Educational Ecosystems in the Concept of Sustainable Development of the Region

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Keywords: Ecosystem, Educational ecosystem, Smart specialization, Quadruple innovation helix, Regional educational platform, Sustainable development.

Abstract: The educational paradigm of the 21st century highlights the problem of preparing a specialist who is ready for real work and life in a complex digital community where unique skills are valued. In the scientific literature, new integrated approaches to learning are emerging, focused on working with the future. The problems of forming educational ecosystems as an evolutionary trajectory for the development of the education system to achieve the goals of social transformation based on the principles of the concept of sustainable development become topical. The purpose of the study is to theoretically substantiate and develop a model solution for the involvement of educational structures as elements of the educational ecosystem in the strategic process of the region's development. The proposed ecosystem approach makes it possible to reveal the problem of creating a new innovation and project space in the region in the context of sustainable development. The tool for implementing the ecosystem approach is regional educational platforms that can become a link in the innovative development of the territory. The research materials can be used to substantiate the directions of sustainable development of the region based on the formation of an educational ecosystem.

1 INTRODUCTION

The development of socio-economic systems is currently determined by environmental factors that have the context of a multi-format protracted crisis (geopolitical, economic, social, climatic), supplemented by key trends: digitalization of all spheres of society; automation and robotization in industry and the economy; globalization of the economy, knowledge and technology; greening of production processes and aspects vital activity; demographic changes; socialization of society; acceleration of technological and social changes. In this regard, we can note the following conditions for the formation of competitive advantages of socio-economic systems of various levels from transnational to subject:

- deepening of social stratification and scrapping of the socio-economic paradigm;
- new challenges as a consequence of global climate change;
- new threats from information transparency and cybersecurity, the emergence of epidemics of universal scale;
- active scientific and technological development affecting the transformation of the industry, the structure of employment and social development;
- new environmental requirements forming modern formats of production and social life;
- new formats of competition with the emergence of the phenomenon of co-competition to achieve the goals of territorial development;
- growing demand for communication, joint development and implementation of projects (especially at the local regional level);

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- the relevance of the development of integration processes based on the principles of partnership and cooperation at the vertical and horizontal levels;

- the need to find and maintain a balance between equality and freedom, individuality and society, traditions and innovations, autocracy and democracy.

The emphasis is increasingly shifting from the national to the local regional level, since it is the socio-economic system at the regional level that can become a catalyst for developing new strategies and setting new tasks for the harmonious development of the territory. The authors of many scientific papers note the importance of territorial development through the prism of the formation of common ideas that correspond to local culture, widely shared by all regional stakeholders and provide motivation to achieve common success. Here we are talking about choosing the trajectory of the territory's development and forming the necessary ideas for this (the image of the «future») based on interpretation and search for consensus - a valuable resource and the success of stakeholder interaction. In this regard, there is an urgent need to revise the mental framework for the development of promising approaches focused on the future, as well as a deep understanding of the mechanisms of cooperation.

For the functioning and development of socio-economic systems, it is necessary to change old patterns to new «organizational patterns» based on holistic perception and critical analysis of information. In this regard, the theory of ecosystems becomes relevant, focusing on the features and patterns of ecosystems of various levels and types, taking into account their naturalness and discreteness as the basic postulates of formation and development.

One of such ecosystems is an educational ecosystem built on the unification of various participants and the involvement of all stakeholders in the learning process. It includes a wide range of educational services, programs and trajectories. Such an ecosystem is designed to develop lifelong learning regardless of age and using the full potential of new technologies, tools, spaces and resources, where everyone has their own unique niche and the right to choose. Today, the educational ecosystem is important for the development of the well-being of society, as it begins to set tasks atypical for classical industrial education. Such an ecosystem should move from traditional forms of training to new team approaches capable of creating new products and developing relevant solutions, responding to the challenges of the external environment in a timely manner.

The ecosystem approach in education is a relatively new direction in the field of education, including personalized learning; close relationship with the business environment and the creation of mutually beneficial partnerships with stakeholders in education; integration of diverse educational opportunities, new formats and types of educational activities available in a particular area; high scientific component; formation and development of key competencies that promote health, well-being and self-realization, and determine long-term life strategies.

Thus, the educational ecosystem is a new model of the organization of the educational process and a future driver of the development of educational organizations on a regional and national scale. It meets the challenges of the 21st century and allows you to form the «skills of the future» in accordance with the requirements of the business environment to meet personal needs, as well as achieve collective well-being in a particular area.

2 RESEARCH METHODOLOGY

An important task of the research is the scientific understanding of the essence and role of educational ecosystems, as well as the justification of their application in the field of education to ensure the sustainable development of the territory. In our opinion, the educational ecosystem should not only reflect the existing fundamental concept and case practice, but also be an active player in the regional innovation system, and therefore act as an initiator and tool for creating and accumulating experience in forming a strategy for innovative development of the territory in conditions of sustainable development.

Based on this, the methodology of this study is focused on exploring the possibilities of using educational ecosystems to ensure sustainable innovative development of the region and increase the innovative territorial potential through the organization of regional educational platforms (REP), contributing to the stimulation of innovative processes in the field of education. The methodological basis of the scientific research of the concept of educational ecosystems in the sustainable development of the region are system-integrated, structural-logical, comparative and descriptive approaches to the study of the problem, comparative and critical analysis, methods of generalization, analogy, concretization, deconstruction, modeling and synthesis, as well as methods of visual representation of information (graphic images and tabular forms).

3 RESULTS

«Educational ecosystem» and «ecosystem approach to education» are popular definitions that have recently begun to appear in discussions about the future development of education. Theoretical and methodological aspects of the ecosystem concept began to be formed taking into account business practices when making high-tech decisions, creating innovations and diffusing new knowledge, as well as using new relevant approaches in the development of the value chain.

Initially, educational ecosystems were interpreted by foreign researchers [Uden, Wangsa and Damiani, 2007] as one of the forms of e-learning. The emergence and development of the ecosystem in the context of education is based on the strategy of Virginia Polytechnic University, in which the educational ecosystem was a set of assets and interests of stakeholders in the educational process, ensuring the achievement of synergetic results beneficial to all. The further development of the phenomenon of the educational ecosystem is reflected in the report of prominent authors [Hannon, Patton and Temperley, 2011], who believe that «the educational ecosystem promotes the formation of links between formal and informal learning, existing education providers and its new participants, between «service providers» (teachers) and «service users» (students). The importance of educational ecosystems and the transition to an educational ecosystem with flexibility and the ability to adapt to the requirements of a changing economy and the challenges of the real world is confirmed in a study by scientists [Spencer-Keise, Luksha and Cubista, 2020].

Among the domestic authors who paid attention to the study of the ecosystem approach as the newest paradigm of education and the analysis of the advantages of its use in education, it should be noted researchers [Argunova and Morgun, 2021], who emphasized that the educational ecosystem is a management paradigm of the organization of the educational process, and education for sustainable development is a new educational ecosystem, including environmental, economic and social subsystems. Of scientific interest are the works of other authors on the specifics of the ecosystem approach to education and its main characteristics [Prokhorova and Petrovsky, 2022], as well as research scientists [Weindorf-Sysoeva and Subocheva, 2021; Oleynikov, Fominykh, Koikova and Bubenchikova, 2021], forming their vision of the educational ecosystem as a new trend in the development of education the future and the basis for the prosperity of society, consisting of a variety of educational components and processes that interact intensively with each other.

With all the diversity and significance of works devoted to the use of the ecosystem approach in education, in our opinion, the issues of functioning of educational ecosystems and ecosystem interaction of the main subjects of the educational process in the context of sustainable development of the territory and solving key socio-economic problems of the region have not been sufficiently studied.

In our opinion, ecosystems are certain formations that are geographically and functionally limited from other formations of the target system, where each constituent structural element has a specific place and role. For the purposes of our research, we will focus in more detail on the features of the formation and functioning of the educational ecosystem as a driver of innovative development of the territory. Based on the scientific works of [Karayannis and Grigorudis, 2016], it is possible to single out a special role and place of the educational system in the model of the «quadruple innovation helix». According to the model, each of the regional stakeholders (civil society, public authorities, business community, science and education) participates in solving the problems of sustainable development of the territory in the modern global knowledge economy through the process of interaction on three important issues: innovation, productivity improvement and competitiveness growth (Figure 1). At the same time, the concepts of productivity and competitiveness are considered internally interrelated, since they ensure sustainable economic growth based on the efficient allocation of resources and taking into account the uniqueness of the territory. And innovation activity becomes an auxiliary component of this triad, since technology through innovation is a key factor in the development of any modern socio-economic system. The model provides a stable environment of parallel connections between groups of regional stakeholders, connecting their capabilities and potentials for the development of social ecology, knowledge production and innovation transfer. It turns out that the model of the «quadruple innovation helix» model visualizes collective interaction and knowledge exchange within the regional innovation system, while forming its own communicative culture and creating new formats of cooperation and partnership [Tronina, Tatenko and Bakhtina, 2019].

It is believed that the core of the «quadruple innovation helix» model is the civil society as consumers, co-developers and co-creators of innovations. State authorities, the business

community, science and education, in turn, become a mechanism for supporting the innovative activity of citizens, providing tools, information, platforms for the development of innovations, skills. In our opinion, the connecting mechanism in this model is the block «science and education», which is able to activate, mobilize and maintain knowledge as a resource as a basis for creating new competitive advantages of the region.

The process of creative interaction of four groups of stakeholders aimed at creating innovations is called «entrepreneurial search» in the scientific literature. This is an interactive process of revealing the potentials of participants in the regional innovation system and working with information about new areas of activity with localization to specific regional assets and resources, taking into account the peculiarities of the socio-economic situation. A strategy is being formed in those areas that are potentially important for future regional development. The organization of the process of «entrepreneurial search», according to the concept of «smart specialization», becomes the result of cooperation and partnership of regional stakeholders in solving the tasks of innovative development of the territory [Kutsenko, Islankina and Kindras, 2018]. In addition, it is necessary to maximize the opportunities for knowledge exchange both at the intra-regional and interregional levels.

Much attention has been paid to the theory and practice of using the concept of «smart specialization» in scientific literature and practical cases. Based on the results of the theoretical analysis of the research of domestic [Kalyuzhnova and Violin, 2020; Eferin and Kutsenko, 2021], and foreign scientists [McCann and Ortega-Argilés, 2015], I would like to note the following. «Smart specialization» in the context of sustainable development is a set of principles and an algorithm of actions that help shape the strategy of innovative development of the territory. This algorithm necessarily provides for the search for the region's place in the national value chain, the analysis of structurally similar territories for further benchmarking, as well as the disclosure of the potential and opportunities of collaborations of regional stakeholders at the intra and interregional levels. Thus, the concept of «smart specialization» offers an approach to the formation of a knowledge-based strategy to determine the priorities of the region's development in partnership with stakeholders in the regional innovation system, which is reflected in Figure 1.

In our opinion, the educational ecosystem should be a collective institutional form of educational, research and innovation-project activities. At the same time, as a result of the study, it was found that the following trends influence the formation and development of the educational ecosystem, causing the transformation of the classical system of education into the education of the «future»:

- active use and popularity of online education and digital educational technologies;
- changing the role of the teacher as a facilitator and navigator of the educational process;
- increasing the flexibility of training programs under the reality of a constantly changing external environment;
- the emergence of an objective need for the formation of universal «human-oriented» competencies at all levels of education;
- development of social and emotional learning based on a person-centered approach;
- the growing role of multi-position partnerships and the emergence of new forms of cooperation and
- interaction for educational purposes;
- development based on the principles of justice and equality regarding access to educational resources;
- formation of a new educational culture to support learning throughout a person's life;
- a new approach to learning: teaching not individuals, but teams, organizations, communities;
- moving away from ready-made universal programs towards the «cloud of personal learning» and, as a result, the development of network education. Taking into account these trends, the educational ecosystem is designed to change the ways of learning, the way of thinking and move from a strict archaic system and traditional processes to models of interconnectedness and cooperation, uniting students and communities in a specific area of their localization, contributing to the formation and development of a culture of lifelong learning. To do this, it is necessary to create a comprehensive educational environment in which the development of competencies goes towards providing the economy of the territory with talents and economic social realization of people within the zone of their well-being. In addition, skills are acquired for joint creativity, cooperation, teamwork, situational leadership, cooperation and others [Efimov and Lapteva, 2017].

In this regard, the educational ecosystem is the optimal way to organize the interaction of regional stakeholders of the innovation process in the study and formation of various ways of development of

Russian education based on the principles of sustainable development. The core of the educational ecosystem is universities as an association of communities with a huge resource base and partner experience. This allows universities to become powerful hubs of educational ecosystems and a platform for interaction of subjects of the educational process at the regional level in the context of sustainable development. The uniqueness of the university as the basis of the educational ecosystem and its value orientation can be embedded in the uniqueness and value orientation of the region [Tronina and Tatenko, 2022]. Fulfilling their three missions, modern universities are involved in the regional innovation process, acting as the center of innovative socio-economic development. The main role of the university in the regional strategic process will be associated, on the one hand, with the creation of an innovative environment where the knowledge gained is reflected in new products and technologies that are formed a request from the society, and on the other hand - with participation in the formation of the entrepreneurial potential of the region. Expert roles (analytical, consulting) are allocated for each stage of strategy development. Therefore, a modern university can be viewed from two positions: as a stakeholder - a carrier of scientific, innovative and educational competencies of the region, a participant in the innovation and project process and as a direct expert and organizational coordinator of the strategic process.

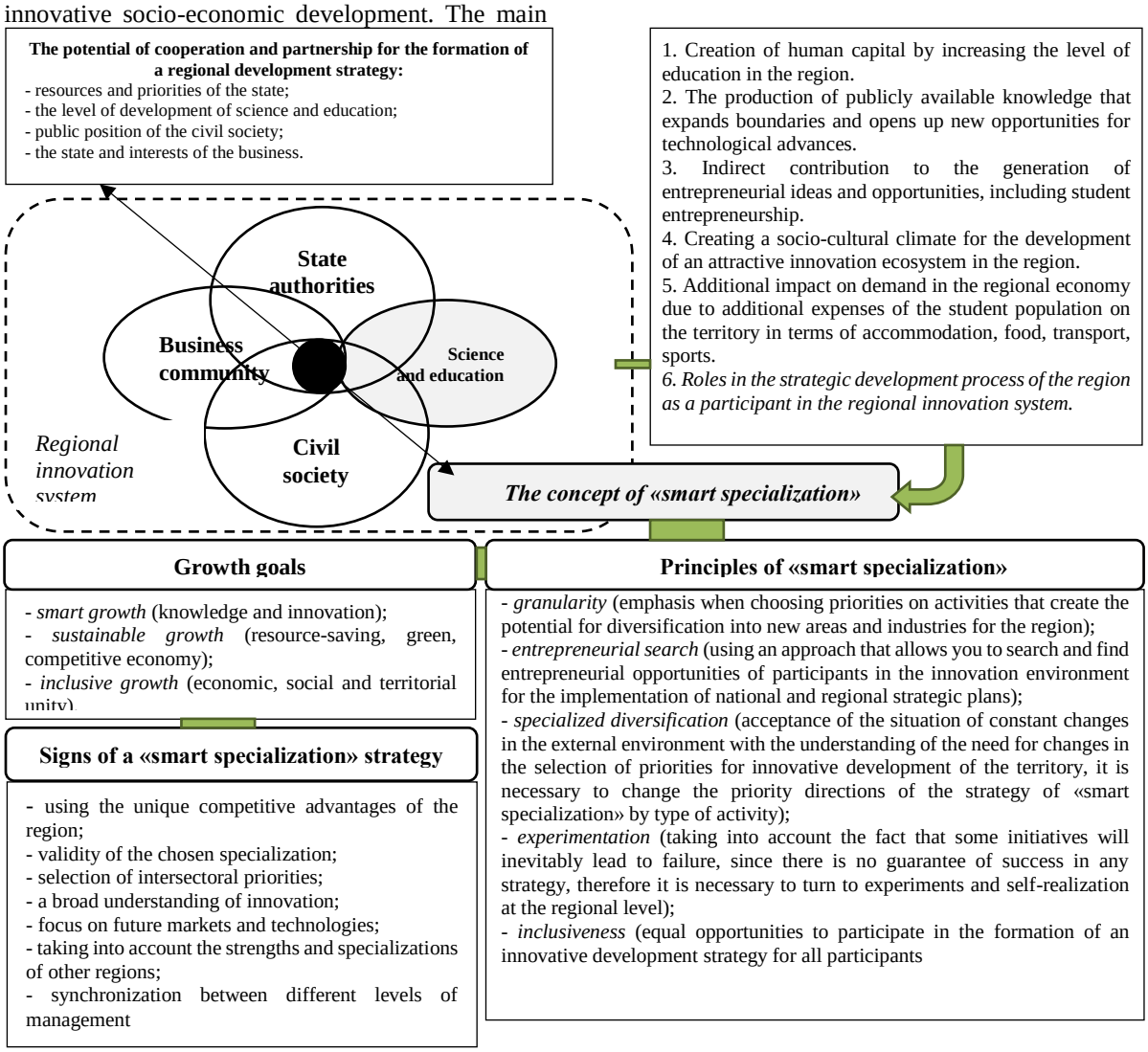

Figure 1: «Science and education» in the model of the «Quadruple Innovation Helix» and the concept of «smart specialization».

4 THE DISCUSSION OF THE RESULTS

It should be recognized that the involvement of educational structures in the regional innovation and project process will contribute to the spread of innovations and the achievement of sustainable growth of the region due to the systemic and synergetic effects of the educational ecosystem. This will require modern tools responsible for the sustainable innovation and project development of educational ecosystems, one of which is the regional educational platforms (REP). Their practical significance lies in the development and improvement of educational structures, methods and technologies of the educational process [Tronina, Tatenko and Petrova, 2022].

The development of innovation and project activities within the framework of the REP allows for integrated interaction of the educational ecosystem with all structures interested in its results of activity in the field of regional eco-space. The REP is a strategic alliance that includes educational structures united by a common innovative idea, regardless of their level, scale, type, departmental affiliation.

The structure and scale of the REP depend on its constituent elements. The external and internal elements of the structural composition of the REP and the stakeholders in its activities are shown in Figure 2.

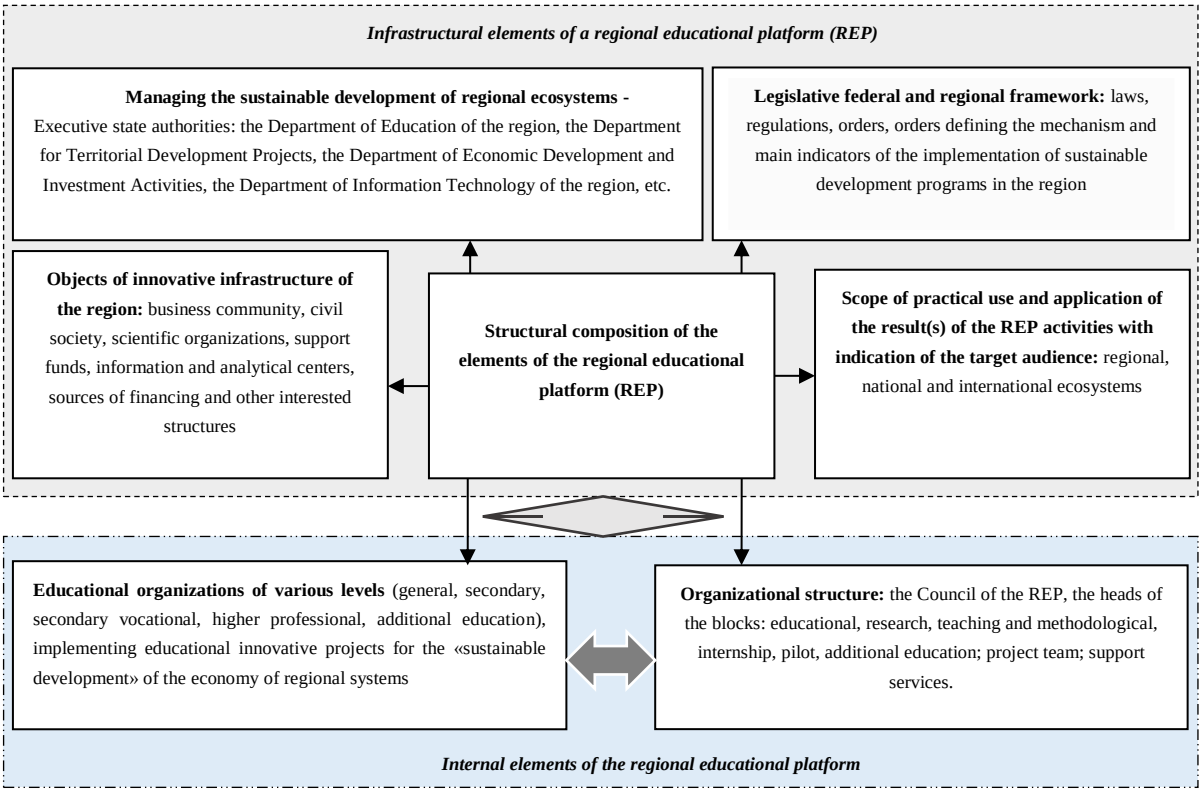

Figure 2: Elements of the structural composition of the Regional educational platform: external and internal.

At the federal level, the main document regulating the activities of institutions – innovation platforms is the order of the Ministry of Education and Science of the Russian Federation № 218 (23.06.2009) «On approval of the Procedure for the creation and development of innovative infrastructure in the field of education». At the regional level, the regulatory and legal basis for the activities of the REP are the orders of the relevant Departments.

The functioning of educational ecosystems is carried out at the expense of financial support from the state in the implementation of priority educational projects and programs of important national economic importance and contributing to the development of the Russian education system.

The directions of innovation and project activities of the REP are shown in Figure 3. The innovation and project approach contributes to the realization of the potential of educational structures, allowing them to participate in pilot design through a competitive

selection of educational projects focused on the implementation of national programs «StartUP of general education», «School - territory of education», «Successful preschooler», «Synchronization general and vocational education taking into account the needs of the regional labor market», «Education of children of special care», «Additional education of children - navigator of the future».

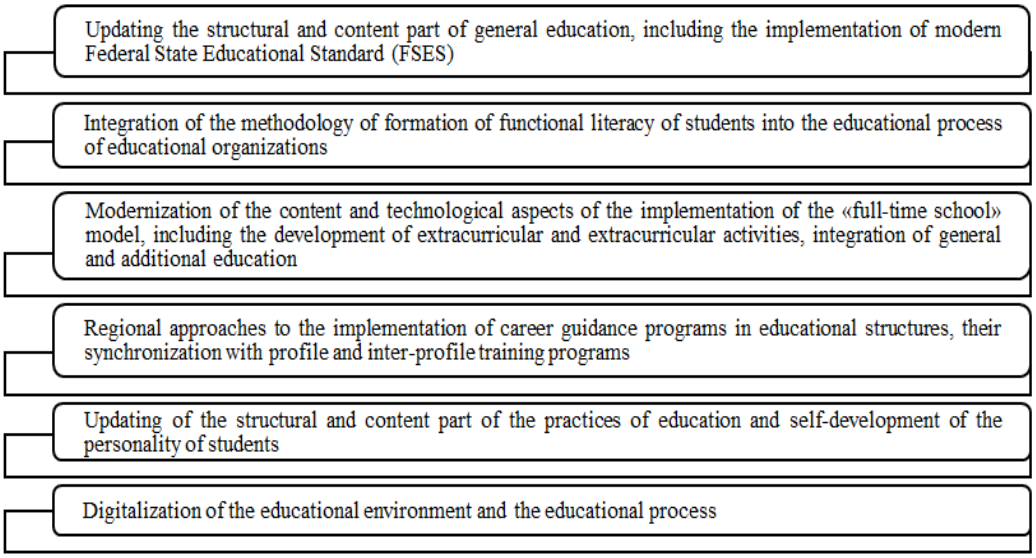

Figure 3: Directions of innovation and project activity REP.

The areas of regional educational ecosystems that require innovative project development are:

-·models of organization of preschool education;

-·inclusive education;

-· economics of an educational institution;

-·work with gifted children;

-·foreign language;

-·health-creating environment of an educational institution;

-·continuing technical education.

Regional educational platforms implement educational projects supported by the expert commission in accordance with the approved plan, subject area of activity, as well as within the specified time frame. The REP provides:

- the required conditions for conducting educational activities within the framework of the project in accordance with the roadmap;
- development of the necessary educational and methodological materials that ensure the educational process;
- development and approval of documents corresponding to the specifics of the educational project;
- building network interaction with other subjects of the educational ecosystem;
- a high degree of satisfaction of students with the quality of educational services provided;
- external effectiveness and sustainability of the results from the implementation of an innovative educational project;
- the ability to translate and scale the obtained project results into mass practice [Tronina, Semenikhina and Petrova, 2022].

The results of the study have theoretical and practical application and allow making infrastructural changes to existing educational ecosystems, taking into account emerging regional needs within the framework of the concept of sustainable development. The structural components of the regional educational ecosystem on the example of the Orel region are shown in Figure4.

According to the given infrastructural model of the regional educational ecosystem of the Orel region, it can be noted that the active elements of the educational ecosystem in the region are: regional educational institutions of all levels, regional educational platforms, executive state authorities, information support organizations, professional associations and public organizations, as well as representatives of the business community and industrial business partners.

Effective interaction of participants in the educational ecosystem of the Orel region will increase the regional socio-economic potential and ensure long-term and balanced development of educational structures.

As systemic effects arising from the interrelationships of the elements of the educational ecosystem with the environment of their localization, it should be noted the growth of the intellectual and innovative potential of educational structures, as well as the increase in the level of research activities by increasing the concentration of educational and scientific organizations and joint resource use for their sustainable development.

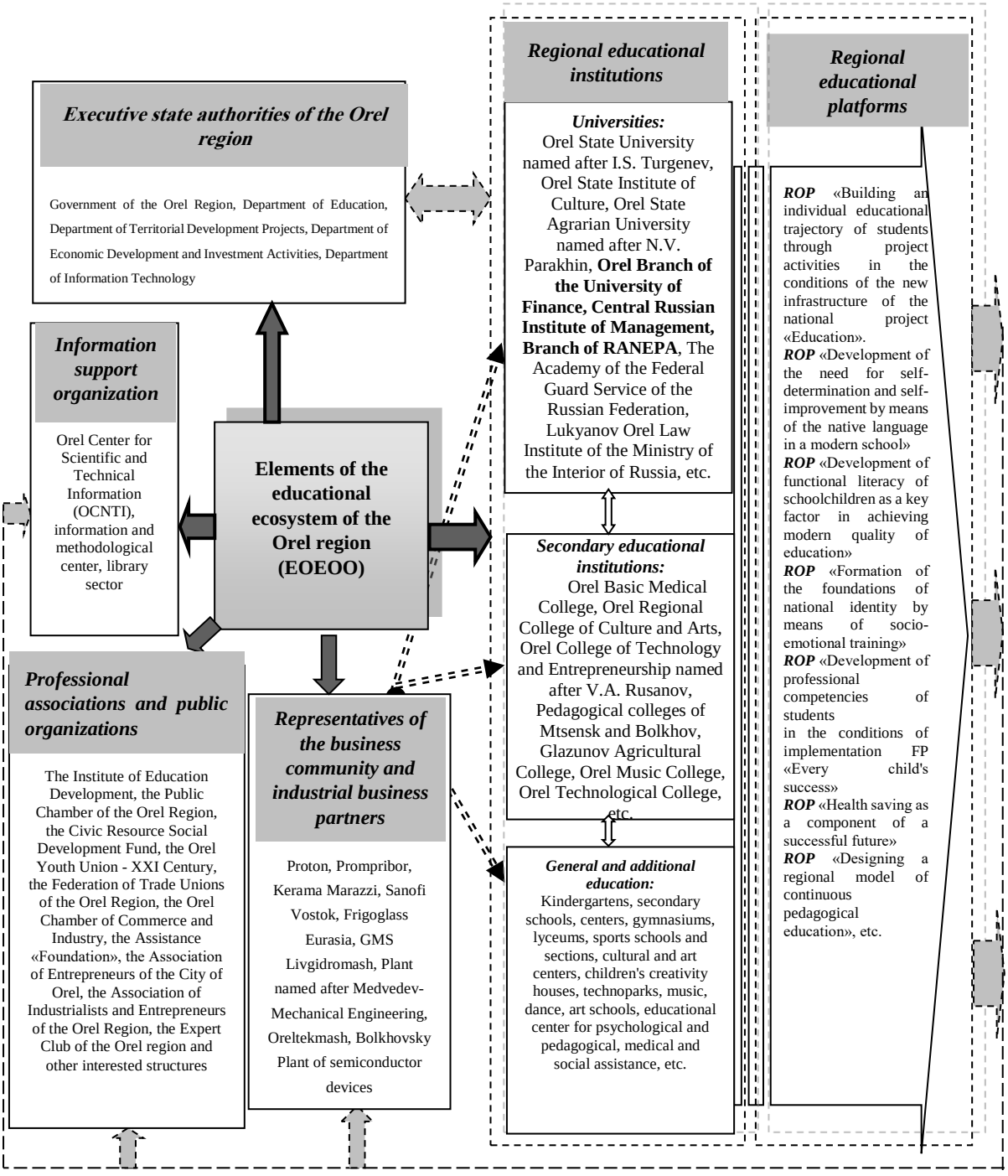

Figure 4: Infrastructural model of the regional educational ecosystem of the Orel region.

5 CONCLUSIONS

To activate the processes of development of the territory as a socio-economic system, it is necessary to mobilize local players - regional stakeholders. Their participation in solving the problems of the region will ensure a positive attitude of the local population - the civil community, which in turn can lead to a reduction in the time parameters of project implementation, the development of synergy between participants in economic activity. The connecting role of the educational ecosystem in this process is undeniable.

The educational ecosystem in the context of sustainable development of the territory should not be an industrial conveyor for training future specialists, but a living ecosystem of knowledge, where each element has its own unique niche that allows achieving the goal of sustainable development. The basis for the interaction of ecosystem participants should be projects that allow them to gain experience, apply interdisciplinary knowledge, and make joint creative decisions based on the use of the potential of new technologies and individual abilities.

An effective learning environment should be based on the constant interaction of participants in the educational ecosystem with the search for new ways to expand professional, social and cultural capital based on the cooperation of science and education with business, government, civil society (according to the «quadruple innovation helix» model). The mechanism of functioning of such an ecosystem should provide for the following aspects: the behavior model of all participants, the process of generating and selecting ideas, the principles of talent realization, optimization of the use of capital in the system.

The results of the study allow us to conclude that many current regional development strategies in fact remain disconnected from the global economic and technological context, representing a model of imitation of successful regions. Nevertheless, we must not forget that each region has its own path of development, taking into account the uniqueness and competitive advantages. We believe that the regional educational platform as the center of the innovation and project space of the educational ecosystem will be able to show the specifics and use the best practices of the region in achieving sustainable development goals.

The abstracts of this study contain a conceptual approach to the study of the development of educational structures from the point of view of the theory of ecosystems, which is of scientific interest. The practical significance is associated with the possibility of using the model solution proposed by the authors for the formation of a regional educational ecosystem with an active role of educational platforms in achieving sustainable development goals. Directions for further research by the authors will be related to the development of a mechanism for the interaction of participants in the educational ecosystem in the innovation and project space of the region.

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