METHODOLOGICAL AND PRACTICAL ASPECTS OF HUMAN POTENTIAL MANAGEMENT IN THE REGION

Marina Gennadyevna FEDOTOVA
Associate Professor, Plekhanov Russian University of Economics
mgfedotova@yandex.ru

Anastasia Viktorovna ZHIGLYAEVA
4th - year student, Plekhanov Russian University of Economics
anastasia.zhiglyaeva@gmail.com

Elena Valentinovna STOLYAROVA
Associate Professor, Plekhanov Russian University of Economics
mgfedotova@yandex.ru

Abstract
Human potential is the main factor, a key aspect of the socio-economic development of the region. The article presents a systematic approach to the management of the human potential of the region, which is distinguished by its novelty and based on modern methods of system analysis, management and regional economy. In the course of the study, a model for managing the human potential of the region is formed, based on a system with a closed loop, consisting of a number of simpler functional subsystems. The structure and the mechanism for managing the human potential of the region based on the proposed conceptual model are substantiated. The scientifically grounded proposals and recommendations on the formation, use of the system at the regional level are presented. A system of indicators for the integrated assessment of the human potential of the region has been developed in linking them to strategic development guidelines. In total, eight fundamental quantitative indicators have been identified. Based on these indicators, the integral indicator (the level of the human potential of the region) is calculated. Using the formed system of indicators makes it possible to assess the magnitude of human potential, the effectiveness of the proposed management model. In addition, it is planned to monitor the dynamics of indicators, conduct interregional comparisons. Approbation of methodological tools was carried out on the example of Oryol region, Russia (2010-2015). Priority directions of development of human potential in Oryol region are determined and some recommendations for their implementation are given.
Keywords: human potential, structural components, Oryol region, priority directions
JEL classification:

1. Introduction

Human potential of the region (HPR) is described as a set of development expectations and opportunities related to individuals, companies and other regional economy entities and pointed towards achieving desired development goals for the regional society [1]. It represents a complicated scientific category that includes both economic and social aspects and requires and overall, multifaceted review.

Research findings dealing with human potential, its separate components, various approaches to the qualitative and quantitative assessment of the human potential magnitude are introduced in several papers by Russian and foreign scientists .

Foreign researchers who substantially contributed to the studies on this topic are represented by E. Denison, A. Toffler, R. Layard, W. Petty, A. Smith, K. Marx, A. Sen. S Bowles et al.

Such Russian scientists as T.I. Zaslavskaya, K.A. Kotomnova, Ye.V. Chuchulina, O.I. Ivanov, N.N. Morozova, S.N. Sakharovsky, A.O. Verenikin, S.Ye. Yolkin, A.B. Doktorovich, et al, have investigated human potential.

These days it seems reasonable that major tasks in this area include   development of the integrated model for managing the HPR, methodological framework and regional human

potential management mechanism. It is extremely important for implementation of regional development strategies, system-based coordination of regional management constituents.

2. Modern Approaches to HPR Management and Assessment

The research papers highlight various human potential features called as elements, components and opportunities. These components constitute HP complicated structure. The analysis completed on the previously conducted research suggests that the most significant HP components include health, industrial/organizational, social, educational and demographic components [2-3]. Some papers also describe such HP (in, particular, HPR) components as innovation, competitiveness, labor, activity, etc.

In addition to specific components highlighted, researchers denote HP levels. Thus, micro-, macro- and meso-levels of HP implementation have been identified. Besides, human potential features basic and active, individual and collective levels [4].

Along with investigating human potential structural components, its features and indicators, researchers give much attention to HP assessment. Since "human potential" notion implies versatility and diversity, this task is rather difficult. It is very difficult to give a qualitative assessment to the components like cultural, moral and spiritual [5].

However, the current situation suggests some quite mature approaches to calculation of HP quantitative indicators. Thus Human Development Index (HDI), calculated using living standards, education and health (life expectancy at birth) data, has proved to be the most widespread. Ye.V. Chuchulina highlights the following indices (indicators) of the regional HP full assessment: stock of human potential in regions (SHP), flow of human potential in regions (FHP), quality of human potential in regions (QHP), investment into human potential in regions (IHP).

Referring to sustainable management of human potential in regions, it is important to indicate fragmentary nature of studies dedicated to this topic and lack of an integrated model for managing human potential of the region. A similar model shall be developed taking into account various external and internal factors (with respect to the regional system) and shall provide for forecasting human potential status and development.

3. Structure and Quantitative Indicators of Regional Human Potential Assessment

With regard to the analysis of the current techniques, we propose a hierarchically structured model of the human potential (so called, hierarchy   model that has some similarities with the hierarchy of needs). The first basic level features the following components: *health (physical and psychic), demography, socio-economic components*. This level is called fundamental since it forms the basis serving to establish and develop other components. In case, the basic level is not in proper condition other components can hardly exist.

The second human potential structure level (with consideration of a particular region) includes the following components: *education, profession and labor, competition and entrepreneurship*. The second level correlates and interacts with the first one. For example, total health and income standards have a significant impact on the education quality and further actualization of the potential in the labor market.

The third top level is formed by *research, scientific and technical, innovative and creative* components. This level involves great intellectual capital, striving for maximum self-actualization, generation of new knowledge and innovative products. Intensive personal growth in diverse respects is the case in point [6].

The authors of this research have developed a system of indicators for the integrated assessment of the human potential in the region based on the components identified in the hierarchy structure. In total nine basic quantitative indicators have been identified:

1. Health indicator – IH.
2. Demographic indictor – ID.
3. Socio-economic indicator – ISE.
4. Educational indicator – IE.
5. Professional and labor indicator – IPL.
6. Competition and entrepreneurship indicator – ICE.

7. Research indicator – IR.

8. Scientific and technical indicator – IST.

9. Integrated indicator (HPR level) – HPI (UHP).

Let us discuss in more detail the calculation method used for these indicators, their interpretation and importance for developing and functioning of the HPR management system.

The first estimate indicator engaged in the proposed method is a health indicator (IH):

$$IH = \frac{TRP - (MR + DN)}{TRP} \qquad (1)$$

TRP – total regional population;

MR – population morbidity rate per major categories of diseases (number of patients diagnosed with the condition for the first time);

DN – number of individuals aged 18 and over recognized as disabled persons for the first time.

This indicator represents the regional population share not falling into the categories designated as MR and DN in the total population. The IH health indicator shall grow; in this context, it is important to conduct a factor analysis, i.e study which indicators trigger changes in the indicator total value. Thus, it is evident that a component to (MR + DN) sum shall go down, in this respect, it is necessary to achieve a sustainable increase in TRP and healthy population share.

The next indicator reflects the quantitative aspect of the ID (HPR) demographic component:

$$ID = \frac{(AB - DI) + MP}{TRP} \qquad (2)$$ TRP – total regional population;

AB – annual births in the region;

DI – deaths of infants aged under one year in the region;

MP – number of people moved into the region (in particular – from Russian regions, CIS countries, from other foreign countries).

The introduced indicator is mainly descriptive of MP inflow to the region resulting from natural and migratory population mobility. AB is adjusted for DI value that designates the number of people who will never become human potential bearers and will not participate in regional socio-economic processes.

The third developed indicator (ISE) serves as a quantitative feature of the HPR component:

$$ISE = \frac{TRP - RPLI}{TRP} \qquad (3)$$

TRP – total regional population;

RPLI – number of regional population with money income lower than a subsistence wage.

The provided indicator represents the population share in the total TRP with incomes higher than a subsistence wage. The proposed indicator is important on the ground that in case money incomes are lower than the SW value HP (HPR) reproduction and development is not only extremely complicated but practically not possible (let alone, high quality and continuously improved human potential). Generally, ISE indicator value shall tend to one. As the formula shows (3), ISE = 1 provided the region has no individuals whose incomes are lower than the subsistence wage (RPLI = 0).

The fourth indicator (IE) is necessary for quantification and assessment of the HPR educational component:

$$IE = \frac{CPE + SGS + SVT + SHE}{TRP} \qquad (4)$$ TRP – total regional population;

CPE – number of children in preschool educational institutions;

SGS – number of students in general education schools;

SVT – number of students in vocational education and training institutions;

SHE – number of students in higher education institutions.

The above indicator describes the share of individuals in the total regional population who are going through an educational process. The higher the IE indicator is the higher HPR quality and the wider the range of strategic benchmarks of the innovative development are, etc. This indicator represents a potential that may be actualized in the future labor market, including the market outside a particular region, it also reflects opportunities for replenishment and saturation of the professional and labor component [7].

The next indicator (IPL) may be applied to quantitative assessment of the professional and labor component:

$$IPL = \frac{WFS}{TRP}$$

(5)TRP – total regional population;

WFS – work force size in the region.

This indicator represents the work force share in the total regional population. It is known that WFS indicator covers both economically active and unemployed population. When calculating the IPL indicator we consider the unemployed to be bearers of human potential that will be actualized at some time in the labor market and in various society life spheres. The indicator value should grow but for the purposes of factor analysis, principally, due to the growing number of economically active people.

In accordance with the proprietary method, the competition and entrepreneurship indicator (ICE) is calculated as follows:

$$ICE = \frac{SME}{ERE}$$

(6)SME – number of small business employees (including, micro enterprises);

ERE – number of people engaged in the regional economy.

The indicator represents the share of small business employees in the total number of people engaged in the regional economy. This formula indicates the quantitative status of small business in the region. It is advisable to underscore that the full-fledged description of the competition and entrepreneurship component requires reviewing competitive environment status, etc. [8].

Besides, for the research purposes this indicator may undergo further modification. For example, active private entrepreneur rate in the region (PER) may replace SWE indicator in the numerator, the SME indicator may omit regional micro enterprises, etc. In order to avoid repeat count, it is not recommended that SME and PER be used in the same formula (for example, if private entrepreneurs are also small business employees).

The seventh indicator is the indicator corresponding to the research indicator (IR) and is calculated as per the following formula:

$$IR = \frac{PST + DST}{PS + DS}$$

(7)PST – number of postgraduate students with PhD thesis Viva Voce;

DST – number of doctoral students with doctoral thesis Viva Voce;

PS – number of postgraduate students;

DS – number of doctoral students.

The provided indicator describes the reserve pool of research staff as well as productivity in terms of thesis Viva Voce (logical and successful completion of postgraduate and doctoral studies, respectively). Empirically this indicator presents the level of desire, experienced by the regional population, for generation of new knowledge, plunging into new areas, discoveries, very high level of self-development and self-actualization [9].

The eighth indicator is descriptive of two components – scientific and technical; innovative and creative (IST):

$$IST = \frac{RN}{RDP}$$

(8)

RN – number of researchers (along with technicians, auxiliary and other staff, which are also classified as RDP by the official statistics);

RDP – number of personnel involved in research and development.

The above indicator shows the share of individuals directly involved in researches (persons who are engaged in developments and bring in a greater creative portion to the research) in

total RDP. This indicator differs from the previous indicator– formula (7) – mainly by the fact that it takes into account the researchers employed by particular enterprises whose job is more applied (than theoretical) in nature as compared with researchers in educational institutions. Scientific and technical achievements in this case are sufficiently closer to their actual practical use and commercialization.

We combine the feature of both above components in this indicator, as innovative products may be invented and used and technology transfer implemented (in particular, through specialized technology transfer centers (TTC) in regions, etc.) in the course of research conducted at enterprises [10].

Finally, based on eight relative indicators obtained, we may calculate the ninth summarizing indicator (integral) that describes the HPR – HPI (UHP) level. It is calculated as a geometric mean value of eight above indicators:

$$HPI(UHP) = \sqrt[8]{IH * ID * ISE * IE * IPL * ICE * IR * IST} \tag{9}$$

HPI (UHP) indicator may be used to monitor the status and dynamics of the human potential in the region in order to conduct inter-regional comparisons, HP analysis within separate federal districts.

It is worth noting that integral indicators may be calculated at each HP structural level as well (basic, medium and top level). In this case, they will represent geometric mean values related to the indicators of the components that comprise each level. This procedure may be convenient for differentiated approach to management [11] to ensure detailed research and assessment of HPR structural components.

4. HPR Management System

Based on the identified components, considering all the above elements we have developed the model for human potential management system in the region. The HPR management system model is shown in Fig.1.

Fig.1. Regional model of the human potential management system
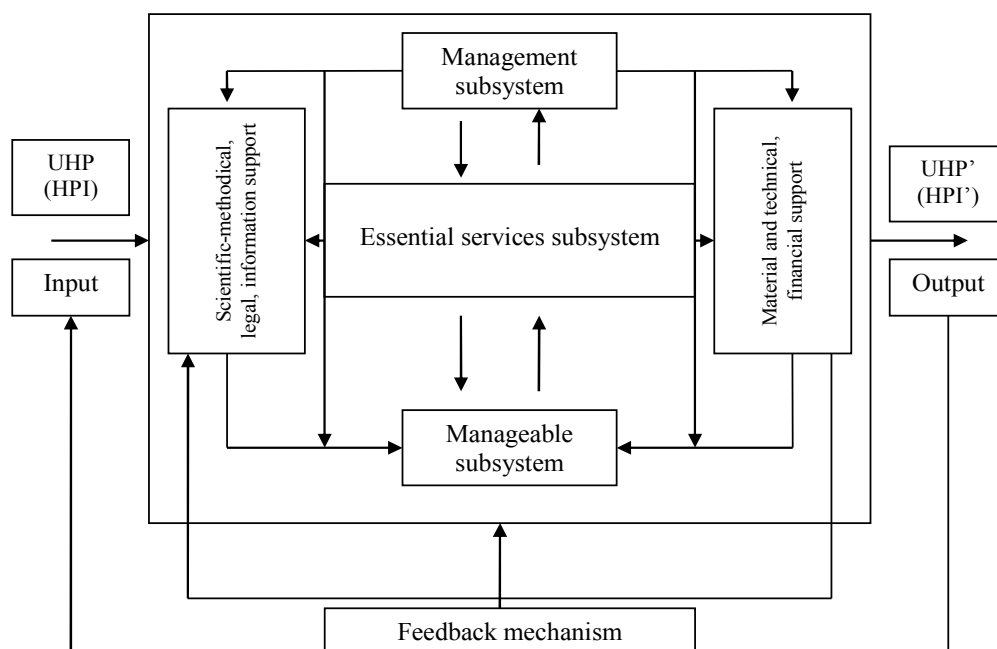
Source: compiled by the authors.

The model formed in this research encompasses the closed loop which interior part comprises continuously interacting simpler functional subsystems, thus ensuring HPR formation, development and actualization.

The system places the central emphasis on the essential services in the region   (housing and utility services, transport, communications, etc.), since not only do they participate in the human potential dynamics, but also create proper environment in order to support operation of

the management mechanism. Essential services subsystem in the region also serves as a link (and a "conductor") between a management and manageable subsystem.

The level of human potential in the region - HPI (UHP) is an input indicator; its calculation method has been provided above – formula (9). In this instance, the provided indicator represents the expected and forecasted HPR level, which can be achieved through orchestrated and efficient operation of the system management mechanism. As it has been noted previously, separate or integral indicators at each HPR structural level (1-3) may be also reviewed for the research purposes.

The achieved and formed regional human potential - HPI' (UHP') - is located at the output end. It is evident that given proper operation of the system and its components, the HPI' (UHP') indicator actual (real) value shall be equal to HPI (UHP) indicator value or exceed it. Otherwise (in case the output value is lower than an input one) we may expect management or operational problems associated with the entire regional complex and thorough analysis of the current situation is required. In this instance, the adjusted feedback mechanism is of great importance.

The presented model also contains two important subsystems that ensure smooth implementation of the management process. We would like to note that each of such subsystems is strongly linked to the economic sectors, which, largely, supply required resources to them (then resources are redistributed in the identified subsystems deliberately for management purposes).

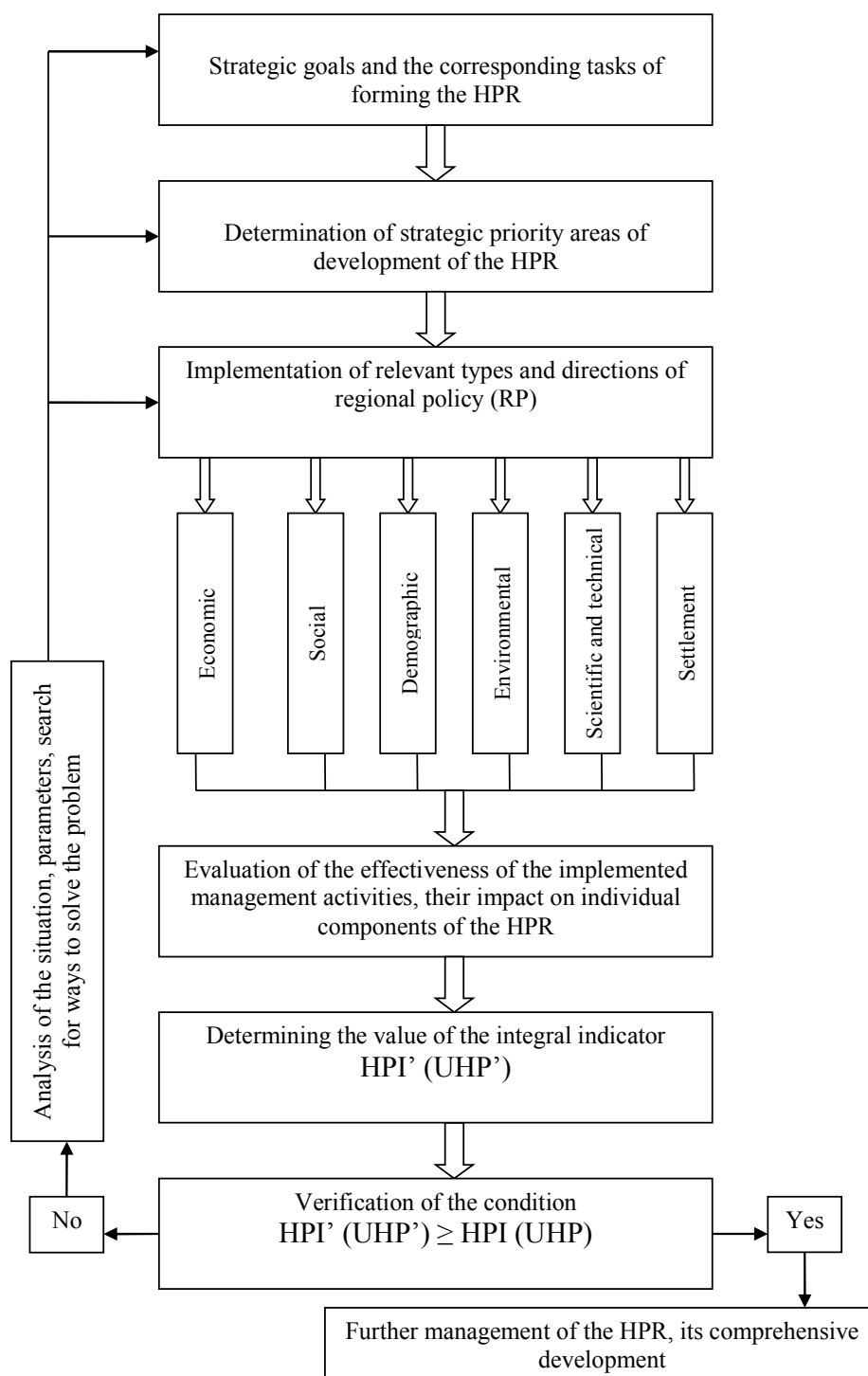The proposed HPR management system model allows:
1. Implement HPR complicated management process more effectively and consistently.
2. Form and develop new and still more balanced interrelation among HPR fundamental components and its structural levels.
3. Perform goal-oriented activities on HPR recovery, development and accumulation, verified by qualitative and quantitative indicators.
4. Motivate the regional complex and socio-economic system to improve HP indicators, enhance its quality and take leading positions among other regions (based on interregional comparison results).

It is necessary to notice the importance of observing the following system formation (establishment) principles that ensure successful operation of the management system:
1. Harmonious integration into the regional government authority system (lack of contradictions, in particular, regarding implementation of priority projects dedicated to HP development).
2. Efficient interaction of the proposed management system with budgetary and investment sources (including, additional budgets, various funds, etc.).
3. Differentiated approach to management that features focus on separate regional population categories and various age groups in order to make more targeted and relevant regulatory impact using varied tools.
4. System flexibility, ability to adapt management mechanism to changeable environment (it is most important to respond actively and timely to changes in HPR separate components as well as to the impact of exogenous and endogenous factors).

We will demonstrate the managerial decision-making algorithm in the context of the described system-based approach and HPR management mechanism (for convenient visualization shown in Fig.2). This chart presents major stages in the regional human potential management process. Compliance with a specific requirement (fulfilment of a condition) acts as a basic efficiency criterion. Certainly, the rate of change of HPR qualitative characteristics during management process is also important [12]. Should failure to comply with the requirements occur, it is recommended that a systematic analysis be conducted to reveal factors, causes, etc, contributed to HPR level decrease (in particular, to identify HP deformation and degradation up to its disappearance).

Fig.2. Generalized scheme for the implementation of HPR control mechanism concept

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                    ┌─────────────────────────────────────┐
              ┌────►│ Strategic goals and the corresponding│
              │     │ tasks of forming the HPR             │
              │     └─────────────────────────────────────┘
              │                      │
              │                      ▼
              │     ┌─────────────────────────────────────┐
              ├────►│ Determination of strategic priority  │
              │     │ areas of development of the HPR      │
              │     └─────────────────────────────────────┘
              │                      │
              │                      ▼
              │     ┌─────────────────────────────────────┐
              ├────►│ Implementation of relevant types and │
              │     │ directions of regional policy (RP)   │
              │     └─────────────────────────────────────┘
              │      │    │    │     │       │        │
              │      ▼    ▼    ▼     ▼       ▼        ▼
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Economic   Social   Demographic   Environmental   Scientific and technical   Settlement

Analysis of the situation, parameters, search for ways to solve the problem

Evaluation of the effectiveness of the implemented management activities, their impact on individual components of the HPR

Determining the value of the integral indicator HPI' (UHP')

Verification of the condition HPI' (UHP') ≥ HPI (UHP)

No   Yes

Further management of the HPR, its comprehensive development

Source: compiled by the authors.

It is appropriate to note that return to any initial stage of the algorithm logic chain is possible (depending on revealed problems, their depth, complexity, etc.)   The algorithm is available for repetition with respect to all stages and then summarized assessment of the obtained results follows. It is objectively needed to identify new goals and tasks, type and form of HP development in the region, etc. at specified intervals, even if there are no severe problems encountered.

However, it is recommended that the strategy be updated in whole only if it is not viable to adjust parameters and improve situation at separate stages [13] (i.e. strategic goals, priorities

can be changed last of all after all other tools and methods have been applied and a comprehensive analysis completed).

4. Findings of approbation of the Proposed Evaluation Methodology and Model

It is advisable that the indicators developed for HPR integrated assessment, the management system model and a number of other identified provisions and elements be tested using a region (or a group of regions) as an example. As for this study, Oryol region was taken as an example. The eight main quantitative characteristics of the HPR components and the level of the region's HP for the period 2010-2015 have been calculated. The results are shown in the table.

Table № 1. The indicators of the HPR in Oryol region in 2010-2015

Indicator	2010	2011	2012	2013	2014	2015
IH	0.111262729	0.1003827	0.0474568	0.0806039	0.0602444	0.0218981
ID	0.024035132	0.0342391	0.0387613	0.038326	0.0378581	0.0385955
ISE	0.851832994	0.8540893	0.8865687	0.872987	0.8715369	0.8594182
IE	0.197347251	0.1958211	0.1962929	0.1954766	0.1953803	0.1967987
IPL	0.506364562	0.4981441	0.5041248	0.5118182	0.507449	0.5071739
ICE	0.134388628	0.131313	0.1331145	0.1321746	0.1273391	0.124477
IR	0.08282476	0.0713115	0.0971625	0.1177665	0.0564042	0.0509383
IST	0.484316186	0.4277251	0.4301607	0.5258493	0.4638109	0.4820359
UHP (HPI)	0.182436653	0.1809012	0.175449	0.1963416	0.1687159	0.1472965

Source: compiled by the authors.

Based on the results obtained, it is possible to conclude that three components have made the largest contribution to formation of the integral index value: socio-economic (ISE), vocational (IPL) and scientific and technical, combined in the calculation with innovative and creative (IST). In general, the values for each indicator differ in dynamics over the years only insignificantly.

It is evident that the values of the health component indicators and the cognitive-research component have been decreasing during the latest three years of the period under review. There has been a decrease in the number of postgraduate and doctoral students, as well as the number of defended graduates of post-graduate and doctoral studies, respectively. While analyzing the IH index dynamics, we have observed an increase in all major classes of illnesses against declining total population of the region.

The indicator of the demographic component (ID) has begun to increase since 2015. Referring to the structure of this indicator, we can note an increase in the number of deaths under the age of 1 year and increased number of arrivals in Oryol region. Nevertheless, the registered changes are local in nature and do not have a pronounced tendency (were recorded from 2014 to 2015).

The indicator that describes "critical state" of the HPR social and economic component (ISE) tends to its maximum value - one. However, based on the recommended factor analysis, it has been determined that this indicator is growing in Oryol region mainly due to reduction of the total population in the region, while the population with incomes below the subsistence level is increasing (in general, the indicator of the regional socioeconomic component has been decreasing after 2012). In this regard, as for Oryol region, it is not possible to deem the contribution of this component as positive in terms of quality.

The value of the integral indicator - HPI (UHP) – has been decreasing (also after 2012). This is a strong reason for an in-depth analysis, recognizing, in particular, the fact that the important health component, belonging to HPR basic structural level, is deteriorating significantly. In addition, other components of this level are also hard-pressed. Consequently, in the long run, further development of other regional HP components is under risk.

It should be noted that the obtained HPI (UHP) value can be used both as the output (actual value) - HPI '(UHP') and input HPI indicator (UHP) to assess HP of Oryol region in a year. That is, for example, in 2016 the obtained value of the indicator is transferred to the input, and then compared with the value achieved by the end of the year, etc. On the other hand, it is also possible to forecast the input indicator.

As for application of the developed HPR management system to Oryol region, it is important to emphasize the need for its harmonious implementation in the structure of the authorities. These include: Government of Oryol region, territorial bodies of federal authorities, state executive authorities of special competence, and other state bodies of Oryol region. The Youth Government of Oryol region, as well as non-profit organizations, firms (as subjects of the region's emergency management) have a great influence on the HP formation and development in this region.

Regional HP development and improvement of its quality should occur owing to the synergetic effect that results from interaction of the actual authorities [14] and other subjects related to regional HP management and the special structures (represented in the proposed model), which should have direct effect on certain HPR parameters.

Based on this study we are introducing some proposals on HP development in Oryol region using the developed methodology. First, it is necessary to devote special attention to the health, fertility and mortality of the population in order to reduce morbidity and overcome the decline in the total population of the region [15]. Second, it is necessary to pursue a balanced social policy, strive to minimize the number of people with incomes below the subsistence minimum, purposefully implement the measures necessary to improve the standard of living of the population. Third, it is important to develop a competitive environment and implement measures to support entrepreneurship (including individual entrepreneurial initiatives) - based on the analysis of the ICE indicator.

In order to facilitate more successful implementation of priorities, the authors recommend that an "objective tree" be derived to include definition of the main objective (objectives) of the priority direction, followed by sub-objectives of the first, second, third levels, etc. It is also advisable to identify entities assigned to certain directions on each tree branch (particular departments, etc.). Finally, we can determine indicators on the share and relevance of each direction needed to achieve the main objective (for example, so that the sum of the values at each level be equal to one, etc.).

5. <u>Conclusion</u>

The findings and recommendations provided in this study could be used in the work of expert groups, as well as by regional authorities and the regional community to improve effectiveness of human resource management. It is possible to use the model and system of indicators in order to forecast and assess the status and dynamics of the regional human potential taking into account the system-forming factors of the internal and external environment.

Further development of the methodology involves the following studies: develop various methods for HPI (UHP) forecast and describe them; carry out correlation-regression analysis in order to establish particular relationships, dependencies among the HP components (their direction, strength, etc.) as well as assess the contribution of various factors; carry out a comprehensive study of the HP level in various regions (presumably - in the context of federal districts), implement interregional comparison and factor analysis.

<u>Acknowledgements</u>

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