ROLE OF UNIVERSITIES IN THE REGIONAL INNOVATION SYSTEM FORMATION

Abstract. In the matter of universities formation as the major subjects of the state innovative activity, it is necessary to consider separately their role in development of the regional innovation system. It is important to implement the model of «Triple Helix» which extends to the formation and development of the regional innovation system (hereinafter RIS). Both Western and Russian scholars pay their attention to the meaning of RIS and role of university for RIS development. In general, according to the authors, the RIS is either a complex or the institutions or the organizations (or the institutional infrastructure) that are the base of the region's innovative development. There are a lot of approaches to the definition of RIS, but our analysis of the different views on the essence of RIS shows several common features, and thus we would like to highlight the following. The changes taking place in higher education not only in Russia, but around the world, demand new infrastructure of university as a regional base of human, industrial, technical and technological resources. It is needed to identify mechanisms that would lead universities as intellectual centres to participate successfully in the regional economic development. Working-out applied tool that can assess effectiveness of not only a university, but also cooperation between the university government and industrial sector, is a promising direction for further research.

Keywords: university; regional innovation system; criteria for University efficiency; Triple Helix.

JEL Classification: O32, O33, O34, O38, O39

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РОЛЬ УНИВЕРСИТЕТОВ В СТАНОВЛЕНИИ РЕГИОНАЛЬНОЙ ИННОВАЦИОННОЙ СИСТЕМЫ

Аннотация. В статье показана роль университета в становлении и развитии региональной инновационной системы (РИС) и регионального инновационного кластера. Рассмотрены основные функции университета как основного фактора влияния на развитие региональной инновационной системы. Предложены критерии оценки эффективности университетского пояса как составляющей РИС, которые позволяют определить его влияние на региональную инновационную систему.

Ключевые слова: университет, региональная инновационная система, критерии эффективности университета, модель «Тройная спираль» (Triple Helix).

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РОЛЬ УНИВЕРСИТЕТОВ У СТАНОВЛЕНИИ РЕГИОНАЛЬНОЙ ИННОВАЦИОННОЙ СИСТЕМЫ

Аннотация. У статьи показано, что университет является основным фактором в развитии региональной инновационной систем (РИС) и регионального инновационного кластера. Рассмотрены основные функции университета как составляющей РИС, которые позволяют определить его влияние на развитие региональной инновационной системы.

Ключевые слова: университет, региональная инновационная система, критерии эффективности университета, модель «Тройная спираль» (Triple Helix).
Introduction. In the matter of formation of universities as major subjects of innovative activity of the state, it is necessary to consider separately their role in the development of regional innovation system. It plays an important role in terms of the approach to the formation and development of regional innovation system (hereinafter RIS). Economic activity of university is largely determined by effective integration of education, science, industry and government agents and that, ultimately, is an effective tool to build a regional innovation system.

Brief Literature Review. F. Cook is one of the first theorists of RIS. According to him, RIS is a «set of nodes in the innovation chain», including the company generating knowledge directly, as well as organizations and businesses using (or applying) this knowledge, and a variety of structures that perform specialized mediation: infrastructure support, financing of innovative projects, marketing expertise and political support [1].

Russian scientists also try to determine the issue of regional innovation system (K. A. Zadumkin, N. I. Vakhrusheva, etc.). In general, according to the authors, the RIS is either complex or institutions or organizations (or institutional infrastructure) that is the base of the region's innovative development. There are attempts to the definition of the different points of view on its essence provides several common features, and thus we may highlight the following.

RIS effectiveness is defined as a set of knowledge, skills, abilities, which are produced and generated in the interaction of certain institutional entities or institutions. In this case, by analyzing the structure of RIS participants we can conclude that universities in the region are on the first place among the factors, influencing RIS. They play their role as the organization generating and broadcasting knowledge, skills and abilities, and their infrastructure is able to provide a direct positive impact on the development of RIS. This concept of «university in the region» is especially popular in the works of foreign authors in the last 20 years, and is directly related to the model of «Triple Helix», proposed in 1997 by H. Etzkowitz [2]. L. Leydesdorff also gave his attention to the development of this theory in his works (2000-2012). K. Hill's paper is devoted to the university's role in the innovation system (2006).

The purpose of this article is to determine the role of university in the regional innovation system within the changing paradigm of higher education. In this paper, regional university complex is proposed to understand as the set of the higher education subjects, the most important distinguishing features of which are developed cooperative ties with the industrial sector of the regional economy and the indirect role in regional scientific-production associations due to its capacity (industrial enterprises, technologic zone, engineering organizations, technology transfer centres, design offices etc).

Results. Analyzing foreign experience of RIS development, it should be noted that the RIS essence in Europe and the United States varies widely. Firstly, we have completely different common features, and thus we may highlight the following.

Productive forces development and regional economy
members of the regional innovation system chain. Moreover, some of the traditional university functions, such as «to spread academic knowledge», are also modified by new requirements to the quality of knowledge that is generated and disseminated by universities. It is important to understand that the process of these functions realization is necessary for the further usage in implementation of certain values, and effectiveness evaluation. In Table 2, the authors’ view on criteria and indicators for the effective participation of university/university complex in RIS development is presented. These criteria and indicators were collected after analysis of university functions as the factor of regional innovation system development.

Presenting the Table 2, we would like to stress the following. Firstly, indicators proposed in this table are not exhaustive. Secondly, it is impossible to achieve any of the presented indicators without participation of either the government or the industrial sector (activation of «Triple Helix» principles). Achievement of the criteria for «younger» regional human capital is impossible without regional programs implementation for young people and young scientists supporting or targeted support for this category from the industrial sector (scholarships etc.). Achievement of criteria for regional human capital is impossible without dual connection between university and the industrial sectors. The industrial sector is a natural customer of proper human capital (in its intellectual and innovative parts).

Conclusions. When knowledge transforms to the most important productive force in economic structure changing, universities, as the generators of knowledge, become active actors in the economy. They achieve ability to fulfill not only their traditional academic functions, but also serve as a driver of the regional economy. Despite the fact that a necessary condition for the development of university as the core of the regional innovation system declares its autonomy, the role of the government – especially in the Russian practice when a rigid vertical hierarchy exists – seems undeniable. Generalizing the experience of Russian’s Tomsk region, we can say that the local governor’s power should be considered positively. The participation of the industrial sector plays an active role in the transformation of university complex also. Nevertheless, when we stress the necessity to actively include the industrial sector in university transformation, we have to point out that it is necessary to maintain a balance between them. The fact that in some cases when the industrial sector has a strong influence, universities can be transformed into a model close to «Corporation model» with detriment of academic component. In some cases this can be seen as a negative aspect of cooperation between university and the industry. Such form of university might lead to the development of «useful» knowledge only, and essence of this industrial sector will determine along the way of research.

Understandable desire to «effective entrepreneurship» in university complexes must not take academic component away, depriving them of the ability to the adaptive flexibility as the public institutions that are involved in the most direct way to generate the cultural environment of the society.

The changes taking place in higher education not only in Russia, but around the world, form new demands for academic infrastructure as a regional base of human, industrial, technical and technological resources. University needs to identify the mechanisms that would lead them as intellectual centres to successful participation in the regional economic development.

Working-out of applied tool that can assess the effectiveness of not only university, but also cooperation between university, government and industrial sector is a promising direction for the further research development of the regional innovation system.

References


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Tab. 1: University functions as the factor of the regional innovation system development

<table>
<thead>
<tr>
<th>Function</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training/Broadcasting of academic knowledge</td>
<td>- Student education; - Advanced training courses for workers of corporate, branches.</td>
</tr>
<tr>
<td>Cultural</td>
<td>- Younger generation take plans, values, life ideals prevailing in a given society.</td>
</tr>
<tr>
<td>Social «selection»</td>
<td>- Implementation of the «social elevator»; - Collaborative researches with government and industrial sector.</td>
</tr>
<tr>
<td>Consulting</td>
<td>- University gives expert consulting for regional government and local business society; - Organization and energizing of business society by mutual conferences, forums, etc.</td>
</tr>
<tr>
<td>Researching</td>
<td>- Activity of «academic component»; - «Public» researches and «academic knowledge».</td>
</tr>
</tbody>
</table>

Source: Own research

Tab. 2: Criteria and indicators for the effective participation of university/university complex in RIS development

<table>
<thead>
<tr>
<th>Criteria of university’s effectiveness in RIS</th>
<th>Indicators of effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Innovative infrastructure of university</td>
<td>- number of start-ups;</td>
</tr>
<tr>
<td>Regional human capital</td>
<td>- number of spin-offs;</td>
</tr>
<tr>
<td>Productivity</td>
<td>- number of created jobs in the region;</td>
</tr>
<tr>
<td>Amount of «younger» regional human capital</td>
<td>- number of the joint research centres on the base of university;</td>
</tr>
<tr>
<td>- collaboration with the financial institutions to stimulate innovative activity;</td>
<td></td>
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<tr>
<td>- patent and license activity;</td>
<td></td>
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<tr>
<td>- university share in the regional gross income;</td>
<td></td>
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<tr>
<td>- number of jobs created by university complex or university and cooperation with industry;</td>
<td></td>
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<tr>
<td>- number of employed graduates;</td>
<td></td>
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<tr>
<td>- term of adaptation reduction for a «young» specialist;</td>
<td></td>
</tr>
<tr>
<td>- average productivity and labor productivity in the priority sectors of industry in the region;</td>
<td></td>
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<tr>
<td>- number of students and postgraduates;</td>
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<tr>
<td>- number of nonresidents students and postgraduates;</td>
<td></td>
</tr>
<tr>
<td>- number of international students;</td>
<td></td>
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<tr>
<td>- number of young researchers and scientists up to 35 years</td>
<td></td>
</tr>
</tbody>
</table>

Source: Own research