ABSTRACT

The main factor in the development of the Russian economy at present is human capital. The capitalization of the human factor, i.e. the transformation of knowledge into value added, is impossible without increasing innovation activity. In Russia, despite the rather high educational level of the population, there is low innovation activity in comparison with the leading countries. There is a clear contradiction. One problem is the assessment of human capital. The article presents the author's method of assessing the human capital of an innovative organization. To determine the scenario of human capital development, a theoretical matrix is used, which characterizes the interdependence of the level of human capital assessment and the effectiveness of innovative activity of the organization.

Key words: human capital, innovative organization, innovation, management, evaluation, innovative development.

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1. INTRODUCTION

In the Russian economy today there is a contradictory situation, on the one hand, the country has a significant scientific and innovative potential, on the other low innovation activity. Today, only 9% of innovative products are manufactured at Russian plants (Gorodnikova, Hochberg, 2017). In high-tech industries, initially focused on high innovation activity, the share of products new to the market of the Russian enterprises is 0.3 % (Gorodnikova, Hochberg, 2017). For comparison, the share of such products in Finland is 16% in Germany and the Czech Republic -12-13%, Greece – 23%, in the United States – more than 30% (Gorodnikova, Hochberg, 2017).

In Russia (fig.1), despite the rather high educational level of the population, there is a low innovative activity in comparison with the leading countries (Gorodnikova, Hochberg, 2017).

![Figure 1 Human capital in the implementation of innovative development, 2017](image_url)

Today, Russia's share in the market of high-tech products is negligible and is 0.3 %. But there is a positive dynamic in the development of innovation. From 2004 to 2018 the number of granted patents increased by 51%, including the number of applications for inventions for the same period increased by 9 % (Healthcare in Russia, 2018). The cost of R & d expense increased 6 times and amounted to 523 billion rubles. In the rating presented by INSEAD according to the analytical report "Global innovation index 2018" (Global Innovation Index 2018), Russia took 46th position out of 126 countries with an index value of 37.9, Switzerland (with an index value of 68.4), the Netherlands (63.3), Sweden (63.0) (Global Innovation Index 2018).

The index is calculated on the basis of more than 80 indicators combined into two groups: available resources and conditions for innovation and the results achieved from the introduction of innovation. The report notes that the strong position for the innovative development of Russia is associated with the high quality of human capital, the development of knowledge and technology, business development. Contributes to the development of innovation, poor infrastructure, and prevent the development of inadequate institutions, low results of creative activity (72) and the development of the internal market (111) (Global Innovation Index 2018).
In 2014, experts paid special attention to the impact of human capital on innovative development. The report on the results of the study indicated that the high performance of countries was achieved through intangible assets such as high-quality human capital necessary for the practical implementation of innovations.

The state's attention to this problem was expressed in the development of the concept of socio-economic development of the Russian Federation until 2020, focused on the transition to the "model of innovative socially oriented development". To this end, the decree of the President of the Russian Federation approved the priority directions of development of science, technology and technology for the modernization of the main competitive industries. The priority directions of modernization of the Russian economy include:

- Energy efficiency and conservation, including the development of new fuels.
- Nuclear technology.
- Space technologies related to telecommunications, including GLONASS and the terrestrial infrastructure development programme.
- Medical technologies, primarily diagnostic equipment, as well as medicines.
- Strategic information technologies, including supercomputers and software development.

Thus, pharmaceutical production is a priority for innovative economic development of Russia. International statistics confirm that the pharmaceutical industry has the highest share of value added per employee and the ratio of research and development costs to sales. This sector occupies a leading position in the economy of the USA, Europe and Japan.

Today, 460 domestic pharmaceutical organizations and more than 1100 foreign enterprises operate in the Russian pharmaceutical market (AlphaRM, 2018). In 2018, the volume of the Russian pharmaceutical market reached 1.254 trillion. rubles, which made it one of the largest and most promising in the world.

Today the state of the Russian pharmaceutical market is characterized by such main features as: a high share of imports of finished pharmaceutical products and the supply of obsolete, lost the clinical efficacy of the substances and finished medicines. This is confirmed by statistical data: the volume of imports from 2000 to 2017 increased from $ 6 billion. up to $ 216 billion (AlphaRM, 2018). Only 25% of substances required for pharmaceutical production are produced by Russian pharmaceutical organizations. The resulting deficit is closed by imports of Chinese and Indian medicinal substances. The dependence of the Russian pharmaceutical industry on imports poses a threat to the national biological security of the country.

According to the analytical Agency "DSM Group" the share of medicines of the Russian production in 2018 25% in terms of value, respectively the 75% of the medicines of foreign production. At the same time, the ratio of imported and domestic medicines in natural indicators remains in favor of domestic ones, the share of which is 56% (DSM Group, 2018).

This discrepancy in the ratio of cost and natural volumes between imported and domestic drugs can be explained, first of all, by the low cost of domestic products. Thus, the average cost of packaging domestic drugs in 2018 amounted to 92 rubles., imported about 320 rubles (DSM group, 2018).

The low cost of domestic medicines can be explained by their low level of innovation. In the Russian pharmaceutical market today is dominated by generic drugs, the so-called generics. Original drugs, in accordance with the Federal law "on circulation of medicines", are such drugs, which include a pharmaceutical substance obtained for the first time, the safety of which is proved by the results of preclinical and clinical studies.
In public procurement of original imported drugs and generic drugs, financing of foreign pharmaceutical production, stimulation of development and introduction of innovations in other countries actually takes place. All that weakens the competitive advantages of individual Russian pharmaceutical manufacturing companies and the entire pharmaceutical industry.

Today, Russian pharmaceutical organizations are focused on the production of generic drugs with low profitability, which limits their ability to invest in the development of innovative drugs. The low number of innovations is a barrier to entry into the world market. Low R & d costs do not allow to develop and implement innovative technologies, innovative drugs. But it is modern science that enables the scientific search for new drugs.

The population of developed countries today lives an average of 30 years longer than a hundred years ago. The reduction of mortality and improvement of quality of life are largely merits of pharmaceutical production. The emergence of new drugs in the pharmaceutical market is the result of a long, high – cost, risky innovation process carried out by pharmaceutical organizations.

Success in the implementation of an innovative project is largely due to the presence of functioning human capital of employees involved in the implementation of such a project. And the innovative development of the organization as a whole depends on the effectiveness of human capital management of the organization, which is largely determined by the presence of an adequate system for assessing human capital

2. MATERIALS & METHODS

The objectives of the assessment of human capital can be a retrospective assessment, forecast, operational (current), assessment of compliance with the strategies of innovative development of the organization, assessment of the structure and quality of human capital in the dynamics, evaluation of the effectiveness of the use and transformation of human capital in the innovation process.

Evaluation of the human capital of employees of an innovative organization is carried out using management functions. Such as: planning directions and evaluation procedures; organization of project and expert staff; monitoring of evaluation.

The methodology for assessing the human capital of employees of an innovative organization may consist of a large number of methods, depending on the objectives of the assessment. The main methods of human capital assessment include the following: methods of graphs, methods of expert evaluation, test methods, methods of statistical evaluation, the method of assessment center, the method of 360 degrees, certification, evaluation by the method of analysis of individual activities of the employee and its results, etc. But in General, the methods of evaluation should provide the calculation of quantitative, qualitative and cost indicators of the effectiveness of human capital in innovation.

As a tool to identify problems in the management of human capital in an innovative organization, we present the author's methodology for assessing the professional, intellectual and creative components of human capital.

The effectiveness of its implementation depends on the availability of science-based methodology of human capital management in the organization, the main provisions of which should be included in the concept of personnel policy of the organization.

Today, an innovative pharmaceutical organization cannot be expected to succeed if the use of advanced technologies and the latest equipment is not supported by due attention to the management of human capital of employees. Optimization of involvement of human capital of employees in the innovation process, in our opinion, significantly affects the achievement
of the goals of innovative development of the organization. Therefore, the social dimension of governance is now given high priority.

The main efforts of the management should be directed to the employee, to his intellectual and creative (creative development), and also it is necessary to pay attention to the formation of the innovation project team, capable of working together, ensuring the achievement of goals.

Human capital management system is a key strategic factor in the development of innovative pharmaceutical organization. When making management decisions, the Manager must have full information about the level of human capital of each employee, professional, intellectual and creative components of human capital, tendencies to rational or creative thinking.

The objectives of personnel policy and work with personnel should include modern mechanisms, models, scenarios, tools, methods, approaches to human capital management of each employee for the formation, development, use and transformation of his professional, intellectual and creative (creative) abilities in the results of innovation, as well as to stimulate the most effective professional return in the implementation of the innovation process.

When assessing human capital, it is important to assess the contribution of each employee to the achievement of economic and social results of the organization. Professional activity of any employee can be both productive and insufficient or completely unproductive, both simple and complex, technically equipped and without the involvement of technology, etc. This has a variety of explanations. But in General, the effectiveness of activities directly depends on the performer, or rather — on his human capital and especially intellectual and creative components, the degree of manifestation of creative return (innovation activity), the transformation of human capital in the innovation process.

3. AUTHOR'S METHODOLOGY OF HUMAN CAPITAL ASSESSMENT: PROFESSIONAL, INTELLECTUAL AND CREATIVE LEVEL

The author's methodology for assessing the human capital of employees of an innovative organization includes:

1. Assessment of the professional level of human capital.
2. Assessment of the intellectual level of human capital.
3. Assessment of the creative level of human capital.

In general, the evaluation system will allow monitoring the effectiveness of human capital management, and the accumulation of statistical data – to form an internal management accounting system for the operational management of human capital of an innovative organization.

Considering the human capital of an employee as an object, it is necessary to assess his contribution to the economic and social development of an innovative organization. The person is the main initiator and performer who provides advance of the organization to an objective in a certain field of professional activity. Man embodies the unity of intellectual accumulation and processing of information coming from the external environment and the return of creative (creative energy), aimed at meeting their needs or interests of the organization in which they work. Therefore, when assessing the contribution of each employee to the implementation of the organization's strategies, we will proceed from the assessment of professional, intellectual and creative level (the level of innovative activity).
In developing the evaluation methodology, the following requirements were taken into account:

- **objectivity** – independent of the private opinions or individual judgments;
- **reliability of evaluation** - freedom from all kinds of random factors;
- **reliability of assessment** - only the real, actual level of human capital of the employee, the available knowledge, skills, level and type of intelligence and the level of creative impact (innovation activity);
- **prognostic** - the assessment is aimed at identifying the presence and possibility of use, hidden intellectual and creative reserves of the employee;
- **accessibility and consistency** – the evaluation process is clear to all participants;
- **compliance with the objectives of the organization** - the assessment of human capital meets the objectives of a particular organization.

To meet these requirements, the human capital assessment technology contains the following principles:

- **several subjects of evaluation** - in conducting the evaluation involved several experts;
- **establishment of a set of evaluation methods** - evaluation includes different methods, complementary and duplicative, to increase credibility;
- **system assessment** - employee's human capital is assessed from several positions: professional, intellectual and creative (creative).
- **development of evaluation criteria** - identification of key indicators that reflect professional, intellectual and creative requirements to the employee involved in the implementation of the innovative project;
- **development of a measurement system of evaluation criteria** - ensuring quantitative and qualitative expression of the characteristics identified in the evaluated employee;
- **formalization of evaluation activities** – development and formation of reporting forms to ensure follow-up, research and evaluation.

The author's methodology for assessing the human capital of an employee includes three levels: professional, intellectual, creative:

- at the professional level - expert assessment of the importance of professional level indicators, taking into account the consistency of experts' opinions;
- at the intellectual level - expert assessment of the importance of the components of the intellectual level (intelligence), taking into account the degree of consistency of experts' opinions;
- at the creative level - expert assessment of the significance of creative level indicators, taking into account the consistency of experts' opinions;

### 3.1. Assessment of the professional level of human capital

Assessment of the professional level of human capital of an innovative pharmaceutical organization. The evaluation algorithm consists of the following sequence:

- Determination of the purpose of evaluation: monitoring and diagnostics of the quality of the professional component of human capital
- Building a system of indicators that assess the professional level of human capital of the employee and the comparison of these indicators with the standard, the norm, which serves as a unit of measurement.
Assessment using tests on General ability to perform professional duties and compliance with the recommended standards of certification indicators of the individual, developed by experts taking into account job responsibilities.

To ensure the comparability of the obtained indicators, the methods of multidimensional scaling were used, allowing to move from quantitative to qualitative indicators of professional level, to assess not only the degree of quality of the professional level of human capital, but also to rank the employees of the organization on this indicator.

Prior to the ranking, the degree of consistency of experts’ opinions on the determination of the ranks of professional level indicators using the multiple concordance coefficient was determined.

The integral quality of the employee's professional level is proposed to be calculated by the formula (1):

\[ P = \sum_{i=1}^{n} k_i x_i \]  

where \( x_i \) is the qualitative value of the i-th indicator of the employee's professional level;

\( k_i (\sum k_i = 1) \) - weighting factor that determines the value of

3.2. Assessment of the intellectual level of human capital

- 2. Assessment of the intellectual level of the employee's human capital. The effectiveness of all intellectual and innovative activity of the organization depends on the quality of the intellectual level of human capital of employees. The intellectual level of the employee is evaluated by individual components of intelligence. The evaluation algorithm consists of the following sequence:

  - Determination of the evaluation goal: monitoring and diagnostics of the intellectual level for managing employee development in innovation, identifying unused reserves, for the formation of project teams involved in the implementation of innovative projects.

  - Assessment of the intellectual level by types of intelligence. Assessment of certain properties of a particular type of intelligence is carried out using ready-made psychological tests (tests to determine the intellectual level). To determine the intellectual level of an employee, it is proposed to use a formula that allows you to evaluate the intellectual level of an employee, as well as to detail it by a number of properties. Since the work was allocated six types of intelligence, the formula for calculating the intellectual level will be as follows:

\[ I = \sum_{i=1}^{6} k_i A_i \]  

where \( A_i (i = 1 \ldots 6) \) - assessment of the components of the employee's intelligence in points (intelligence perception, logical, economic, emotional, creative, socio-cultural)

\( k_i (\sum k_i = 1) \) is the weighting factor that determines the importance of a certain type of employee intelligence when creating project teams.

- The expert group (head of Department, HR Manager, psychologist, leading specialist in the direction) in the formation of the project team determines the weight value for the types of intelligence of each employee, based on the objectives of the innovative project and achieve a synergetic effect of the interaction of employees. Experts rank components of A_i according to the principle: the higher the importance of the type of intelligence, the higher the rank.

- The multiple concordance coefficient is used to determine the degree of consistency of the opinions of many experts who have determined the ranks of the types of intelligence.
3.3. Assessment of the creative level of human capital
Assessment of the creative level of the employee's human capital. The external manifestation of intellectual abilities during the practical use of intellectual human capital is creative return. Creativity can then be seen as the ability to innovate.

The evaluation algorithm consists of the following sequence:

- Determination of the evaluation goal: monitoring and diagnostics of the creative level of employees to optimize the management of creativity, and subsequently-the development of measures aimed at increasing the innovative impact.
- Survey and testing of employees to identify creative abilities.
- Collection and processing of statistical information on evaluation indicators.
- The expert group determines the weight value for the indicators of creative level evaluation. Experts rank indicators according to the principle: the higher the significance of the indicator, the higher the rank.
- The multiple concordance coefficient is used to determine the degree of consistency of the opinions of many experts who have determined the ranks of the creative level indicators.

3.4. Assessment of human capital of employees of innovative organizations
The resulting individual values are used to calculate the human capital of the organization (group, division). The indicator of human capital of the organization is calculated as the arithmetic mean of individual professional, intellectual and creative levels of human capital of employees.

\[ PIC = \frac{\sum_{i=1}^{n} P + \sum_{i=1}^{n} I + \sum_{i=1}^{n} C}{n} \]  

where \( \sum_{i=1}^{n} P \) - the total professional level of employees;
\( \sum_{i=1}^{n} I \) - the total intellectual level of workers;
\( \sum_{i=1}^{n} C \) - total creative level of workers;
\( n \) – number of employees of the organization (divisions)

4. SCENARIOS OF THE EFFECTS OF HUMAN CAPITAL ON THE PERFORMANCE OF INNOVATIVE ACTIVITIES
Management as a conscious activity involves the need to determine the possible prospects for the development of human capital. Therefore, the study proposes a theoretical matrix of basic scenarios, which is original. The matrix and scenarios of human capital impact on innovation performance are presented in figure 2.

![Figure 2 Scenarios of the effects of human capital on the performance of innovative activities](http://www.iaeme.com/IJCIET/index.asp)
The matrix of basic scenarios defines the relationship between the level of human capital development and the effectiveness of innovation activities of the organization in four scenarios: favorable, satisfactory, unsatisfactory and scenario excluding development.

During the study, a methodology for empirical research on human capital management was developed.

The author's matrix of basic scenarios of innovative development of the organization was used to assess the impact of human capital of the organization (division, team, project group) on the effectiveness of innovative activity of the organization.

The human capital of innovative organizations was chosen as the subject of empirical research.

The choice is determined by the following circumstances:

First, in the current economic literature, a significant amount of research is devoted to innovative organizations in which innovation is not the main activity. But the Russian practice has already developed an innovative sector in which organizations are actively using high-tech innovations, strive to create new ones. Research of these organizations has not yet been reflected in the scientific literature.

Secondly, the analysis of human capital of innovative organizations is of research interest. During the empirical study, many research questions were raised.

Hypothesis of the study: Russian innovative organizations are characterized by a high level of human capital, providing high efficiency of innovative activity and a favorable development scenario.

To prove the hypothesis, 47 innovative pharmaceutical organizations were examined, which were included in the rating of technical success, which employs more than 23 percent of industry workers, and their share in the market of domestic products is more than 37 percent (Gorodnikova, Hochberg, 2016; Gorodnikova, Hochberg, 2017; Healthcare in Russia, 2017).

Data collection for the evaluation of human capital of employees was carried out by the method of testing of employees, as well as the audit and remote questioning of managers, using the internal reporting of the organization. Statistical methods were used for data processing.

Evaluation of human capital of employees is carried out according to the developed author's methodology, which is used to evaluate the professional, intellectual and creative components of the human capital of the employee and the organization.

To confirm the hypothesis, the effectiveness of innovation was also evaluated. The innovative activity of the organization was determined by the indicators that experts in the rating “Technical success-2017”. Reporting data for 2012-2017 were collected directly on the surveyed organizations.

Their processing is carried out by the method of multidimensional scaling.

To determine the scenario of human capital development, we used a theoretical matrix that characterizes the interdependence of the level of human capital assessment and the effectiveness of innovation.
5. RESULTS
The results of the analysis are shown in fig. 3.

![Figure 3 Scenarios of human capital development of innovative organizations](image)

The results show that the higher the level of human capital, the more innovative the organization becomes. Surveyed innovative organizations provided a favorable development scenario.

Thus, the hypothesis was confirmed.

6. CONCLUSIONS
Thus, it is possible to identify the key points in the management of human capital to increase the innovation activity of the Russian economy:

1. The need to intensify innovation activities in Russia, which is clearly inferior to many developing countries, requires the introduction of human capital management systems not only in innovative organizations, but also in those organizations in which innovation is not the main activity.

2. The formation of the human capital management system should be carried out in accordance with the following principles:
   - Backbone-synergy, teamwork, innovative management, feedback, reproductive balance, integration with the system of strategic management, efficiency, parallelism, prospects and hierarchy, activity of management, flexibility and adaptability of management, information openness and accessibility;
   - Content and multidimensionality in the management of perceptivity, motivation to innovative activity, management of multiplicity of subcultures, adhocracy and humanization activities.

3. The main condition for the development of human capital is the integration of explicit and implicit knowledge – the basis to produce new knowledge to transform it into innovation.

REFERENCES


Human Capital: The Evaluation Methodology and Definition of Scenarios of Innovative Development of the Organization

