Universities Entrepreneurial Ecosystem in Russian Regions Innovative Activity

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The entrepreneurial ecosystem of universities is frequently recognized to have a key influence on the innovative activity of the related regions. It is extremely important to strengthen the impact of university entrepreneurial activity on the innovative activity of regions by building the interactions between education, science, and business.

innovative activity entrepreneurial ecosystem interaction contours

1. Introduction

Currently, the development of national economies has to deal with fast changes in the external environment. It requires meeting future challenges with the efficient use of the available resource capabilities of the system. It is extremely important to strengthen the impact of university entrepreneurial activity on the innovative activity of regions by building the interactions between education, science, and business.

In Russia, there is high competition in the market of educational services, which is combined with reduced direct funding from the state budget. Therefore, the priorities for the functioning of higher education institutions require modification to meet the challenges of the socioeconomic system. The best practices of the world's leading universities highlight entrepreneurial activity as a key factor in their dynamic and successful development, capable of providing an adequate response to the threats and opportunities of the external environment. In this context, understanding the essence of an entrepreneurial university as a form of "education–science–business" integration within the framework of the creation and development of multilevel entrepreneurial ecosystems is of particular importance for the promotion of innovative activity in regions, among other things. From this viewpoint, all areas of a university's activities that characterize its major resources and contribute to the transfer of research outputs to objects of intellectual property, commercial products, and economic development together contribute to forming an entrepreneurial university that is a growth point for an ecosystem.

So far, the relationship between the evolution of entrepreneurial ecosystems and the priorities of universities in terms of creating opportunities for their interaction and influence on the innovative activity of regions is not studied in detail.

2. The Effect of the Entrepreneurial Ecosystem of Universities on the Innovative Activity in Russian Regions

The emergence of new requirements for universities is a natural response to the challenges of the current stage of economic development for universities to be primarily directed toward advancement in their transition to the next technological paradigm. Particularly, this results in emerging universities that are actively involved in rather new entrepreneurial activities. In the mid-1980s, for the first time, publications in the United States (Etzkowitz 1983) followed by other countries (Van Dierdonck and Debackere 1988; Hisrich and Smilor 1988) considered the fundamentals and development of entrepreneurial educational organizations. Furthermore, the concept of an entrepreneurial university has been well articulated and advanced in numerous studies (see, for instance, Golubev 2010; Konstantinov and Filonovich 2007; Ropke 1998; Kauffeld-Monz and Fritsch 2013; Bae et al. 2014; and Nabi et al. 2017). Among others, the seminal research dealing with the transformation of classical universities into entrepreneurial ones should be highlighted (Clark 1998; Isenberg 2010, 2011; Fernández-Nogueira et al. 2018). In this context, Clark (1998) put forward and elaborated a hypothesis according to which universities can implement entrepreneurial activities without compromising the "traditional university values" such as an educational process and scientific research. At the same time, a university started to be considered as an ecosystem that includes clusters, platforms, incubators, and networks, thus creating the basis for developing entrepreneurship in different regions (Mazzei 2018). For these reasons, some authors think that the growth of the entrepreneurial potential in the university allows one to identify the university not just within an ecosystem (Adner 2017; Jacobides et al. 2015) but rather within an entrepreneurial ecosystem (Fuster et al. 2019).

Interest in entrepreneurial ecosystems has increased enormously in recent years (Spigel and Harrison 2018; Ritala and Gustafsson 2018; Barnard et al. 2019; Colombelli et al. 2022; Corazza and Saluto 2021). This trend is noted both by researchers (Venkataraman 2004; Cohen 2006; Abreu et al. 2016; Hoffman 2020; Uslu et al. 2019; Fischer et al. 2022) and politicians, as well as international and national organizations. For example, Fritsch et al. (2018) investigated Eisenberg's ideas about the entrepreneurial ecosystem with a research scope focused on highlighting its major components. In general, the World Economic Forum defined the essence of the entrepreneurial system as a set of "inter-related components that determine the opportunities and rates of creation and scaling of new sustainable businesses by entrepreneurs" (World Economic Forum 2014). Stam (2015) went even further and proposed a synthetic model of such a system. However, questions remain that are outside the scope of research performed thus far on the identification of the factors that affect the elaboration of entrepreneurial ecosystems.

In some works by domestic authors, the entrepreneurial ecosystem of universities in Russia is noted to be mainly focused on increasing the number and survival of startups created by university students (Korotkov and Zobnina 2019). However, this view is rather limited, for the development of entrepreneurial activities of universities. Shapovalov et al. (2020) considered the university ecosystem as a space for a set of subjects attributed to an educational process, where their interaction with an external environment is realized. As a result, the individual personality traits of a social entrepreneur are revealed. Here, an important feature of the environment of socioentrepreneurial education as a system is that the student is considered a subject of the educational process and therefore is also a system. Thus, the student in the ecosystem of socioentrepreneurial education shows the active nature of knowledge, which is ultimately expressed in the mutual influence between the subject and the environment.

By 2025, a significant proportion of value chains, according to the forecasts of McKinsey specialists (McKinsey & Company 2022), will unite into several dozen ecosystems, which do not exhibit clearly defined borders among their individual sectors. The developed connections could be revealed only by monitoring the activity of the entrepreneurial ecosystem of universities and assessing their impact on the rating indicators of regional R&D and the country as a whole. The Russian Ministry of Science and Higher Education annually reviews 1286 higher educational institutions in order to assess the efficiency of their activities. It is ordinarily conducted by evaluating more than 70 indicators in the following areas (Information and Analytical Materials Based on the Results of Monitoring the Activities of Educational Institutions of Higher Education (2022)):

- Educational activities (15 indicators);
- Research activities (16 indicators);
- International collaboration (13 indicators);
- Financial and economic activities (8 indicators);
- Staffing (5 indicators).

The assessment includes two sections: (i) indicators reflecting the role of the university in the system of personnel training for the region and (ii) additional indicators for its extended characteristics. The major target for monitoring is "preparing information and analytical materials about educational institutions of higher education and their branches based on performance indicators" (*Portal of Federal State Educational Standards of Higher Education* (2023)), which, does not reflect the real efficiency of universities, their entrepreneurial potential, or market rating but only demonstrates the actual value of university performance indicators.

Regarding the concept of entrepreneurial universities, two major approaches could be distinguished, as follows:

(1) Entrepreneurial universities are elements of the "triple helix" model that provide interaction for science (universities), business, and the state; universities play a leading role in this model (Etzkowitz et al. 2019; Budyldina 2018; Thursby and Thursby 2002; Ulhøi et al. 2012).

(2) Entrepreneurial universities commercialize scientific advances at the international level and transition to an innovative development model (Astebro and Bazzazian 2011; Gianiodis et al. 2016; Meissner 2017).

As noted above, the term "entrepreneurial university" was introduced in 1998 by B. Clark, who highlighted its features in his book *Creating Entrepreneurial Universities*, as summarized in **Figure 1**.

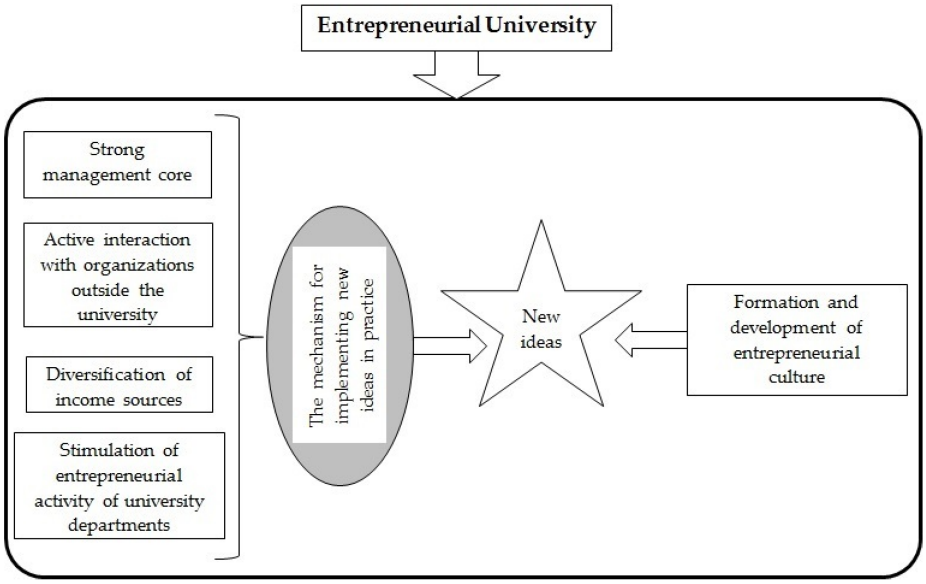

Figure 1. Characteristics of an entrepreneurial university.

As can be seen from **Figure 1**, there are five basic features that classify the university as an entrepreneurial one. The presence of a strong managing "core", capable of independently directing the development of the university and quickly and adequately responding to emerging changes, makes it possible to respond to external challenges. The second indicator reflects the presence of subdivisions with highly professional employees, which firstly leads to the development of external associations to transfer knowledge, attract new sources of financing, interact with industry, and develop continuing education and intellectual property; and, secondly, facilitates the interaction of interdisciplinary project-oriented research centers in universities and the external environment. The diversification of income sources, as a hallmark of an entrepreneurial university, is important in the context of declining budgetary funding and reflects the ability of the university to expand its funding base through grants, legal entities, regional funding, charitable foundations, royalties from the use of intellectual property licenses, and income from the provision of paid services. Stimulating the entrepreneurial activity of departments enables their transformation into entrepreneurial units that interact with the external environment, implement the results of scientific research, attract additional sources of income, and lead to the acceptance of new values by employees.

The abovementioned features together form a mechanism for implementing new developments via the integration of an entrepreneurial culture with university-wide activities, as well as the dissemination and sustainable consolidation of ideas. In terms of the characteristics inherent in entrepreneurial universities, their areas of activity are education and research, which are accompanied by a transfer of knowledge that underlies the need for interaction with the external environment. Consequently, the activities of an entrepreneurial university must meet the needs of the market in educational services, high-tech developments, and labor (Lankin et al. 2011). According to some domestic authors (Andryushkevich and Denisova 2014; Buniak 2016; Podborodnikova 2019; Yudkevich 2014), entrepreneurial universities in Russia are characterized by a reduced dependence on state institutions; susceptibility to global trends; flexibility; adaptive management structure; integration of education, science, and business; interaction with investors; the training of competitive specialists for entrepreneurial and innovative thinking; the development of infrastructure adapted for research and entrepreneurial activities (development centers, technology parks, business incubators, etc.); an effective system for the motivation and stimulation of scientific and teaching staff; a focus not only on fundamental science but also on applied research; competitive and selective selection of students; a high degree of information openness; and the organization of scientific communities and business environment in the region (or scientific, technical, and economic realms surrounding the university).

Thus, the distinctive function of entrepreneurial universities is highlighted in the literature (Digital/McKinsey 2017) as the commercialization of R&D outputs, which is defined in a sequence as follows: Universities conduct scientific research, the result of which is new knowledge. Then, the commercial attractiveness of the invention is assessed by formalizing an intellectual property to be claimed through patenting. Finally, a business plan is detailed to promote the product and the corresponding licenses. One can agree with the opinion that entrepreneurial universities should function as commercial organizations, while university staff and students should behave and think like entrepreneurs. Moreover, universities should be closely linked to the region and support local businesses. However, the mechanisms of the triple helix used in the

development of Russian universities are still in their infancy. To accelerate this process and advance their competitiveness, an effective rating assessment is required.

The history of university rankings goes back to 1997, when universities were assessed by the *Asia Week* magazine. In 2003, the staff of Shanghai University compiled the Academic Ranking of World Universities (ARWU) according to 13 criteria, which reflect "the academic mobility of students and teachers, the number of international scholarship programs, the efficiency of scientific research, the citation of scientific articles, the quality of educational services, etc." (Primina 2018; Lin and Chen 2021). In 2004, Britain began to annually publish a list of the world's top universities, titled "The Times Higher Education", and since 2010, they have been reporting the reputation rating of world universities (World Reputation Rankings) and the ranking of the world's leading universities (World University Rankings) (Velitchenko 2020; Bowman and Bastedo 2011). Currently, one of the commonly recognized rankings is the ranking of 500 leading world universities regarding Poverty Reduction Strategy Papers (PRSPs), according to criteria that reflect the volume of research activity calculated by taking the number of published scientific articles. Because many national policies necessitate the presence of universities in such rankings, there is permanent competition between universities according to the criteria involved. Therefore, the indicators that assess the results of scientific activity are extremely important. For example, objective data such as the number of inventions, patent applications, granted patents, active licenses, the number of scientists, etc., could be included in such an analysis.

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