

# Conceptual Approaches to the Development of Indicators System When Analyzing Human Capital Inter-Territorial Relocation

Ekaterina Zharova<sup>1,\*</sup>, Nickolay Minaev<sup>2</sup>

<sup>1</sup> Tomsk State University, Russia

<sup>2</sup> Saint-Petersburg State Marine Technical University, Russia

\*Email: [yekaterina.zharova@mail.ru](mailto:yekaterina.zharova@mail.ru)

## ABSTRACT

The results of the research on the development of indicators system for the assessment of interterritorial (interregional) human capital relocation are considered in the proposed article. A system of indicators, worked out on the basis of an approach to the development of the balanced criteria system, and containing basic parameters, which have an impact on the value of territorial accumulated human capital, is presented. The dynamic analysis of criteria, calculated at the developed system basis, allows evaluation of human capital relocation scale on the national level. The research of the interterritorial human capital relocation process is of great interest especially in the scope of the enhancement of its role in providing the stable economic and social development of the territories in passing to the fourth industrial revolution, digital economy, and economy of knowledge. However, by the present moment, scientists have not presented comprehensive researches on this topic, though the study scope of different aspects of human capital theory is very wide.

**Keywords:** *Human capital, Balanced criteria system, Economic and social development of the territories.*

## 1. INTRODUCTION

The present-day society appeared in the center of large transformational processes, generated by the passing to the fourth industrial revolution, digitalizing of economy and economy of knowledge development. The transformation of global production chains, the depletion of economical growth capacities mainly driven by raw materials mining and export, and also a quick rate of new technologies creation and implementation in the production sphere and everyday life precondition the changes in factors system, which determine the stable development and economical growth both on inter-country and national economies levels. In the scope of the described conditions, the special place is taken by human capital as one of the key factors, that provide the territory leading position in the global competition for economical superiority. According to the top-ranked world organizations and companies, such as The World Bank Group [1], World Economic Forum [2], and OECD [3],

which study countries' development problematics, it is human capital that appears to be one of the economic growth key drivers. However, at the present moment, there is a tendency of uncontrolled relocation and uneven distribution of human capital both on a global scale between countries and inside the territory of one particular country, and this is typical for the Russian Federation. All the above said preconditions the necessity to develop efficient instruments for the management of human capital accumulation and distribution. Indicators system for the assessment of interterritorial (interregional) human capital relocation can become one of such instruments.

## 2. RESEARCH METHODOLOGY

The method of forming a balanced scorecard (BSC) is used in this research as a basis for the development of an indicators system to evaluate the interterritorial (interregional) relocation of human capital. This

instrument is traditionally applied in the companies management process and allows setting firm goals of strategic development and following their achievement with the help of available and comprehensible indicators. The use of the BSC method allows determining of basic components, that should be considered in examining the level of accumulated human capital, and developing a set of indicators for their assessment. Apart from this, a number of general-logic methods, including analysis, synthesis, simulation, and system approach, were used within the scope of the research.

### 3. THE RESULTS OF THE STUDY

The widespread and discussed today theory of human capital has a long history of origin and development. The hypothesis that the gained useful skills of all inhabitants and members of society comprise an integral part of basic capital, was first mentioned in the work of A. Smith [4]. Later it took shape into a self-sufficient theory in the works of T. Schultz [5] and G. Becker [6] in the 60s of the XX centuries. Native scientists integrated into the study of this theory much later (in the 90s of the XX century), but also made a significant contribution to its development [7,8].

However, notwithstanding the extensively studied level of the human capital theory and its continuing development in works of both foreign [9] and native [10] researches, at the present moment there is no generally accepted definition of human capital in economic science, which often leads to the replacement of this notion by others, similar in content [11]. All the above said preconditions the necessity to clarify that in the scope of this research, based on the native and foreign literature analysis, the following definition of human capital as an economic notion was stated and used: human capital is a set of human knowledge, skills, and competencies gained as a result of investments and used for own and social needs satisfaction by their implementing in the professional experience.

As a result of the essential content analysis of the economic notion "human capital", and also based on the methodology applied for a balanced scorecard development, a BSC of the territorial (regional) level of human capital assessment was formed (figure 1). The developed system demonstrates the level of territorial (regional) human capital at a definite period of time (year), and data analysis in dynamics for several periods allows the examination of the interterritorial (interregional) human capital relocation process.

Considering human capital as an economic notion, which is applied in the process of professional experience fulfilled by a person, there can be emphasized four aspects influencing the total amount of territorial human capital and the efficiency of its use: time, level of technologies, productivity and skill level. Further, each

aspect will be examined in detail, and indicators description will be presented, by which the implementation completeness of the given components and the degree of their mutual impact on the human capital of the territory (region) are assessed.



**Figure 1** The system of a balanced scorecard (BSC) of the assessment of regional human capital [Author's development].

In the presented pattern, time is considered as the parameter of skill implementation. The human professional experience is inseparably connected with the time concept because a person can not work continually 24 hours per day 365 days per year keeping high efficiency all the time. Apart from this, time itself is a limited resource, especially in the contemporary conditions of rate acceleration and production scaling. Thus, in the scope of interaction with other parameters presented by BSC, the time parameter can be described as follows: high skill level and the respective level of technological development increase productivity and allows generating a large volume of products, works, services in a shorter period of time, which means more efficient use of the limited time reserve. However, the time parameter cannot equal 0, since even with the highest skill level, technological equipment, and productivity indicators, it is necessary to spend a certain amount of time for labor function implementation.

#### 3.1. The parameter "Time"

In order to assess the time parameter in the presented BSC, the indicator of working time duration per year is introduced (T). As far as there is universal labor legislation on the territory of the Russian Federation, which establishes the working day duration and regulates the number of working days per year, the indicator of working hours per year (T) can be calculated as the product of the working day in hours (8 hours) by the number of working days per a year (for example, 248 days in 2020). However, while calculating this indicator, it is necessary to take into account the following assumptions and limitations:

1. Despite the existence of universal labor legislation on the territory of Russia, many organizations have their own duration norms of the working day, which may be higher or lower than the established by law. Still, in the presented BSC, the general statutory value will be used.

2. During the entire period of working time usage, the human capital productivity is uneven, due to various factors considered in theories on time management, however, in the context of this BSC, the same productivity rate will be taken throughout the entire period of working time.

### **3.2. The parameter "Level of technologies"**

The second parameter of the presented BSC is the level of technologies, which indicates the technological equipment condition of the production and innovation rates on the territory (region). In the scope of the BSC, the relationship of this parameter with the skill level is the most significant, since the values of these parameters should be comparable. Thus, a territory (region) characterized by a high level of technological equipment and rapid innovation creation and implementation rates must have high-quality skill human capital to ensure the effective implementation of technological potential and innovation reproduction. In the case of non-correspondence between the level of technologies and skill level, the efficiency of technological potential use decreases, or ineffective human capital use is observed.

For the evaluation of the level of technology parameter in the presented pattern, the indicator, applied in innovative development of regions rating compiling (in the context of the given BSC - I), is used (the rating is compiled on an annual basis by the Association for Innovative Development of Regions) [12]. This indicator is calculated on the basis of 29 statistical parameters, combined in 4 large groups: Scientific researches and developments; Innovation activity; Social and economical conditions of innovation activity; Innovation activity of the region.

### **3.3. The parameter "Skill level"**

The skill level in the presented BSC shows professional knowledge, which is implemented by a person during the professional labor experience. It is this parameter that undergoes significant changes in the modern conditions. Under the impact of the technological process and digitalizing of the economy, the new information and knowledge development rates change, and the necessity of more often skill upgrading arises. The skill level gets more complicated year by year to meet the level of technology.

To evaluate the parameter of skill level in the scope of presented BSC it was decided to use the indicator of working population number, employed by occupation

(E). The decision to use this indicator was made on the basis of the thesis that during the human capital implementation in the process of labor activity, knowledge, skills, and abilities, obtained in professional education and aimed at the professional learning, as well as gained as a result of professional experience, are used. In the case of specialist employment with professional education not by occupation, this person does not have the complete skills necessary to achieve high productivity indicators, and his level may not correspond to the level of technology. And consequently, the skills acquired during professional learning are not applied.

### **3.4. The parameter "Productivity"**

Finally, the productivity parameter in the presented BSC reflects the efficiency implementation rate of the territorial technological and skill levels over a period of time. The productivity parameter is calculated through the indicator of GRP ratio to the employed population of the territory (region) - V. The GRP indicator shows the gross value-added product level, created on the territory (region) during the working activity, and the number of the employed population determines the number of the human capital units involved in the creation of added value. Thus, the V indicator shows the added value created by a human capital unit.

The indicators, obtained as a result of all parameters calculation, are corrected to index values and applied in the following formula:

$$HCp = T \cdot I \cdot E \cdot V \quad (1)$$

## **4. CONCLUSION**

As a result of the conducted research, a balanced scorecard was developed, which contained indicators allowing the measurement of the territorial (regional) accumulated human capital amount.

The present system will make it possible to carry out a dynamic analysis of the human capital relocation between territories (regions) at the national level, which is especially important for the Russian Federation, where there is a tendency of human capital uncontrolled relocation and uneven distribution.

The developed system of parameters can be used in the territorial executive bodies activities during the development of programs and strategies for the socio-economic growth of territories, as well as in the regulation of population migration flows.

The implementation of the present system in the executive bodies activities will allow the improvement of the territorial development balance and decrease the region differentiation level inside the national economy.

## ACKNOWLEDGMENTS

The reported study was funded by RFBR, project number 20-310-90019.

## REFERENCES

- [1] Human Capital Project: Year 2 Progress Report (English). Washington, D.C.: World Bank Group. Retrieved from: <http://documents.worldbank.org/curated/en/483491602866728302/Human-Capital-Project-Year-2-Progress-Report>
- [2] Readiness for the future of production Report 2018. Retrieved from: <https://www.weforum.org/reports/readiness-for-the-future-of-production-report-2018>
- [3] OECD (2020), How's life? 2020: Measuring well-being, OECD Publishing, Paris. DOI: <https://doi.org/10.1787/9870c393-en>
- [4] A. Smith, An Inquiry into the Nature and Causes of the Wealth of Nations, M.: Sotsekiz, 1962, 688 p.
- [5] T. Schultz, Investment in human capital, The American Economic Review Vol 51 (1961) 1-17.
- [6] E.P. Zhilenkova, Y.V. Shevaturina, Concept of development of the notion of human capital: historical aspects of the main provisions and system analysis, Regional problems of transforming the economy 2(88) (2018) 73-79. DOI: <https://doi.org/10.26726/1812-7096-2018-2-73-79>
- [7] A.G. Mokronosov, Y.V. Krutin, Human capital or human potential, Ideas and Ideals 2(32) (2017) 80-89. DOI: <https://doi.org/110.17212/2075-0862-2017-2.2-80-89>
- [8] A.I. Dobrynin, S.A. Dyatlov, E.D. Tsyrenova, Human capital in a transitive economy: formation, evaluation, efficiency of use, StPb.: Science, 1999, 309 p.
- [9] M.A. Gvozdeva, M.V. Kazakova, Research on the concept of human capital in the economic literature, Society and Power 1(63) (2017) 82-87.
- [10] M.S. Zlotnikov, S.K. Demchenko, Theoretical and methodological aspects of human capital category research, Fundamental research 4 (2018) 63-68.
- [11] O.E., Pirogova, A.A. Grigorieva, Comparative analysis of the concepts of "human potential" and "human capital", Science and Business: Ways of Development 3(81) (2018) 134-138.
- [12] Rating of innovative regions of Russia. Retrieved from: <http://i-regions.org/reiting/rejting-innovatsionnogo-razvitiya/>