THE CONCEPT OF KNOWLEDGE MANAGEMENT IN THE REGION AS A BASIS OF ESTIMATION OF CONDITIONS OF INNOVATIVE ACTIVITY

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Abstract: Innovative activity in a region is considered in terms of the knowledge management concept. An approach is proposed for assessing the conditions for innovative activity on the basis of three groups of indicators: indicators, characterizing the financial conditions for innovative activity; indicators, characterizing human resources; indicators, characterizing the knowledge generation sources in a region and their accessibility. The obtained integral estimation allows us to classify regions and, on this basis, differentiate innovation policy.

Keywords: HUMAN RESOURCES, KNOWLEDGE MANAGEMENT, INNOVATIVE ACTIVITY

1. Introduction

Information and knowledge play an important role in modern socioeconomic systems. Knowledge economy is formed when knowledge becomes a commercial commodity. Knowledge acts as a specific commodity, which is sold and bought similarly to traditional consumer products. However, a knowledge market has some specifics.

A knowledge-based economy must have the following common features:

1) intensive development of knowledge, which is reflected in a form of constantly increasing importance of the science intensive sector, growing volumes of production and sale of modern high technologies, accelerating computerization processes in the economy and the entire life of society;
2) growing capitalization of the market share of companies involved in advanced research and development;
3) one of the priorities of the state policy is capitalization of costs in man, who is one of the most important resources;
4) high rates of fixed capital renewal in life-supporting sectors of material production and servicing infrastructure;
5) provision of a decent living standard for every citizen in the country: housing, job, information and transport support, etc.

The socioeconomic development of Russia is characterized by high level of interregional differentiation and it must be considered in the pursuit of innovation policy. Evaluating the conditions of innovative activity allows us to estimate the capabilities of regions to generate and use innovations to increase competitive advantages. This estimation must consider the factors of knowledge formation in a region.

2. The concept of knowledge management in a region as a basis for estimating the conditions of innovative activity

The concept of knowledge management is based on interpretations of the essence of knowledge, its role in the economy, classification [1, 3, 4, 5].

Knowledge is spread chaotically, and brain drain from regions occurs. Consequently, mechanisms are necessary which would regulate the flow of those who are involved in intellectual labor and have unique knowledge. In the 1950s in the USA the concept of knowledge management appeared so that this problem could be tackled. First it was applied to private firms and organizations, but since the mid 1990s this concept has been adapted for a regional level.

Today knowledge management is understood as systematic processes thanks to which the main elements of intellectual capital are created, sustained, distributed and applied. Knowledge plays an important role in advancing innovations, creativity and idea exchange [2, 6, 7, 8].

Knowledge management includes the following basic processes:

- creation: the result of this action is new knowledge;
- search: search for and formalization of inexplicit knowledge, which makes it possible to create a common knowledge base for collective use;
- systematization (organization): categorization and classification of knowledge for its further well-targeted extraction;
- access: actions which make knowledge spread and exchange;
- utilization: application of knowledge in every day activity, particularly, in decision-making [9].

The concept of knowledge management can be considered not only at the level of organizations, but also at the level of regions. Development and pursuit of innovation policy of a region, functioning of the regional innovation systems must be considered given the processes of knowledge generation, development and utilization.

The forever growing volume of knowledge under the conditions of constant advancement of technology and modernization of today's economy determines knowledge management as a major resource of the country. The intellectual potential of a region can often affect its competitiveness, while the capability to bring innovative ideas to the stage of commercialization under the conditions of innovative development of society becomes a major factor not only for successful functioning, but also for survival in the global arena. At the same time, globalization processes accompanying innovative activity contribute to an effective exchange of knowledge and experience and speed up commercialization of innovation.

The innovation potential of a region allows us to determine the development prospects of the regional economy and estimate its capabilities for innovative activity. Improving the well-being of regions becomes a top priority objective of their economic development. Economic growth with the economy transiting to an innovative way of development is directly connected with successful fulfillment of innovation potential. Innovation potential depends to a large degree on the quality of human capital.

For effective fulfillment of a region's innovation potential, capabilities for both extensive and intensive development have to be united. The problem of staff replacement in the scientific research sector must be solved, but it is also important to think of the quality of intellectual resources. Some knowledge, abilities and
skills cannot be replaced with their holder being gone. Consequently, ways should be found to keep this knowledge and make it accessible to those people who need it. I.e. conditions should be created that would allow us to identify and realize human potential as well as to acquire knowledge management skills. Thus, the role of knowledge management takes the leading position in increasing both a region's innovation potential and the innovation potential of the entire country.

Let us point out the factors of knowledge management which affect the formation of favorable conditions for innovative activity in a region:
- the total volume of costs associated with forming and improving knowledge infrastructure, the structure of these costs;
- the volume and quality of human capital whose holders take part in innovative activity;
- availability and accessibility of knowledge generation sources.

The concept of knowledge management is grounded at a regional level on the following statements: the cost of producing innovation and creating modern knowledge infrastructure in a region takes up regional costs and determines financial conditions for innovative development of a region; knowledge, abilities and skills of man represent a specific form of capital (human capital); formation of human capital, whose quality meets the demands of innovative development, calls for financial and organizational resources and well as time resources; the knowledge sources of a region are represented by databases and access to these databases, thanks to which the process of knowledge generation takes place.

Regional innovation policy should be considered in the context of the developing concept of knowledge management at a regional level taking into account the processes of human capital formation.

Let us look at the factors of knowledge management in more detail. Research and development costs as a whole determine the general capabilities for implementing innovative activity.

According to the Industrial Research Institute — IRI (USA), in 2015 the share of Russia and CIS countries in the total volume of R&D funding was 3.0% (the share of the USA was 25.8%, that of China was 20.1%, in 2017 these indicators were 2.8%, 25.5% and 20.8% respectively) [10]. The projected value for Russia for the year 2018 is 2.6% [11]. At the same time, according to the data of "Battelle", "R&D Magazine", "World Factbook", the International Monetary Fund and the World Bank, Russia took the 8th position in 2016 (50.9 billion USD) in terms of the absolute amount of costs. However, this indicator is still incomparable with the potential of China and the USA [17].

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With relatively low expenditure on R&D in the Russian Federation, human resources involved in scientific research have quite a considerable weight. In the analysis of the total employment of population, the share of scientific workers in the country corresponds to the average value of this indicator among the countries being studied [14, 15]. Almost two thirds of researchers are employed in the public sector.

An essential problem in creating new knowledge in the private sector is a limited interaction with R&D conducted in the public sector. The majority of scientific workers in the public sector of science have virtually no interest in commercializing the results of their activity. This is proved by a relatively low number of both patent applications and issued patents. However, Russia belongs to the ten countries involved most intensely in innovative activity in terms of the number of patent applications and the number of patent applications per 1000 workers employed in the R&D sector in 2015 [14,15]. The invention activity coefficient (the number of patents issued per 10 thousand people of the country's population) was 1.18 in 1995, 1.68 in 2014, and 2.04 in 2015. Various technology innovations, developments in the field of transportation, chemistry and metallurgy are the most common to patent [16].

Innovative activity performance in the Russian Federation is not high enough. But it is not because of the lack of highly-qualified manpower, but because there are no favorable conditions for scientific activity in the country. Russia is a major exporter of scientific workers aged 30-35 [14]. In order to fulfill innovation potential in the country, it is necessary to improve the labor conditions of scientific workers and provide opportunities for career growth, which will be quite an important factor for forming favorable conditions for innovative activity of a region.

The conditions for innovative activity are noticeably different in Russian regions. At the same time, these conditions must be evaluated in order to manage innovative activity and identify priorities for funding.

3. Solution of the examined problem: evaluating the conditions for innovative activity in a region

When methods are chosen for evaluating the conditions for innovative activity in a region, non-uniformity of socioeconomic development of the regions in the Russian Federation should be considered. Ways to improve innovation climate that will work for one region might have no effect in other subjects of the Russian Federation.

The existing systems for evaluating the innovative development of regions are based on an "input/output" model. I.e. resources available at the input and results obtained at the output are looked at. It implies that results are evaluated rather than original (background) conditions. At the same time background conditions have to be evaluated so that effective innovation policy can be developed. In order to evaluate the conditions for forming and improving regional innovation policy, it is suggested using only "input" elements, which define the conditions for innovative activity.

Evaluating regional conditions for innovative development is the first stage in developing regional innovation policy. A productive approach to carrying out such evaluation is to evaluate integratively the factors of knowledge management: financial conditions for knowledge management; characteristics of human capital in terms of participation in innovative activity; availability...
and accessibility of knowledge sources (knowledge generation points).

It is suggested that the following set of indicators should be used:

- a) financial conditions for knowledge management:
  - gross regional product, mil. RUR
  - internal R&D cost, mil. RUR
  - remuneration of workers involved in R&D, RUR
  - average salary of workers in organizations in a region, RUR
  - information-communication technology costs in a region, mil. RUR
- b) capabilities for human knowledge development:
  - population size, thousand people
  - average annual number of the employed, thousand people
  - manpower involved in R&D in a region
  - researchers with academic degrees (PhDs and Doctors of Sciences)
  - number of students in higher educational institutions
- c) knowledge sources in a region:
  - number of enterprises and organizations
  - R&D organizations in a region
  - organizations involved in training PhD students and doctoral students
  - organizations having broadband access to the Internet

We will use the concept of an "ideal system" for integral estimation. It implies choosing reference values of indicators and comparison of the achieved values of indicators in a region with the reference values. Thus, having no opportunity to determine a reference region by all indicators that are analyzed, a region should be chosen where a specific indicator has the best value ("ideal" at a certain time for a specific indicator). A set of indicators "ideal" for a certain moment characterize an "ideal" region.

Indicators must be limited for integral estimation so that estimates can be obtained in unit fraction. For example, indicators which characterize financial conditions for innovative activity for an entire region and are related to R&D costs and costs associated with information-communication technology are limited in relation to gross regional product.

After limited indicators are obtained, their values are compared to the "ideal" ones and deviations are identified. Integral estimation is calculated on the basis of the geometric mean of the obtained deviation coefficients.

### 4. Results and discussion

This set of indicators is presented in the official statistics, but the comparability of indicators by regions must be taken into account. In terms of the entire system (the national innovation system of the Russian Federation), common points of development can be set for all regions. These points must be significant for all aspects of innovative activity, like funding, scientific manpower or knowledge generation sources. Depending on the obtained estimates of the conditions for innovative activity it appears possible to make a reasonable choice of the priority direction for a certain region. Further on, provided there is constant monitoring, it is possible to identify the effectiveness trends of the pursued innovation policy and wisely alter its course.

### 5. Conclusion

Advancing innovative activity is an important factor for competitiveness growth of regions. Regional innovation policy must consider the conditions actually existing in a region. The concept of knowledge management can be effectively used at the level of a region as a methodological basis for estimating the conditions for innovative activity.

In terms of this concept, the estimation of the conditions for undertaking innovative activity involves:
- estimation of the financial conditions for innovative activity;
- estimation of human capital, whose holders are involved in innovative activity;
- estimation of the availability and accessibility of the knowledge generation sources in a region.

Each of the knowledge management factors includes an integral indicator of the consistent elements, which reflect some aspects of innovative activity, like funding, scientific manpower or knowledge generation sources. Depending on the obtained estimates of the conditions for innovative activity it appears possible to make a reasonable choice of the priority direction for a certain region. Further on, provided there is constant monitoring, it is possible to identify the effectiveness trends of the pursued innovation policy and wisely alter its course.

### 6. References