

**INNOVATION ACTIVITIES INFRASTRUCTURE AS FEES-BENEFITS SYSTEM**  
**FOR REGIONAL SUSTAINABLE GROWTH**

**1. Introduction**

Issues of providing of sustainable economic growth and defining of ways of its achievement are actually for all countries. The specific importance they have in transition countries and particularly in Russia and its regions. Moreover, it is important to note that every region has its own features, which can be taken into account conducting regional development policies and programs. Perm Oblast is a traditionally industry-developed region with a built-in effect of the military-industry complex and of powerful manufacturing. It is also a production region. with different raw material industries. As Russia as a whole, the oblast suffers from the difficulties of economic development, mass-unemployment burden, falling level of its citizens' standard of living and increasing ecological tension. However, in spite of these difficulties, Perm Region is to be region-donor financing other regions of Russian Federation and its economic situation has been improved. As for general social-economic situation, Perm Region's macroeconomic indicators are better than in other regions: Perm Region occupies the 4<sup>th</sup> place among 89 Russian regions on the «alive» money volume, the 13<sup>th</sup> on the level of average income per capita, the 38<sup>th</sup> on the price of living standard, the 52<sup>nd</sup> on the rate of price's growth (in comparison with January 1993 the prices have increased only by 67 times while in other regions by 150-250 times). According to official statistics, Perm Region is included in to the group of «rich» territories.. That is why the problem of increasing of efficiency of innovative potential through creating of innovation activities infrastructure is very attractive and actual.

In the frame of such initiatives the authors of this paper carried out research and implementation of solving problems methods in the reform of innovation potential of Perm Region such as creating of science-technical and innovation activities infrastructure. Some of the difficult tasks in this field are:

- 1) identification of the main problems of concrete economic agents (firms and enterprises) in the field of science, technologies, techniques and innovations;
- 2) creation of mechanism (scheme of interrelationship) of different economic agents for organization of an effective process of spreading the scientific-technical and innovative information;
- 3) identification of regional and other levels of different economic agents that can be involved in such scheme;

- 4) Finding common points in which all participants of such a scheme are interested;
- 5) Creation of a mechanism of start financing for creation and improvement of such scheme;
- 6) Identification of the main elements of such scheme and to examine ( to create) a scheme of flows of interrelationship between these elements.

The authors of this paper have raised these essential issues through different activities.

- Special problems of the development of an innovative-creative potential and the necessity and possibilities of participation in the process of different non-commercial communities, organizations, foundations, initiative groups were discussed during the 1<sup>st</sup> international conference of NGOs which was held September 24 to 26, 1998, in Perm with participation of representatives of regional and municipality

- Issues of possibilities, necessity and possible forms of participation of local authorities (regional and municipality) were raised in the frame of scientific-practical conference devoted to the Perm City development where the authors took part in elaborating recommendations on improving its economic and innovation policies.

- Identification of the main problems of concrete economic agents (firms and enterprises) in the field of science, techniques, technologies and innovations was done during the panel surveys of firms and enterprises of Perm Region held by authors in November-December 1998.

- The aim of the panel survey was the identification of the main problems of enterprises in the real sector of economy concerning the field of scientific-technological and innovation policy. Moreover, its impact on activities of different economic agents, such as educational organizations, research institutes, NGOs, policies of local and federal authorities etc., was analyzed. Through the survey actual and potential agents of the regional innovation system were identified, as well as possibilities and necessities of linkage between business, science, technology and engineering. Also the authors identified the main directions and dynamic of the process of spreading experience of participants of innovation activities in the frame of a regional system for creating investment possibilities and competitive advantages of Perm Region. Through the panel survey, questionnaires were spread among top managers, such as directors, the main engineers, the main managers of accounting, deputy directors in financing etc., and within big enterprises among the leading functional specialists and heads of divisions.

- Panel surveys were conducted on more than 100 enterprises and firms of the region out of different industries, forms of property, quantity of employment, particularly «de novo» forms, big export-oriented enterprises, enterprises of the social significance of Perm Region economy, including town-founded enterprises.

As a result of this survey, the main necessities and difficulties regional innovative activities infrastructure of the region's enterprises in the field of innovation activities were identified.

## **2. Theoretical background for constructing theoretical model of innovative activities infrastructure**

As the result of the survey we could consider the development of the scheme of creation of innovation activities infrastructure in Perm Region, which would be adequate to the current necessities of free market economy.

This scheme could work if the economic agents included in it would receive advantages. So, let us describe such scheme of creation of effective infrastructure of regional innovation activities.

The main strategic goal of the scheme is the development of innovation potential on the territory of Perm Region.

As the participants of such a scheme we can include: regional local authorities (representatives and policy-makers); organizations of local self-management, scientifically organizations (universities, institutes of Russian Academy of Science, defense industry's technological bureaus and scientifically-research institutes, small enterprises of scientifically-technological industry, innovation technological centers and etc.); business (enterprises and different firms of real sector of economy, aimed on economic rent seeking, and consulting, educational and etc. firms), institutes of finance sector (banks, venture foundations, others finance institutes), non-profit sector (NGOs, NPOs, initiative groups of citizens, other forms of self-organization of population, included in solving problems of attractive participation of different groups in reforms, in carrying institutions of civil society, which helps to build strong legal society and the achievement of sustainable economic growth), different international funds.

The difficulty of uniting participants in an indivisible process of spreading scientific-technological and innovation information and knowledge lies in the necessity of the linkage of different interests, so called «civil cohesion.» The problem is that different social groups have their own particular interests, which is the element of institutional infrastructure of modern civil society: parties, trade unions, organizations of entrepreneurs, consumers, farmers, ecologists, legal-defenders and others are struggling for the budget share, for the participation in federal programs, for goals and priorities of economic policy as a whole.

Solving the problem of uniting the participants in the scheme is defined as the necessity to take into account the fact, that more optimal decision for realization of such plan is taking into account the profit reason and the demand of decreasing costs (private and social) for the conducting of innovative activities, increasing returns from R&D activities, and also the building of the society founded on democratic principals.

Therefore, for the solution of the problem of effective organization and providing with conditions of self-support and self-development of scientific-technological and innovation activities infrastructure it is important to define possibilities of different social agents for participation.

Let us describe the advantages and weak points and identify possible methods to be included in the scheme of every potential participant and also point out the main advantages received by agents from such collaboration.

The participation as an agent of innovative activities is profitable for the government because it allows to avoid the majority organizational problems in realization of programs to support and develop scientific-technological and innovation activities. The participation in this scheme allows to minimize control for different program budgets. As a result there is increasing effectiveness of using budget finance, aimed at social requirements. Moreover, the total amount of investment of concrete inquiry may be increased partly through volunteers' activities. It is possible to calculate and evaluate the additional amount of money saved through using this way. Additionally, one of the important result of successful innovation activity of regional enterprises and firms could be considered as taxes flows to federal and local budget from innovative active enterprises.

For the first six months of 1999 the total taxes and other inflows to the budgets of different levels have been increased in average on 84,1%, to the Federal budget on 105,2%, to the Regional 290 %. The growth in taxes are spread as follows: company income taxes 410%, excise taxes 210 %, income taxes 40,5 %. The share of industries in taxes and other inflows to the regional budget is 68,8 %.

Analyzing the motivation of local authorities in carrying out and development of innovation activities infrastructure, we have to mention the form (type) of support for regional sustainable economic growth. However, this problem is not only from economic field but also from social one. It means that authorities are interested in regional labor mobility without big social catastrophes and without a decline of their economic situation.

There is also a related problem of social guarding of population. Solving this problem is such an objective necessity that provides with social equality in every social system. Such equality is the background of social stability, support of which is becoming one of the strategic goals of transition economy. Transition period and reforming process in Russia have sharpened the social-economic problems and new problems are still being added. At the same time deep worsening of general economic situation in the country has reduced enormously the possibilities for financing social programs from the government side. This creates additional difficulties in solving social significant issues. The key problem is becoming the organization of self-defending of the population with the help of the government in different social and economic forms.

The participation in this scheme is profitable for scientific and research organizations of all types, because of additional financing, receiving of the basis for practical implementation of discoveries and the possibility of fast commercialization of patents etc.

For firms the advantages from the collaboration could be considered as possibilities of receiving contracts from the government (guarantee demand); economy on applied research; decreasing of transaction costs; possibilities in increasing the product quality and its international standardization (it can allow to provide themselves with sustainable consumer's and investment demand); to conduct reconstruction of production process through implementation of ecological-safety and nature-saving technologies. In addition, of course, an important motivation of participation of private firms could be investment in such infrastructure and receiving profit from this activities (particularly, from the participation in commercial transferring of technologies).

Being included in this innovation scheme as participant of infrastructure it is profitable for non-government organizations (NGOs, NPOs), because of the additional advantages: receiving of additional finance aid, receiving of administration support, increasing of civil status of NGOs (NPOs). In addition, they receive possibilities to satisfy social requirements as the goal of their creation, mostly for different ecological movements, associations of consumer defense etc.

Participation of such collaborations gives advantages also for international foundations. Because of the creation of such infrastructure, inter-regional and international scientific-technological collaboration is possible. There is an increase of regional technological culture, ecological problems could be solved qualitative and complexly, and there are possibilities for a more effective control of the ecological situation and possibilities of fast adequate measures for its improvement. At last, the creation of such infrastructure is more profitable for innovators themselves (researchers, producers, and consumers of scientific-technological products).

As a whole participants are allowed to solve one problem – recreation of the regional economy and decrease of social tension in society. Partly it depends as well from the government side as from the side of the society.

Including different agents in one process of creation and spreading scientific-technological knowledge and information, the experience skills, the number and the size of financing sources are increased. As such sources we can consider direct payment from the government budget; dotations, pensions, subsidies; tax privileges for enterprises with innovation activities; variety of non-budget finance sources (grants, aid, etc.); donations of enterprises and firms etc.

The main stage of such a project on creation and development of scientific-technological innovation activities infrastructure is the identification of priority fields of activities, and the development of take off activities. Proposals on cooperation could be addressed to such organizations, whose goal is socialization and being prepared for collaboration in any form. The

main goal is to provide the agreement of necessity of the creation of such an infrastructure using the participation of enterprises and organizations (authorities, banks and organizations that can provide with start financing and active volunteers).

The aim of such infrastructure might be consulting and interrelationship activities; training and re-training of the staff; informational-analytical and technological services; marketing of high-technology products, providing commercial and non-commercial transfer of technologies; and also, possibly, search for investors for financing of more priority nature-savings, innovative, investment projects.

Today there are some assumptions for implementation of this idea in real practice. It was proved that organizations (institutions) unite people on the background of concrete social interests. Particularly, from the rank of local organizations that are interested in development of such infrastructure and able to participate actively in its creation we can mention the Chamber of Commerce, Ural NGO Support Center, Ural business incubator, Ural Small and Medium Enterprises Support Center and the Association of Industrial Enterprises of Perm Oblast.

### 3. The formal model of fees-benefits of innovation activities infrastructure

#### Describing of variables

##### Scenario variables:

<b>TAR<sub>t</sub><sup>i</sup></b>	- average rate of taxes of i-type form of organization in t period, %
<b>INV_GOS<sub>t</sub></b>	- total investments in non-production sphere from government in t-period in correlated prices (thousands rubles*)
<b>PIN_RF<sub>t</sub></b>	- income of RF population of in t-period in correlated prices (thousands rubles*)
<b>PEOPLE<sub>t</sub></b>	- population of the region in t-period. (thousands of people*)

##### Resulting variables:

<b>INV_ALL<sub>t</sub></b>	- investment in non-production sphere from all types of budget in correlated prices in t-period in correlated prices (thousands rubles*)
<b>INV<sub>t</sub><sup>i</sup></b>	- investment from enterprise's, firms and private budgets of i-type form of organization in t period, %.
<b>INV_S<sub>t</sub></b>	- total investments from enterprise's, firms and private budgets of all forms of organization in t period in correlated prices (thousands

rubles\*)

- PIN<sub>t</sub>** - income of population within the region in t period, in correlated (thousands rubles\*)
- QS<sub>t</sub><sup>i</sup>** - output (products, services) of i-organization in t period, in correlated (thousands rubles\*)
- QSD<sub>t</sub><sup>i</sup>** - regional demand on products, services of i-organization in t period, in correlated (thousands rubles\*)
- QSZ<sub>t</sub><sup>i</sup>** - production costs of output (products, services) of i-organization in t period, in correlated (thousands rubles\*)
- PR<sub>t</sub><sup>i</sup>** - profit of i-organization in t period, in correlated (thousands rubles\*)
- QS\_S<sub>t</sub>** - total output of all organizations in t period, in correlated (thousands rubles\*)
- QSD\_S<sub>t</sub>** - aggregated regional demand on products, services of all organization in t period, in correlated (thousands rubles\*)
- QSZ\_S<sub>t</sub>** - total production costs of output (products, services) of all organization in t period, in correlated (thousands rubles\*)
- PR\_S<sub>t</sub>** - total profit of all organization in t period, in correlated (thousands rubles\*)

\* - retrospective data demanded

Indexes:

- i** - index of of the type of organization i:=1..13
- t** - period of calculation

Coefficients:

- A** - share of government investment in investment of non-production sector including of sources of financing
- B<sup>i</sup>** - coefficient of influence of the rate of population income growth on products and services of i-organization demand

- C<sup>i</sup>** - coefficient of influence of the rate of products and services of i-organization demand
- VL** - coefficient of influence of investment of cooperation. Experts, in practice it is about 1,2 point it.

Types of organization (included 13 agents including in modeling process):

- regional local authorities;
- universities and institutes;
- institutes of Russian Academy of Science (fundamental researches);
- defense industry's technological bureaus and scientifically-research institutes;
- small enterprises of scientifically-technological industry;
  - innovation technological centers;
- business (enterprises and different firms of real sector of economy;
  - educational firms;
  - consulting firms;
    - banks;
  - venture foundations;
    - NGOs, NPOs;
  - different international funds.

Then we suppose to calculate rates of index:

$$T\_POK_t := \frac{POK_t}{POK_{t-1}}$$

where:

**T\_POK** - growth rate of index,

**POK** - index,

Describing of equations:

*Calculation of coefficients:*

Share investment in non-production sphere from all types of budget is estimates using retrospective data, limited from 0 to 1:



$$A := \frac{\sum_t INV\_GOS_t}{\sum_t INV\_ALL_t}$$

where :

**INV\_GOS** - total investment in non-production sector from the government

**INV\_ALL** - investment in non-production sector from all types of budget

Experts point coefficient of influence of the rate of population income growth on products and services using equations, limited from 0 to 1.

Equation:

$$B^i := \frac{\frac{T\_QSD_t^i}{T\_PEOPLE_t} - T\_QS_{t-1}^i}{T\_PIN_t - T\_QS_{t-1}^i}$$

where:

**B** - coefficient of influence of the rate of population income growth on products and services demand

**QSD** - population demand on products and services

**PEOPLE** - number of people in the region

**QS** - output

**PIN** - regional population income

Experts point coefficient of influence of the rate of products and services demand using equations, limited from 0 to 1.

Equation:

$$C^i := \frac{\frac{T\_QS_{t-1}^i}{T\_TAR_t^i} - T\_INV_t^i}{T\_QSD_t^i - T\_INV_t^i}$$

where:

**C** - coefficient of influence of the rate of products and services of demand on output

**QSD** - demand on products and services

**TAR** - average rate of taxes in the industry for all organizations

**QS** - output

**INV** - investment from enterprises, organizations and private

*Equation:*

***Calculation for the separate policy***

Investment from enterprises, organizations and private:

$$INV_t^i := INV_{t-1}^i \times (A \times T\_PR_{t-1}^i + (1 - A) \times T\_INV\_GOS_t)$$

where:

**INV** - investment from enterprises, organizations and private

**PR** - profit of organizations

**INV\\_GOS** - total investment in non-production sector from the government

**A** - share of government investment in investment of non-production sector including of sources of financing

Income of population within the region:

$$PIN_t := PIN_{t-1} \times T\_PIN\_RF_t$$

where:

**PIN** - income of population within the region

**PIN\\_RF** - income of population of Russian Federation

Demand on products, services:

$$QSD_t^i := QSD_{t-1}^i \times ((1 - B^i) \times T\_QS_{t-1}^i + B^i \times T\_PIN_t) \times T\_PEOPLE_t$$

where:

**QSD** - regional demand on products, services

**PEOPLE** - number of people in the region

**QS** - output

**PIN** - income of population within the region

**B** - coefficient of influence of the rate of population income growth on products and services demand

Output:

$$QS_t^i := QS_{t-1}^i \times \frac{(1-C^i) \times T\_INV_t^i + C^i \times T\_QSD_t^i}{T\_TAR_t^i}$$

where:

- QSD** - regional demand on products and services
- TAR** - average rate of taxes in the industry for all organizations
- QS** - output
- INV** - investment from enterprises, organizations and private
- C** - coefficient of influence of the rate of products and services of demand on output

Production costs of output (products, services) of all organization:

$$QSZ_t^i := QSZ_{t-1}^i \times T\_QS_t^i$$

where:

- QSZ** - production costs of output (products, services)
- QS** - output

Profit of all organization:

$$PR_t^i := QS_t^i - QSZ_t^i$$

where:

- PR** - profit of all organization
- QSZ** - production costs of output (products, services)
- QS** - output

### *Calculation for cooperative policy*

Total investment from enterprises, organizations and private:

$$INV\_S_t := \sum_I INV_{t-1}^i \times (A \times T\_PR\_S_{t-1} + (1-A) \times T\_INV\_GOS_t) \times VL$$

where:

- INV\\_S** - total investment from enterprises, organizations and private

- PR\_S** - profit of all organizations
- INV\_GOS** - total investment in non-production sector from the government
- A** - share investment in non-production sphere from all types of budget
- VL** - coefficient of influence of investment of cooperation

Aggregated regional demand on products, services:

$$QSD\_S_t := QSD\_S_{t-1} \times ((1-B) \times T\_QS\_S_{t-1} + B \times T\_PIN_t) \times T\_PEOPLE_t$$

where:

- QSD\_S** - aggregated regional demand on products, services
- PEOPLE** - number of people in the region
- QS\_S** - total output
- PIN** - regional population income
- B** - coefficient of influence of the rate of population income growth on products and services demand

Total output:

$$QS\_S_t := QS\_S_{t-1} \times \frac{(1-C) \times T\_INV\_S_t + C \times T\_QSD\_S_t}{T\_TAR\_S_t}$$

where:

- QSD\_S** - aggregated regional demand on products, services
- TAR\_S** - average rate of taxes in the industry for all organizations
- QS\_S** - total output
- INV\_S** - total investment from enterprises, organizations and private
- C** - coefficient of influence of the rate of products and services of demand on output

Total production costs of output (products, services):

$$QSZ\_S_t := QSZ\_S_{t-1} \times T\_QS\_S_t$$

where:

**QSZ\_S** - total production costs of output (products, services)

**QS\_S** - total output

Total profit of all organization:

$$\mathbf{PR\_S_t := QS\_S_t - QSZ\_S_t}$$

where:

**PR\_S** - total profit of all organization

**QSZ\_S** - total production costs of output (products, services)

**QS\_S** - total output

Then we suggest to spread these calculations for organizations using retrospective data.

General equation:

$$\mathbf{POK_t^i := POK_{t-1}^i \times T\_POK\_S_t}$$

where:

**POK** - index of structure of industries

**POK\_S** - summarizing index

The main goal of proposed infrastructure activities is to provide the marketing of high-technology products. For successful commercialization of scientific-technological R&D it is necessary to have good knowledge of production process, possibilities of practical implementation of concrete discovery (i.e. consumers) and its commercial utilization. As a rule the possibilities of such implementation are rather narrow on the first step, especially from production-techniques side. That is why the return of first investment is not very high (sometimes with losses).

The only one way of solving this problem is the maximum extension of possible implementations of this innovation (sometimes it requires modification and other improvements of products themselves and production process). That is why the problem of effective marketing exists in the unknown for researcher fields.

Nevertheless, the problem of organization of effective marketing itself is faced with many problems. Particularly, there is no update working system of innovation marketing, because of the unstable economic situation and visible ignoring the problems of scientific-technological development from the government side. It creates the situation of non-attractiveness of this field for professionals. In addition, as the barrier of the development of this process, non-payment abilities of many enterprises can be considered, as far as destroying many technological networks and chains.

At last, non-predictable government practice of the system of the government contracts leads to conservation of many enterprises that can be included in the process of creation of difficult civil products.

Finally, the main stage of carrying out innovation activities' infrastructure is the creation of special institutions responsible for the coordination issues among different participants and for the organization to select concrete agents. Particularly, in the distribution of contracts on scientific researches and development specialized institutes (universities, scientific-research institute etc.) have to be taken into account. In addition, it is possible to arrange auction and competition on some issues such as training of the staff, consulting etc.

We can propose the establishing of such a specialized institution as the Innovation Center that can be considered as infrastructure organization with the main activity of complex of services for participants of innovation-technological cycles.

It is very important to take into account that effective activities of such a center would be visible expressed indirectly in most cases – through increasing of taxes for federal and local budgets from innovative active enterprises.

## **Conclusions**

- Sustainable economic growth can be the result mainly because of innovative activities. It is rather actual and attractive for countries in transition. In Russia the process of concentration of innovations is going on particularly in its regions. We made an attempt to prove that such element of regional innovation system, as innovative activities infrastructure is becoming to be its essential element of regional innovation system as innovative activities infrastructure is becoming to be its essential element.
- Identifying the main problems of concrete economic agents (firms and enterprises) in the field of science, technologies, techniques and innovations we prove that creation of mechanism (scheme of interrelationship) of different economic agents for organization of an effective process of spreading the scientific-technical and innovative information will be something like as multiplier of innovation activities output.
- Comparing the effectiveness of separate and coordination policy in the examined field we have to the conclusion that all main agents of such scheme (regional local authorities (representatives and policy-makers); organizations of local self-management, scientifically organizations (universities, institutes of Russian Academy of Science, defense industry's technological bureaus and scientifically-research institutes, small enterprises of scientifically-technological industry, innovation technological centers and etc.); business (enterprises and different firms of real sector of economy, aimed on

economic rent seeking, and consulting, educational and etc. firms), institutes of finance sector (banks, venture foundations, others finance institutes), non-profit sector (NGOs, NPOs, initiative groups of citizens, other forms of self-organization of population, included in solving problems of attractive participation of different groups in reforms, in carrying institutions of civil society, which helps to build strong legal society and the achievement of sustainable economic growth), different international funds) will receive benefits from including in such scheme.

- It is more important that government budget will support not only separate economic agents of innovative activities but its core – infrastructure that is considered to be one of the important advantage of the region.
- We prove that it is possible and necessary to use theoretical background of Leontieff's out-put model in construction of fees-benefits system particularly in the field of innovative activities.
- Continuing to work under the stated problem we are going to include inter-industry module of Leontieff's model in our future research.

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