THEORETICAL ISSUES

UDC 331, LBC 65.24

Intellectual potential of population: theoretical and methodological framework for research

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Abstract. The article considers the theoretical and methodological framework for the research into the population's intellectual potential. The presented materials show that this category is the subject of interdisciplinary studies, including philosophy, psychology, sociology, pedagogics, economics. One of the important conclusions drawn from the analysis of the essence of intellectual potential is the conclusion that the actual level of intelligence is the result of its development. It means that certain efforts on the part of such social institutions like family, education, government, promote not only the formation of smart people, but also the implementation of their potential intellectual capabilities in the production, creation of cultural values, society management, education, etc. when using this approach, the intellect ceases to be just a research object of related disciplines, but it acquires social dimension and becomes a socio-economic category.

The basic theories, concepts and approaches, used in its study, were analyzed. The theory of human capital was given a most thorough consideration, because, according to this theory, the income of a person is earned by knowledge, abilities and skills, i.e. the essence of intellectual properties of an individual.

The article provides the author's definition of the intellectual potential of the population, which brings to the fore the following elements necessary for the understanding of this category: relation to socio-economic development, factors in the formation of the characteristic, including the need for training (reproduction) of intelligent people, the psychological aspect (abilities), the carriers of intellectual potential are not ignored, because it is an attribute of the population.

The article identifies methodological approaches to the estimation of the population's intellectual potential, describes the applied procedures and research methods.

The authors propose methodological approaches to the monitoring of the population's intellectual potential as an indicator of innovation development of the society and the efficiency of public administration.

Key words: population, intellect, intellectual potential of population, labour potential, human capital, science, education, culture.

The strategic goal of the Russian Federation is reaching the world level of priority research and development and mastering the sixth technological mode [8, 16]. The objectives achievement is associated with the availability of high quality human potential of the country. However, modern Russia (the end of the 20th – beginning of the 21st century) is characterized by deterioration of the population quality, associated, first of all, with reduction of its intellectual component [21]. Serious scientific and technological backwardness of the Russian economy testifies it: the share of the Russian Federation in the world markets of high technologies is 0.3%, primarily due to a significant decline in the resource base of the scientific researches in the 1990s. The subsequent reduction in the number of researchers (by 2 times from 1992 to 2012) and intellectual migration (the scale of the "brain drain" is amounted to one million people or so according to the researchers' estimate) have significantly weakened scientific and technological development of the country [21].

The important indicator characterizing the degree of intellectual development of the population is a human development index[1] (HDI) calculated under the UN auspices. According to the latest countries ranking by HDI (2010), Russia takes 55th place (in 1990 its position was 33rd; *tab. 1*).

Although after a substantial "failure" in the late 1990s – early 2000s the Russian HDI has positive dynamics, its value has not reached the basic level. Furthermore, the gap between the world's leader (in 1992 – Canada – 0.982, in 2010 – Norway – 0.955) and the Russian Federation is growing (from 0.108 in 1990 to 0.112 in 2010). It has to be admitted that over the past years among the countries with high HDI[2] the index decreased only in Russia [5]. Moreover, none of the Russian Federation subjects has reached the HDI level of developed countries. This fact clearly demonstrates that the effective organizational and economic mechanisms to facilitate reproduction of population's intellectual potential were not established in Russia during the years of market economy formation and nowadays as well. Today this problem is in focus of the administration.

Continuing disintellectualization of the Russian economy requires not only the authorities' increased attention to this issue, but also identification of the concept "intellectual potential".

Its contemporary content is a result of scientific understanding of socio-economic practices of the leading world countries. It incorporates essential provisions of many theories, developed in the mid-1950s: human capital, labor capacity, knowledge economy

Table 1. Dynamics of a human development index in Russia

Indicators	1990	1992	2000	2005	2007	2009	2010
A human development index	0.873	0.862	0.781	0.792	0.817	0.840	0.843
Place in the UN rating	33	37	60	67	71	66	55

Sources: *National Reports on Human Development of the Russian Federation (the index publication year means that it is calculated by 2-year indicators): Russia Facing Demographic Challenges*. 2008. P. 178-180; *Regions of Russia: Problems, Goals, Achievements*, 2006–2007. P. 132-133; *Modernization and Human Development*. 2011. P. 137; *Sustainable Development: Challenges RIO*, 2013. P.149.

[1] In 2010 the range of indicators that measure the HDI has been broadened and the index itself has undergone significant revision. In addition to the HDI, a composite measure that is based on regional average statistical data and does not reflect internal inequalities there were introduced three new indicators: an index of human development, adjusted for socio-economic inequalities (IHDI), gender inequality index (GII) and multidimensional poverty index (MPI). On the basis of these changes all available data were recalculated.

[2] High index starts from 0.800 points.

and other concepts of postindustrial society, since the economy structure is undergoing drastic changes. All the necessary objective and subjective conditions have been created in the second half of the 20th century for the human capital theory (*fig. 1*).

The most important prerequisite for the human capital theory formation is a scientific and technological revolution of the late 1950s – early 1960s. It caused the profound transformation in the productive society forces, significantly strengthened the role and value of a human personality in economy, a level of education, scientific knowledge, skill and experience. Another precondition is transformation of science into direct productive force. The degree of production research intensity has begun to exert a direct influence on the intensity of industrial turnover. In the leading STP (scientific-technological progress) countries one can note growing progress in the development of intellectual productive forces and formation of non-property wealth, impressive in an absolute and relative size. The most significant factor in an economic breakthrough is the society's ability to develop and implement innovations.

Development of economic thought gradually contributed to a shift in emphasis from a materialistic interpretation of deve-lopment sources to realization of the original role of knowledge, intellect, creative abilities of a person.

The human capital theory [3] (T. Schultz, D. Becker) is important to understand economic nature of intellectual potential of the population. According to this theory, a person brings income due to knowledge and skills, that is the essence of intellectual features of a person. According to the researchers, human capital is a functional component of the innovation production ("knowledge, skills, practical experience, spiritual intellectual activity, serving as a form of realization of intellectual, moral and cultural-oriented abilities to create new, previously unknown knowledge that provides intellectual rent and various competitive advantages") [26, p. 332]. This implies that intellectual activity is a component that distinguishes creative work abilities from labor work abilities, human capital from simple labor power, determines conditions and nature of the process of "capitalization" of intellectual abilities to work.

The analysis of the existing definitions of "intellectual potential of the population" shows that the common understanding of this category has not been developed by modern science yet. We have singled out three methodological approaches:

- philosophical [1, p. 1472], that treats intellectual potential as "an abstract category, which does not change in time, but has inherent creative power" (T. Aquinas, A.A. Ukhtomsky, P.A. Florensky and others);
- psychological-pedagogical [25, p. 25], which defines intellectual potential as "an ability to learn, learning capability", and refers competence, initiative, creativity, self-regulation, uniqueness of mind to intellectual qualities of a person (D.B. Bogoyavlenskaya, P.S. Vygotsky, A.I. Kochetov, A.I. Subetto and others);
- socio-economic [7, p. 228; 12, 16, 26], that refers a comprehensive characterization of the development level of intellectual and creative resources of the country, industry, personality to functioning of the spheres of education and science and acceleration of scientific and technological progress (V.K. Levashov, B.G. Klejner, Ju.P. Lezhnina, R.E. Leshhiner, A.I. Tatarkin, A.F. Martynov and others; *tab. 2*).

The essence of the population's intellectual potential can be viewed through two key concepts – "intellect" and "potential".

The category "potential" has a scientific nature: it is used in mathematics, physics, engineering, biology, chemistry, economics, sociology and other disciplines. In the economic literature, it was used in the 1920s when designing the integrated assessment of the development level of productive forces. "Potential" (from lat. *potentia* – power) is

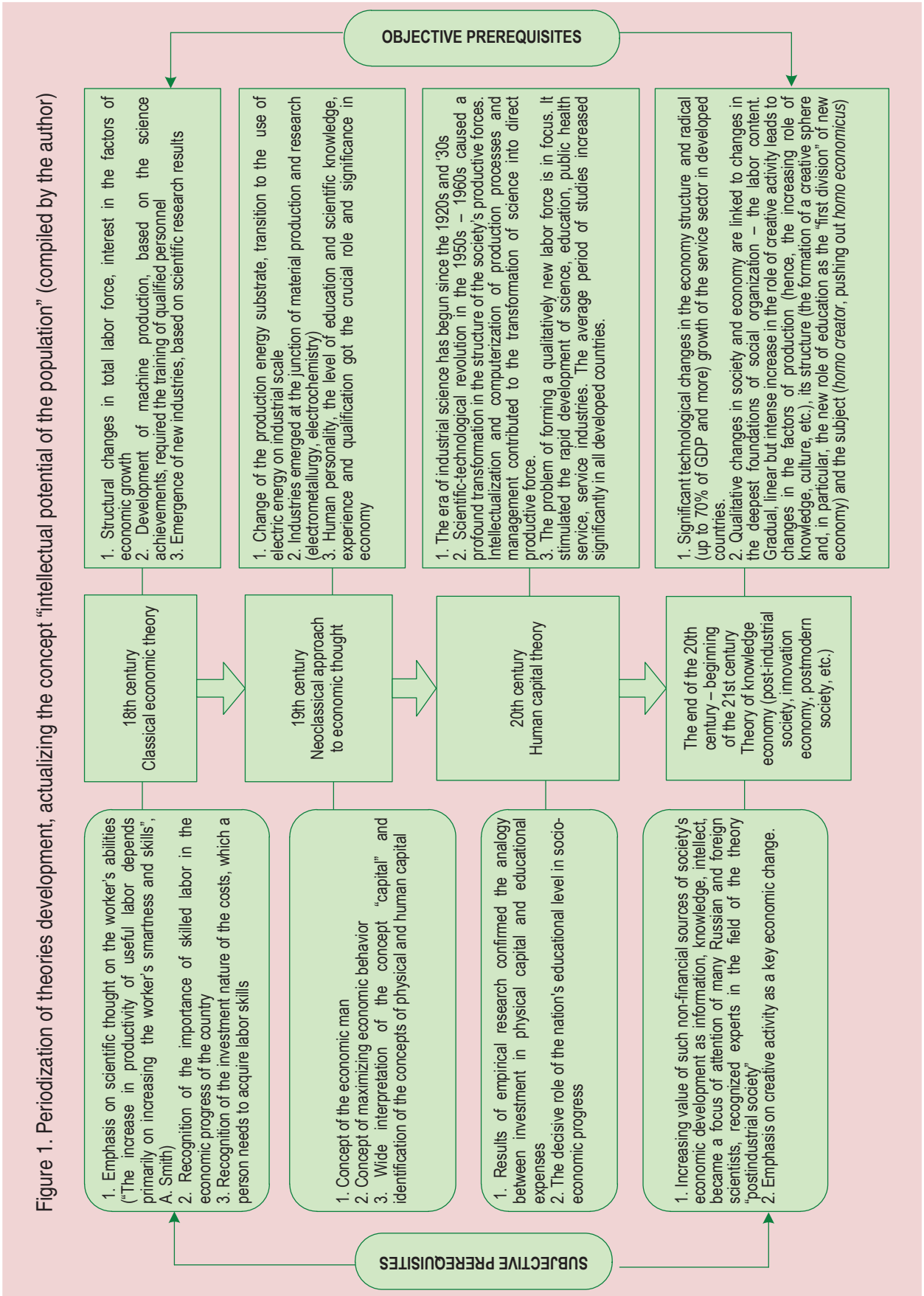


Figure 1. Periodization of theories development, actualizing the concept "intellectual potential of the population" (compiled by the author)

Table 2. Basic approaches to the "intellectual potential" definition

Basic approaches	Content	Authors
Philosophical	An open dynamic system of interacting cognitive-creative and value-praxeological components An abstract category, which does not change in time, but has inherent creative power Knowledge of objects inaccessible to the experience by means of operating symbols, models and other representatives of extrasensory being An ability of a person connected with spirituality, personality's cultural background, consciousness, thinking, directed to rational cognition of reality, universal connection of all things, all phenomena An individual level of thinking (intellect) occurs and forms in the beginning of noogenesis as a pure power of comprehension of actions meaning and its expression in his generally valid forms (words, symbols, signs)	T. Aquinas P.A. Florensky V.S. Solovyov I. Kant G. Gegel A.I. Herzen A.A. Ukhtomsky V.V. Orlova I.T. Frolov P.T. de Chardin
Psychological-pedagogical	"An ability to learn, learning capability" Competence, initiative, creativity, self-regulation, uniqueness of mind Wealth which determine the present and future of every nation and people, a progress "tool", an indicator of a society development level. It is not only a number of educated people, but also a level of cognitive independence, quality of mental activity of individuals and all people in general, a degree of mental activity of various population strata	A.I. Subetto A.A. Derkach D.B. Bogoyavlenskaya A.I. Kochetov P.S. Vygotsky
Socio-economic	An ability of the system (state, region, enterprise, organization, etc.) to find unique solutions for significant results achievement in the field of science, technique and technology, in the spiritual and moral sphere A combination of intellectual, creative, spiritual capacities, resources of a country, industry, personality to address the challenges ahead A combination of intellectual abilities of people constituting a single socio-demographic group and influencing a socio-economic status of this group members A combination of knowledge, skills, and abilities of an individual, developed to a socially required level and involved in the process of social production in order to meet interests and needs of various business entities An ability to reproduce a "marketable product" which takes the form of intellectual property A combination of intellectual potentials of the economic entities, which in turn are formed as a set of implemented intellectual potentials of workers contributing to the acceleration of scientific and technical progress Aggregate society's capacity to develop and comprehend the world, its accumulated volume of scientific and cultural information, systems of production, knowledge transfer, as well as a corresponding combination of labor force, capable to receive, process, use, reproduce and hand over information A system of relations concerning the production of new or enriched (updated) knowledge and intellectual abilities of individuals, groups and society in a sustainable, enhanced and balanced reproduction of national wealth to improve the quality of life and preserve the integrity of the country A complex characteristic of the development level of intellectual and creative resources of a country, industry, personality A combination of intellectual, communication, information, moral-aesthetic and "cognitive-activity" competences and capacities of the staff and opportunities availability for their implementation and development Amount of acquired innovations; input of implemented innovative products (depreciation of fixed assets, working capital turnover, capital productivity, a share of the research staff's wages in the cost of production); the state's ability to ensure rights and interests of intellectual property creators	E.V. Bobkova M.I. Bagdasarov V.K. Levashov Yu.P. Lezhnina M.N. Rutkevich Yu.M. Voronin L. Ya. Baranova O.V. Belyaeva A.A. Ivanov I.V. Usol'tseva E.V. Chmykhova E.Yu. Marusinina B.M. Ruditskiy V.A. Kadomtseva V.A. Ivantsov A.F. Martynov L.A. Lemdyaeva A.I. Tatarkin R.G. Aglyamov M.A. Nugaev B.G. Kleyner D.M. Shakirova G.V. Krayukhin R.E. Leshchiner

End of table 2

Sources: compiled by the author by: Bagdasarov M.I. *Intellektual'nyy kapital v sisteme korporativnykh otnosheniy: avtoref. diss k. s. n.* [Intellectual Capital in the System of Corporate Relations. Ph.D. in Sociology Dissertation Abstract]. Moscow, 2008. 28 p.; Kleyner G.B., Tambovtsev V.A., Kachalov R.M. *Predpriyatie v nestabil'noy ekonomicheskoy srede: riski, ekonomicheskie strategii, bezopasnost'* [An Enterprise in the Unstable Economic Environment: Risks, Economic Strategies, Security]. Ed. by S.A. Panov. Moscow: Ekonomika, 1997. P. 228; Lezhnina Yu.P. *Vzaimosvyaz' sotsial'no-ekonomicheskikh pokazateley regiona s intellektual'nym potentsialom ego naseleniya* [Interrelation between Socio-Economic Indicators of the Region and the Intellectual Potential of its Population]. *Trudy SGU* [Works of SGU], 2006, Issue 99 (Humanities. Psychology and Sociology of Education); Marusinina E.Yu. *Upravlenie intellektual'nymi resursami predpriyatiya v ramkakh realizatsii kontseptsii vnutriorganizatsionnogo marketinga: avtoref. diss. k. e. n.* [Management of Intellectual Resources of the Enterprise within the Framework of Realization of the Corporate Marketing Concept. Ph.D. in Economics Economics Dissertation Abstract]. Volgograd, 2007. 24 p.; *Regulirovanie innovatsionnykh protsessov v regione* [Regulation of Innovation Processes in the Region]. Ed by. G.A. Krayukhin. Saint Petersburg: SPbGIEA, 1997. P. 289; Rutkevich, M.N. Rutkevich M.N., Levashov V.K. O ponyatii intellektual'nogo potentsiala i sposobakh ego izmereniya [About the Concept of Intellectual Potential and Ways of its Assessment]. *Naukovedenie* [Science Studies], 2000, no. 1.; Subetto A.I. *Rossiya i chelovechestvo na "perevale" istorii v preddverii tret'ego tysyacheletiya* [Russia and Mankind on a "Crossover" of History on the Eve of the Third Millennium]. Saint Petersburg: PANIL, 1999. 827 p. P. 25; Tatarkin A.I. Intellektual'nyy resurs obshchestva [Intellectual Resource of the Society]. *Vestnik Rossiyskoy akademii nauk* [Herald of the Russian Academy of Sciences], 2011, vol. 81, no. 8, p. 684; Shakirova D.M. Kriterii otsenki intellektual'nogo i obrazovatel'nogo potentsialov v informatsionnom obshchestve [Criteria of Evaluation of Intellectual and Educational Potential in the Information Society]. *Obrazovatel'nye tekhnologii i obshchestvo* [Educational Technologies and Society], 2010, vol. 13, no.3, pp. 445-455; Tomas Aquinas. *Summa Theologica*. Kyiv: El'ga, Nika-Tsentr, El'-kor-MK, Ekslibris, 2002. P. 1472.

interpreted as "assets, reserves, sources that are available and can be mobilized, activated to achieve a certain goal, implement a plan, solve a problem; opportunities of an individual, society and the state in a certain sphere [4, p. 428].

"Intellect" is a property of the individual. However, "intellect" cannot be equated with thinking. One of the differences is that thinking is a process of reasoning and solving some cognitive tasks. Another difference is connected with the fact that thinking occurs when there is a practical task, and the ability to think (intellect) is sustainable, permanent feature of the individual inherent in him/her throughout life. Thus intellect is a feature of the individual, determining the possibility of mental activity occurrence [24, p. 71].

The modern authors associate philosophi-cal content of intellect with such a notion as a noosphere [30, p. 25]. According to P.T. de Chardin, intellect (an individual level of thinking) occurs and forms in the beginning of noogenesis as a pure capacity of comprehension of the actions meaning and its expression in generally valid forms (words, symbols, signs). Using these forms, a person can orientate in the community, which forms the ground of thin covering, earthly universe, called the noosphere [30, p. 178].

It is possible to identify key elements of intellect: knowledge and mental capacity, sufficient conditions for the intellectual potential to perform its function to be a basis of mental activity, i.e. solve practical or theoretical problems with required efficiency. In relation to the modern world one can differentiate professional competences (competency) as components of human intellectual potential. They are "a combination of intellect, certain types of thinking, moral-ethical qualities and activities". Moreover, according to A.A. Ovsyannikov [18, p. 76-96] competence is "a strategic resource predetermining social and economic life of the country for dozens of years".

The definition of intellect concludes that the existing level is a result of its development. So, certain efforts of social institutions such as family, education, government do not only contribute to the development of smart people, but also to realization of their potential intellectual capabilities in production, creation of cultural values, society management, education, etc. In this approach, intellect is no longer an object of study in psychology, it acquires social dimension and becomes a socio-economic category.

The study does not provide an unambiguous answer about the components of intellectual potential, its structure, because it all depends on who has this potential – an individual, a company or society as a whole (country, region, etc.).

In the structure of individual intellectual potential the researchers (A.V. Sokhan') such elements as [24, p. 71]:

– advanced skills;

– knowledge, skills, that is a system of mental formations, which reflects the results of individual's cognitive and processing activity at a personal level;

– ideals, beliefs, values, interests which are a result of a person's intellectual understanding of the surrounding world and his/her place in it [29, p. 448].

The difficulties to study intellectual potential of a person (an individual) lie in the fact that knowledge, as a rule, is considered within pedagogical sciences, and abilities – within psychological ones.

In the structure of an individual's intellectual potential the authors point out, in addition to knowledge, educational and socio-cultural values (an urge towards creativity, cognition of the surrounding world, a general standard of culture, etc.), a basic level of education, a professional-qualification level, a degree of talent, an ability to perceive innovations, which quickens implementing new technologies in production and management.

Analyzing socio-economic essence of the concept "intellectual potential of the population" one can conclude that there are several different approaches to its assessment in the works of Russian economists. Their systematization shows that the wordings, which highlight the cognitive-creative element guiding an individual to implement his/her knowledge and skills, have the greatest heuristic value. Intellectual potential is inherent in man as a latent possibility that needs to be formed in the direction necessary for the society, for its further improvement. The stated above presupposes that the main components of human intellectual potential are cognitive (knowledgeable) and creative characteristics [22, p. 9; 14, p. 70].

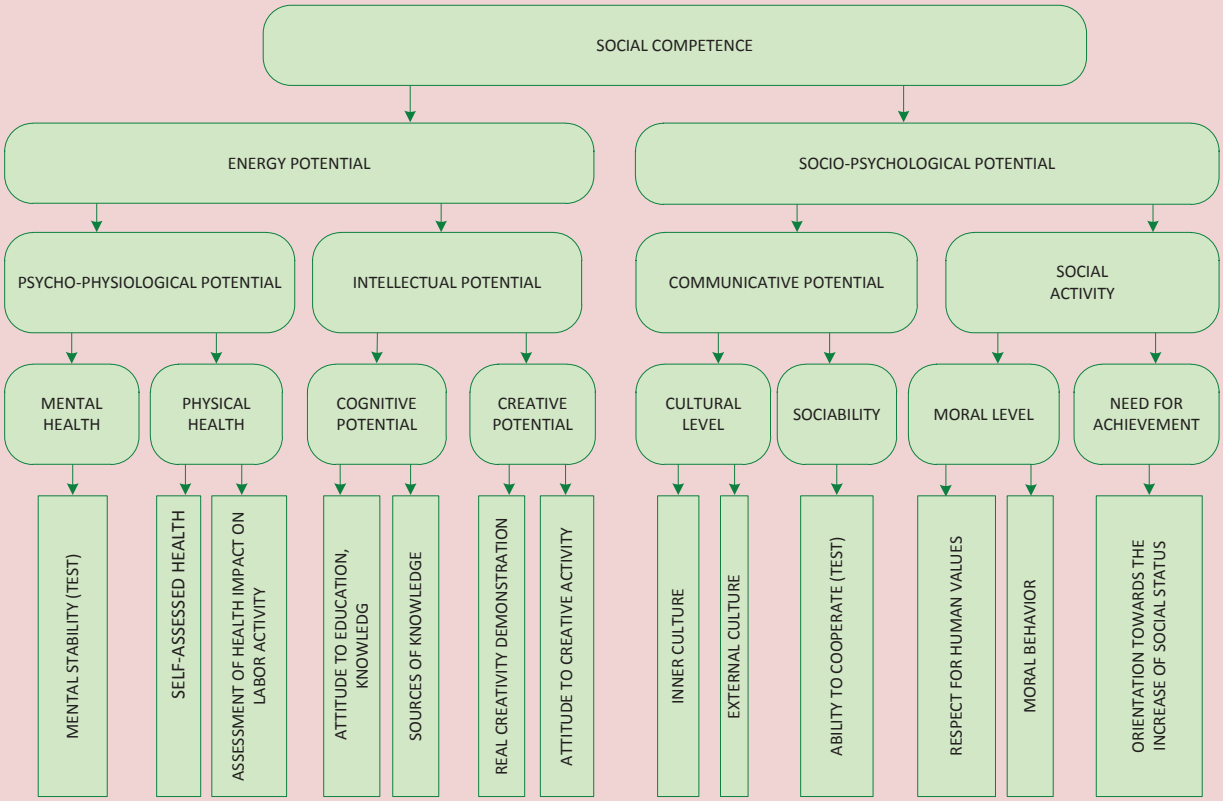
The concept of qualitative characteristics of the population fits in the logic this approach (N.M. Rimashevskaya). The Institute of Socio-economic Development of territories of RAS is carrying out a long-term research into the labor potential quality of the population on the basis of this concept[3]. In the described research the intellectual potential is considered, on the one hand, as a component of labor potential and, on the other hand, as an integral characteristic of human cognitive and creative abilities (*fig. 2*). The underlying empirical data contain information about the nature of intelligent behavior (activity) and the population attitude to the values of intellectual and artistic spheres [27, p. 30-33].

The facts stated above single out the following levels of the study of intellectual potential: a micro level (individual), a meso level (company) and a macro level (society; *fig. 3*).

Most authors characterize the essence and content of the intellectual potential of the population estimating tendencies of development of education, science and culture [6, p. 20, 22] as spheres of formation and

[3] Monitoring of the labor potential quality of the population in the Vologda Oblast has been carried by ISEDT RAS since 1997. The research object is able-bodied population of the Vologda Oblast. The surveys are conducted annually in August– September in the cities of Vologda and Cherepovetz and in eight districts of the region (Babayevsky, Velikoustyugsky, Vozhegodsky, Cherepovetsky, Kirillovsky, Nikolsky, Tarnogsky and Sheksninsky districts). The survey method is questioning of respondents at the place of their residence. The sample size is 1500 people, the sampling error does not exceed 3%. The research object is able-bodied population of the Vologda Oblast over the age of 16. According to the used methodology the basic characteristics of the labor potential quality of the population are: physical and mental health, cognitive potential, creativity, communication skills, a cultural and moral level, need for achievement (social claims). As a result of a mathematical processing of the monitoring database each of the qualities mentioned above receives a numerical assessment as an index in the range from zero to one. The integral index is a quality of labor potential, otherwise referred as social efficiency.

Figure 2. Components of the intellectual potential by the methodology of assessment of qualitative characteristics of the population

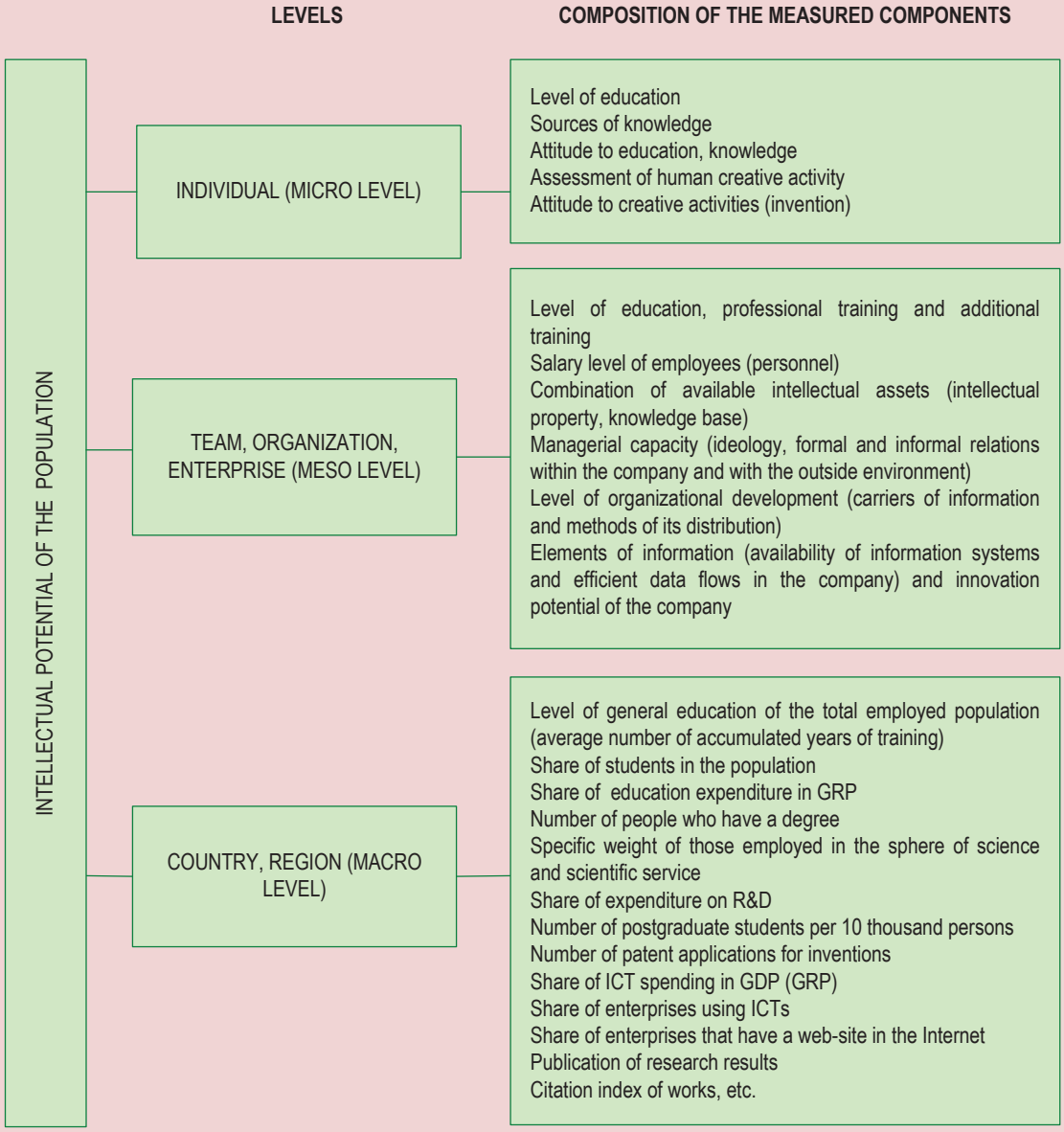


realization of this property. In this case, one uses indicators of scientific personnel density in the given spheres for the studied territory, a rate of consumption for research and development, both in total and per researcher, a development degree of facilities and infrastructure of the science on this territory (country, region). It gives an opportunity to determine not only a current situation of the country in the world community, but a vector of the future economic development of society through the creation of an appropriate macroeconomic environment to improve the quality of intellectual resources. The components structure of the public intellectual potential specifies spheres and subjects of the region's activity (*fig. 4*) that are directly involved in the reproduction of intellectual potential, and particularizes key directions of the reproduction process management.

When analysing and estimating intellectual potential, the scientists single out some methodological differences in the approaches. Some studies clearly pursue a *resource approach* [9, p. 18; 10, p. 20]. It proceeds from the premise that the social and intellectual potential is a special group of resources (material, natural, labor, financial, information) of social production and reflects the national economy's ability to use scientific and technical knowledge technologically and commercially for socio-economic development.

Other scientists (L.S. Blyakhman, F.L. Merson, E.M. Torf) used an effective approach, based on an assessment of the intellectual activity "output" in their works [15, p. 56]. At the macro level the financial results of the national economy got from the sale of goods containing objects of intellectual property on foreign markets are analyzed in this case.

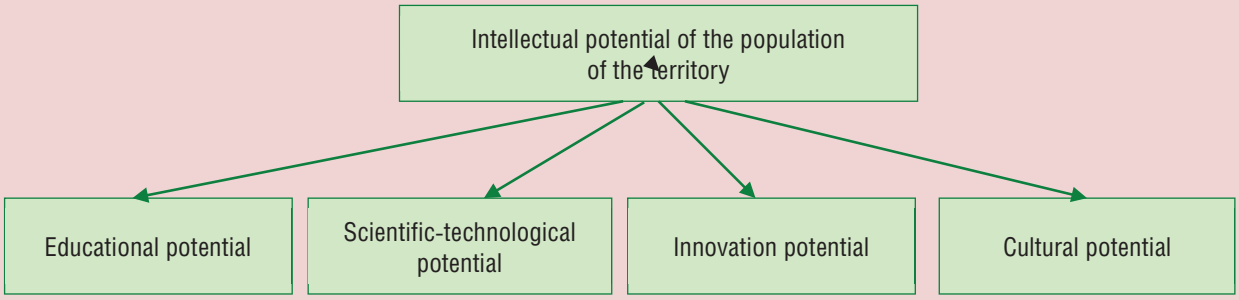
Figure 3. Levels of study of the intellectual potential of the population (compiled by the author)



In many researches the resource and effective approaches are combined (E.V. Bobkova, A.G. Krayukhin, R.E. Leshchiner, V.K. Levashov, Yu.P. Lezhnina, M.N. Rutkevich) [20, p. 45]. The estimation of intellectual potential is conducted in this case on the basis of the integral index, aggregating both the results of intellectual activity (volumes of assimilated innovations/implemented innovations) and resources (depreciation of fixed assets, working capital turnover, capital productivity, a share of the research staff's wages in the cost of production). According to this approach the category of "intellectual potential" is viewed as a measure of economic efficiency, reflected in its ability to implement intellectual opportunities of a person and society for socio-economic development [17, p. 20].

One of the methodological approaches to the intellectual potential study is based on the study of social structure of society [24, p. 19]. Its supporters single out intelligentsia as a bearer of

Figure 4. Structure of intellectual potential of the region



Source: Maksimenko I.I. Management of Intellectual Potential of the Region: Ph.D. in Sociology Dissertation Abstract. Perm, 2010.

intellectual potential. On the one hand, in fact intelligentsia concentrates a significant part of intellectual potential, but on the other hand, it is incorrect to reduce the studied concept essence only to creative activities of this category of people. The intellectual potential includes knowledge not only of those who are engaged in challenging intellectual work, but of the entire population performing certain economic, social, political and cultural functions.

In the broadside approach the intellectual resources are very close to the category of "human potential". And for this there are strong arguments based on international methodologies for evaluating and calculating a human development index. The assessments of the level of education (literacy), health (life expectancy), economical effectiveness (per capita income) specially modified (for comparability) according to the country are known to be used in this index [6, p. 15].

The estimates of the countries' intellectual development, adopted in international studies, include the following methodologies in addition to the HDI. Firstly, it is *a knowledge economy index* which shows how efficiently knowledge is used for economic development. This index measures the country's ability to produce and distribute knowledge on its territory. The index is calculated as an average estimate of four parameters: economic incentives, an institutional regime, education, innovations, information technologies use.

There is such international indicator as *the global competitiveness index* (GCI), the components of which are united into 9 basic groups[4], with one of which being "higher education and training"[5].

The intermediate level between micro- (person) and macro levels, corresponding to the entire national economy in general, is a measurement of intellectual potential within certain professional groups (a company, a firm). Among estimated figures one can differentiate either a combination of the firm's current intellectual assets (intellectual property, accumulated knowledge bases, beneficial relationships with other subjects (A.F. Martynov) [16, p. 40], or human (qualification and creative abilities of the company's employees) and administrative (a managerial ideology, formal and informal relationships, both within the company and with its external environment, an organizational development level and

[4] Nine basic groups: 1) institutional environment, 2) infrastructure status, 3) macroeconomic indicators, 4) development of public health service and 5) of primary education, 6) higher education and training, 7) market efficiency, 8) technological susceptibility, 9) business management and business practices.

[5] When calculating the index "higher education and training" one takes into account not only the share of people with higher and unfinished higher education but also the quality of education and science in the country (when calculating the index one considers business' assessment of educational system quality, a level of training in mathematics and natural sciences, quality of schooling management).

a development level of a single employee, employees' awareness, media and its distribution methods) potentials and elements of information (availability of an information system and well-functioning of information flows in the company) and innovation potential of the company [11, p. 1, 18].

The researchers single out a structural capital (intellectual property, information systems, financial relations system, regulations, standards, awards) as the essential component of intellectual potential of company. The main function of this potential is to greatly accelerate increment in profit by means of development and implementation of knowledge and relations systems, necessary for the enterprise [7, p. 13].

The analysis of theoretical and methodological approaches showed that while defining the essence of intellectual potential of the population most authors do not take into consideration an individual, a carrier of this feature.

Our approach is based on the following interpretation of the studied concept: "Intellectual potential is a property of the population of a definite territory, consisting in the human ability for knowledge acquirement, its generation and creative development of new knowledge, technologies, products, providing sustainable extended and balanced reproduction of the national wealth, that forms by the integrated influence of socio-economic, socio-cultural, and educational-scientific factors". Therefore, we actualize the components, compulsory for the category understanding, such as connection with society's socio-economic development, factors contributing to the formation of the feature, including the necessity for intellectual people training (reproduction), a psychological aspect (skills); nonetheless the intellectual potential carriers are not ignored, as it is a feature of the population. From our point of view, such an approach corresponds to formation of intellectual potential of the population in the environment that can be called innovative if all the stated above systems interact actively.

The complexity to define the essence and parameters of intellectual potential is determined by the fact that, on the one hand, it has revealed and unrevealed parts and, on the other hand, it includes a wide range of abstract notions: knowledge (theoretical, applicative, and experimental), skills (mental, creative), and intuition. In addition, the intellectual potential of the population evolves dynamically in time under the influence of many factors: if it is not used, it decreases quickly and, on the contrary, when the practice requires science, it grows fast, with the efficiency of its use increasing faster [14, p. 115].

The study of intellectual potential, its state at the moment is an important scientific and practical task which can be solved only within an interdisciplinary approach.

The described characteristics of this category indicate differences in its measurement: at the macro level – on the basis of official statistics data (it mostly concerns public intellectual potential), at the micro level – on the basis of empirical data (estimation of intellectual potential of the individual is in focus, a significant preference is that the research methodology gives an opportunity to also evaluate intellectual potential of the population of any territory or the company) [13, p. 73].

The algorithm to estimate intellectual potential at a micro level constitutes a system of procedures for empirical data uncovering, their subsequent mathematical processing and calculating a general overall indicator[6]. The index of human intellectual potential (I_{ip}) is calculated as a geometric average of the indices of creativity (I_{cr}) and cognitive (I_{kn}, knowledge) potential:

$$J_{ip} = \sqrt[2]{I_{cr} + I_{kn}} \qquad (1)$$

On the basis of comparative analysis of the methodologies we have developed our own

[6] This entails monitoring the labor potential quality (intellectual potential of the population is one of the labor resources qualities).

system of indicators, comprehensively characterizing structural components of intellectual potential of the population at the macro level. They are educational, scientific and innovation, cultural indices. Despite the traditional character of these indicators, we used new approaches to their choice, consisting of fixing not only the result of intellectual activity, but conditions for its implementation. The approach takes into account synergistic effect to reproduce intellectual potential of the population (*tab. 3*).

For each index there are fixed minimum and maximum values. The minimum values are defined as the smallest possible values to be reached by these indicators (in this case they are adopted for 0), the maximum ones – as the greatest possible values to be achieved by these indicators separately in the Russian Federation and the Northwestern Federal District during the analyzed period. The values of educational (P_{ep}), scientific and innovation (P_{si}) and cultural potentials (R_{cp}) are calculated as an arithmetic average of their coefficients, and the integral index of intellectual potential of the population (I_{ipp}) is calculated according to the function (2):

$$I_{ipp} = \frac{P_{ep} + P_{si} + R_{cp}}{3} \qquad (2)$$

where:

I_{ipp} – an integral index of intellectual potential of the territory;

P_{ep} – an index of educational potential;

P_{si} – an index of scientific and innovation potential;

R_{cp} – an index of cultural potential of the territory.

The introduction of indicators of sociocultural development of the territory in the structure of the measured components makes it possible to evaluate contribution of the intellectual potential reproduction of not only educational, scientific and innovation spheres, but also of culture as an environment of historical continuity and social experience of people.

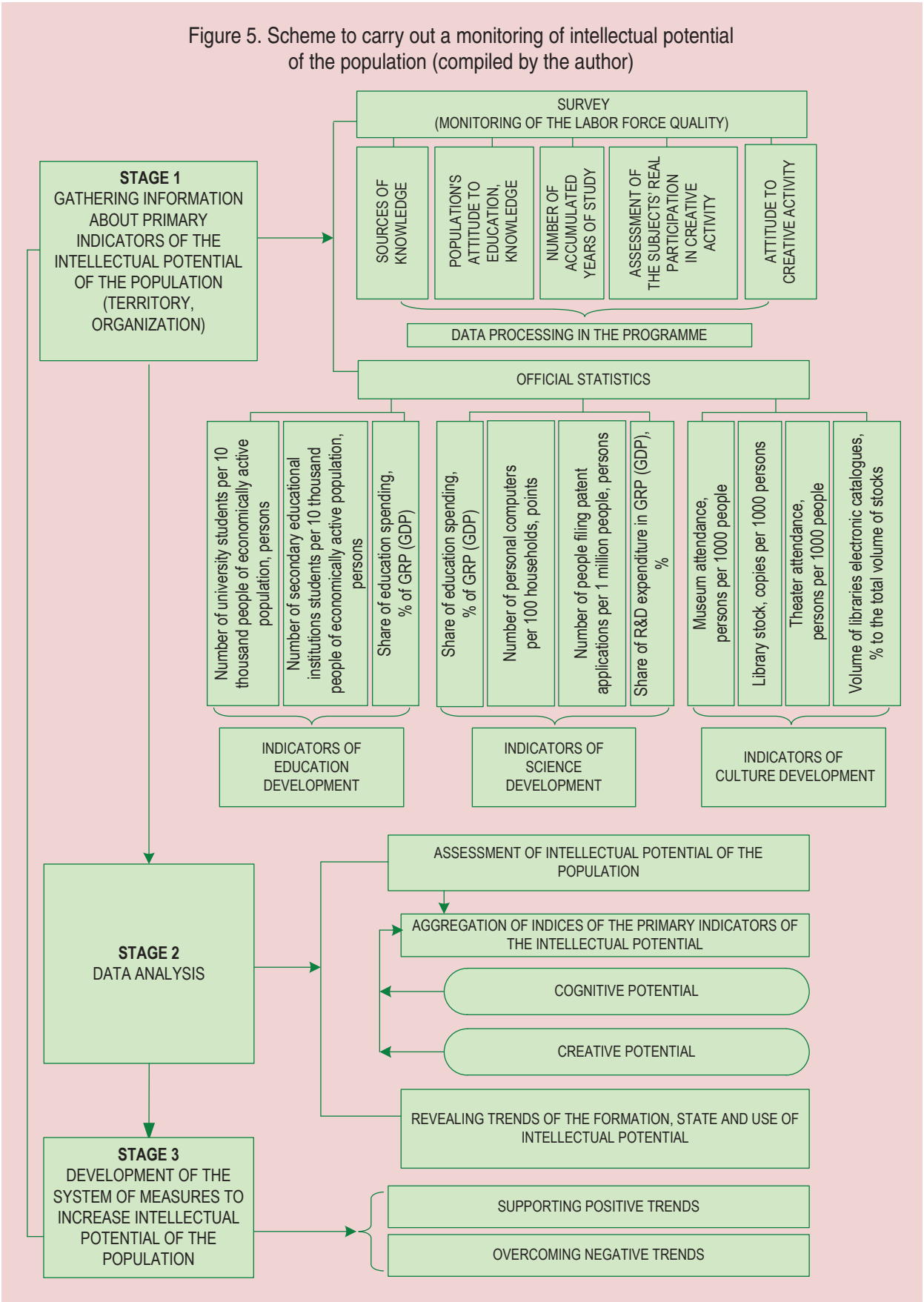
The methodology of intellectual potential evaluation at a macro level (including countries, federal districts, regions) provides an opportunity to rate territories by this indicator, thus ensuring effective measures to improve conditions for formation of intellectual features of the population for each particular society.

The described above tools for intellectual potential assessment at a macro level were applied while studying intellectual development of the Northwestern Federal district territories in 2000–2010. The results analysis has revealed that the characteristics demonstrate a slight

Table 3. Indicators used to assess intellectual potential of the population

Index	Indicator
Educational	Number of university students per 10 thousand people of economically active population, persons
	Number of secondary educational institutions students per 10 thousand people of economically active population, persons
	Share of education spending, % of GRP (GDP)
Scientific and innovation	Share of R&D expenditure in GRP (GDP), %
	Number of scientists and engineers per 10 thousand people, persons
	Number of people filing patent applications per 1 million people, persons
	Number of personal computers per 100 households, points
Cultural	Library stock, copies per 1000 persons
	Museum attendance, persons per 1000 people
	Theater attendance, persons per 1000 people
	Volume of libraries electronic catalogues, % to the total volume of stocks

Figure 5. Scheme to carry out a monitoring of intellectual potential of the population (compiled by the author)



tendency to increase intellectual potential of the Russian population at the macro level. However, the Vologda Oblast lags behind the Russian Federation by almost all indicators (except for the index of a cultural potential), especially by the science and innovation index values, which are 2 times lower than nationwide (0.19 points against 0.38 for the Russian Federation). All this clearly shows that the scientific and technological potential is currently the main source of socio-economic development of the Russian territories.

The given methodological tool can be used to assess intellectual potential of the population both at a municipal level and at a level of regions and countries.

Intellectual potential can be an indicator of innovation development of the territories and efficiency of the state administration. In this case it is viewed as scales to weigh the different political, economic and social regulations. When the authorities take any decision, it can be assessed in terms of which direction – increasing, decreasing or even eliminating intellectual potential of the society – it works.

The monitoring is a methodological tool to study intellectual potential. The proposed system of monitoring can be considered as an evaluation studies component of the direct and indirect mutual influence of economics and socio-economic development on intellectual potential and the impact of intellectual potential of the population on economic development of the region in the near-term prospect and remote future. The monitoring serves to examine and estimate dynamics of intellectual potential parameters, to identify trends in its development (*fig. 5*):

Taking into account simultaneous study of the indicators characterizing the intellectual potential and impacting factors of the environment, the monitoring solves the following tasks:

1) organization of observation, obtaining accurate and objective information about changes of intellectual potential of the region;

2) assessment and system analysis of the obtained information, revealing causes of the intellectual potential deterioration;

3) preparation of recommendations to how to overcome these negative trends;

4) providing the authorities with information got during the monitoring.

However, the monitoring serves as an information base for solution of such tasks as:

- justification of the objectives and priorities to retain and increase the population quality in the regional policy;
- preparation of the reports on the results of implementation of policies to maintain and improve the population quality or on the human development of the territories;
- assessment of the effectiveness of the local authorities activity to solve problems in the field of the society intellectual development.

The methodological tools for intellectual potential assessment can be one of the instruments to study the effectiveness of public administration in the conditions of building the knowledge society.

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