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PROBLEMS OF FORMING COMPETITIVE REGIONAL INNOVATION SYSTEMS

Serikova O.M., Syvochka V.V., Fomenko D.V.

ПРОБЛЕМИ ФОРМУВАННЯ КОНКУРЕНТОСПРОМОЖНИХ РЕГІОНАЛЬНИХ ІННОВАЦІЙНИХ СИСТЕМ

Серікова О.М., Сивочка В.В., Фоменко Д.В.

The creation of conditions for the development of integrated research, education and business complexes will be possible through the interaction of political, regulatory, economic, social and cultural factors. Political conditions are determined at the state level. At the same time, the integration of education, science and innovative business has faced some problems, in particular, related to governance. Therefore, the main task at present is to ensure real integration in these sectors in order to ensure innovative transformations not only in the economy but also in society as a whole, and the ministry should restructure the management of these areas to adequately meet this task. For example, the project to modernize universities envisages that they should become a place where people are trained to perceive innovative ideas, to be formed into specialists in a new way, and to be the driving force behind innovative development. It has also become clear that it is necessary to move from training specialists in mass professions to training specialists capable of ensuring the operation of modernized enterprises and enterprises that use innovative technologies aimed at producing innovative products. The vocational education system has already begun to restructure in this direction, with resource centers emerging that bring together primary, secondary, and higher vocational education institutions to build a chain of training for all levels of personnel focused on advanced manufacturing. At the present stage, the problems of integrated formation and development of science and education are being solved, but the mechanism of systemic influence through the creation of integrated regional research and education complexes - research (leading) universities of a new type - is not used. The experience of implementing integration processes of academic and university science and production shows that the development of a specific model and its organizational and legal formalization require resolving the issues of identifying the lead organization and co-executors, which will determine the type of integration model, scientific, educational, social, environmental and

other problems to be solved. In this case, it is important to choose the organizational and legal form of interaction between the structures formed as part of the new entity, the distribution of responsibilities of all participants in addressing issues of staffing, inventory and equipment, financing for each participant through an interconnected system of legal documents and regulations, reporting, etc.

Keywords: innovation system, region, competitiveness, development, strategy, enterprise

Introduction. Negative economic phenomena have a destabilizing impact on the development of science, education, innovation and business. These include social and economic instability; aging and insufficient renewal of the material and technical base of scientific and educational institutions in accordance with the current needs of scientific and educational activities; reduction in the number of highly qualified researchers and teachers, young scientists due to low salaries. The information space of the economy consists of weakly interconnected information sectors (state, departmental, regional, and commercial). However, in recent years, there has been a positive trend in the innovative activity of enterprises and innovative business: the number of small innovative enterprises and internal research and development expenditures are increasing.

The first condition is the formation of demand for technological innovations, which, also due to insufficient financial capabilities and subjective reasons, remains low and inconsistent with the task of achieving sustainable economic growth.

The second condition that affects the processes of diversification of sources and financing of R&D processes and integration of science, education,

production systems and business is the creation of financial structures with the participation of the state that stimulate the processes of commercialization of science..

Analysis of basic research and publications.

A significant contribution to the research of innovation management problems was made by foreign and domestic scientists Bazhal Y., Valdaitev S., Ilyenkova S., Zavlin P., Kaletski M., Kondratiev N., Koryennoi A., Lapko O., Neikova L., Santo B., Solow R., Twiss B., Chervanov D., Schumpeter Y. Isolation of previously unsolved parts of the general problem. Despite the fact that the range of research on strategic management of regional development is quite extensive, given the current economic situation, the effects of the pandemic and martial law, this issue needs to be given even more attention, as most regions of Ukraine are unstable and economically unprofitable, so it is necessary to consider special levers and directions that will help to strategically manage the region effectively.

Therefore, the **purpose** of this article is to highlight the problems of forming competitive regional innovation systems and to find ways to solve them effectively.

Materials and results of the study. The necessary and socially significant conditions for the development of R&D are the realization of the role of knowledge, intellectual values, science, education and business, and their integration in accelerating socio-economic development of society. Changes in public opinion and financial conditions in the process of integration will help to raise the prestige of scientists and, accordingly, the inflow of young talented specialists into science.

At the same time, global trends and processes of social development confirm the position of scientists that the integration of science, education and business in modern conditions has no limits and is of exceptional importance for ensuring a high scientific and technical level of specialists.

The integration processes of science, education and business are developing in certain territories in certain organizational forms: technology parks, research universities, consulting firms and others that are able to solve research, educational and production problems, as well as meet the needs of employers for highly qualified specialists.

At the same time, the requirements for university education are growing, driven by new labor market conditions, the increasing role of continuing education, and competition between different universities, universities and other

research institutions, and between private and public education.

There are four groups of problems that hinder the development of integration processes in these areas. These are insufficient financial base and support for research and production integration, including from the state; lack of coordination programs and mechanisms, hence the weak motivation of participants in the integration process; and insufficient legal framework for integration development. Some of these problems can be solved by joint efforts of representatives of science, education and business. Here, the key factor is the position of the leadership of the relevant organizations to create an integrated space of interactions that generate innovations.

Investigating the problems of developing new institutional forms and relations in the field of research and development, we can see that there are opportunities and directions for innovation. However, today there are a number of problems that affect the development of the innovation sphere: low innovation activity of a significant part of organizations in the real sector of the economy; lack of economic interaction between individual elements of the innovation infrastructure [9]; low investment attractiveness of scientific organizations as an object of investment and lending, underdevelopment of economic and legal mechanisms for introducing implementation business.

The social conditions for the integration of science, education and business are the society's awareness of the high importance of knowledge and skills, goals and values, science and education in the development of the economy and society, which are the basis for the reproduction of innovation potential.

The development of integrated complexes of science, education and business is based on the creation of socio-cultural, political, regulatory and economic conditions. The economic conditions for the integration of science, education and business involve the pooling of resources to generate economic and commercial benefits. In this regard, it is necessary to provide tax and economic benefits for entities involved in the development, mastering and production of new equipment and technologies, including innovative small business companies established in co-founding universities and other scientific and educational organizations, as well as to ensure the creation of special economic zones, etc.

No less important than the awareness and support of integration processes at the state level is

the initiative of the participants in integration processes. For example, the first American technology park emerged as a result of the active work of Stanford University aimed at the territorial and functional integration of small innovative firms.

At the same time, there is a growing belief in society that the integration of science, education and business is extremely important for the competitiveness of specialists, as the level of scientific achievements and creative potential is determined by the quality of specialists.

Rapid development of knowledge-intensive industries, shorter cycles of industrial equipment renewal and retraining, accelerated introduction of innovative scientific developments into mass production, and the information economy place new demands on science, education, and business. The growth of these requirements means that science, education and business cannot develop and adapt to changes more effectively independently of each other.

Scientific organizations are increasingly facing the problem of financing and commercializing basic research, scientific developments and discoveries. Lack of funding leads to deterioration of the material and technical base, aging of equipment, and outflow of highly qualified personnel. According to statistics, 75% of university graduates do not find a job in their specialty. According to analysts, one of the reasons for this state of affairs is the constant emergence of new specialties to which the market does not have time to respond. Another reason is the shortage of teaching and management staff with the necessary qualifications [4].

The solution to these problems will obviously be facilitated by a mutually beneficial spatial organization of interaction between science, education and production systems of adjacent territories with a special geographical position. In particular, regions remote from major scientific centers, large universities with the necessary scientific base, which allows for extensive basic and applied research, respectively, and the training of highly qualified specialists and young scientists.

Out of the three areas of integration partners - science, education and business - we consider education to be the key link in the impact of this interaction on the process of innovation development at the state level. Integration processes are implemented primarily on the basis of universities. This interaction is built with the help of innovation and implementation firms.

International practice has accumulated considerable experience in the integration of

science, education, and production systems. Science cities, called technopolises, have been developed and include technology parks. The purpose of such entities is to provide new high-tech enterprises with the opportunity to collectively use infrastructure on the most favorable terms, and to develop knowledge-intensive businesses.

A technopolis (technopolise: from the Greek *techne* - skill and *polis* - city) is a form of territorial integration of science, education and highly developed production, a single research, production, educational, residential and cultural and amenity zone united around a research center that ensures a continuous innovation cycle based on scientific research. The first technopolis emerged in the United States after World War II: a number of companies on the West Coast of the United States, in California, received orders from the government to create new types of products, including electronic devices [2].

Due to the specifics of the new orders, a significant portion of the funds was transferred to the University of California and other universities upon agreement on the topics and areas of research. The scope of work was much larger than the universities' capacities, and as a result, they were forced to create new laboratories and institutes in suburban areas. These processes were most active in Silicon Valley, near San Francisco. Here, thanks to the assistance of the governor of San Francisco, the world's first science town grew up, which became a symbol of the scientific transformations of the 21st century with a new style and quality of life for scientists.

The United States also created technopolises in Florida, North Carolina, Texas, and other states in the Midwest and Northeast. In recent years, more than 140 science and technology parks have been actively operating in the United States [3].

The development of science and education in the United States, their integration with production and various types of businesses is facilitated by the fact that, according to US law, part of the profits of companies and business structures invested in the development of universities and institutes is considered a charitable contribution and is not taxed.

The close relationship with universities and government research centers is a key feature of American technopolises and technology parks. There are differences in this form of interaction. For example, about 20% of technology parks are structural units of universities, about 10% are independent legal entities, 28% operate on the basis of contracts with developers of innovative projects,

38% are joint ventures, and about 4% are technology parks with a share of government participation.

Since the 1970s, technology parks have been actively created in Western Europe and other countries. The European innovation infrastructure includes more than 1500 different innovation centers and 260 science and technology parks [5].

In Japan, the state program "Technopolis" is being implemented, according to which a network of 19 technopolises is being created in Japan. The Japanese attach national importance to technopolises and develop a network of technopolises on the basis of state planning. The sources of funding for technopolises in Japan are: 30% - the state, 30% - municipalities, 30% - business and individuals, 10% - foreign investors [3].

Such an organizational form as parity funding of research and creation of science and technology parks has proven to be effective in foreign countries. However, the creation of technology parks is not universally approved in the West. Some economists, for example, E. Staud, a professor at the University of Ruhr in Germany and head of the Institute for Applied Aspects of Innovation, reject the very idea of parks as contrary to the laws of the market economy. In our opinion, the development and intensity of the innovation process in the economy is largely determined by the integrative interaction of science, education and production, the forms of which are improved in the course of their development, go beyond the boundaries of individual administrative units, and become both interregional and intercountry.

In the context of the formation of the innovation economy, new terms have emerged in the assessment of the state and prospects of their development: "high-tech civilization", "information society", "knowledge society", "innovation economy", "knowledge economy". Among them, despite some vagueness of these concepts, the terms "innovation economy" and "knowledge economy" as synonyms are becoming more and more prominent and stable. They carry the main sign of a new stage of economic development - new knowledge, not just natural resources, is becoming the main inexhaustible factor of production. The economy has begun to include the entire mechanism of knowledge production, in addition to the technologies themselves. The modern economy is not only the economy of material production, but also basic and applied scientific research, the communication system and the patent system, the education system, especially higher education,

which ensures the readiness to work with these technologies - all this huge complex.

Science and education as resources of strategic knowledge, unlike, for example, irreplaceable resources (oil, gas), do not decrease after their use, because the intellectual potential increases in the process of production. For this reason, the knowledge-based economy is gradually replacing the industrial economy based on the use of exhaustible natural resources.

Industrialized countries are completing the transition from machine technology and a three-tier technological structure to a four-tier one. Information-controlled electronic machines are becoming the fourth link. Then - to the fifth technological mode. Its distinctive feature is the automation of technological processes and the widespread use of automation tools. At the same time, humans cease to be an element of the technological system, but rather control it, forming the technological basis of the knowledge-based information post-industrial society.

In fact, a new basis for social production is being formed - an organizational and technological one based on functionally integrated cycles of product creation and sales, including research, design and development, marketing, pilot and mass production, and sales. It plays a decisive role in the sphere in which information wealth in the form of new knowledge is accumulated through the development of science and education, which is then transformed into new technologies.

New knowledge is becoming a sustainable source of competitive advantage. In this regard, the concept of "knowledge" has an expansive interpretation. It includes the ability to capitalize intangible assets, create brands, produce new technologies, know-how, and accumulate practical and theoretical experience in corporate governance. It also includes the ability to create social resources, invent complex financial structures and schemes, initiate business research, influence ratings, indices, quotes, intuitively make the right decisions in the field of investment, assess the value of companies in a situation of information deficit, avoid possible risks, and so on.

The sphere of innovative activity in one way or another forms the knowledge capital that forms the basis of the innovative economy, which ensures the competitiveness of business entities. The local nature of competition is being transformed to a global level. These changes are accompanied by market liberalization, which intensifies the highly competitive global economic environment. The

survival strategy of market players is changing from ensuring stability to managing change.

At the same time, enterprises, being the engine of innovation, economic growth, employment and social stability, are also undergoing a certain transformation. Both internal structures and corporate relationships, as well as company management methods, are changing, and more flexible production is being organized. Vertical management structures are gradually giving way to horizontal associations. New types of production organization are emerging, which, in turn, leads to closer ties between economically independent units that are actually interconnected and interdependent. Enterprise boundaries are becoming more blurred.

Various forms of associations between enterprises are developing, covering the organization of scientific research, pilot production, joint marketing and sales. Innovative entrepreneurial firms, as opposed to large industrial companies in an industrial economy, are becoming the main driving force, placing high demands on the professional competence of technical specialists.

Mass production is giving way to production focused on meeting the changing requirements of individual consumers, in which the product turnover cycle (product life cycle) is becoming shorter and shorter. The need to accelerate the renewal of products (goods) requires appropriate innovative changes and development.

Conclusions and proposals. Thus, the conditions and principles of integration interaction of science, education and production systems in the modern economy consist of the following positions. First of all, there is a need for an adequate innovation policy aimed at the formation of regulatory mechanisms, regulation of innovation activities, development and adoption of laws of national and regional importance, regulatory documents that determine the state policy in relation to the development of sectoral innovation processes. It is necessary to develop areas and measures of state support in order to create favorable conditions for investing in innovation, and it is necessary to assign responsibility to state organizations.

For the purpose of a successful innovation policy and increasing the innovation activity of business entities, certain social and psychological conditions must be met, including the awareness and understanding by society (the government, producers, etc.) of the importance of innovation processes for the economic development of industries. In this regard, the formation of active public interest in innovation should be carried out through well-organized information promotion of

innovative achievements of national and world science.

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Серікова О.М., Сивочка В.В., Фоменко Д.В.
Проблеми формування конкурентоспроможних регіональних інноваційних систем.

Створення умов розвитку інтегрованих науково-освітніх та бізнес-комплексів стане можливим при взаємодії політичних, нормативно-правових, економічних та соціально-культурних факторів. Політичні умови визначаються на державному рівні. При цьому інтеграція освіти, науки та інноваційного бізнесу зіткнулася з деякими проблемами, пов'язаними, зокрема, з управлінням. Тому головне завдання в даний час – забезпечити реальну інтеграцію в цих секторах, щоб забезпечити інноваційні перетворення не тільки в економіці, а й у суспільстві в цілому, і міністерство повинно перебудувати управління цими сферами так, щоб

адекватно відповідати цьому завданню. Наприклад, проект із модернізації вузів передбачає те, що вони повинні стати місцем формування людей, здатних сприймати інноваційні ідеї, по-новому формуватися в спеціалістів і бути, в результаті, рушійною силою інноваційного розвитку. Також стало зрозуміло, що необхідно переходити від підготовки спеціалістів у сфері масових професій до підготовки фахівців, здатних забезпечити роботу модернізованих підприємств та підприємств, які використовують інноваційні технології, націлені на випуск інноваційної продукції. Система професійної освіти вже розпочала перебудову в цьому напрямку – з'являються ресурсні центри, які об'єднують установи початкової, середньої та вищої професійної освіти, щоб побудувати ланцюжок підготовки кадрів усіх рівнів, орієнтованих на передові виробництва. На сучасному етапі вирішуються проблеми комплексного формування та розвитку науки і освіти, натомість не використовується механізм системного впливу через створення інтегрованих регіональних науково-освітніх комплексів – дослідницьких (провідних) університетів нового типу. Досвід реалізації інтеграційних процесів академічної та вузівської науки і виробництва показує, що розробка конкретної моделі та її організаційно-правове оформлення вимагають вирішення питань визначення головної організації та співвиконавців, від складу яких залежатиме тип моделі інтеграції, розв'язувані наукові, освітні, соціальні, екологічні та інші проблеми. При цьому важливе значення мають вибір організаційно-правової форми взаємодії структур, що формуються у складі нової освіти, розподіл відповідальності всіх учасників при вирішенні питань штатного розкладу, оснащення інвентарем та обладнанням, фінансування по кожному учаснику за допомогою взаємопов'язаної системи юридичних документів та нормативних документів, звітності тощо.

Ключові слова: інноваційна система, регіон, конкурентоспроможність, розвиток, стратегія, підприємство

Серікова Ольга Миколаївна – кандидат економічних наук, доцент, доцент кафедри обліку і оподаткування СНУ ім. В. Даля.

Сивочка Василь Васильович – аспірант СНУ ім. В. Даля.

Фоменко Денис Володимирович – докторант СНУ ім. В. Даля.

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