THE ALGORITHM OF INTEGRATED ESTIMATION OF INNOVATIVE DEVELOPMENT AT MESO LEVEL

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The author suggests the procedure of integral evaluation of innovative development of regional social and economic systems that is possible to apply to different levels of competition. The suggested approach was used in application to the regions of Volga Federal Okrug and Russian Federation. The ways of developing the competitiveness in innovation sphere at meso level are shown.

The transition to the innovative type of development of the economy on micro- meso- and macrolevels for modern Russia becomes a clear necessity.

The solution of this challenge requires, first of all, adequate estimation of innovative competitiveness of managing subjects, regions and national economy as a whole.

In the research of innovative competitiveness of the regional social and economic systems the most comprehensible method of ordered estimate is used due to the significant amount of base values that can be involved in the course of research and the possibility to account different levels of competitiveness it provides.

In this case it is necessary to consider competitiveness between the regions of corresponding federal district (the first level of competitiveness) and competitiveness between the subjects of the Russian Federation (the second level of competitiveness).

The algorithm of integrated estimation of innovative competitiveness of a region is presented in fig. 1. We use the given algorithm to estimate the level of innovative development of Samara region.

The procedure of integrated estimation of innovative competitiveness of regions and the definition of the rank of Samara region were made in some stages.

Stage 1. Estimating the actual possibility of innovative development of regions and their ranging, proceeding from the set of indicators of innovative competitiveness.

The realization of this procedure probably needs to use mathematical-statistical device.

In this case the most comprehensible is the method of "The pattern". This method, on the one hand, allows to replace absolute values of the data normalised and consequently it is a method subtle enough for solving the problem of comparative estimation. On the other hand, it is absolutely adequate to the research task for according to benchmarking technique within the limits of inter-regional comparisons it is necessary to carry out comparison to the best (or standard) value (comparison with the sample).

Stage 2. Estimation of potential possibility of innovative development of the regions and their ranging with the account of results of the first evaluation stage and the parameters of investment risk.

Stage 3. Defining the integrated estimation of innovative competitiveness of the regions and their ranging on the basis of the results of the second evaluation stage and with the account of dynamics of the investigated indicators of competitiveness.

While estimating the dynamics of each indicator the first place was given to the region with either the highest positive or the lowest negative tendencies.

During the spent calculations within the limits of Privolzhsky federal district the following results have been received:

At the first stage of the procedure of integrated estimation of innovative competitiveness of the regions on the basis of reference values of the selected indicators as of 2000 and 2006 by means of "The pattern" method PFD has been advanced in the rating of innovative competitiveness of regions in the investigated period (tab. 1, tab. 2).

The given rating testifies that the Samara region in comparison with other regions of PFD has strong positions both in 2000 and in 2006, accordingly - the second and the first place (conceding the superiority in 2000 of Nizhniy Novgorod region).

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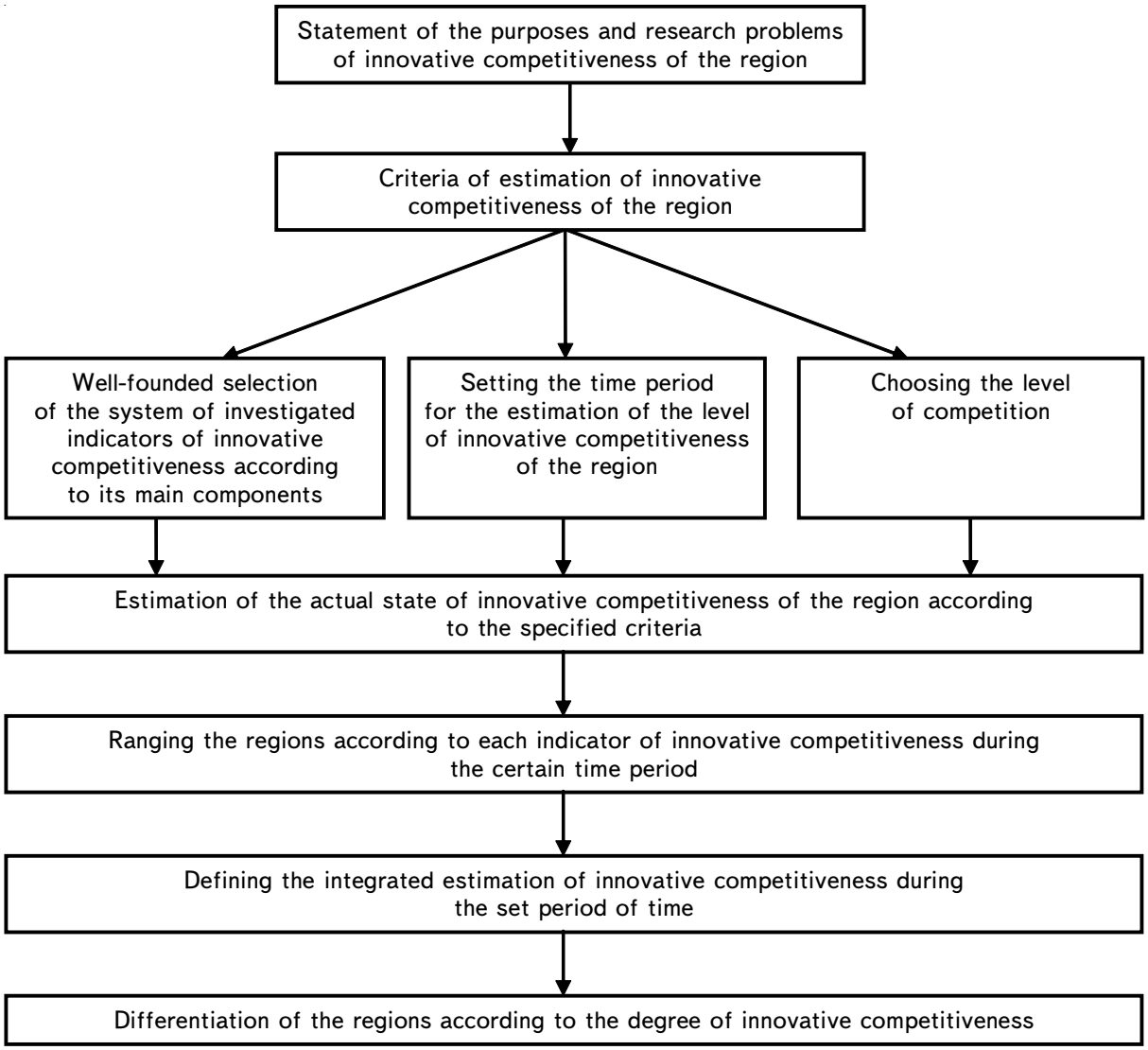

Fig. 1. **Algorithm of integrated estimation of innovative competitiveness of the region**

At the second evaluation stage ranging of the regions of Privolzhsky federal district on the basis of rating their innovative competitiveness and ranking the investment risks as of 2006 (tab. 3) has been carried out.

In the given rating Samara region shares the third place with the Republic Mordovia and Perm region, conceding the positions of Nizhniy Novgorod region and the Republic of Tatarstan. The decrease in competitive positions in this case occurred owing to the high level of investment risk in the region.

The rating of the regions of PFD in the dynamics of indicators of innovative competitiveness (2006 in comparison with 2000) shows that Samara region is here in the fourth place sharing it with Penza region.

With the account of dynamics of the investigated indicators and the results of the second estimated stage the integrated estimation of innovative compettiveness of the regions of PFD (tab. 4) was carried out.

As we see, the competitive position of Samara regionaccording to the summary estimation are strong enough. The region takes the second place after The Republic of Tatarstan and The Republic of Mordovia that share the first place.

The research on integrated estimation of innovative competitiveness of Russian regions in 2000 - 2006 and the establishment of the rank of Samara region according to the indicated stages allowed to advance the competitive status of the region in the system of the subjects of Russian Federation.

Ranking the rating of innovative competitiveness of Russian regions on the basis of the investigated indicators in 2000 and 2006 shows

Table 1

Rating of innovative competitiveness of the regions of PFD in 2000

Regions	Number of the staff doing research and blueprints on 10 thousand of the population, taken in economy	Share of doctors and candidates of sciences in the total number of researchers	Internal expenses for research and blueprints in % to the TRP	Share of fundamental and applied research costs in the total sum of internal costs to research and blueprints	Inventors' activity factor	Quantity of the created high technologies per 1000 researchers	Relative density of the i nnovative-active organisations in their general number	Specific weight of innovative production in the total amount of shipped production	The relation of internal expenses for research and blueprints to permanent investment	The relation of expenses for technological innovations to permanent investment	Integrated estimation	Rank
Republic of Bashkortostan	0,203	1	0,116	1	0,667	0,058	0,238	0,117	0,071	0,105	0,357	8
Republic of Mary El	0,189	0,225	0,268	0,187	0,375	0,105	0,131	0,320	0,261	0,469	0,253	10
Republic of Mordoviya	0,120	0,480	0,063	0,450	0,208	0,073	0,167	0,417	0,067	0,395	0,244	11
Republic of Tatarstan	0,330	0,801	0,132	0,784	0,708	0,005	0,475	0,184	0,082	0,451	0,395	5
The Udmurt Republic	0,113	0,722	0,078	0,879	0,417	1,000	0,287	0,175	0,060	0,201	0,393	6
The Chuvash Republic	0,103	0,399	0,072	0,319	0,250	0,000	0,340	0,160	0,051	0,240	0,193	13
The Perm region	0,330	0,451	0,197	0,809	0,667	0,126	1,000	0,165	0,127	0,927	0,480	3
Kirov region	0,096	0,631	0,060	0,498	0,333	0,000	0,128	0,053	0,075	0,469	0,234	12
Nizhniy Novgorog region	1,000	0,444	1,000	0,657	0,625	0,089	0,550	0,199	1,000	1,000	0,656	1
Orenburg region	0,045	0,759	0,025	0,786	0,292	0,000	0,234	0,228	0,018	0,055	0,244	11
Penza region	0,399	0,115	0,280	0,381	0,417	0,094	0,181	0,117	0,265	0,318	0,257	9
Samara region	**0,605**	**0,295**	**0,398**	**0,114**	**0,833**	**0,440**	**0,883**	**1,000**	**0,368**	**0,465**	**0,540**	**2**
Saratov region	0,278	0,735	0,188	0,646	0,417	0,099	0,319	0,519	0,130	0,245	0,358	7
Ulyanovsk region	0,467	0,307	0,617	0,165	1	0,157	0,291	0,262	0,666	0,291	0,422	4

Table 2

Rating of innovative competitiveness of the regions of PFD in 2006

№ p/p	Regions	Number of the staff doing research and blueprints on 10 thousand of the population, taken in economy	Share of doctors and candidates of sciences in the total number of researchers	Internal expenses for research and blueprints in % to the TRP	Share of fundamental and applied research costs in the total sum of internal costs to research and blueprints	Inventors'activity factor	Quantity of the created high technologies per 1000 researchers	Relative density of the innovative-active organisations in their general number	Specific weight of innovative production in the total amount of shipped production	The relation of internal expenses for research and blueprints to permanent investment	The relation of expenses for technological innovations t o permanent investment	Integrated estimation	Rank
1	Republic Bashkortostan	0,164	0,877	0,075	0,609	0,494	0,047	0,301	0,100	0,093	0,270	0,303	8
2	Republic of Mary El	0,060	0,510	0,107	0,354	0,635	0,213	0,145	0,060	0,076	0,026	0,219	12
3	Republic Mordoviya	0,101	0,484	0,091	0,879	0,196	1,000	0,329	0,490	0,069	0,820	0,446	4
4	Republic Tatarstan	0,295	0,635	0,122	0,358	0,879	0,019	0,454	0,649	0,132	0,529	0,407	5
5	The Udmurt Republic	0,097	0,588	0,071	0,525	0,398	0,069	0,462	0,052	0,072	0,206	0,254	11
6	The Chuvash Republic	0,067	0,388	0,045	0,384	0,401	0,000	0,333	0,139	0,030	0,233	0,202	13
7	Perm region	0,321	0,318	0,250	0,329	0,683	0,109	1,000	0,829	0,309	0,529	0,468	3
8	Kirov region	0,101	0,593	0,101	0,290	0,277	0,049	0,177	0,088	0,086	0,147	0,191	14
9	Nizhniy Novgorod region	1,000	0,329	1,000	0,326	0,552	0,145	0,510	0,223	1,000	0,331	0,542	2
10	Orenburg region	0,034	1,000	0,018	1,000	0,186	0,151	0,458	0,028	0,024	0,071	0,297	9
11	Penza region	0,392	0,147	0,383	0,044	0,373	0,121	0,293	0,243	0,296	0,287	0,258	10
12	**Samara region**	**0,578**	**0,246**	**0,379**	**0,092**	**1,000**	**0,165**	**0,510**	**1,000**	**0,595**	**1,000**	**0,556**	**1**
13	Saratov region	0,201	0,764	0,124	0,687	0,569	0,137	0,309	0,108	0,116	0,182	0,320	7
14	Ulyanovsk region	0,466	0,320	0,606	0,045	0,967	0,103	0,249	0,470	0,612	0,155	0,399	6

Table 3

Rating of innovative competitiveness of the regions of PFD in 2006 with allowance for investment risk

№ p/p	Regions	Rank of innovative competitiveness	Investment risk ank (2006)	The sum of places of regions	Region rating
1	The Republic of Bashkortostan	8	4	12	4
2	The Republic of Mary El	12	12	24	10
3	The Republic of Mordoviya	4	6	10	3
4	The Republic of Tatarstan	5	1	6	2
5	The Udmurt Republic	11	14	25	11
6	The Chuvash Republic	13	3	16	7
7	Perm region	3	7	10	3
8	Kirov region	14	11	25	11
9	Nizhniy Novgorod region	2	2	4	1
10	Orenburg region	9	5	14	5
11	Penza region	10	10	20	9
12	Samara region	1	9	10	3
13	Saratov region	7	8	15	6
14	Ulyanovsk region	6	13	19	8

that Samara region takes a high competitive position. In 2000 the region was on the fifth place in innovative competitiveness in aggregate subjects of the Russian Federation, conceding accordingly to the city of Moscow, St.-Petersburg, Nizhniy Novgorod region and Moscow region. In 2006, Samara region occupied the third place, having leapt forward, after St.-Petersburg and Moscow.

Ranging Russian regions on the basis of rating innovative competitiveness and investment risk in 2006 shows that in this case, owing to a bit low rank of investment risk, Samara region takes the ninth place and shares it with The Republic of Mordovia. First eight places belong accordingly to St.-Petersburg, Moscow, Nizhniy Novgorod region, Moscow Region, The Republic of Tatarstan, Lipetsk region, Perm region, Kaluga region.

Table 4

Integrated estimation of innovative competitiveness of the regions of PFD

№ p/p	Regions	Rank of innovative competitiveness	Investment risk rank (2006)	Rank with allowance for investment risk	Rank in dynamics of indicators, 2006 to 2000 г	The sum of places of regions (gr. 5 + gr. 6)	Rank with allowance for the dynamics of indicators
1	The Republic of Bashkortostan	3	4	5	6	7	8
1	The Republic of Mary El	8	4	4	7	11	5
2	The Republic of Mordoviya	12	12	10	11	21	11
3	The Republic of Tatarstan	4	6	3	1	4	1
4	The Udmurt Republic	5	1	2	2	4	1
5	The Chuvash Republic	11	14	11	9	20	10
6	Perm region	13	3	7	8	15	7
7	Kirov region	3	7	3	6	9	4
8	Nizhniy Novgorod region	14	11	11	5	16	8
9	Orenburg region	2	2	1	12	13	6
10	Penza region	9	5	5	3	8	3
11	Samara region	10	10	9	4	13	6
12	Saratov region	1	9	3	4	7	2
13	Ulyanovsk region	7	8	6	10	16	8
14	Regions	6	13	8	9	17	9

The summary estimation of innovative competitiveness of the regions of Russian Federations shows that Samara region in 2006 took the third place.

Thus, according to the conducted integrated estimation of innovative competitiveness in the system of Privolzhsky federal district Samara region has a strong competitive position and is one of the three top competitors - leaders, taking the second place (tab. 5).

In the order of competitiveness between the subjects of Russian Federation, Samara region holds its position and in 2006 takes the third place according to the level of innovative competitiveness and the third place according to its summary estimation.

The conducted research allows to advance the competitive status of Samara region in the sphere of innovative development at different levels of competitiveness and promotes system engineering of practical offers ensuring its further increase.

The directions of innovative competitiveness of Samara region development are expedient for structuring in two blocks:

1. The process of production of knowledge and productivity of research activity.

2. The process of transfer of knowledge and innovative susceptibility.

The action of the first block reflects the improvement of forms of state financial support of innovative activity in various stages of innovative process.

First of all here it is necessary to establish the fixed share of costs of the regional budget on financing research and development works, with spendings on science not less than 4 percent, similarly advanced by the federal statute of 23.08.1996 № 127-FL "On science and the state scientific and technical policy" to the size of an account part of the federal budget (not less than four percent) allocated funds on financing of research activities and experimental blueprints for civil application.

The forms of indirect financial support can be: indemnification to the innovative enterprises of a part of the expenses connected with submission and advance of innovative projects at exhibitions, venture forums, broker meetings etc., parts of expenses for insurance of risks of the subjects of innovative activity, giving privileges on lease of uninhabited premises and so forth.

As a part of the State expenditure on science it is necessary to provide the means for acquisition of the necessary scientific literature, restoration of volumes of acquisition of scientific and technical libraries by domestic and foreign scientific editions.

The major economic condition of successful innovative development is the stimulating system of taxation.

With the purpose of redistribution of financial risks and the attraction of additional means for realization of innovative programs and projects, creation of organizations with high innovative activity, security funds, with deduction

Table 5

Competitive position of Samara region in the system of PFD in 2000-2006

Competitive positions		
strong	average	weak
Innovative competitiveness		
Samara region Nizhniy Novgorod region Perm region The Republic of Mordoviya The Republic of Tatarstan	Ulyanovsk region Saratov region The Republic of Bashkortostan Orenburg region Penza region	The Udmurt Republic The Republic of Mary El The Chuvash Republic Kirov region
Investment risk		
The Republic of Tatarstan Nizhniy Novgorod region The Chuvash Republic The Republic of Bashkortostan Orenburg region	The Republic of Mordoviya Perm region Saratov region Samara region Penza region	Kirov region The Republic of Mary El Ulyanovsk region The Udmurt Republic
Integrated estimation of innovative competitiveness		
The Republic of Tatarstan The Republic of Mordoviya Samara region Orenburg region Perm region	The Republic of Bashkortostan Nizhniy Novgorod region Penza region Chuvash Republic Saratov region Kirov region	Ulyanovsk region The Udmurt Republic The Republic of Mary El

on the indicated purposes of the means included in product cost, within one percent of the volume of realized production is also necessary.

The basic actions of the second block are directed towards the increase of innovative activity of the enterprises of the region, the maintenance of growth of competitiveness of production on the basis of the development of scientific and technical achievements and production update, restoration and development of scientifically-technological potential of industrial enterprises as the basis of innovative development of all the industry in the region, assistance to active use by the regional enterprises and the organizations of innovations of a broad spectrum of directions (technological, in the field of management, marketing, the finance, etc.).

The Innovative susceptibility largely depends on the organization of knowledge transfer process.

The basic tool of introduction of the intellectual property accumulated in scientific and technical sphere to economic circulation and fast advance of innovations from research to the launch of competitive industrial output is the innovation infrastructure, including industrial-technological, financial, personnel and information components.

Creating the following elements of an innovation infrastructure is seen as necessary:

1. With the purpose of formation of a uniform regional database of subjects of innovative activity and its results the following measures are necessary: the increase of knowledge of subjects of innovative activity, the participants of international and inter-regional cooperation about directions and problems of an innovative policy of Samara region, the attraction of potential investors and business partners, the increases the quantity of concluded deals, the realization of continuous monitoring of innovative activity and, finally, the creation of system innovative activity information supply.

It is also advisable to:

♦ work out standard-legal and methodical base for maintenance of functioning of the system of innovative activity information supply;

♦ form the information infrastructure on the basis of integration of local and distributed databases of common use, the organization of preparation and retraining of personnel for servicing databases and help systems, and also training users of the system of innovative activity information supply;

♦ creation of the information-analytical centre of innovative activity whose basic functions should become collecting, processing, analysis and granting the information of innovative character to all the interested subjects of innovative activity and also promotion of the idea of innovative development in a company by means of preparation and placing of corresponding materials in mass media.

2. With the purpose of developing the system of advance in scientific and technical production on the market it is necessary to create innovative web stock exchange. At the initial stage of its functioning the organization of auctions by means of creation and maintenance of a specialised web-site in global computer network Internet is necessary. This site should correspond to modern safety requirements of information systems in the field of electronic trade, and also support the realization of all functionality exchanges. The expected result from the creation of the centre of electronic auctions by scientifically - technical and innovative production - centre inclusion in the domestic and foreign information network which is carrying out the electronic auctions.

3. Network structure creation on training and transfer of experience of the employees of the organizations of innovation infrastructure - an Innovative club - with the purposes of effectivization of functioning of the organizations of the innovation infrastructure active in the territory of the region. The actions of the given block should be directed on stimulation of innovative activity of the enterprises. It can be achieved via:

♦ conducting an innovative rating of the industrial organizations;

♦ creation of information base for the construction of a regional system of keeping statistical records of innovative activity, working out the catalog of statistics on the regional level;

♦ identifying of the enterprises and the organizations working in hi-tech branches, connected with perspective blueprints and having a growth potential, analysing their requirements and problems, working out instruments and scenarios for cooperation of these organizations with science;

♦ working out the techniques of performance evaluation of innovative activity of the organizations of the region;

♦ formation of regional and municipal orders for scientific, scientific and technical and innovative production;

♦ formation of a portfolio of innovative projects in separate kinds of activities;

♦ supporting small innovative enterprises.

The system of the considered suggestions will allow to increase the level of innovative competitiveness of the region and to ensure its sustainable development.