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## Innovative potential and networking possibilities in life sciences

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### Abstract

*Currently, the concept of innovation becomes more important, particularly in connection with indispensable increase in the competitiveness of individual firms, but also regions and national economies. The process of creation of innovations includes several phases, starting from scientific invention up to introduction of the innovation into practice. Therefore, the problem of linking knowledge producers with the private sector becomes more and more important. This paper deals with analysis of the current situation in cooperation, knowledge- and technology transfer across sectors in Košice Self-governing Region (KSR), as well as with the possibilities of networking and innovation systems in the area of life sciences in KSR. The main factors displaying influence up to the possibilities of networking in science, research and innovation in KSR were identified based on empirical research carried out by personal interviews with key representatives of the three sectors (knowledge producers, private sector, and regional self-government). Hereby in this paper the most significant barriers in networking are discussed and, with the aim to enhance innovation activities in KSR, several possible institutional links are suggested.*

**Key words:** Innovation, Technology transfer, National innovation system, Regional innovation system, Innovation policy

**JEL Classification:** O3

### 1 Introduction

The fact that innovation is one of the most important factors of development of economics, has been already confirmed by many studies carried out by analysis of the relationship between knowledge, innovation and economic performance of particular regions [1]. More popular and important becomes also the fact, that in regional innovation policies the region is deemed as the most appropriate scale at which to sustain innovation-based learning economies [2]. The need of identification of regional networks or clusters of industrial activities which are deemed as central elements of the use and application of knowledge is closely related to the popularity of the concept of regional innovation systems. Regional cluster is a spontaneous phenomenon, where there is a natural collaboration between firms operating in regional proximity. Conversely, the regional innovation system is planned and systematic effect [3]. A regional innovation system, according to [4], consists of a “geographically defined, by administrative supported arrangement of innovative networks and institutions, which react to each other regularly and strongly with the aim to increase the output of innovative companies in the region”. These interactions occur

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between the actors of regional innovation systems. According to [5] innovation system consists of four basic elements:

- *Producing sector*, represented by firms operating in major industrial clusters in the region.
- *Scientific sector*, which consists of two components:
  - the educational component, which provides qualified human resources,
  - the research component, which includes knowledge producers - universities, research centers, research institutions.
- *Service sector for producers*, which embraces organizations providing support to firms such as technology transfer agencies, business associations or financial institutions.
- *Institutional arrangements*, which are governing the relationships between particular actors in the system.

Building a functioning innovation system requires mainly strengthening of region's institutional infrastructure, especially more cooperation between firms and knowledge producers [3]. It is important to emphasize, that the creation of innovation systems really has a sense at the regional level, considering the differences in industrial specialization and innovation performance in particular regions, as well as spatially bounding of knowledge transfer [6]. According to [3] and [6] it is important to specify the approach to innovation policy for each type of region with regard to malfunctioning of "one size fits all" policy. Therefore it seems to be necessary to create differentiated types of regional innovation systems with respect to their preconditions for innovation, networking and innovation barriers [6].

## 2 Innovative potential in life sciences in KSR

According to aforementioned theoretical knowledge, it is needful to take into account the particularities of each region by developing innovative policies. In the article we deal with the Košice Self-governing Region (KSR) and its innovative potential, as well as with the possibility of networking in this region. Especially, we handle with the field of life sciences as in KSR high-quality scientific institutions in this field of the scientific sector are well established. Following institutions are representative examples: Faculty of Medicine of Pavol Jozef Šafárik University (UPJŠ), Faculty of Science of UPJŠ, Department of Chemistry, Faculty of Metallurgy of Technical University of Košice (TUKE), University of Veterinary Medicine, Institute of Experimental Physics of Slovak Academy of Science (SAS), Institute of Animal Physiology SAS, Parasitological Institute SAS and Institute of Neurobiology SAS. Based on previously conducted studies, e.g. [7], we can assume that through more intensive mutual cooperation of these institutions could be achieved much better results in science, research and innovation; preliminary studies have shown that cooperation between particular institutions does not reach adequate level. Therefore, we determined the following two hypotheses:

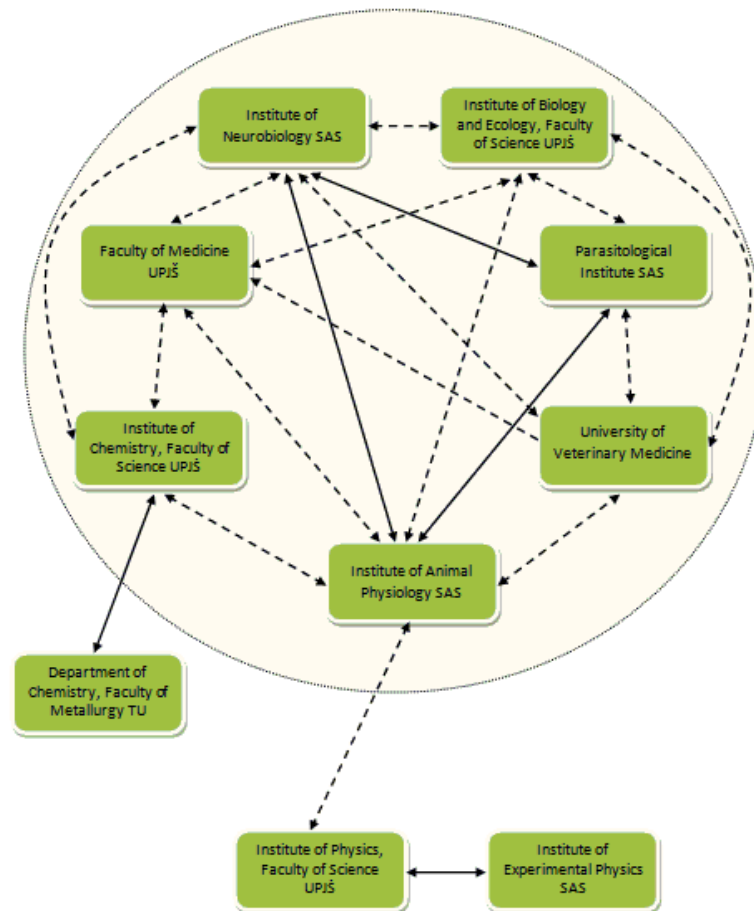
1. cooperation within the knowledge producers is not sufficiently developed - closer cooperation could lead to better results;
2. investments in research and development from the part of the private sector are not sufficient - private sector has no interest in supporting knowledge producers and to collaborate with them, although such cooperation would facilitate the innovation process.

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Subsequently was provided qualitative research to verify these hypotheses. The research was conducted through personal interviews with key representatives from all three sectors. Participant of research were nine experts from universities and SAS, two representatives of the private sector as well as two experts from the regional government. Through interviews the experts expressed their views and experiences which regard to specified hypotheses. Subsequent evaluation of results from interviews enabled the identification of the degree of cooperation and the situation in the area of networking between research centers (universities, SAS), the private sector and regional governments, as well as it enabled to obtain a scheme of institutional links and to identify problems and the level of social capital and also factors and conditions for development of innovation in life science.

## **2.1 Current situation of networking level in life science**

Hypothesis No. 1 has been only partially confirmed. Cooperation within knowledge producers is quite widespread, but it is necessary to distinguish between cooperation in education and in research. The educational level of cooperation is well established. Cooperation based on research is less established, often depends on interpersonal relationships and is mainly limited to common projects, which involves only few workers of the particular department or institution. The broader cooperation based on common technical infrastructure, joint investments in equipment, as well as on creation of associated investments is not very widespread. The evaluation of this hypothesis enabled to obtain a scheme of links between surveyed institutions. Dashed lines show less intense cooperation based on common projects and grants, the full lines represent intense cooperation among institutions.



**Figure 1: Scheme of institutional links among knowledge producers**

*Source: own*

The second hypothesis was proved to be correct. The level of cooperation between universities and the Slovak Academy of Sciences on one side and the private sector on the second one is poorly developed. If there is collaboration between the two sectors, this is mostly based on personal contacts and is more or less casual or it is a purely commercial relationship relating to the business of Institute of SAS or University. The substantive fact is that the problem is not only a lack of coordination of activities in these sectors arising from the diversity of their needs, but especially in its willingness to communicate, which is, surprisingly, lacking mainly in the private sector.

## 2.2 Factors affecting the networking in life science

The innovative potential and networking possibilities are affected by specific factors that are characteristic for different types of regions. Based on the research, we defined the following factors specific for the KSR.

### 1. Poorly functioning National Innovation System

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The problem of the national innovation system (NIS) in the Slovak Republic from the perspective of our research is especially in its centralization. Centrally managed NIS is not able to take into account regional needs and does not support the development of innovation sufficiently. In a case of centralized NIS no effective functioning regional innovation system is possible. The limited powers of regional governments in research, development and innovation cause its disavowing from the issues of innovation promoting.

## *2. Missing funding from private sector*

There are two problems which are related to the issue of research, development and innovation (RDI) funding from private sector. The first one is almost non-existence of the private sector in life sciences in the KSR. There are several companies focused on the field of biomedicine or pharmacy, but most of them are not motivated to cooperate in their research with institutions of the KSR. The survey pointed to several ways to solve the problem. One of them is the creation of scientific and technological park, where the technical infrastructure could serve to all participants from universities and SAS, but also to subjects of the private sector; this could enable the meeting of knowledge producers with firms and it would also simplify the process of seeking partners for cooperation. The second option is more intensive promotion of cooperation of research institution with foreign companies; in this process the regional government acts as an intermediary between foreign investors and institutions in the region. The second problem related to RDI funding from the private sector is the lack of venture capital. Banks are reluctant to participate in research projects or to support projects in the regions, although in developed countries this type of support is common practice.

## *3. Low level of RDI funding from the state*

The low level of state funding and unreliable and erratic functioning of the grant agencies are the most serious problems that stunt the development of innovative activities. Under-funded institutions with insufficient instrumentation have no chance to obtain additional funds in view of the fact that often the sufficient technical equipment of the demanding research institute is main condition for success of the project request. Conversely, institutions that are better funded, have the opportunity to get even more money. It is questionable whether every institution had the same starting conditions and whether their current state and facilities depends only on skill and motivation of the staff.

## *4. Human and social capital*

By designing and building cooperation between different actors interpersonal relationships and social capital are important elements. On the basis of good personal relations and contacts occurs cooperation; on the other hand, interpersonal relationships, and rivalry are often the reasons why different institutions with similar research focus and similar needs for technical infrastructure do not cooperate. Social capital and communication are in the conditions of the KSR major element of developing cooperation and building innovation systems.

## *5. Undeveloped applied research*

A major barrier of cooperation and institutional links across sectors is a lack of effort to find common goals. Universities and institutes of SAS deal with basic research, which is the main content of their activities. Most of the universities and the SAS consider the cooperation with the private sector for poor. The problem is often reluctance on the strengthening of applied research

and collaboration with practice. Support for application of research and promotion of technology transfer, especially vertical, which is the basis for innovative activity, is needed. Without linking of the research base with economic entities it is not possible to maintain competitiveness in the region.

## Conclusion

The research showed that innovation policy in the KSR should be aimed at improving the technical infrastructure of research institutions, to increase motivation of skilled human resources due to lack of their evaluation and also to promote a non-existent or only underdeveloped private sector, given the fact that in terms of KSR the direct private sector participation in research of knowledge producers is not developed. In the aim of successfully application of innovative policy in the KSR by regional government, decentralization of NIS is needed, especially considering the fact that the current division of competences in research, development and innovation does not effectively support the innovation process. Therefore it seems to be necessary to emphasize the role of regional governments in promoting RDI.

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