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Scheme of program cooperation between participants of regional innovation system

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Abstract

The paper analyses modern methods, used to forecast means and ways of object transformation in complex management systems. A complex dynamic system is defined as a system that is characterized by a high level of contradictions between efficient economic entities, between enterprises and investors, between enterprises, investors and executive authorities, managing innovative activity in the region. Under consideration and analysis are also various ways of designing cooperation strategies between the participants of a regional innovation system, as well as the structure and elements of a regional innovation system and its participants. The article demonstrates methodological approaches to the development of management schemes, contributing to development of efficient regional innovation systems.

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Keywords: Modelling, Cooperation, Region, Dynamic System, Innovation, Strategy

1. Introduction

Today the target of the economy of the Russian Federation is to achieve national competitiveness. One of the most important strategic tasks of the country is to increase regional capitalization. The target of the region, in its turn, is to increase the cost of assets. Thus, state authorities and other participants of the regional innovation systems – enterprises, R&D centers, universities etc. – take active steps. Unfortunately, under current conditions, the efficiency of innovative process management decreases, which is related to the differences in the economic development of the regions of large countries. The regional aspect becomes more and more important in innovative processes, which is proved by the papers of the majority of modern researches (Belomestnov, 2006; Dandon, 2006; Chernorutsky, 2004;

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Rodionov, Sedov, 2013; Roisman, Grishina, 1998; Rudskaya, 2013; Falaleev, 2010; Lundvall, 1998; Roberts, 1999).

Thus, finding effective ways of manageable development and cooperation between the participants of the regional innovation system, ensuring their dynamic development with a view to increase innovative activity of the region is a burning issue today.

The performed analysis of the structure and elements of the regional innovation system allows defining it as a complex dynamic system with a high level of contradictions between economic entities, enterprises and investors, investors and executive authorities that manage innovative activity in the region. Consequently, a potential increase of innovation resources of the region depends on both: external managerial influence (state management) and the way the elements of a regional innovation system work together. This cooperation, its features, determine at the end of the day development of the regional innovation system and the ways of increasing innovative activity of the region.

Therefore, another important issue is to find effective ways of manageable development of the regional innovation system actors, ensuring their dynamic cooperation with a view to increase innovative activity of the region. That is why it is necessary to evaluate systematic features of manageability of economic entities, belonging to a regional innovation system – centers of knowledge generation, innovation-active enterprises, and organizations of innovation infrastructure.

2. Literature Review And Hypotheses

An innovation-active enterprise or an organization, belonging to innovation infrastructure (business incubator, techno-park) is an element of regional innovation system and an object of management. It means that it is quite a complicated subsystem, converting input managerial impacts Y(t) (means a list of state measures, undertaken in a certain period of time, aimed at supporting innovative activity) into output signals (paths) M(t). These paths characterize final comprehensive economic state of a managed object at a certain moment of time t, assessing manufacturing facilities, finances, intensity of innovative activity, number of realized projects, number of registered intellectual property assets, and other parameters (Vinogradov, 1985; Chernorutsky, 2004).

As a regional innovation system includes elements that develop in a figuratively objective way (population growth, real income dynamics etc.), there is a link between the object and environment - C(t). It indicates a development function of the external economic environmental impact on the objects of management. We cannot manage this impact, but can observe the consequences of it. R(t) means a vector of disturbances, that we can neither manage nor observe (internal and external impacts on an innovation-active enterprise) (Vinogradov, 1985).

Under the analogue of the entity development process, we understand f* operator, connecting entity's input and output (Vinogradov, 1985):

$$M = f^*(C, Y, R) \quad (1)$$

Complexity characteristics of a managed item are the following (Vinogradov, 1985):

1. f* operator is not described.
2. Inevitably non-evident, anti-intuitive behavior of the item.
3. Non-stationary state (changeability in time) of f* operator.

A state may be evaluated with a special algorithm, providing for optimization. The sequence of a state evaluation and its setting algorithm are defined based on the evaluations, received in the course of modeling of a managed item (parameters of a built model based on the identification algorithm). In reality, when the elements of the system are managed, not all of the stated algorithms may be used.

When management processes are being revealed, the model of organization behavior shall be defined, which converts input signals into output ones in a certain way. This model allows forecasting system element behavior. Based on it, it is possible to increase the efficiency of managerial decisions.

Surplus topological structures form a methodological basis for the development of the existing and desired item behavior model. First, a surplus structure is formed, and then parameters are identified based on the available information base, which leads to the development of a complex model of organization behavior. Certain elements are excluded from the model (having, for example, zero value of certain parameters) (Quingrui, 2012).

In the present model an operator is determined by two types (groups) of parameters (Vinogradov, 1985):