Socio-Economic Environment as the Basis for Innovation Economy

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ABSTRACT

The authors carried out a correlation analysis of the socio-economic environment factors, which have a decisive influence on the territorial innovative development according to data for the year 2012. The paper discloses socio-economic determinants that provide to reinforce territory's innovative development. These determinants are higher education development, improving of social and transport infrastructure, growth in small business and trade.

The paper also carried out a dynamic analysis according to data for period of 2012 - 2014 in the group of regions (Russian Federation) "Generators of Innovations" and disclosed the positive impact of selected key determinants on the regional innovative development.

The results of this research may be used in the government practice of different territories (countries, regions) for decision-making in the field of socio-economic development.

INTRODUCTION

It is globally recognized that the formation and development of innovative systems and investments in new technologies are essential for the territory's development. Methodical issues are relevant for the innovative system management. At the same time an integrated approach to assessment that reflects the diversified situation of innovative systems in the socio-economic environment of the region is required.

In previous studies the authors examined the structure and conditions of innovative system development in national and regional levels. As a result the researchers came to the conclusion that the innovative system development is largely determined by the state of economic, social and innovative environment, which form the territorial innovative potential. The results of the innovative

potential monitoring are directly taken into account in decision-making by public authorities. As a rule, the assessment of territorial innovative potential is based on a set of interrelated factors, determined by experts.

Study of innovative potential analysis methods allowed the scientists to conclude that is necessary to use not only the indicators of the scientific, human, financial (cost) and effective components of the innovation processes, but also indicators of the regions, reflecting the possibility of introducing, production and diffusion of innovations for the most comprehensive evaluation (Kumakova S.V., 2013).

Socio-economic environment is often characterized through an integrated indicator of the «living standard». Living standard is a complex category, accumulating all essential conditions for the individual existence, the satisfaction level of the whole needs and interests of people.

Innovative potential as an accumulated resources and terms of use for innovations is the most important institutional factor determining the prospects and directions for region's development. Resources, coming into the innovative system, produce by the socio-economic environment. Innovative environment converts incoming resources in innovation and change in the living standards and human activities.

Thus, the authors study is devoted to actual issues of raising living standards through the innovations promotion. This will provide economic benefits to the industry; it allows creating high-tech jobs and contributing to the development of science and education; it also allows attracting investment to the region.

The innovation policy should be a comprehensive to stimulate innovations in the regions according to the government representatives and regional management experts. This problem is very topical on the variety of organizational, methodological, financial and integration levels in the Russian regions. The authors rightly point out that this activity is not sufficient for a science-based theoretical foundation at present.

1. ANALYSIS OF THE RECENT STUDIES AND PUBLICATIONS

The issues of national and regional innovation systems development are reflected in the researches of M. A. Afanasova (2009), B. A. Lundvall (1992) and other scientists. The linkage and interdependence of innovation and economic growth were investigated by J. Schumpeter (1982).

Territorial socio-economic and innovative development are estimated through main actors activity or their groups, as well as on a number of complex characteristics. This is a fairly fully discussed in numerous studies of domestic and foreign experts.

Wide research of approaches and principles of the territorial innovation potential assessment presented in the works of O.G. Belyaev (2012), S.D. Komilov (2013), I.M. Bortnik (2014), V.V. Razuvaev (2012), U.V. Trifonova (2014), E.V. Shvarova (2015), K. Freeman (1995) and others.

The results of new research in the field of innovative development management in the Russian regions indicate that the previously implemented projects and approaches have contributed to a certain acceleration of innovation development. However, it failed to start the structural transformation and modernization in economy on the required degree.

There are still significant differences in the level of socio-economic development of Russian regions and, in particular, in the innovation systems maturity, which in most cases needs to be improved and developed.

In our opinion, this is largely due to the limitations and the lack of conceptual approaches and tools aimed at the regional innovative system management from the perspective of mutual effect of socio-economic and innovative environment.

Relevance, insufficient scientific readiness of various aspects of the problem and high practical significance are determined the choice of the study purpose and objectives.

2. PROBLEM STATEMENT AND RESEARCH OBJECTIVE

Innovative activity in Russia is just gaining momentum. Due to the fact there are a limited number of tools for the innovative potential assessment which are universal. The purpose of the research is a developing of a methodology for assessing the level of innovative potential of the regions, which confirms or disproves the existence of interdependence between the innovative development of the region and its socio-economic development. It will allow assessing the influence of certain factors on socio-economic development of a specific region and proposing directions of the state policy in the innovative sphere at different levels of management.

It is determined the objectives of the research as identifying the set of indicators for assessment of innovation and socio-economic development of the region and the analysis of relationships between them. Next, we need to identify the factors that have a significant impact on the regional development, and to consider a change of the key factors in the dynamics on the example of Russian regions.

3. KEY RESULTS

Assume that a change in one environment does not entail change in another. In other words, what basic living standards do not change under the influence of innovations and the science development and innovative economy do not depend on the income level of the population in this region, life safety, enough social and institutional support, comfortable to do business in a given territory, etc. For testing the hypothesis it need to prove or disprove the existence and importance of such mutual influence. If the relationship is it need to identify the key determinants of socio-economic development of the region.

Indicators should be chosen that they are varied, adequate, measurable and applicable in relation to any region of Russia.

Evaluation algorithm for innovative potential level includes 7 stages: selection of indicators, data collection, standardization, calculation of integrated indicators, correlation analysis of integrated indicators, correlation analysis of selected indicators of socio-economic and innovation environment, interpretation of results and graphical interpretation of integral indicators (Akhmetova, 2015). Firstly, we identified 3 groups of innovative environment indicators (z1-z20) and 10 groups of the socio-economic environment indicators (x1-x28).

The indicators groups were formed on the basis of such hypothesis, that in the socio-economic environment any person has the opportunity to be born (demography), be healthy and educated (health and education), work and earn income (the income level; the development of entrepreneurial initiatives; the level of economic development), live in comfortable conditions on the developed area (housing conditions; environmental conditions; security of residence; transport infrastructure and the level of the territory development), rest and obtain social services (provision of social infrastructure). These conditions directly affect the economic and innovative activity at the stages of its formation as a consumer, student, specialist, scientific researcher, entrepreneur, expert and innovator (J. Schumpeter, 1982).

Also the regional innovative environment is characterized by three groups of factors: the development of science and education (generation of human and research resources), development of innovative infrastructure (support of innovative products and production) and development of innovative economy in general (creation the sources of income). All this indicators are best characterizing the innovative activity in the region.

The selection of indicators was carried out with the following requirements:

- The requirement of representativeness, according to which indicators should more fully reflect the relevant areas of the region's development;
- The requirement of availability, whereby indicators attracted to the analysis should be included in the list of official statistics. Either indicators should be calculated from the official data base, or should be published in open sources of information. The availability of data for all regions in the framework of the relevant year is a necessary condition. This requirement should be taken into account especially in the case of assessing the dynamics of the region's innovative capacity;
- The requirement of objectivity, according to which indicators should be adequately reflect the different aspects of the region's development. The choice of indicators is based on an analysis of other valuation methods, as well as their inclusion in public policies effectiveness indicators;
- The requirement of regional perspective, for evaluation and prediction should be taken factors that have the most significant impact on the livelihoods of the population and region's development.

Integral indicator of the socio-economic development level can be set according to the number of indicators from 0 to 28, and the integral indicator of the development level of the innovation environment can be fixed from 0 to 20. The calculation is made using the method of integral region estimation for each development factor (Akhmetova, 2015).

The interpretation of the obtained integral indicators (Y1, Y2) in graphical form led it possible to study features of development of regions which are different in terms of socio-economic and innovative development. Chart is based on the type of scatter plot which reflects the region location based on the measure of innovative potential level (figure 1). This graph is based on the integral indexes of 81 Russian regions. The chart does not reflect the data of Moscow city and St. Petersburg city, as the level of innovation potential of these territories largely exceeds the national average.

Figure 1. The scatter plot of Russian Federation regions according to a level of innovative and socio-economic environment (the data for 2014)
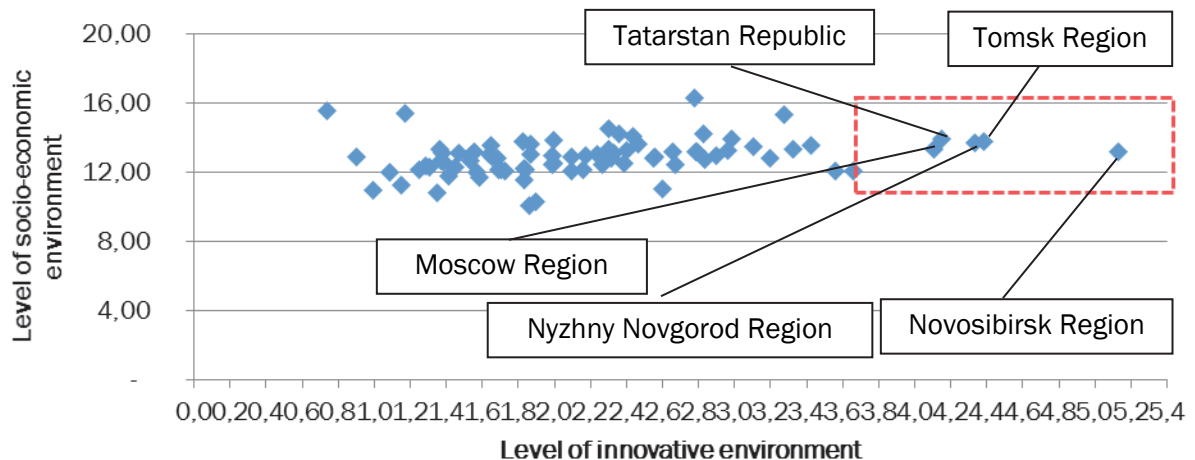
Source: adapted from Akhmetova and Kozonogova, 2015.

Figure 1 clearly shows significant differentiation of the Russian Federation regions. A number of regions have abnormally high levels of socio-economic development and low level of innovative development. At the same time we can observe regions where both indicators are low. Of course, without an appropriate management tools the divergence will progress and regional differences will grow, preventing a stable development of the national economy.

The greatest interest for the study is an area of balanced and moderately high socio-economic and innovative environment (right upper area) can be conditionally designated on the resulting graph. This sector «Generators of innovations» includes such regions as Moscow Region, Nyzhny Novgorod Region, Novosibirsk Region, Tatarstan Republic and Tomsk Region.

Let's denote the indicators of socio-economic environment for x1-x28 and indicators of the innovative environment for z1-z20. The data source for the research is based on the statistical observation through 83 regions of Russia for the year 2012 (Federal service of state statistics, 2013).

The main analysis of the relationships between the *integral indicator of the innovative environment* (Y_1) and the *individual factors of the socio-economic environment* (x_1-x_{28}). Correlation analysis results are presented in Table 1.

Table 1. Correlation analysis results of the region's development factors

Indicators groups	Variables	Symbol	Correlation coefficient	Value of t-student criterion
Provision with social infrastructure objects	Income of social infrastructure objects, thousands of rubles	x_8	0,72	9,34
Development of business initiative	Turnover of small businesses per capita, thousands of rubles	x_{13}	0,74	10,17
Level of education	A number of university students per 10 000 persons	x_{17}	0,57	6,31
Traffic infrastructure	Density of public motor roads with hard coating (at the end of year; kilometers of roads per 1000 sq.km. of territory)	x_{19}	0,73	9,59
Level of economic development	Retail trade turnover per capita, rubles	x_{25}	0,61	6,85

Source: adapted from Akhmetova M.I., Kozonogova Ye.V., 2015.

The value of correlation coefficient from 0.7 to 0.9 indicates about a high degree of fidelity to the assumptions of mutual influence, and a value from 0.5 to 0.7 - the average strength of the variables mutual influence.

All calculated values of t-student criterion more than critical value [t calculated > t critical (1, 99)] therefore, the correlation coefficient is significant and the relationship can be considered significant. The critical value (t=1,99) was obtained using MS Excel «=TINV(0,05;81)», where 0.05 is the significance level, and 81 is the number of freedom degrees.

Let's present the interpretation of the correlation analysis results, that demonstrates the presence of average correlation between the level of socio-economic environment, marked by indices

of a number of university students per 10 000 persons (x_{17}), the retail trade turnover per capita (x_{25}) and the integrated innovative environment level (Y_1) (correlation coefficient in the range 0.5-0.7). And high correlation with integrated innovative environment level (Y_1) demonstrate such indicators as the income of social infrastructure objects (x_8), Turnover of small businesses per capita (x_{13}), density of public motor roads with hard coating (x_{19}) (correlation coefficient in the range 0.7-0.9).

Consider the following most significant figures. The number of university students per 10 000 persons (x_{17}). This parameter characterizes the situation in educational sphere. At the same time the national average of the number of university students per 10 000 persons in 2014 is 316 persons even taking into account Moscow city, which shows the maximum level of 660 persons. Minimum level revealed in Leningrad Region – only 63 persons (fig. 2).

Figure 2. Dynamic analysis of the number of university students per 10 000 persons
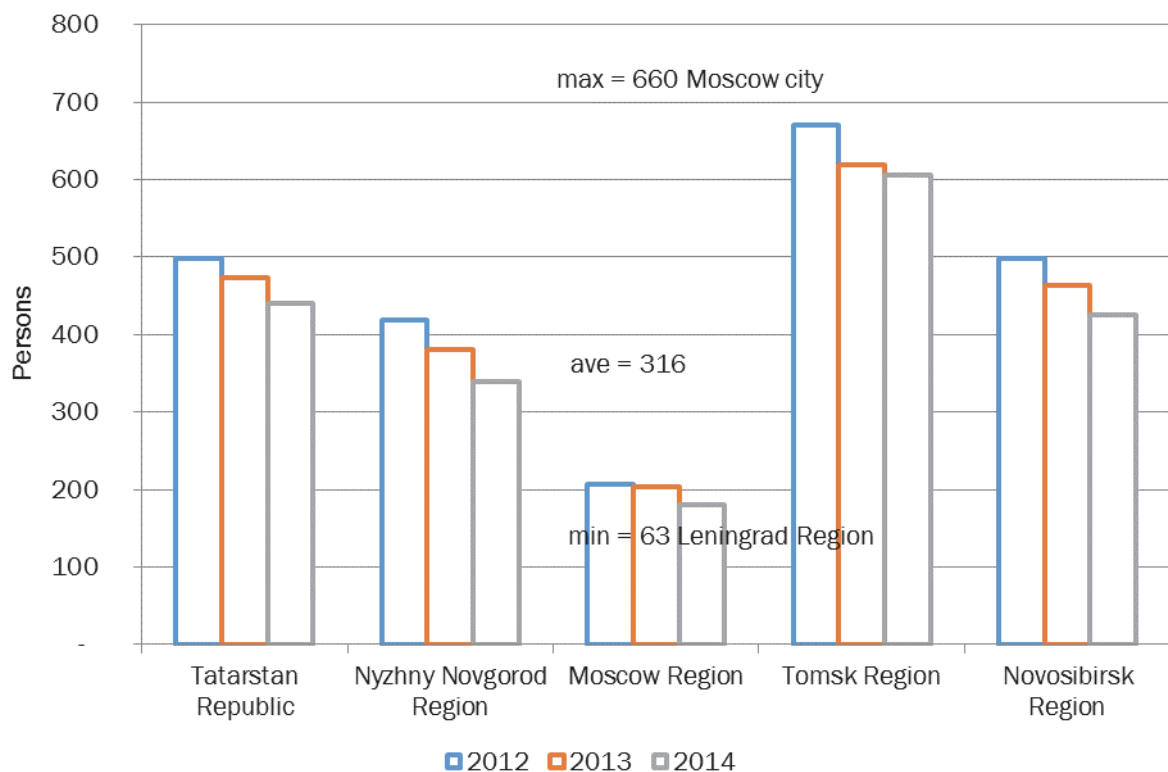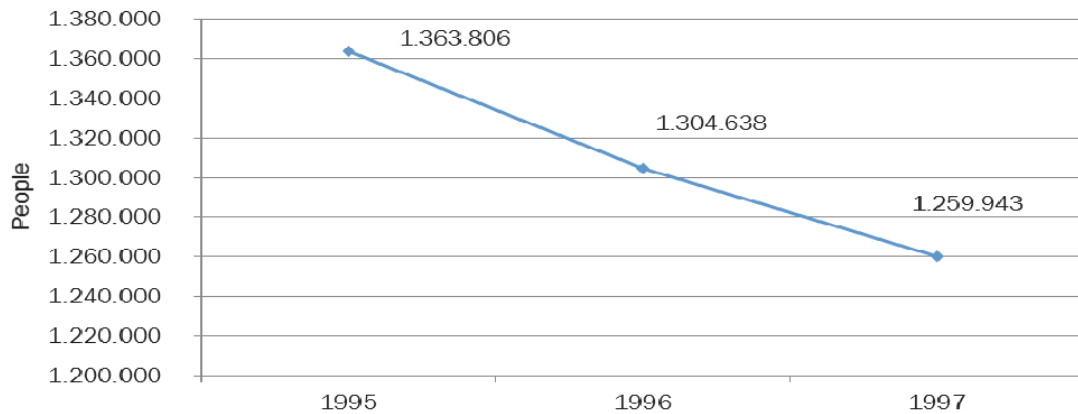

Source: constructed by the author on the basis of Russian Federal Service of State Statistics, data for the years 2012-2014.

As we can see on Figure 2 the number of university students per 10 000 persons every year is reduced, primarily due to a sharp decline in the birth rate between 1995 and 1997 (fig. 3).

Of course, this had affect the quality of students in higher education institutions, as in the lack of competition in the universities were able to do high school graduates with lower pass rate than in a situation of intense competition. Since 2000, the demographic pit in Russia has been overcome, and there was the birth rate reduction, so in 2017 is expected to restore the level of students in higher education, and in 2018 assumed the growth of this indicator.
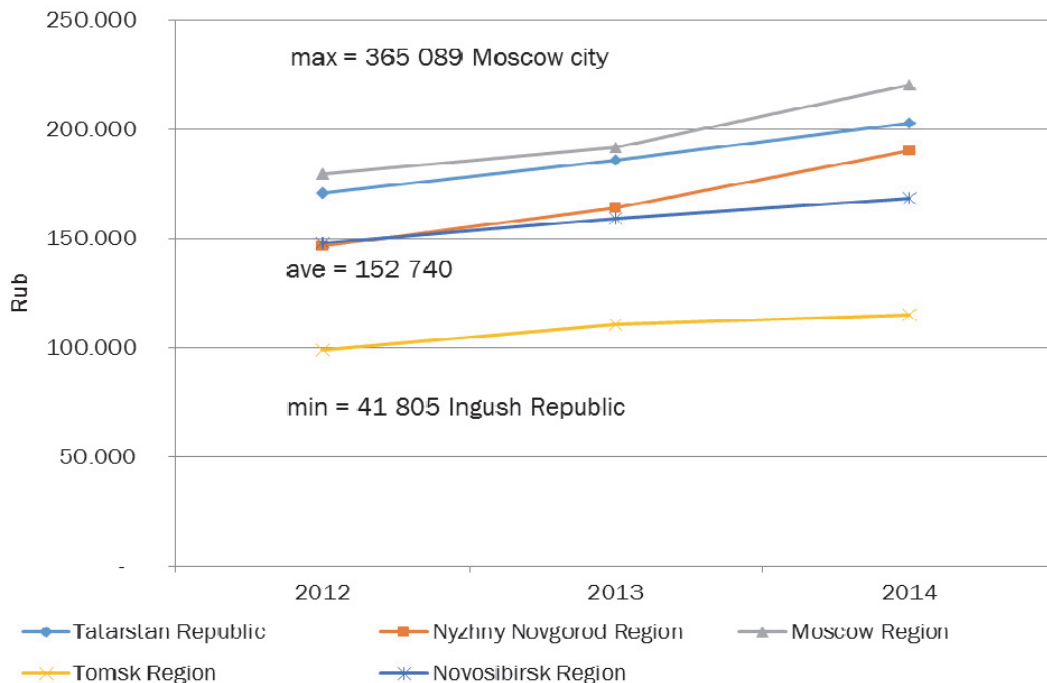
Figure 3. Dynamic analysis of the birth rate

Source: constructed by the author on the basis of Russian Federal Service of State Statistics, data for the years 1995-1997.

Another key indicator, included in the list, is the retail trade turnover per capita (x_{25}). At first it may seem that is no place for innovations in a region with high level of retail trade. It is not quite right. The study shows that the development of the retail trade is one of the main prerequisites for the innovative development of the region. The high level of consumption shows that the population in the region has sufficient income and indirectly indicates the high level of consumer demand, including for innovative products. In Figure 4, we can note a positive trend.

Figure 4. Dynamic analysis of the retail trade turnover per capita
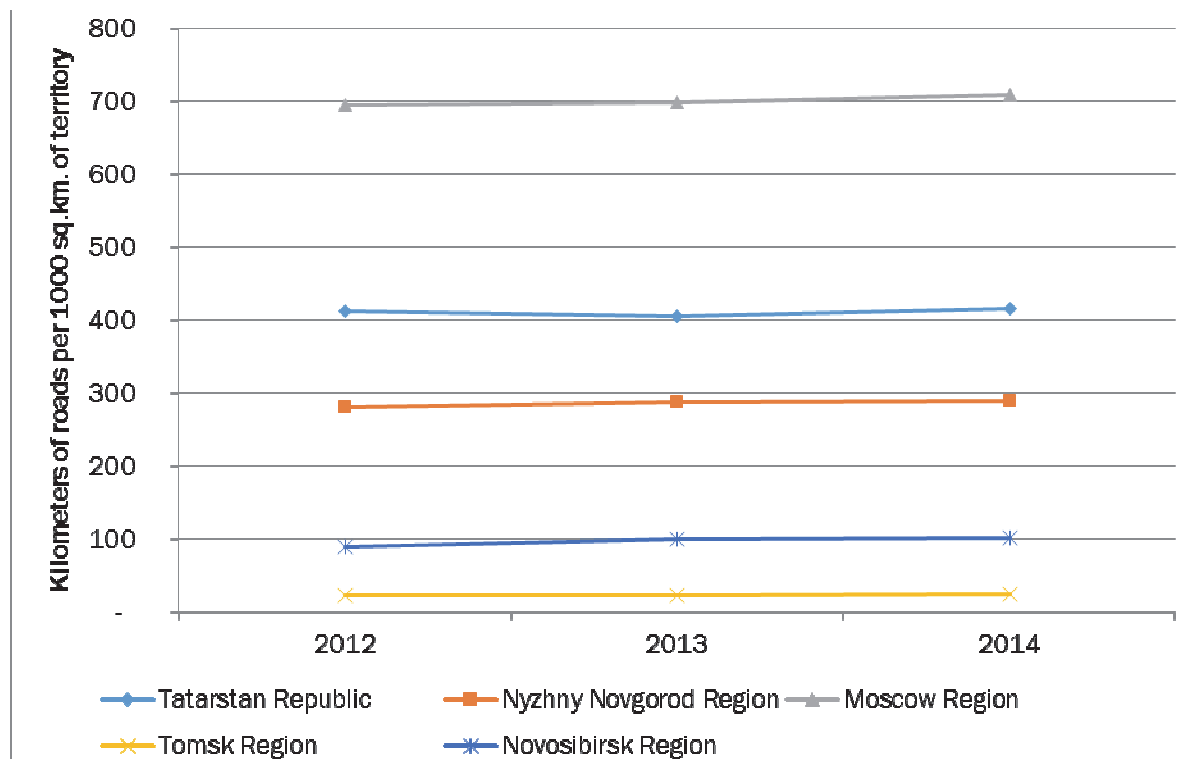

Source: constructed by the author on the basis of Russian Federal Service of State Statistics, data for the years 2012-2014.

Income of social infrastructure objects (x_8) and turnover of small businesses per capita (x_{13}) have a positive trend in the period from 2012 to 2014 in the considered regions and allow to keep these territories a high level of socio-economic environment.

For the attractiveness of the region to live is crucial roads satisfaction of the population. The density of public motor roads with hard coating (x_{19}) characterizes the situation with availability of various localities in the region for road transport.

At the same time the national average of the density of public motor roads with hard coating in 2014 is 269 km even taking into account Moscow city, which shows the maximum level of 2 438 km. Minimum level revealed in Chukchi Autonomous District – only 0,9 km (fig. 5).

Figure 5. Dynamic analysis of the density of public motor roads with hard coating

Source: constructed by the author on the basis of Russian Federal Service of State Statistics, data for the years 2012-2014.

CONCLUSIONS

Based on the results of this study, the state policy to encourage innovations should cover such areas as the development of small and medium-sized enterprises, development of higher-level educational environment and development of social and transport infrastructure in the region. In addition to direct support to the innovations, these areas of activity have a significant indirect effect on the extensive development of the socio-economic and innovative environment.

Dynamic analysis of the regional innovation policy impact and effectiveness on the basis of the socio-economic and innovative indicators reveals the strengths and weaknesses of the territory strategy. The minimum set of analyzed parameters includes the key determinants of the socio-economic and innovative development, the maximum - all 48 individual indicators.

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REFERENCES

Afonasova, M. A. (2009), "Upravleniye innovatsionnym razvitiyem regiona v usloviyakh institutsion-al'noy transformatsii ekonomik", avtoref. dis. ... d-ra ekon. nauk. – SPb., Moskva (in Russian)

Akhmetova, M. I., Kozonogova, Ye. V., (2015), "Klyuchevyye faktory sotsial'no-ekonomicheskogo razvitiya regiona: innovatsionnaya sostavlyayushchaya", *Izvestiya vysshikh uchebnykh zavedeniy*, Seriya «Ekonomika, finansy i upravleniye proizvodstvom», No. 4 (26) – in Rossian.

Belyayev, O. G. (2012), "Otsenka innovatsionnogo potentsiala ekonomicheskikh sistem", *Upravleniye ekonomicheskimi sistemami*,

Bortnik, I. M., Sorokina, A. V. (2014), "Rekomendatsii regionam AIRR po rezul'tatam reytingov innovatsionnykh regionov", *Innovatsii*, № 7(189), pp. 59-68 (in Rossian).

Federal'naya sluzhba gosudarstvennoy statistiki RF, URL: http://www.gks.ru (08.10.2015).

Freeman, C. (1995), "The National System of Innovation in Historical Perspective", *Cambridge Journal of Economics*, Vol. 19, No. 1, pp. 5-24.

Komilov, S .D., Fayzulloyev, M. K. (2013), "Otsenka innovatsionnogo potentsiala sotsial'no-ekonomicheskogo razvitiya regiona", *Problemy sovremennoy ekonomiki*, No. 3, pp. 369–373.

Kumakova, S. V. (1992), "Metodologiya integral'nykh otsenok innovatsionnoy deyatel'nosti i innovatsionnykh potentsialov regionov", http://pandia.org/815909.

Lundvall, B. A. (1992), *National Innovation Systems: Towards a Theory of Innovation and Interactive Learning*, Pinter, London.

Razuvayev, V. V. (2012), "Metodika otsenki nauchno-tekhnicheskogo potentsiala regionov Rossiyskoy Federatsii", *Vestnik Permskogo universiteta, Ekonomika*, No 3 (14). pp. 67–74 (in Russian).

Trifonov, YU. V. (2014), "Veretennikova A. A. Problema otsenki urovnya innovatsionnosti regiona", *Sovremennyye nauchnyye issledovaniya i innovatsii*. No. 2, http://web. snauka.ru/issues/2014/02/31792.

Shvarova, Ye. V., Mironova, Ye. G. (2015), "Analiz urovnya innovatsionnogo potentsiala Bryanskoy oblasti v sostave regionov Tsentral'nogo Federal'nogo okruga", *Ekonomika predprinimatel'stva*, № 8-2 (61-2), pp. 276-280 (in Russian).

Shumpeter, Y. (1982), *Teoriya ekonomicheskogo razvitiya: issledovaniye predprinimatel'skoy pribyli, kapitala, kredita, protsenta i tsikla kon'yunktury*, ed. A.G. Mileykovskogo, Progress, Moskva (in Russian).