

AN ALGORITHM FOR BUILDING REGIONAL INNOVATION STRATEGIES IN UKRAINE BASED ON THE SYSTEMS OF INNOVATION APPROACH

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1. Introduction

The strategic goal of Ukraine's transition to an innovative model of development can be achieved only with the reorientation of state innovation policy to the regional level. Recently it became clear that it is the regional level that plays an important role in the generation of new knowledge and its use. Regional innovation systems began to be seen as an important tool for economic and innovation policy, as they emphasize the critical importance of spatial proximity and availability of favorable institutional structures at the regional level for innovation. The advantages of regional innovation processes [1, p.23]:

- joint presence of a large number of manufacturers of various kinds that offer specialized services promptly and flexibly in response to the request;
- effects of training caused by attraction of regional producers in transnational networks;
- emergence of local funds of labor with the concentration of specific skills and forms of learning;
- cultural and institutional infrastructure that constantly arises in and around industrial clusters and is often very important to the efficient operation of a single local socio-economic system;
- development of networks of trust among regional economic actors.

Today the advanced countries give increased attention to building Regional Innovation Strategies (RIS), which allow to use local benefits to a greater extent. Such strategies are based on developing business environment, broad involvement of business in building and implementing regional innovation policies tailored to enterprises technological possibilities and needs and innovative capacity of scientific organizations, the benefits of innovation process participants networking.

Ukrainian regions have elaborated and implemented a number of strategic documents, concerning regional innovative development [2, p.146–166]. However, their effectiveness remains very low. In most cases such documents have been elaborated based on a methodology of linear model of innovation process, according to which, measures within these programs were limited to creating conditions for the commercialization of research results – a “technology push model”, which does not meet modern requirements for the innovation policy.

The aim of the article is to develop an algorithm for building RIS in Ukraine, based on systems of innovation (SI) approach, that will more fully utilize the scientific and educational, innovative and entrepreneurial potential of the region, establish long-term partnerships between key regional institutions, working in the field of innovation, and the private sector, strengthen the role of scientific and educational institutions in regional innovation processes. Building such strategies will be a tool that allow accelerate the development of a modern knowledge-based economy in Ukraine.

2. Theoretical background

A significant increase in the role of regions in the implementation of innovations led to the growth in the number of studies on the creation and dissemination of innovation at the regional level and on the formation of regional innovation systems. Most of these works are based on the Systems of Innovation (SI) approach, elaborated by K. Frimen, B.-A. Lundvall, Nelson and C. Edquist.

C. Freeman in work [3] criticized what has become known as the Washington consensus for its

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neglect of dynamic processes related to innovation when analyzing economic growth and economic development, and stressed the necessity to develop an alternative analytical framework. In [4] B.-A. Lundvall, underlying the systemic nature of innovation processes, considered that “the ‘system’ dimension has moved the attention in policy making from linear to interactive thinking of innovation. This can be referred to as a movement from Science and Technology toward Innovation Policy”. According to C. Edquist [5], the SI approach in contrast to the New Growth Theory is about the determinants of innovations, not about their effects (in terms of growth, employment etc). This has made SI approach central for the modern way of understanding innovations. Initially the main emphasis within the SI approach was on national systems of innovations, later emerged its sectoral and regional variants [5]. The main components of SI are organizations (formal structures created with an explicit purpose – companies, universities, venture capital organizations, public innovation agencies) and institutions (sets of common habits, routines, established practices that regulate the interactions and relations between individuals, groups and organizations). The relations between main components of SI are considered to be crucial for innovation processes [5].

3. Results

Regional Innovation Strategy aims at assisting regional and local authorities and regional development organizations in implementing an effective system to support innovation in the region. For this purpose strategy should define innovation policies and ways to improve regional innovation support infrastructure, especially in the context of its compliance to the needs of small and medium enterprises (SMEs). The basis for the emergence of RIS in the early 90-ies was the conviction that there were significant differences in the level of development among the various regions of the European Union, due to existing barriers and restrictions in these areas. Barriers that limited the ability of regions to accumulate innovation potential were [1, p.28]:

- a weak system and institutional framework in the region;
- weak or deformed demand of firms for research and development R&D;
- the lack of cooperation between the public and private sectors;
- obsolete approach to solutions that were too rooted in the traditions of the regions, combined with ignoring national and international contexts in which these regions operate;
- excessive focus on basic research in the public research sector, the lack of attention to technology transfer and market dissemination projects;
- administrative “top-down” approach, instead of the market “bottom-up” approach, which takes into account research and local businesses problems.

Based on the experience of implementation of RIS in OECD countries following their types can be defined: Regional Technology Plans (RTP); Regional Innovation and Technology Transfer Strategies (RITTS); and Regional Innovation Strategies (RIS) themselves.

RTP projects historically were the first type of RIS, which have been formulated and implemented in European Union regions since 1994. RTP encouraged regions to develop innovative strategies, which should have been manifested in strengthening the ability of regions to create policies that took into account the real needs of the production sector and, at the same time, the strengths and weaknesses of R&D base. RTP became the first manifestation of a strategic approach to innovation, as well as the regional approach to development based on innovation. Based on RTP projects, a new tool was defined – technology transfer as an essential element of increasing regions innovation activity. It has also been paid an accent on the need to create Regional Innovation and Technology Transfer Strategies. In parallel with the implementation of RITTS measures, part of the regions, using the same methodology, started to create RIS. Both initiatives RITTS and RIS were aimed at supporting regional governments and development organizations in undertaking an assessment of the regional innovation system including management, financial, commercial, training and organizational and technological issues. The resulting strategy provided a framework for optimizing regional innovation policy and infrastructures, especially with regard to their relevance to SMEs needs. It was designed to promote co-operation between the private and R&D sector, and public

administration [6, p.12]. The difference between these strategies was that the emphasis on technology transfer, which was a characteristic of RITTS, in the case with RIS, was limited. As a result, RIS were focused on the *systemic approach*, where the leading role in the development of innovatively advanced region was assigned to a wide range of regional organizations.

Today's RIS are worked out based on the algorithm [1, p.32–46; 6, p.27–58] which is the result of long process of mechanisms formation and results analysis. The algorithm describes a set of measures by which it is possible to process the regional concept of innovation support. All mechanisms are closely interrelated and create a regional system of relationships between key institutions and individuals working in the field of innovation. Implementing RIS typically involves following steps (phases):

First Phase – *Phase 0*, concentrates on activities that aim to create a favorable environment and climate for development RIS, and to establish long-term relationships between regional leaders. The main aim is to achieve *regional consensus* that is manifested in including key organizations and individuals, which operate on the regional innovative field, in the process of working out the strategy. Regional consensus concerns building the objectives of RIS and expected results, long-term view on the realization of regional process initiated by the strategy, information that should be collected and taken into consideration, ways of disseminating and organizing information available. Therefore, this consensus should emerge through awareness of the problem by all the actors of regional scene and reflect their vision of building and implementing strategies to life. Element of regional consensus, both in terms of instrument of strategy building and results achieved, is the governance structure, managing the process of building RIS. It is necessary to include in its administrative body the representatives of businesses, entrepreneurs, business associations. In this phase carrying out advertising and information activities addressed to all groups is made, which aim is to increase public awareness in the region about innovation, their role for socio-economic development and obtaining public support for the development of innovation policy.

By creating favorable conditions for the building RIS through involvement of a wide range of participants, *Phase 0* helps to create a favorable atmosphere for business, emphasizes its role in raising the level of innovativeness in the region, promotes the inclusion of companies in the process of creating strategies, plans research work that will be conducted in the following phases.

The development of an integrated approach is *Phase 1*, in which analytical research in the region in terms of its innovation potential, barriers to endogenous process of regional development based on innovation, is conducted. Regional analyzes focus on:

- main technological and industrial trends affecting the region; innovative potential and areas of key sectors development (like industry and services);
- potential of regional SMEs, namely their technological capabilities and management capacity;
- potential of research organizations;
- level of development and use of innovation support infrastructure in the region.

A RIS project must take into account that the decisions taken by regional firms in their innovation activities are heavily influenced by similar decisions being taken around the world. Therefore, policy choices must take account of the global environment, in particular the trends in industry sectors and technological advances. An analysis of these trends may be carried out from the perspective of industrial or service sectors and technological disciplines. A choice has to be made as to which perspective is of greatest relevance to the region, keeping in mind that the project is not only concerned with “new technologies”. Attention should be given traditional or generic technologies or skills which are to be of continuing strategic importance to the regional economic growth prospects.

SMEs are a key element that determines enhance in the level of regional economy innovativeness. Companies are the part of the demand for innovation, which is manifested in their interest in new technologies – both in the manufacturing process and in management. The best tool of research of *SMEs*' innovative aspects is *technology audits*, through which it is possible to learn about the natu-

re of innovation needs and barriers, the nature of activities, product structure, scope of innovation, financial investment funds, demand for technology, financial and human resources. The result of the research is to determine the companies' strengths and weaknesses. This definition takes place at sectoral, local, regional levels and enables to create a database of the most important innovation needs and comparing them with opportunities to meet these needs by regional organizations.

When assessing the environment in which businesses operate, *the potential of research organizations* is examined first, as they are the main source of knowledge and technology in the region. The study should identify the strengths and weaknesses of these organizations, as well as the possibility of using knowledge by regional enterprises. As a result, the authors of the strategy are informed of the implemented research, scientific personnel, technological orientation and quality, costs and major revenue sources of such organizations. This creates the possibility to compare the technological needs with the proposal, to assess whether regional innovation potential is used (and how much), or whether it is impossible to use it, what are the prerequisites forming this potential.

Another object of the analysis is *organizations functioning directly in business environment*. It is the financial institutions, regional development agencies, chambers of commerce, associations, advocacy groups, professional consulting firms and others. Interest with these organizations arises from the fact that they are the primary source of information for the companies operating in their environment. The aim is to assess whether services, provided by these organizations, lead to the increased levels of innovation, whether they meet key requirements of the latter, whether provided assistance and support instruments were addressed to create innovations by enterprises or not.

The final stage of all tests carried out in the region, is working out SWOT-analysis – that is determination on the basis of the results received the potential and needs of the strengths and weaknesses of the region in terms of innovation, the chances and threats of innovation.

Based on consensus and identified strengths and weaknesses of the innovation development of the region, in *Phase 2* main activities are concentrated on:

- formulation of the document of the strategy;
- definition, implementation and testing of activities envisaged by the strategy;
- establishment of a monitoring system with the aim to evaluate the implemented measures.

Compiled resulting document is a derivative of all measures taken in the framework of strategy processing. Since its role is to be the framework of innovation in the region, the strategy value depends on what consensus has been reached during its processing. Such consensus should be the derivative of local actors' awareness and requires their positive perception, otherwise it will inevitably meet with resistance of people and institutions that did not participate in the process and the implementation of this strategy will be virtually impossible. That is why RIS should be discussed in environments, which it concerns, and which have been included in the process of its creation.

Practical implementation of the strategy is fulfilled through a set of actions specially elaborated within the framework plan. The plan sets goals, performers and sources of funding for the group of pilot projects. These pilot projects are the first instrument of RIS performance, and their number stems from the action plan elaborated. Pilot projects are considered primarily as: flagship projects, implementation of which aims to demonstrate the effectiveness of RIS and support for innovation atmosphere; "rabbits" for large projects or programs specified in working plan; tools that can in the long run maintain regional political potential, while in the initial phase perform a pilot function.

The prime objective of a RIS development is that beneficial results in terms of the improvement in the region's innovation performance will be achieved. That's why it is necessary to develop a basis for the measurement of the efficiency and appropriateness of the actions and the benefits gained. Indicators for measuring results can be described as either "linear" or "interactive". *Linear indicators* concentrate on the "hard" outputs – e.g. patents, R&D expenditure, new products developed, etc. *Interactive* seek to measure the various actions and activities which signify that

R&D is taking place regardless of the “hard” outputs which are obtained e.g. “links” between universities and SMEs, the number of projects dealt etc. Interactive indicators therefore measure the health of the R&D system, which is not being identified by the linear indicators.

Strategy worked out together with the mechanisms for measuring, monitoring, funding and broad support, which are the result of consensus achieved – all this become a tool by which regional innovation capacity can confidently develop.

4. Conclusions

Scientific and methodological support for development and implementation of RIS in Ukraine must be made not from the standpoint of traditional for national science linear approach to understanding innovation, whereby innovation process is seen as comprising the consecutive steps from the scientific research, experimental development to production of innovative products, but in terms of systems of innovations approach, where innovations are considered as interactions between all the complex economic, social, political, organizational and other factors, that determine the creation of innovation including linkages between firms, manufacturers, consumers, labor market, government regulation and others. According to this approach, investments in R&D and human capital are considered only as a necessary condition for growth; as a sufficient one – the process of circulation of knowledge between academic institutions and companies.

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Summary

The article deals with the methodological issues and algorithm for building regional innovation strategies. A Systems of innovation approach to strategic planning of region innovative development was considered. An algorithm for building regional innovation strategies was presented, which consist of such steps as building regional consensus, analysis of main technological and industrial trends affecting the region, analysis of strengths and weaknesses of regional firms, assessment of regional innovation support infrastructure and potential of research organizations, definition of strategic framework, design and implementation of a monitoring and evaluation system.

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