Human capital as a factor of development of innovative activity of construction industry enterprises

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Abstract. As practice shows, qualified personnel is the human capital of the organization, which allows you to improve the scientific and technical capabilities of the company, and therefore its innovative potential. The purpose of the scientific article is to study the main approaches to the definition of human capital and its role in the development of innovative activities of enterprises in the construction industry at the present stage. The authors identified the fundamental provisions and trends of scientific research in the field of human capital. On the one hand, human capital is an integral part of intellectual capital, and is a kind of intangible asset of the enterprise. On the other hand, increasing the level of intellectual potential of an enterprise is possible only with the development of human capital. The paper proves that an important factor influencing the development of innovative activities of construction industry enterprises at the present stage is the level of staff qualification. To implement measures of personnel policy of construction industry enterprises (improving the professional level of personnel, employee satisfaction, reducing staff turnover, etc.), it is advisable to monitor such basic indicators of scientific and technical training of personnel as the share of employees with higher education, the share of employees engaged in research and development (RDA), the share of costs for professional development and training of employees, the share of costs for remuneration of employees engaged in RDA, etc.

1. Introduction

The development of the construction complex has the ultimate goal of improving the quality of life of the population. To achieve this goal, it is necessary to increase the volume of construction, improve the quality of construction projects and the level of innovation potential [1], [2], [3], [4], [5].

The basis of the innovative potential of a construction enterprise are scientific knowledge, innovation, investment, human resources, entrepreneurial resources, technological tools necessary for the production of new building materials, products and building systems that requires a higher level of human capital, since recent years have seen the following major indicators [6], [7], [8]:

– Average number of employees of organizations engaged in technological innovation amounted to 3865 people have a high education – 1323 people;
– Expenses for technological innovations – 49.8 million rubles.

The dynamics of labor productivity in the construction industry has remained virtually unchanged in recent years, which is confirmed by the data in figure 1.
As shown in figure 1, the amplitude of the level of labor productivity in construction during the study period varies from 1.5% to 5.2%. Labor productivity in construction reflects the dependence on trends in the movement of personnel, in particular:

- The value of the turnover coefficient for staff retirement in 2016 was 58.1%, in 2017-56.8%;
- The value of the turnover ratio for hiring personnel in 2016 was 49.2%, in 2017-50.5%;
- The value of the employee turnover rate (mainly on their own) in 2016-2017 was 78%.

2. Materials and methods
The concept of “labor force” was used by economists until the 60s of the last century, and the term “human capital” was introduced into economic theory by T. Schultz, who divided all human abilities into “innate” and “acquired”. The innate abilities of a person, determined by a complex of genes, make up the human potential. Valuable qualities acquired through appropriate investments are also included in human capital [10].

R. Solow proposed a model of economic growth of the American economy due to an additional component in the form of technological progress. He introduced an additional variable that takes into account the acquisition of new high-tech equipment with higher productivity in subsequent production cycles. Accordingly, to work on such equipment, it is necessary to improve the skills of employees, that is, to increase the human capital of the enterprise [11].

Issues of formation and management of human capital are given sufficient attention in modern scientific research, the essence of which is such basic provisions as:

First, human resources and organizational conditions are defined as the leading factors influencing the implementation of the innovation process [12];

Secondly, the innovation-oriented activity of personnel plays a decisive role in managing the use of resources [13];

Third, innovative activity implies not only planning of perspective directions of development of economic objects, development of ideas, introduction into production with subsequent implementation of the finished product on the market, but also innovative resource management, which results in
improving the quality and efficiency of production, increasing labor productivity through effective management of the resource potential of construction enterprises (innovations in the organization of labor and production activities) [14].

3. Results
The dynamics of the average annual total number of employed workers for such economic activities as trade, manufacturing and construction is shown in figure 2.

![Figure 2. Dynamics of the number of employed employees by type of economic activity (thd. people) [15].](image)

According to figure 2, the total number of employees for the presented types of economic activity in 2018 decreased by 0.3% compared to the previous period.

In terms of the total number of employees employed during the analyzed period, the construction industry ranks last, with a slight increase in this indicator in 2018.

The number of active construction organizations tends to decrease (table 1).

| Table 1. Dynamics of existing construction organizations (thd. units) [9]. |
|---------------------------------|-----------------|-----------------|-----------------|
|                                 | 2016            | 2017            | 2018            |
| Total, including by form of ownership | 271604          | 279496          | 278059          |
| State                           | 778             | 759             | 589             |
| Municipal                       | 426             | 442             | 395             |
| Private                         | 269548          | 276944          | 275749          |

The need of employers for construction workers is shown in picture 3 and indicates the need to attract more qualified personnel.
Figure 3. Dynamics of the number of employed employees by type of economic activity (thd. people) [15].

The structure of employed employees by level of education indicates that the largest number of employees in construction have secondary vocational education (48.5%), employees with higher education make up 24.4% of the total number of employed workers in construction.

According to the data on the prevalence of personnel training in the construction industry, 64% of companies from the total number of surveyed company managers organized various types of training for their employees [9].

4. Findings
Implementation of the main directions of innovative personnel policy of construction industry enterprises should be aimed at:
- Improving the professional level of personnel, which is reflected in an increase in employees with higher and secondary professional education;
- Satisfaction of the employees and reduced turnover of staff, upgrading of human resources;
- Development of employee skills through retraining to meet the needs of the industry;
- Development of partnership between enterprises and organizations of professional education on training specialists in new, popular and promising professions and specialties.

5. Discussion
The innovative potential of the enterprise is formed under the influence of such factors as the use of new materials, technologies, methods of organizing production and stimulating labor, resource provision (investment, intellectual, human resources), identification and management of innovative risks [16], [17], [18], [19], [20], [21].

Human capital is formed by natural abilities of a person, health, motivation to work, creative potential, knowledge, skills, professional experience acquired as a result of investment, all these components together contribute to the growth of labor productivity, and bring income to the owner of such capital.

However, according to experts, the problem of attracting and retaining talented and promising specialists who form the added value of the enterprise is an urgent issue for the management of modern companies [22].
To assess the human resources potential, various indicators are usually analyzed, including: the share of employees with higher and secondary professional education; employment of employees and their movement dynamics; costs for retraining and training of personnel, etc.

For the evaluation of innovation capacity of enterprises to further carry out the analysis of the dynamics of these indicators of scientific and technical training of personnel as share of employees with higher education engaged in research and development (RDA), the share of expenditure on training and education of workers engaged in RDA, the share of costs of employees engaged in RDA, etc. [23]

6. Conclusion

Summing up, we can assume that at the present stage, improving the quality of human capital of a construction organization should be based on the results of systematic monitoring of the main indicators of scientific and technical training of personnel, assessment of qualification requirements for employees, qualitative changes in the content of professional training, development of the system of continuing professional education through professional development and retraining.

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