UDK 338.242.2

CHUKHRAIEVA N.
SHEE "Vadym Hetman Kyiv National Economic University"

INFRASTRUCTURE PROVISION OF INNOVATION COMMERCIALIZATION: FOREIGN EXPERIENCE

The purpose of the article is to clarify the features of infrastructure support as one of the main mechanisms for the formation of an innovation environment for the successful implementation of innovation results by the example of economically developed countries. The relevance of the research topic is due to the enormous importance for innovative enterprises of solving the problem of the commercialization of innovative products. This is due to the fact that enterprises in a tough competitive environment are not enough only to develop innovations, but for their own effective development and continued competitiveness they need to be sold also on the market. Successful implementation of this task requires the creation of a modern mechanism for bringing innovations to the market. To optimize the commercialization process in each of the advanced countries, its own innovative environment was formed. One of the important mechanisms for the formation of an innovation environment in economically developed countries is the infrastructure support, which implies the creation of special organizational structures and is classified according to the range of services provided by the organizations that make up it. For successful innovation commercialization and their introduction to the market, a sufficiently developed infrastructure complex is required with the direct involvement of the state. Generalized foreign experience provides examples of detailed and balanced state regulation of innovation activity through both direct participation in innovation activities and indirect support and development of innovation infrastructure.

Key words: commercialization, innovative infrastructure, innovations, types of innovative infrastructure.

ЧУХРАЄВА Н. М.
ДВНЗ «Київський національний економічний університет ім. В. Гетьмана»

ІНФРАСТРУКТУРНЕ ЗАБЕСПЕЧЕННЯ КОМЕРЦІАЛІЗАЦІЇ ІННОВАЦІЙ: ЗАРУБІЖНИЙ ДОСВІД

Вирішення проблеми комерціалізації інновацій є базовою умовою успішної інноваційної діяльності та міжнародної конкуренції національної продукції. У статті виділено інфраструктурне забезпечення економічно розвинених країн як один із основних механізмів формування інноваційного середовища, що припускає створення спеціальних організаційних структур. Автором виявлені основні види інноваційної інфраструктури, які класифікуються згідно зі спектром наданих послуг організацій, що входять до її складу. Розглянуто узагальнені приклади зарубіжного досвіду регулювання державою інноваційної діяльності.

Ключові слова: комерціалізація, інноваційна інфраструктура, інновації, види інноваційної інфраструктури.

Introduction and statement of the problem. Innovative activity plays a key role in the effective development of national economies in all economically developed countries of the world. Realizing the importance of innovative processes, the governments of developed countries apply a variety of measures to support this activity. At the same time, sustentation is carried out not only at the expense of state regulation in the form of adoption of appropriate normative acts, creation of innovative infrastructure and state stimulation of innovation activity, but also due to investment activity. In the United States, about $ 500 billion annually are invested in innovative activities, in China more than $ 300 billion per year, Japan – about $ 150 billion per year, in Ukraine – about $ 34 billion [8–10]. Moreover, in the modern world it is precisely the innovations that are paid special attention during the periods of overcoming the crisis situations that arise in the economy.

As world experience shows, one of the main sources of new technologies and innovations, without which no innovative economy can do without, are enterprises that carry out innovative activities. Innovative enterprises not only ensure the development of the scientific and technical sphere of countries, along with research institutes, but also have a great importance for social and economic development. Enterprises of innovation sphere form a healthy competitive environment, promote employment of the population, at the expense of taxes supplement the state budget, create and support innovative activity in the countries, and most importantly, ensure their economic growth [1].

Nevertheless, the effective development of the innovation economy is impossible without the orientation of innovation to consumers, without meeting their requests and preferences, that is, without bringing to the market innovations that can be fully realized through the commercialization of innovative products. In all developed countries the problem of innovation commercialization is one of the central to effective innovative development. His decision is not only the main condition for the successful implementation of innovative results, but also directly affects the international competition of national products.

The relevance of the research topic is due to the enormous importance for innovative enterprises of solving the problem of the commercialization of innovative products. This is due to the fact that it is not enough for enterprises in the conditions of tough competition to develop innovations only, but for their own effective development and preservation of competitiveness it is necessary to sell them also on the market. Successful implementation of this task requires the creation of a modern mechanism for bringing innovations to the market.

Recent research and publications analysis. Research on innovation and the introduction of innovative products to the market are devoted the works of such foreign scientists as: Bruce E., Littbert C., Monchev N.,

Mansfield E., Nixon F., Perlaki I., Rogers E., Santo B., Tucker R., Twist B., Foster R., Freeman K., Hartman V.D., Hemel G., Shelton R., Schumpeter J. and others.

The main mechanisms for the commercialization of innovation were considered by such scientists as Kvashnin A., Mizhinsky M., Pilnov G., Sigutin M., Sushkov P., Tarasov O., Khomkin K., Yanovski A. and others.

Considerable attention is paid to the solution of the problem of innovation commercialization taking into account the world experience in the works of leading Ukrainian scientists, in particular: V. Heyets, V. Solovyov, M. Ilchenko, L. Fedulov, O. Mazur [2–4], S. Ilyashenko [5] and others.

However, despite the fact that the problem of realizing innovations in the market is not fundamentally new, and to date, it has been devoted to a significant number of scientific papers, the formation of an effective mechanism for the commercialization of innovative products is still insufficiently investigated.

Aim of the article. To clarify the features of infrastructure support as one of the main mechanisms for the formation of an innovation environment for the successful implementation of innovation results by the example of economically developed countries.

Main results of the study. The solution of questions of innovation commercialization is one of the priority directions for innovative development in the entire world community. Thanks to the commercialization of innovations, many developed countries occupy a leading position in the international market of high technology products, since commercialization is the main condition for successful implementation of innovation activity.

To optimize the process of bringing innovation to the market in each of the advanced countries was formed its own environment of commercialization (or innovation environment as such). All developed countries differ from each other of a variety of different institutional conditions, including political, economic, social and other factors, but the mechanisms of formation of innovation environment used by these countries have been developed on the basis of global experience, and therefore have minimal differences. The main mechanisms used in the world for the establishment and development of the environ of the innovation commercialization are: regulatory and legal support, infrastructure support and methods of supporting and stimulating the innovation environment.

One of the important mechanisms for the formation of an innovation environment in economically developed countries is infrastructure support. It implies the creation of special organizational structures – centers, agencies and funds, intended for:

- providing financial, marketing, legal, personnel, information and other assistance to developers;
- creation of favourable conditions for innovation activity and, consequently, innovation commercialization;
- coordination of innovation activities, etc.

Innovative infrastructure is classified according to the range of services provided by its organizations (structures) - financial, material, information, personnel and expert-consulting (Figure 1).

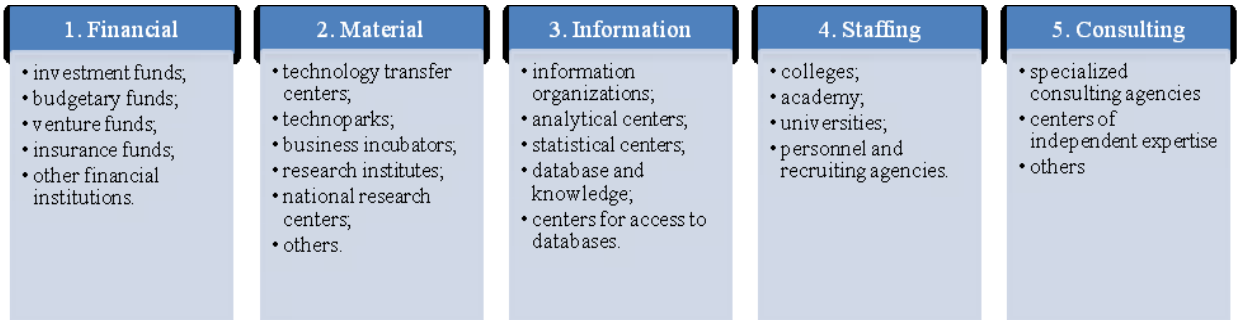

Fig. 1. The main types of innovation infrastructure [6]

Budget, investment and venture funds are financial organizations that specialize in providing financial resources to small and medium-sized enterprises (in the case of venture funds, high-risk innovation is a priority).

A challenge for early-stage technology-based companies is raising investment to support their growth, although not all companies will need investment; some will be able to “bootstrap” – that is manage to generate early sales of products so that paying customers can provide the development funds needed.

Firms which need investment in order to grow, venture capital is frequently regarded as the only investment to seek, but there may be more appropriate alternatives. Furthermore, a typical technology company developing in a middle-income country is not attractive to venture capital funds. Also, there may be insufficient deal flow to provide the venture fund with a sufficiently large number of business plans from which to select the potentially most profitable investments. Several country governments are creating ‘national investment funds’ which invest public funds to attract private sector investors into the early-stage investing space. While government programs may be effective, there are often constraints which discourage private co-investment (World Economic Forum, 2017) [11].

There are alternatives to venture capital which should be considered. Technology based companies in these countries may be better off initially seeking seed level investment. Seed capital investors, including "angel

investors," work with much smaller deal flows and typically fund a much higher percentage of potential deals they evaluate.

Technoparks are specialized areas characterized by favourable conditions for the development of innovative entrepreneurship, including small and medium-sized enterprises, research institutes, higher educational institutions, various centers and agencies, as well as other objects of innovation infrastructure.

Business incubators are structural organizations formed to assist in the creation and development of small innovative enterprises based on technical, financial, information and consulting support.

Personnel and recruiting agencies are organizations specializing in the provision of services for hiring, searching, selecting and attracting the required specialists from competitive organizations.

National research centers – organizations (more often state) that carry out research, development activities, as well as commercial implementation in the most priority areas of science, technology and technology of the country.

Technology transfer centers are organizations that provide various services for the commercial sale of innovative products.

Colleges, Academies and Universities are higher educational institutions that train (retrain) highly qualified specialists in various fields of activity, both having and not directly related to the innovation sphere. With the importance of commercializing research that emanates from universities, and the fact that the selection of a commercialization strategy is the heart of developing innovations, commercialization determines the path through which organizations gains revenue and profit for the products and innovation [7].

Consulting agencies are organizations created to provide professional consulting services in various areas of innovative entrepreneurship, including assistance in working with the entire list of supporting documentation.

Creating a clear legal framework is critical for fostering technology commercialisation, especially IPR-based. Such processes require the capacity of national intellectual property institutions to clarify IPRs, such as ownership of IP from publicly funded research, and facilitate their effective oversight and IP-based commercialisation.

Centers of independent expertise – specialized organizations that provide services for expert assessment and audit of enterprises and innovative products as such.

Analytical, statistical, information centers are organizations specializing in the collection and processing of a variety of data on innovative enterprises operating on the market, scientific and other organizations providing related services, innovative products and new technologies, registered intellectual property objects, etc.

For example, in Japan, a state-owned Small and Medium Enterprise Agency (SMEA) has been established that regulates the activities of the entire innovation infrastructure of the country and carries out in the sector of small and medium-sized enterprises the coordination of the state strategy in the field of innovation. For example, in Japan, a state-owned Small and Medium Enterprise Agency (SMEA) has been established that regulates the activities of the entire innovation infrastructure of the country and carries out in the sector of small and medium-sized enterprises the coordination of the state strategy in the field of innovation. Also, the Organization for SME Support and Innovative Development of the Regions of Japan – SMRJ, comprising nine institutes for improving technology and enterprise management, four technology parks and a number of business incubators in which specialists and supervisors small enterprises receive theoretical and practical training on all issues of entrepreneurial activity. In the USA, the National Science Foundation (NSF) is an independent agency responsible for promoting science in the country through research programs and educational projects.

In France created the "National Agency for Promotion Innovative attractiveness of scientific research» (Agence Nationale de Valorisation de la Recherche – ANVAR) for rendering assistance and financial support of innovative activity in the industry of France, mainly in the small and medium business sector. In Norway, the "Association in Innovation Societies", created to ensure the planned development of the innovation environment and the investment climate, to improve the conditions for the operation of innovative enterprises, to promote the search for highly qualified personnel for enterprises and much more. The European Social Fund (ESF) specializes in providing financial resources for the adopted programs to develop the capacity of scientific collaborators and researchers.

In Switzerland, the National Centers for Competence in Research (NCCR) was opened. In Sweden, support for small technology firms is provided through the Government Agency for Innovative Systems in Sweden (VINNOVA – Swedish Governmental Agency for Innovation Systems) and the Swedish Industrial Development Fund (IDF), which provides lending and direct investment in small businesses. In Finland, through the Finnish Agency for Technology and Innovation (TEKES) and the Finnish Innovation Fund (SITRA).

The special direction of this mechanism is the use of experience and knowledge of highly qualified specialists (managers, engineers, financiers, etc.) who retired to provide consulting and mentoring services. For example, the US created the "Corpus of Consultants from among former executives" (SCORE), which provides mentoring and consulting services on technical, organizational and financial issues to new and existing enterprises at any stage of their life cycle. Similar structures for the provision of consulting services with the possibility of travelling to a particular enterprise operate in the countries of Europe (European Senior Service Network – ESSN). In Japan, this direction is represented by the Japan Industrial Design Promotion Organization (JIDPO), operating in

Tokyo. The organization JIDPO is focused on granting to the new enterprises the effective help in drawing up of the necessary technical documentation with assistance of experts of design and design associations.

Conclusions. Thus, for successful innovation commercialization and their introduction to the market, a sufficiently developed infrastructure complex is required. At the same time, state participation is an essential condition for the establishment of a successful innovation environment in developed countries. Generalized foreign experience provides examples of detailed and balanced state regulation of innovation activity through both direct participation in innovation activities and indirect support and development of innovation infrastructure. Nevertheless, the success of the process of commercialization is determined not only by the innovative environment, but also by the enterprises themselves.

References

1. Chang Yu, Yang P., Chen, M. (2009). Determinants of Academic Research and Business: On the Way to Organizational Issues. Research Policy, 38 (6), 936–946.

2. Innovative economic development: model, management system, state policy / ed. Dr. ekon. professor L.I. Fedulova. – K. : Basis, 2005. – 552 pp.

3. Strategic Challenges of the 21st Century for Society and the Economy of Ukraine: in U. / Ed. acad. NAS of Ukraine V.M. Gaytsa, acad. National Academy of Sciences of Ukraine Semynozhenko, member – Cor. National Academy of Sciences of Ukraine B.Ye. Kvasnyuk. T.I.: Economics of knowledge – modernization project of Ukraine. – K.: Phoenix, 2007. – 554 p.

4. III International Forum, "Modern Innovation Policy: Status, Problems and Development Prospects. (Ministry of Education and Science of Ukraine, German Technological Cooperation Society, Dnipropetrovsk Oblast State AdMinistry), Dnipropetrovsk, 2009. – 180 p.

5. Marking. Management. Innovations: monograph / ed. S.M Illyashenka – Sumy: LLC "TD" Papyrus ", 2010. – 624 p.

6. Yegina N.A. Actual problems of formation of innovative infrastructure and state support of innovative business in the region [Electronic resource] // Scientific and practical magazine "Studium / Studium". – 2010. – № 2 (15). – Access mode : https://www.sarki.ru/studium/publ10/egina.pdf (date of the application: 15.04.2018).

7. Servo, J.C. (1998). Commercialization and business planning guide for the post award period: design especially for the technology entrepreneur. Dawn Breaker Press.

8. European Innovation Scoreboard 2017 [Electronic resource]. – Access mode : https://www.rvo.nl/sites/default/files/2017/06/European_Innovation_Scoreboard_2017.pdf

9. Official site of the American non-profit research organization "Memorial Institute Battelle" (Battelle Memorial Institute) [Electronic resource]. – Access mode : https://www.battelle.org/

10. Official site of the State Statistics Committee of Ukraine [Electronic resource]. – Access mode : http://www.ukrstat.gov.ua

11. World Economic Forum. 2017. National Infrastructure Acceleration (NIA) [Electronic resource]. – Access mode : https://www.weforum.org/projects/regional-acceleration-of-infrastructure-projects

Рецензія/Peer review : 12.05.2018
Надрукована/Printed : 03.06.2018
Рецензент: д. е. н., проф. Рєпіна І. М.