innovations in order to ensure economic growth. Based on this definition, one of the scientific approaches to the definition of the term “innovation potential” is a
resource approach according to which the innovation potential is a set of resources used for implementing innovation measures [9].

There are several groups of views on the composition of resources. Some scientists believe that the innovative potential of an enterprise is characterized by the presence of intellectual, scientific, technical, material, industrial, financial and information resources [8,12]. Foreign scientists complement the above resources by human and infrastructural ones [1].

The innovative potential of construction enterprises is a set of production, management and organizational resources that create conditions for implementing innovative projects.

Today, the world is on the verge of the sixth technological order. Its contours are shaping in the developed countries (particularly, in the USA, Japan and the People's Republic of China) developing high-tech technologies [6,11].

Innovative technologies in the construction industry and development of the innovation potential are aimed at reducing greenhouse gas emissions when constructing or wrecking buildings; automation or unification of solutions; production of materials that can offset the costs of the first factor. Under the influence of nanotechnologies, it is important to increase the energy efficiency of buildings, reduce the material consumption and optimize the construction process using modern mechanization tools.

Russian construction companies do not pay attention to environmental issues. The main innovations are aimed at saving transportation and maintenance costs by optimizing individual business processes. This approach cannot improve the quality of buildings. One can conclude that the development and implementation of environmentally-friendly innovative technologies is crucial for the construction industry.

The construction industry shows the lowest growth rates of innovation activities which decreases labor productivity rates in comparison with the global economy and other economic sectors. The analysis of domestic and foreign experience showed that the innovative development is held back by the discrepancy of innovative needs of construction enterprises and innovative developments of research centers, poor qualification of workers. These factors impair innovation process performance at the implementation stage.

Administrative barriers have a negative effect on construction volumes which worsens innovation development efficiency indicators at the diffusion stage. Due to the unstable economic system, developers are afraid of investing in long-term innovative projects aimed at improving the quality and energy efficiency of construction objects. When investing in innovation projects, the priority is to reduce the overall costs of an enterprise in the short term.

3. Enhancement of innovative activities of enterprises

To implement innovation projects in the construction industry, it is necessary to revise the existing process of their implementation (Fig. 1) and present it as a structured sequence and a set of interrelated actions that contribute to the creation, development and revitalization of the innovative potential of the construction industry, allow for the detailed analysis of innovative directions of the construction industry, make it possible to adjust performance indicators, and minimize innovation risks at each stage of innovation development [17,18].
Figure 1. Development and implementation of innovative construction project.

An important step is setting goals and tasks: to enhance the competitiveness by improving the quality of existing products or creating innovative products or technologies; to reduce product production costs by saving raw materials using new technologies. The role of federal target programs and construction technology development programs as elements of the balanced innovation system within which the government can stimulate innovation activities of construction enterprises is increasing.

In the construction industry, innovations are created in the following areas: research and development (development and generation of innovations); industrial and technological (innovations are transformed into new products); market (innovations are sold to the consumer, innovative profits are derived and used for creating innovative products) [15]. The innovative potential of a construction company is a combination of structural components (intellectual components, research potential, production and technical factors, financial resources, marketing strategies and organizational and managerial components).

The innovation potential is used efficiently when all its structural components are involved in the process. It is possible when using a systematic approach to the management of innovative development. One of the main characteristics of the innovative potential management is a synergy effect which implies an increase in the resulting efficiency of the entire system of the innovation potential due to the interaction of all selected elements [13].

The system of financial support for innovative projects is important for developing the innovation potential of construction enterprises. It helps the construction enterprise master innovation methods by increasing the demand for domestic innovations. At present, traditional sources of innovation financing are as follows: budget allocations, special extra-budget funds for financing the innovation cycle, own funds, resources of credit organizations and investment companies, leasing financing. Other financing methods are as follows: venture investment, forfeiting, franchising, etc. It is obvious that for each innovation project, its own financing form and source should be identified [18] based on the following factors: a stage of project implementation; size, age and market reputation of the enterprise; a volume of required funds; a technological level, economic effects, social and budgetary effects of innovation project implementation.

4. Conclusion
In the construction industry, innovation projects are implemented with reluctance. One of the key tasks
to be solved is to enhance the innovation potential of construction enterprises. The developed mechanism will improve productivity, economic efficiency of enterprises, quality of construction products, and competitiveness of enterprises. Integrity (a sequence of all stages of innovation project implementation taking into account consistency, complexity and dimensions) is an important principle of the innovation process. The main stages of the innovation process are as follows: development of an idea; creation of an organizational scheme for transforming an idea into an innovation product; predictive modelling of project efficiency; identification of required resources; identification and implementation of an innovation strategy; implementation of an innovation project. Financing methods play an important role in developing and implementing innovation construction projects. In the construction industry, innovations make it possible to obtain results at the construction and operational stages, i.e. during the whole life-cycle of an innovation construction project. Its duration can be more than 50 years [5,7].

5. References
[1] Bettencourt L 2010 Service innovation: How to go from customer needs to breakthrough services McGraw Hill Professiona
[2] Blinov A O, Ugryumov N V 2015 Change management: from good to best. Bulletin UGUES Science, education, economics. Series: Economy 2(12) 37-40
[3] Bobylev V, Starostina N, Starostina E 2016 The economic essence of innovation and innovation technologies in construction Risk: Resources, Information, Supply, Competition vol 2 76-81
[4] Curzio A Q, Fortis M, Zoboli R 2012 (ed.) Innovation, resources and economic growth Springer Science & Business Media 1689-1693
[5] Dmitriev A N 2017 Development of methods for calculating the economic efficiency of innovation in construction Modern problems of project management in the investment and construction sector and environmental management Materials VII of the International Scientific and Practical Conference dedicated to the 110th anniversary of the REU them G V Plekhanov Editor Resin V I 72–77 (Moscow)
[6] Glasyshev S Yu, Khartonova V V 2009 Nanotechnology as a key factor in the new technological order in the economy. Troyant (Moscow)
[7] Golovachev A S, Kalugin S L 2015 The system of methods for evaluating the innovation activities of organizations: innovation-efficiency-competitiveness Science and technologies news 2(33) 16-22
[8] Imaykina O I Analysis of the innovative potential of the enterprise as a tool for determining its internal capabilities Proceedings of higher educational institutions Volga region Social Sciences 3(31) 211-223
[9] Karpenko M O 2013 Modern approaches to the concept and classification of innovations Bulletin of Bryansk State University 2 129-132
[10] Kaverzina L A, Semkina Yu V 2011 Assessment of the innovative potential of small construction enterprises News of the Irkutsk State Economic Academy vol 5
[11] Klimova V V 2010 Interrelation of innovative economy and post-industrial technological structures International scientific-practical conference of students and graduate students "Russia in the period of transformation: the basic concepts of modernization"Yaroslavl: MUBiNT 77-79
[12] Kunitskaya E V 2015 Development of innovative strategies based on the implementation of an integrated approach to assessing the innovative potential of a high-tech enterprise News of universities Volga region Social Sciences 2(34) 187-193
[13] Moiseeva V A, Prokopchey K Yu 2014 Implementation of the regional innovation development strategy Bulletin of the Pskov State University Series: Economy. Right. Control 5 75-91
[14] Rogers E 2010 Diffusion of Innovations Simon and Schuster 518
[15] Tsvetkov V Ya 2012 Innovations Analysis in Terms of OECD Standards European researcher Series A vol 131
[16] Vasyutinskaya S I Innovation as a complex system
[17] 2017 Perspectives of science and education 3(27) 20-25
[18] Volkov O Standards and methodologies for modeling business processes Homepage http://www.connect.ru/article.asp?id=5710
[19] Volodin V M, Soldatova S S 2017 Specific forms of financing innovative projects in Russia Proceedings of higher educational institutions Volga region Economics 1(5) 24-31
[20] Zagidullina G M, Klesheva O A 2011 Development of the innovation infrastructure of the investment and construction complex Izvestiya KGASU 2(16) 271-277
[21] Zaharova V V 2016 Organization of innovative systems in accordance with the challenges of the global economy Journal of economic theory 2 185-189