

# Forming of Institutional Mechanism of Region's Innovative Development

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**Abstract**—The regional innovative competitiveness is an integrating characteristic of the innovative sphere of the region. It depends on a big variety of different parameters connected with all kinds of economic entities' activities. But management parameters shouldn't be irregular, so in order to avoid it, an institutional system should be formed. This system should carry out strategic management of factors having the greatest influence on the region's innovative development.

This article is devoted to different aspects of organization of the region's development institutional mechanism, which is based on management of regional innovative competitiveness parameters.

The base of the analysis is innovatively-active Russian regions which were compared according to the level of the innovative competitiveness. After that the most important parameters of successful innovative development of the region were revealed with the help of the correlation-regression analysis. The results of the research could be used for investigation of the region's innovative policy<sup>1</sup>

**Keywords**—regional innovative competitiveness, institutional mechanism, innovative region development, correlation-regression analysis.

## I. INTRODUCTION

INCREASING of the innovations' economic role, changing of the tempo, directions and mechanisms of the innovative processes' development are the key factors, which stipulate the radical structural shifts in the economies of industrially developed countries. They appear to be in the increase of investments into education and science, technological and organizational innovations; anticipating dynamic of highly technological sectors of industry alongside with the rise of technological level of the traditional fields of industry; appearing of the new kinds of activities etc. Active politics of the state is an important factor of the innovative economics' creation. The determination of the priorities of the national economics' development, creation of the favorable economic and legal environment and the national innovative system, improvement of the mechanisms of the state assistance, providing with necessary resources – all these is the state's prerogative. The use of innovations in the development of the managing subject, including a region, is a unique decision of the problems, caused by the economic crisis.

In today's conditions the regional innovative politics is becoming one of the most important components of the national innovative system's formation process. This is stipulated by the following reasons:

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1. It is assumed that in the times of globalization the main condition for the stability and economic independence of every country is its inner organization including the capability of the separate regions and the whole country as well to react quickly and attentively to the changes of the internal and external economic activities, to implement the quick adaptation by means of a huge supply of the innovative politics' assets.

2. The nature of the world economics' development is changing. A new epoch of the science intensive production is coming. This production is characterized not by the scale of manufacturing and sale, but by the capability of the constant innovation of the products by means of implementation of "the productive technologies", which is of the crucial importance in the strengthening of the competitive positions of the nationalities in the world market.

In this response the formation of the effective institutional mechanism of the innovative activities of the region is becoming acute.

## II. METHODOLOGY

One of the approaches to the analysis of the economic structure is a hierarchical approach, which details the three levels of the national economy: macro-, meso- and micro-. Exploring innovative activity at the micro level, i.e. the operating features of a separate entity in terms of innovation, we study groundwork and strategic thinking in a particular area of economic activity. We are interested in competitiveness of this entity at the national level, among a similar entities, but we are also interested in the industry competitiveness on the international level. Meso level's research is important and interesting because it reflects the development of innovative activities in all spheres of human activity and reveals not only the economic problems, but also the social gaps in a particular subject of the Federation, in the management of the investigating territory.

However an application of innovations ought to be reflected in a long-term strategy of a region, covering all fields of economic activity of the considered subject and being supported by the indicators, which are calculated with use of statistical data and reflect the dependence of introduced innovations and results of economic activities.

In the framework of a region the innovative competitiveness increases and formic the innovation and institutional mechanisms of territories development strategy. The analysis has been carried out from the point of view of the innovative activity and the innovative competitiveness [1]-[2].

It is offered to use the indicator of a regional innovative competitiveness, as the innovative activity indicator, which reflects a development level of innovative activity in regions and allows to compare not only the activity of region in the innovation sphere, but also to analyze the influence of separate factors on this activity.

The technique, which is used by the European Union for the analysis of innovative activity [3]-[4], has been used as a basis for calculation of a regional innovative competitiveness.

A regional innovative competitiveness is counted on the basis of twelve indicators:

1) relative density of workers with higher education in the total number of employees in a region (this indicator is one of the major indicators, because it reflects the general level of available skills and knowledge, which directly influences on the receiving and application of innovations);

2) relative density of the enterprises which carry out training courses for the personnel, connected with innovations, to the total number of the region enterprises (this indicator is important, because it depends on the formation of the innovative culture, which promotes the elimination of the resistance to innovations);

3) relative density of expenses on researches and workings out in a general annual volume of expenses of region (this indicator reflects expenses on innovations which can be used for the further development of the managing subject);

4) relative density of the enterprises, which receive state grants for the innovations, to the total number of the enterprises of a region (the state support of the development of the innovative sphere is the significant factor, considering scale of investments in this area and a long payback time of investments. Very often, the state grants are considered separately on hierarchical levels of granting of the financial assets: federal, regional. Moreover, this indicator is important, because this factor is underlined as the main reason, which interferes in the introduction of innovations);

5) relative density of the enterprises, which introduce innovations to the total volume of the enterprises in a region (this indicator reflects the enterprises, which use their innovations in the economic activities);

6) relative density of the small and average enterprises in a region, which cooperate with other enterprises concerning a scientific and technical development to the total volume of the small and average enterprises in a region (this indicator considers small and average enterprises which had any cooperation agreements about innovations with other enterprises or establishments. This indicator characterises a knowledge exchange between the research institutes and the enterprises. A restriction of this indicator by small and average enterprises is connected with the involving of all large enterprises in the innovation cooperation);

7) relative density of innovation expenses to the general expenses in a region (the development of innovations depends on an innovative climate generated in a region and which directly depends on the financial participation of the administration of a region);

8) relative density of a sales volume of production, which was exposed to considerable technological changes or which was reintroduced to the total amount of sales in a region;

9) relative density of a sales volume of production, which was exposed to improvements to the total amount of sales in a region;

10) relative density of the enterprises in a region which patent the inventions, to the total number of the enterprises in a region;

11) relative density of the enterprises, which use new trade marks, to the total number of the enterprises in a region;

12) relative density of the enterprises using a registration of parts of the project, to the total number of the enterprises in a region.

The last six indicators are divided depending on existing kinds of an innovative activity which are fixed according to the techniques, which are accepted in Russia.

The quantitative estimation of a regional innovative competitiveness level is carried out by an integrated indicator which is counted as the average size of the significances of twelve innovative indicators. The main feature of this approach is that all variables should submit to normal distribution, and also a set should be homogeneous. Uniformity of this set is estimated by the indicators of a variation, thus sizes, which are not corresponding to a condition can be excluded, because for the final calculations, only eight indicators are enough.

The factor of a variation which is calculated under the following formula is used for the research of an uniformity of a set:

$$V = \frac{\sum_{i=1}^n (x_i - \bar{x})^2 * f_i}{\sum_{i=1}^n f_i}, \text{ where}$$

$x_i$  - meaning of i-th variant of a set

$f_i$  - frequency of i-th variant of a set;

$$\bar{x} = \frac{\sum_{i=1}^n x_i f_i}{\sum_{i=1}^n f_i} - \text{average meaning in an aggregate.}$$

If the factor accepts value of 33 % (it is more often used 35 % in practice). The set is considered as homogeneous. It is valid for the distributions which are close to the normal.

Revealing of the general character of distribution in an aggregate assumes the analysis of symmetry and sharply – top or flat top and an estimation of a degree of the uniformity. Thus, in a normal distribution the left and right parts of a set should be expressed equally, so the factor of asymmetry and the excess factor should be equal to zero.

The elementary measure of dissymmetric distributions is the deviation between characteristics of centre value of a distribution. As in symmetric distribution  $\bar{x} = Me = Mo$  (where  $Me$  - is a median, and  $Mo$  - is a tendency of the observable sizes), so if the asymmetry is more considerably, the deviation will be more ( $\bar{x} - Mo$ ). The standard deviation is called as a factor of asymmetry of Pirsona:

$$K_a = \frac{\bar{x} - Mo}{S_x}, \text{ where}$$

$$S_x = \frac{\sum_{i=1}^n (x_i - \bar{x})^2 * f_i}{\sum_{i=1}^n f_i} - \text{average quadratic deviation}$$

As it has been already told, if a number is symmetric, the asymmetry factor will be equal to zero ( $\bar{x} = Mo$ ), if it is

more, than zero ( $\bar{x} > Mo$ ), we have the right-hand warp and we can speak about distribution with a positive bias, if it is less than zero ( $\bar{x} < Mo$ ) – we have a left-hand warp and a bias is negative.

Also in this case it can be used a standard factor of the third order. Conclusions can be made similarly:

$$A_3 = \frac{\mu_3}{S_x^3}$$

A presence of the asymmetric data is an occasion for using of the transformation functions. One of the ways of a transformation of the dissymmetric variables is a using of the transformation functions. Depending on the level of the dissymmetric, a transformation of a square root, or a transformation of a degree of root are applied. After a corresponding transformation the following formula is calculated, according to each of twelve indicators.

$$x_{cij}^r = \frac{\left( x_{cij} - \min \left( \forall_c \forall_j x_{ij} \right) \right)}{\left( \max \left( \forall_c \forall_j x_{ij} \right) - \min \left( \forall_c \forall_j x_{ij} \right) \right)}$$

$x_{cij}^r$  - the counted meaning of an indicator  $i$  for a sector  $j$  of a region  $c$ .

The counted meaning of each indicator turns out by subtraction from meaning of an indicator on the chosen

sector of a certain region ( $x_{cij}$ ) the minimum value of an indicator  $i$  among all considered sectors of all regions, and then a division on a difference between the maximum and minimum values of an indicator  $i$  among all sector values of the chosen regions.

So the results, meanings are transformed in a size between 0 and 1, with the maximum meaning, which is transformed to 1, and minimum meaning, which is transformed to 0. An innovative level of a region as a whole is counted by the account of an average meaning of the resulted data of each indicator.

An economic value of an integrated indicator consists in the innovative level of a region, which measures a degree of activity of an innovative activity in it as a whole, gives the characteristics of the innovative competitiveness in each sector.

Studying of a foreign experience of estimation a definition and using of the innovative competitiveness indicator, also the estimation of its adaptation possibilities to the features of the Russian statistical base, shows, that the given technique can be used for the definition of innovative competitiveness of the Perm region as a whole. It can be also used for carrying out the comparative analysis of a regional innovative competitiveness of the separate subjects of the Russian Federation.

Moreover, an application of the adapted variant of this technique allows:

- firstly to estimate a certain position of the separate regions in comparison with the foreign regions on its basis, that is very actual for an accession of Russia to the World Trade Organization;

- secondly to use those estimated indicators, which can be received according to the limits of this technique, for an estimation of the separate regions in the country in order to

compare of their innovative competitiveness, definition of the prospects of their development, working out of the activities program and a certain measures plan for the increase of the innovative competitiveness of each separate subject of Russian Federation;

- thirdly, there is a possibility of revealing the factors and conditions of the innovative development, on the basis of private calculations and comparison of each of twelve indicators, which are very important for a region and a country as a whole from the point of view of the formation of their innovative competitiveness.

### III. RESULTS AND DISCUSSION

9 subjects of the Russian Federation have been accepted as the basic objects of comparison, 8 from this objects are the strongest and the most competitive regions of Russia, and also the Perm region which will be a comparative base [5]-[7]. They are:

- 1 - Moscow, city;
- 2 - Saint Petersburg;
- 3 - Nizhny Novgorod region;
- 4 - Novosibirsk region;
- 5 - Perm region;
- 6 - Samara region;
- 7 - Saratov region;
- 8 - Sverdlovsk region;
- 9 - Tumen region.

Taking in account that eight indicators are enough for the calculations, the necessary quantity has been selected from the available factors of regional innovation competitiveness. They are listed in the Tables 1-2.

Results of calculation of the indicators of a regional innovative competitiveness are presented in a Table 1.

TABLE I  
THE SUMMARY TABLE OF VALUES OF THE INDICATORS IN THE REGIONS OF THE RUSSIAN FEDERATION, %

Number of region	Number of an indicator							
	1	2	3	4	5	7	8	10
1	46,5	0,0033	1,4705	2,670	12,6	0,1218	2,1	0,0017
2	37,5	0,0063	2,2972	8,386	13,1	0,7023	2,3	0,0027
3	22,4	0,031	1,7068	10,9	13,5	0,7052	2,4	0,0103
4	25,5	0,0047	1,6553	44,2	4,9	0,5004	1,1	0,0020
5	21,4	0,0476	0,6590	0,480	23,2	1,1407	12,4	0,0204
6	28,6	0,0187	0,9689	1,700	17,8	1,2037	25,5	0,0080
7	22,4	0,0214	0,3903	3,200	8,5	0,8429	3,0	0,0053
8	21,6	0,0203	0,6541	1,000	14,3	0,9359	8,1	0,0054
9	26,0	0,0115	0,1793	2,3	6,6	0,6016	0,6	0,0032

The comparative analysis of data (2007 and 2005), when the first statistical calculations were made (for more on this, see [8]-[9]), allows us to conclude that the number of employees with higher education has increased in all monitored regions. For example, in Moscow the figure was at 42.1%, and in the Perm region 17,9%. The reason is the increase of the requirements to employees from employers, transformation of regions and the entire country to a higher level of economic development - «knowledge economy», «new economy».

All data, which are resulted in table.1 correspond to the normal distribution and can be used for the next analysis. In

Table 2 the counted values of the indicators of the regions are presented in Table 1.

TABLE II  
THE SUMMARY TABLE OF THE RESULTED VALUES OF THE INDICATORS OF THE REGIONAL INNOVATIVE COMPETITIVENESS

№ of region	Number of an indicator							
	1	2	3	4	5	7	8	10
1	1	0	0,61	0,05	0,42	0	0,06	0
2	0,64	0,07	1	0,18	0,45	0,54	0,07	0,05
3	0,04	0,63	0,72	0,24	0,47	0,54	0,07	0,46
4	0,16	0,03	0,70	1	0	0,35	0,02	0,02
5	0	1	0,23	0	1	0,94	0,47	1
6	0,29	0,35	0,37	0,03	0,70	1	1	0,34
7	0,04	0,41	0,10	0,06	0,2	0,67	0,10	0,19
8	0,01	0,38	0,22	0,01	0,51	0,75	0,30	0,2
9	0,18	0,19	0	0,04	0,09	0,44	0	0,08

According to the date, the following conclusions can be made: the first indicator (the number of workers with higher education) Moscow takes the first place, because it is the capital and many people flock there, including those with higher education. Up to the second indicator (the number of enterprises engaged in education and training related to innovation) – the Perm region takes the first place. The third indicator (expenditure on research and development) shows that Saint Petersburg is the best. The fourth factor (the amount of public subsidies on innovation) is mostly developed in the Novosibirsk region. Up to the fifth indicator (the total number of businesses using innovation to their development) the Perm region again takes the first place. Up to the sixth (the cost of innovation) and seventh (sales of products with significant technological change) indicators - the leader is the Samara region. And up to the last eight indicators (the level of patenting in the region) the Perm region again takes the first place.

On the basis of the resulted data we will calculate a regional innovative competitiveness of the chosen subjects and we will carry out ranging of the territories on this indicator (see Table 3 and Fig. 1).

TABLE III  
REGIONAL INNOVATIVE COMPETITIVENESS

№	Region	RIC	Rank
1	Moscow, city	0,27	7
2	Saint Petersburg	0,38	4
3	Nizhny Novgorod region	0,40	3
4	Novosibirsk region	0,29	6
5	Perm region	0,58	1
6	Samara region	0,51	2
7	Saratov region	0,22	8
8	Sverdlovsk region	0,30	5
9	Tumen region	0,13	9

Ranking of regions is graphically presented with a help of chart in Fig. 1, where subjects are displayed according to the value of regional innovative competitiveness.

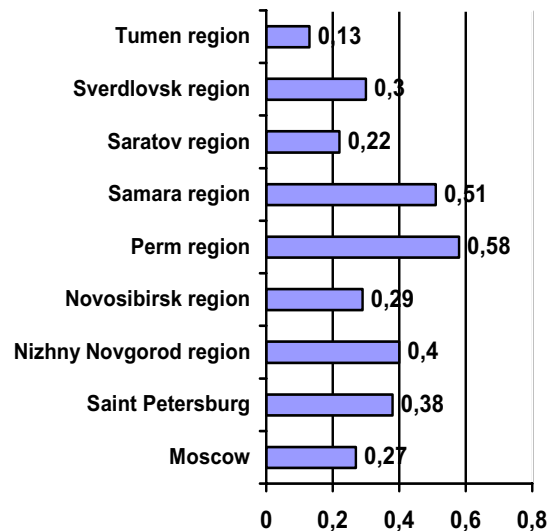


Fig. 1 Reengineering number of regions of Russia on the regional innovative competitiveness

The results of the calculations shows that the most difficult situation in innovative activity is in the Tumen region, with the value of regional innovation competitiveness of 0.13. It is followed by: the Saratov region, Moscow, the Novosibirsk Region, the Sverdlovsk Region, Saint Petersburg, the Nizhny Novgorod Region, the Samara Region and the leader is the Perm Region. If we compare this with the previous research results which were made in 2005, we can conclude that there aren't any fundamental changes in the rating: the Nizhny Novgorod region and the Perm Region have exchanged their places (formerly occupied the first and third place) the value of regional innovation competitiveness in the Nizhny Novgorod region markedly decreased from 0,62 to 0,4, the Perm Region has increased its level by eight-hundredths; The Samara region remained on the second place without changing the numerical value; Saint Petersburg has risen to seventh place (from 0,34 to 0,38 ), the Sverdlovsk region remained on the fifth place, but performance has decreased from 0,34 to 0,3; the Novosibirsk region has risen from the last place to sixth, significantly stepping up to the innovation (from 0.13 to 0.29); Moscow, which traditionally attracts international and large domestic investors is only the seventh, dropping from an already low sixth place; the Saratov region occupies the penultimate line, significantly lower performance from 0.38 to 0.2, dropped from the fourth position. The Tumen region occupies the last place while in 2005 it was penultimate.

There is a point of view that the main economic indicator of the level of region's development is GRP (gross regional product) per capita, which characterizes the current state of already achieved results unlike innovativeness, which shows some groundwork for the region in the future, its potential and capacity. Analysis of correlation showed that there isn't any direct connection between the current performance of GRP and regional innovation competitiveness [10]. Accordingly to this, it is proposed to trace the relationships between the last levels of innovative activity and the current levels of GRP. Combinations of innovation rates of the previous research and the current GRP per capita are shown in Fig. 2.

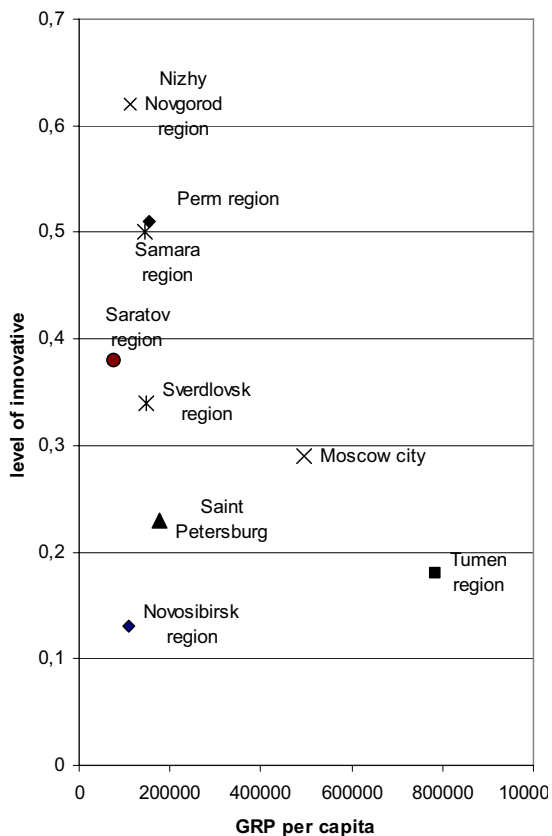


Fig. 2. Reengineering number of Russian regions on the level of innovative and economic activities

However, the results, shown in the chart, don't allow talking about the direct relationship (for example, the Tumen region, which is one of the last in innovation rating, has the highest value for GRP). Thus, economic performance is affected by many factors besides innovation, such as geographic location and quantity of available resources, so the analysis of economic conditions should be conducted more deeply, using a variety of data, which is taking into account the development in all spheres of region economy.

It is possible to come to conclusion, that the effect of the innovation comes much later than in next two years because of the fact that innovative transformation causes a complex of qualitative changes that require long payback.

Here is the factor analysis of the regional innovative competitiveness of the Perm region, which is a leader among the selected regions (see Figure 3). The Perm region took the first place among the other regions of Russian Federation (a value of 0.58, exceeding the average level of value). There are some indicators that reason the first place of the region in the rating.

The diagram in Fig.3 shows that there are 4 factors determining the level of innovation in the leading region with high values. They are: education and training of employees of enterprises connected with innovation, number of innovation-active enterprises in the region, expenditures on innovation compared to expenditures in general, activity in the area of patenting. But in Perm region the two indicators (government subsidies to innovation and the share of employment in higher education) have minimum values

(zero) in comparison with the other regions. But this does not mean that they are not developed at all.

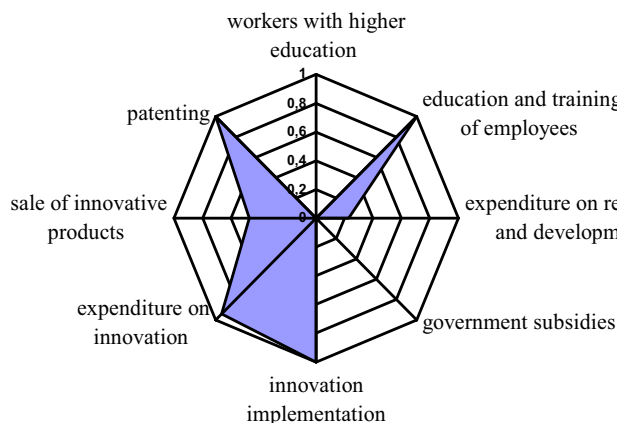


Fig. 3. Factors influencing regional innovation competitiveness of the Perm Region

Another interesting moment is that the top three leaders among the regions remained the same (compared with the results of the research conducted several years ago). But the dynamics of indicators growth is different in the regions (see Fig. 4-5).

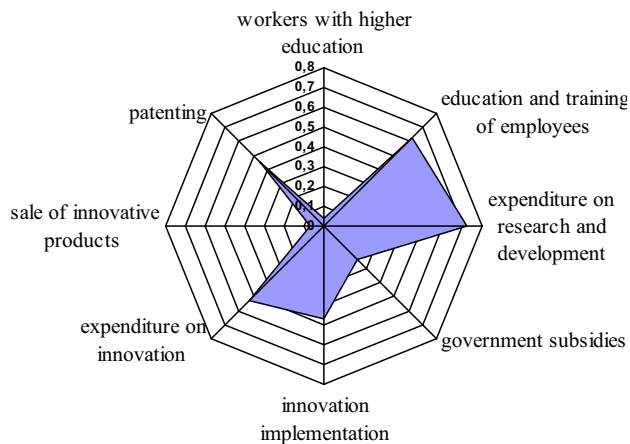


Fig. 4. Factors influencing regional innovation competitiveness of the Nizhny Novgorod region

An important feature of these regions represented in the diagrams 4-5 (the Nizhny Novgorod and the Samara regions) is that their development in the field of innovation is more steadily: there are no zero values of the indicators that characterize the minimum value among the studying areas.

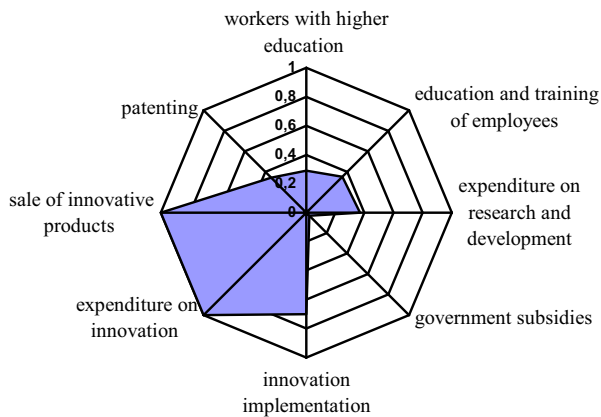


Fig. 5. Factors influencing regional innovation competitiveness of the Samara region

There can be only a hypothesis that the development based on the set of indicators has both positive and negative features. The positive is that the capacity available for use is much higher; moreover, it is possible to use the synergetic effect, which appears only during using the integrated elements.

However, a small amount of innovation activity elements makes its usage easier and does not spray the attention. On the other hand, it can be negative, because it narrows the range of usage, does not allow to use all opportunities, restricting them.

#### IV. INSTITUTIONAL MECHANISM OF THE REGIONS' INNOVATIVE DEVELOPMENT

The institutional mechanism of the innovative activities of the regions is the sequence of various institutions, definite forms and methods of management, the juridical norms, which provide the innovative development of the region by means of conversion of the scientific knowledge into modern technologies, new materials and other competitive production.

The institutional mechanism of the regions innovative development consists of the following elements:

1. Formal rules and norms of the behavior, which stipulate the border of the innovative activities and regulate the interrelations of the subjects of the innovative activities and other economic subjects.

2. Innovative infrastructure.

##### A. The elements of the institutional mechanism of the innovative activities

First consider the system of the rules and norms of the behavior. According to D.North's classification of the rules the formal rules include political (and juridical), economic rules and contracts [11].

*Political rules* in the widest range stipulate the hierarchical structure of the society, its fundamental structure of making decisions and the most important characteristics of the political procedures' control.

Political rules (as a particular basis of the institutional environment) may be singled out not only on the level of the state, but also on the level of the regions etc. In the sphere of the innovative activities such rules include the state

innovative politics [12]. This document as a rule stipulates the foreground directions of the country's innovative activities.

On the one hand innovative politics is a sequence of the state decisions, directly or indirectly influencing the innovative process in the enterprising sector. In this case its basic mechanisms and measures include:

- state financial help to the enterprises by means of providing grants, loans, subsidiaries for the development of the innovative production, technologies, services; sponsorship of the programs or projects, worked out for the strengthening of the cooperation and interaction of the participants of the innovative process and hence for the improvement of the new industrial countries' functioning on the whole;

- measures, which are aimed on the improvement of the access, distribution and intensification of the knowledge of the specific aspects of new industrial countries (implementation of branch, sector, regional strategies, foresights, distribution, duplication of the best innovative enterprises' experience etc.);

- improvement of the legislative provision of the innovative activities (intellectual property right, legal regulation of the creation and functioning of the innovative firms, tax stimulation etc);

- sponsorship of the innovative infrastructure and its connecting links – innovative centers, business-incubators, technologies' transfer centers etc.

On the other hand the innovative politics includes scientific and technological politics. The disposal of the balanced system of the measures in the limits of these "three politics", the definition of the main problem of the state regulation of the innovative development depending on the socio-economic goals, which are being solved by the country are the key conditions of its efficiency.

*Economic* rules directly stipulate the types of the organization of the industrial activity, where economic agents generate institutional arrangements and make decisions of its resources' use.

In the sphere of the innovative activities among along with the economic rules one can name the legislation which reflects the state politics in the sphere of entrepreneurship and intellectual property; higher education, scientific activities and fundamental researches; the laws which stipulate the status and the peculiarities of the functioning of innovative infrastructure institutes and so on. A particular example for that is the legislatively stipulated limited periods of active patents on the invention. Economic rules stipulate the rights of property, that is set of rights of the usage and acquisition of the income from the property and limitation of the access of other people to the assets or resources.

Traditionally we figure out three categories of the rights of the property. The first category is the rights of the asset's use (right of the usage), that determine legal types of potential usage of the assets by an individual. The second category is the right to get an income from the usage of the assets and signing the contracts on usage.

The third category is temporally unlimited right to pass the rights of the property of the assets to the partner (that is a right to dispose) or sell the assets. The rights of the property appear when the rules which limit their choice of means of the limited welfares (resources as well) are generated in the society.

As the founder of the rights' theory, A. Alchian underlines, that the property rights include the social norms: "In any society the rights of the individuals to use the resources (i.e. rights of the property) are confirmed by the behavior rules, social customs, a threat of ostracism, and also by the juridical norms, the efficiency of which in its turn is confirmed by punitive measures of the state [13].

*Contracts* may be defined as the rules which in the course of time and space structure the interaction between two (or more) economic agents in connection with the exchange with the property rights on the base of the duties, voluntarily accepted by them as a result of the signed arrangement. The contracts determine the "individualized", local rights, i.e. such accepted means of actions, which refer to the relations of the interested partners. In the sphere of the innovative activities, an example of the contract is a long-term agreement about the interaction in the sphere of the scientific and technical operations.

*Informal rules* are of particular importance, i.e. those rules which are not stated in the written form. Even in the most developed economics the formal rights constitute a smaller part of the whole sequence of the limitations. Informal rules come across all our life. In our everyday communication with other people our behavior is mostly determined by non-written codes, norms and formalities. The basis of the informal limits there are formal rights, but not always the latter are the evident and direct source of the alternative situations in our everyday interaction with the people surrounding us. Informal limits which come out from the information and passed by means of social mechanisms are a part of the cultural inheritance.

Informal limits come across the whole modern economics as well. Appearing as a means of coordinating of the stably repeated forms of the people's interaction, the informal limits are:

- 1) Proceeding, development and modification of the formal rules;
- 2) Socially allowed norms of behavior;
- 3) Internally obligatory standards of behavior of a man.

#### *B. Innovative infrastructure*

Innovative infrastructure is the sequence of interconnected institutions, which stimulate the realization of the innovative activities by means of providing with necessary resources (personnel, finances, information) [14].

Innovative infrastructure is the key link in the conversion of the knowledge into material subjects.

In the structure of innovative infrastructure one must determine [15]:

- 1) The institutions, which generate the nucleus of the innovative mechanism and fulfill the innovations' production and usage.
- 2) The institutions, supporting, stimulating and regulating the innovative processes.

The institutions which fulfill the production and usage of the innovations consist of the following components:

- 1) Regionally innovatively active enterprises, which provide the achievement of the basic goal of innovative activities, notably the manufacturing of the innovative products (goods, operations, services) and technologies with a value added on the base of the scientific and technological achievements usage, rules, norms and mechanisms of the functioning;

- 2) Regional institutes of higher education, which ensure the training of personnel in organization and management in the sphere of the innovative activities, fulfill the fundamental and applied projects;

- 3) Regional research institutes, rules, norms and mechanisms of their functioning, which provide the implementation of research and development projects.

The institutions, which support, stimulate and regulate the innovative processes are divided into the following types:

The institutions regulating innovative activities - a provision of formation of the juridical basis for the innovative activities, the state's provision with the monitoring of the rights of intellectual property subjects (legislative and executive bodies, laws and norms);

The institutions of the sponsorship of the innovative activities - a provision of the financial support of the innovative activities (state budget, giving the budget assets to the subjects of the innovative activities; budget and off-budget funds of the science support; venture funds, commercial banks, providing credits for the realization of the innovative projects, business angels);

The institutions of the organizational support - a provision of the cooperation to the stipulation of partnership of the subjects of the innovative activities, transmission, keeping and exchanging its results (centers of the technologies transfer, innovative technological centers, technical parks, incubators, centers of the preparation of the specialists in the sphere of the innovative activities, monitoring and statistics centers of the innovative activities);

The institutions of the informational support - a provision of the informational support of the innovative activities (mass media, specialized exhibitions, conferences etc, catalogues, data - bases; centers of the investigation of the demand and the state of the market; Internet; libraries; telecommunicative and informational centers; the centers of consulting of the technological audit and expertise; marketing centers).

Correlations between the separate institutes of the innovative infrastructure are of a particular importance. Here are the main interconnections between the institutions, constituting the nucleus of the regional institutional mechanism and the institutions supporting, stimulating and regulating the innovative processes:

- 1) preparation and re-preparation of the scientists and engineers, managers of the innovative business, specialists in the sphere of the intellectual property;
- 2) provision of qualified technical and consulting services in realization of the innovative projects;
- 3) assistance in commercialization of the scientific projects;
- 4) generated ideas, projects, implementations, results of the scientific and innovative activities;
- 5) education of the specialists and organization of the probations;
- 6) disposal, sale and exchange with the results of the intellectual activities;
- 7) grating of the juridical, financial, informational, technological, marketing and other services;
- 8) establishment of the legal and organization mechanisms of the innovative activities in the region;
- 9) sponsorship of the innovative projects.

### *C. The principals of the regional institutional mechanism formation*

In case of the formation of the regional institutional mechanism it's necessary to consider an openness of the innovations [16]-[17]. As none of the participants is isolated in the innovative activities, the links and experience exchange are becoming the crucial factors. The most effective form of management in the innovative systems is a network structure. Economists confirm that markets create high operational expenses, bureaucracy creates the same, while the networks can balance both kinds of expenses. On the other hand sociologists confirm that the innovations, operating mostly by implicit knowledge depend on the stability of the connections between the participants of the system, which will probably arise in the network structure, than in the market or hierarchical interconnections. As an example we can name the activity of the UN in creating a network between the regions for the information, experience exchange, improving the effectiveness of the interaction and coordination of the efforts. Hence, many regions of the UN countries have become partners of the Innovative Regions in Europe – IRE-Network.

Moreover we have to estimate industrial and sale specialization. In the environment of the remarkable development of the directions' variety in the economic development and the lack of opportunities to reach higher market positions in the world market the countries are becoming obliged to choose their niche concerning simultaneously a definite purpose to achieve high regional positions. This leads to the selection of the industrial fields, appearance of the new manufactures, which in the conditions of the established competitive advantages (varying in different regions) let to define the specialization of the technological policy, i.e. the direction of the concentration of the intellectual assets of the nation overall accurately.

For example, bio-technological towns, preparation of the specialists in the sphere of the biotechnologies and the development of the biotechnological business is now concentrated mostly in the regions which have its relative advantage in the sphere of the biological resources. As an example of a narrow specialization we can consider Singapore [18]. This country invests biological sciences in the least. The medical and scientific center Biopolis, the area of which is 200 thousand square meters was established in 2003. As it is planned by the year 2015 four thousand explorers will work here, and six thousand specialists in such scientific fields as materials technology, ecologically pure and digital technologies will be placed nearby. This center has become a world famous centre of studying of the stem cells. The laboratories in this center are equipped with modern technologies which attract the scientists. Moreover they can use all the benefits of the modern civilization: pompous restaurants, first-class shops, developed leisure infrastructure. The company called Novartis opened the institute of the tropical diseases in the Biopolis center, and other international corporations are also placed here. The companies use common resources. Biopolis, for example, is a colony of laboratory "bold" mice, and the scientists can use them for their experience without being afraid of the protest of "the green".

It's important to notice that the necessary condition for the normal functioning of the institutional mechanism is existence of a strong regional center of the management of

various innovative programs. Besides the estimation of the strategic priorities of the regional innovative politics the local administration (or its competent body) is working over various programs of the innovations' sponsorship (by means of direct budget subsidiaries for these purposes and using various mechanisms of lax credit and tax benefits) and the complex of measures in strengthening of the interaction between the key participants of the innovative process in the region.

For example, in 1994 in a French region Lorraine together with the French government a Regional innovative center was created. It unifies all the active bodies of the innovative politics (business, sales organizations, universities, centers of technological transfer) with the purpose of coordinating and concentrating of the regional policy and gradual movement from the simple acknowledgement of the advantages, provided to the business by the technological innovations to more global aims.

Hence, an effective regional institutional mechanism of the management of the innovative activities must guarantee business and science cooperation.

### *D. The analysis of the innovative infrastructure*

The basic objects of the innovative structure are already formed in the Russian Federation. The first element of the innovative infrastructure such as scientific and technological parks and business incubators is created in Russia on the basis of the institute of higher education in the beginning of the 90's in Tomsk (1990), Moscow and Zelenograd (1991). In the mid-90's the first technical parks appeared. They were organized on the basis of the large state scientific centers. The next step was the appearing of the regional technical parks, created for the development of the manufacturing of the science intensive products. Such technical parks had their own territory, financial support from the federal and regional authorities and they successfully developed small innovative firms fairly.

At the end of the 90's – beginning of the 2000's alongside with the Ministry of industry and science a network of the innovative technological centers was created. They solved many problems like those in the technical parks. The main peculiarity of the innovative technological center is that it is a structure of support of the already formed small innovative enterprises, which have already overcome the most difficult stage of creation. That's why unlike the technical parks which had to be established on the basis of the universities and do the task of the incubation of small firms, the innovative technological centers were considered to provide more stable links of the small business with industry, that's why they had to be established on the basis of the enterprises or scientific production complexes.

Since 2003 the network of the centers of the technologies' transfer is being developed. Their problem is the acceleration of commercialization of the scientific production results, the establishment of the small innovative enterprises, technical parks and innovative technological centers as well.

Nowadays there are more than a hundred originations fulfilling the technical parks' function in Russian regions (see Table 4).

Except the enumerated elements the enterprises of informational provision of the innovative activity, education, finances etc were founded.



Still the basic problem is that despite the right program settings there are no considerable changes on the technological level of the Russian economics.

TABLE IV  
THE ELEMENTS OF THE INNOVATIVE INFRASTRUCTURE IN  
RUSSIAN REGIONS

District	Technical parks and innovative technological centers	The centers of technological transfers
Central district	36	19
North – West district	18	6
Southern district	12	4
Volga district	19	5
Ural district	3	3
Siberian district	12	9
The Far East district	5	2
Total	105	48

The most important role in the innovative process belongs not only to the subjects themselves, but to their relations. Still nowadays the institutions stimulating the links between the scientific, educational organizations and innovative firms which stay between the large companies and minor and average enterprises are poorly developed.

#### V. THE ANALYSIS OF THE SYSTEM OF RULES AND NORMS IN THE SPHERE OF THE INNOVATIVE ACTIVITIES

##### A. The analysis of the innovative politics in the Russian Federation.

The current goals and problems of the innovative politics are fixed in the set of conceptual and program documents accepted in 2002 – 2006 (annual Messages of the President of the Russian Federation to the Federal Assembly of the Russian Federation, concepts, national and field strategies, programs and plans). In 2007 – 2008 some special laws and subordinate legislation acts were accepted. The systematization of the basic documents of the state innovative politics of the Russian Federation is outlined in the Table 5.

TABLE V  
THE BASIC DOCUMENTS OF THE INNOVATIVE POLICY

The documents' status	The documents' title
Federal laws	The Civil Code of the Russian Federation, part IV (the rights for the intellectual property). № 203 (accepted 18.12.2006). Came into force 01.01.2008.
	The Tax Code of the Russian Federation (in the part regulating taxing of the science and innovative activities).
	The last temporal changes of the Tax Code into by the Federal law № 195 «On the changes into separate legislative acts of the Russian Federation in the part of the formation favorable tax conditions for the sponsoring of the innovative activities» (19.07.2007)

Federal law «On the science and state scientific and technical policy» № 127. Accepted 23.08.1996 (with nine amendments by the middle of 2008).

Federal Law «On particular economic zones in the Russian Federation» № 116 (22.06.2005).

The Law RSFSR «On the competition and limitation of the monopolistic activities on the goods markets» № 948-1 (22.03.1991).

Federal Law «On the protection of the competition» № 135 (26.07.2006).

Federal Law «On the arrangement of orders or the goods' delivery, realization of the activities, producing services for state and municipal needs» № 94 (21.07.2005).

Decrees and orders of the President of the Russian Federation. Order-842 (21.05.2006).

The list of the critical technologies of the Russian Federation. Order -842 (21.05.2006).

The President's initiative «The Strategy of the nano-industry development». Order-688. (24.04.2007).

The basis of the politics of the Russian Federation in the sphere of the scientific and technological development for the period till 2010 and further perspective. Order-576. (30.03.2002).

«On creating a national research center «The Kurchatov's Institute». № 603 (30.04.2008)

Resolutions of the RF Government and other documents

The basic fields of the politics in the Russian Federation in the sphere of the development of the innovative system for the period till 2010. Confirmed 05.08.2005.

The strategy of the science development and innovations in the Russian Federation for the period till 2015. (report from 15.02.2006 № 1)

Energetic strategy of Russia for the period till 2020. Order № 1234 (28.08.2003)

Area strategies and concepts

The strategy of the development of the chemical and petrochemical industry for the period till 2015. Order № 119 (14.03.2008).

The strategy of the development of the shipbuilding industry for the period till 2020.

The analysis of the content of the Russian innovative policy shows that it appears to be externally structurally full and completed and corresponding to the best foreign practice. New goals, connected with the stimulation of the innovations and development of the innovative infrastructure, as before, is not fulfilled totally. Their legislative and law enforcement provision is imperfect.

There is no Law about the innovative activities in Russia. The terms “innovation” and “innovative activity” are not legally defined. Nevertheless a set of laws, which stipulate a legal regime of the subjects of the intellectual property is accepted. There are also many by-laws which refer to the regulation of the innovative activities. All this causes to a variety of interpretations and controversies in the juridical field in solving the problems of support and development of the subjects of the innovative activities.

An issue of regulating the intellectual property rights remains acute. The development of Russian science and strengthening of its innovative direction must be based on the effective mechanisms of sponsoring and attracting the investments into the scientific and innovative spheres of activity. The establishment of the favorable economic and legal conditions for the innovative system's development,

involvement the scientific results into the civil life, including the subjects of the innovative system, created with the help of the state funds, demands special mechanisms which provide the interaction of the scientific and technical decisions' creators (who as a rule used to work in the state organizations) and the potential investors from the private sector, and also needs the mechanisms of the "technologies' delegation".

The majority of the experts and the participants of the innovative process think that the regulating potential of the bills in the sphere of the innovative activities must be notably developed. It will be sensible to include there some thesis formulating the common principals of commercialization of the technologies created in the state enterprises (organizations) or in the network of the state contracts, and also a set of additional norms, which limit the relations (rights and obligations) of different subjects involved into the process of the technologies' delegation.

Among them there are the rules which define:

- The aim of the commercialization (delegation) of the technologies as one of the purposes of the development of the scientific organization and universities, and the process of commercialization itself as one of the main (obligatory) kinds of activity;

- The rules and forms of participation of the state scientific organizations and universities in the creation of the small innovative enterprises; the rights and order of the usage of the technologies commercialization income for the development of the scientific researches in the state scientific organizations and universities;

- The necessity and the direction of the development of the commercialization's infrastructure in the state scientific organizations and universities and moreover among the federal executive bodies.

No doubt it demands the sufficient legal regulation or the revision of the acute stimulus of the commercialization by means of giving the part of the expected income to the researchers (technologies' creators), organizations and mediators, cooperating in the process of the technologies' delegation.

We should notice that the similar problems – going thorough the obstacles in the interaction of the state organizations, which create new technologies, and business which can develop and use these innovations commercially – some time ago were acute for the majority of the foreign countries, but they were successfully solved. Particularly the system of the institutions and mechanisms connected with the private-state partnership and a close cooperation of the state scientific structures and industrial enterprises was created in the USA 30 years ago. It was implemented but it is still being improved.

The tax remissions and preferences are the basic and world - acknowledged instrument in the activation and innovative activity, the development of science intensive business, increasing of the interest to the science's support and innovation from the private investors. Russian tax regime started its formation since the middle of the 1990's and it was completed in 2007 with the implementation and accepting of a set of the legal acts texts, aimed to reduce the tax burden for the innovation active enterprises.

We have to acknowledge that compared to the level of integrity of the tax legislation in the innovative sphere of the developed foreign countries, Russian tax system suffers from the absence of complexity and consistency. All the

enumerated innovations certainly can favor the formation of more satisfactory innovative climate, but they are not crucial for the changes of the strategy of the private business in relation to the sponsoring off the explorations and projects.

Particularly the rules of taxation on the added value cost and the income have changed, and moreover a nonexpert taxation system has been introduced.

The introduced benefits are not so spacious and hardly administered. The serious problems of taxation of the state scientific organizations are not solved but have become especially acute since the time of the abolition of the benefits for the assets and real taxes. Particularly painfully their absence was felt in the large field institutions, leading applied explorations and experimental implementations in the field of double technologies as well. Their activity as a rule demands a mighty infrastructure and a large territory. The absence of the tax benefits leads in fact to the destruction of the material and technical basis of those organizations, which may successfully be used in favor of the increase in its innovative activity, development of the innovative sphere on the whole, including the creation of the technical parks, scientific towns, business-incubators and other elements of the innovative infrastructure.

To crown it all, let's formulate a several common theses, characterizing the key (positive and negative) tendencies in the process of the formation and realization of the state innovative politics in Russia.

In our opinion the positive shifts are the following:

- the innovative policy has become the foreground for the increasing quantity of the authority departments;

- all the elements of the innovative system are gradually becoming a single strategy of the development;

- attempts to achieve more rational combination of the direct budget support with the simulative measures are made;

- the usage of the average statistics indexes and indicators working out the goals and problems of the innovative policy is developing;

- the priority of the complex forecast as an instrument for the definition of perspective tasks, tendencies and measures of the innovative policy is increasing.

The disadvantages of the process of the policy's formation are:

- a large number of the fields and priority problems of the innovative policy, which are not accompanied by the definite measures (particularly while implementation of the field strategies); a weak study of some separate measures;

- a little specific weight of such common measures as tax regulation;

- competitive and anti-monopolistic policy;

- the innovative policy doesn't have the systematic character yet. It doesn't unify the measures in the sphere of science and technologies, education, industry and the regional initiatives as well;

- the innovative policy is often based on a large quantity of the conceptual documents, prepared practically simultaneously and often duplicating each other, which proves a low level of the quality of its implementation;

- the usage of the monitoring results, analysis and the estimation of separate measures of the policy for correction of the strategy and approach of the innovative development of the country's conducted rarely and not systematically and that has to be put on a radically new level [19].

In recent years the Russian government pays attention to the implementation of the new forms and methods of the state regulations, including the sponsoring of the science and innovations by means of ventures, the system of state corporations and others. All these fields are making a progress now.

Nevertheless a set of considerable problems of the innovative development exists. The state doesn't pay attention to a number of questions, such as:

-the reduction of the administrative, fiscal and transactional expenses for the innovatively active enterprises;

-the increase of the variety, quality and access of the specific services with the purpose of the increase of the innovative activities effectiveness;

-co-sponsoring of the certification of the innovative production and the process of the conversion to the international standards of the quality;

-assistance in preparation of the qualified personnel;

-the guarantees that in the future the existence of the qualified force in the region/field/country will correspond to the demands of the innovative enterprises.

#### *B. Analysis of the regional innovative politics*

On the regional level the subjects of the Russian Federation work out their own innovative conceptions and strategies of the regional innovative policy. In the regions of the Volga federal district authorities practice investment policy [20]. The obligatory documents, fixing the priorities of the innovative activity are accepted in the total majority of the regions in the Volga federal district. So, the "Law on the innovative activity" and the Innovative memorandum for 2008 till 2010 were accepted. The "Law of the state support of the innovative activity in the technical and scientific sphere on the territory of Samara region" is acute in Samara district.

The analysis of the innovative legislation showed that the existing legislation doesn't support sufficiently the active innovative policy. The basic restrictive factor in the development of the innovative activity is undevelopment of the federal innovative legislation.

#### VI. CONCLUSION

Investigation of regional innovation competitiveness in comparison with others, showed what is missed in a given region, what should be taken into account during the forming of an innovative development strategy of the region, why this or that region is a leader or an outsider. Analyzing the macro-level, i.e. the country in general, many problems and achievements are aggregated on the general background. We can talk about the development of the whole system, without affecting the internal characteristics. The comparison with the of state innovation competitiveness shows a general trend in the development of the country, but for a deeper analysis the individual elements should be investigated in all indicators of competitiveness.

The low effectiveness of the innovative activity is stipulated by the undevelopment (inexpediency) of the existing institutions (rules, laws) regulating the economic relations in the innovative sphere. The institutions in the innovative sphere don't create a civilized and harmonious functioning of the four competitive markets in the network of the global economics: (1) intellectual actives, (2)

innovative assets, (3) innovative production and (4) the services supporting the innovative activity.

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