

OPEN INNOVATIONS IMPLEMENTATION PLATFORMS ON EXAMPLE OF FINLAND**Koloberdyanko I.I., Mozhayska K.O.***Zaporizhzhia National University
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In this article, based on «open innovations» and «knowledge triangle» statement analysis, open innovations implementation platforms in Tampere region, Finland, have been investigated. In order to show differences between traditional innovative process and open innovations concept, those processes have been compared graphically. The «Knowledge triangle» concept has been clarified within a framework of the open innovations model. Herewith, communication channels role in a knowledge triangle has been defined. The innovative progress of Finland in 2010-2018 years has been analysed and, as a result, country positions in a Global innovations index have been shown. The scope and role of private and public investment in research and development have been considered, and, based on this, the role of state policy in shaping the innovation ecosystem has been determined. Given that the knowledge triangle is a local tool for the interaction of science, education and innovations, the programs of innovation development of the regions of Finland from 1994 to 2020 have been considered. Herewith, the impact of the National Agency for Technology and Innovation «Business Finland» on improving the interaction between universities and the private sector has been determined. Forms of the implementation of the knowledge triangle have been studied within the framework of open innovation in Finland, namely: the platform of interaction between New Factory International Ltd., Finnish University Property Ltd., Finnish Broadcasting Company and the University of Tampere. In this regard, the forms of interaction, interaction subjects and communication channels, as well as directions of innovation activity and practical results of the collaboration of these companies and universities in Tampere have been defined. The result of the analysis has been summarized in the table with the comparison of three triangle-platforms of open innovation.

ПЛАТФОРМИ РЕАЛІЗАЦІЇ ВІДКРИТИХ ІННОВАЦІЙ НА ПРИКЛАДІ ФІНЛЯНДІЇ**Колобердянко І.І., Можайська К. О.***Запорізький національний університет
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відкриті інновації, трикутник знань, третя місія, економіка знань, інноваційні платформи.

У статті на основі аналізу понять «відкриті інновації» та «трикутні знання» досліджено платформи реалізації відкритих інновацій у регіоні Тампере, Фінляндія. Для обґрунтування відмінностей між традиційним інноваційним процесом та концепцією відкритих інновацій графічно порівняно закритий та відкритий інноваційні процеси. Уточнено поняття «трикутник знань» у межах моделі відкритих інновацій. Визначено роль каналів комунікації в трикутнику знань. Проаналізовано інноваційний розвиток Фінляндії за 2010-2018 рр., і, як наслідок, показано позиції країни в Глобальному індексі інновацій. Розглянуто обсяги та роль приватних та державних інвестицій у дослідження і розробки, та, виходячи з цього, визначено роль державної політики у формуванні інноваційної екосистеми. Враховуючи те, що трикутник знань є локальним інструментом взаємодії науки, освіти та інновацій, розглянуто програми інноваційного розвитку регіонів Фінляндії з 1994 по 2020 рік. Визначено вплив Національного агентства по технологіях та інноваціях «Business Finland» на поліпшення взаємодії університетів та приватного сектора. Форми реалізації трикутника знань досліджено в межах відкритих інновацій у Фінляндії, а саме: платформи взаємодії компаній New Factory International Ltd., Finnish University Property Ltd., Finnish Broadcasting Company з університетами регіону Тампере. У зв'язку з цим визначено форми взаємодії, суб'єктів взаємодії та канали комунікації, а також напрями інноваційної діяльності та практичні результати колаборації цих компаній та університетів Тампере. Підсумок проведеного аналізу узагальнює таблиця із порівнянням трьох трикутників-платформ відкритих інновацій.

Statement of the problem

Open innovation is a relatively new concept, which allows us to explore the synergistic effect of the cooperation of economic elements in the creation of an innovative product. The given concept is the theoretical basis for the functioning of the model of “knowledge triangle” and other innovative platforms. The question is how the “knowledge triangle” model, within the framework of the concept of open innovation, can be used to create an effective innovation environment in the country's economy.

Analysis of recent studies and publications

The concept of open innovation was introduced for the first time by Henry Chesbrough in the book “Open Innovations. A New Way to Create and Use Technologies” (2003) [1]. This concept was further developed in the work of M. Goossens and E. Sjoer [3], in which they explain the constructing principles of a “triangle of knowledge” model. For their analysis, researchers have used the schematic model of the “knowledge triangle.”

In their works, M. Unger and V. Polt analyse the problem of the realization of the knowledge triangle [4]. Scientists M. Raunio, N. Nordling and M. Kautonen in their works analyse the experience of open innovations platforms in Finland, in the development and implementation of

which they directly participated [7]. M. Cervantes explores the role of universities in the “triangle of knowledge” [8].

Despite the significant work of foreign scientists in the field of implementation of open innovation, the domestic literature has not yet been able to address this problem, which would be based on a synthesis of foreign experience, in particular Finland.

Objectives of the article

The objective of the article is to analyse the models of the implementation of open innovation on the example of the “knowledge triangle” in Finland, which contributes to the achievement of synergy effect in solving socio-economic problems.

The main material of the research

Open innovation is a new business paradigm, introduced in the scientific rush by Henry Chesbrough, which foresees, in contrast to the prevailing approaches, a more flexible policy on the RiD and intellectual property.

According to G. Chesbrough, the logic of the model of open innovation is based on the use of excess knowledge of the company, in order to create an added value and gain potential effectiveness not only for this company, but also the whole chain of innovation (Figure 1).

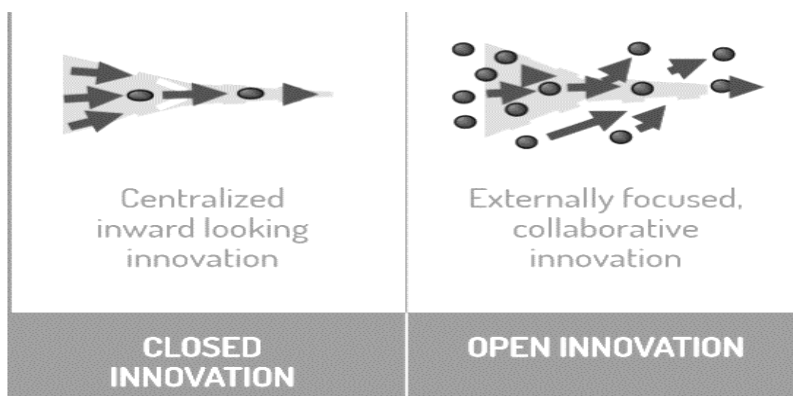


Fig. 1. Schematically depicts a comparison of the innovation process in models of linear (closed) and open innovation (compiled by the authors based on [2])

This article focuses on the knowledge triangle model based on the concept of open innovation. The Triangle of Knowledge is a systematic approach to the coordination and combination of innovation processes, in contrast to the linear (traditional) processes of knowledge transfer

and the commercialization of scientific research. Thus, the triangle of knowledge connects three areas: academic research and knowledge generation, education and training, and business innovation (Figure 2).

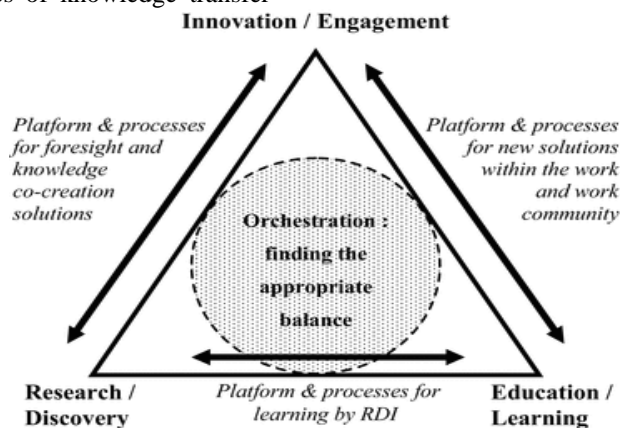


Fig. 2. Knowledge triangle [3]

Let's take a look on the main channels of knowledge distribution in the model, namely: science - innovation, science - education, education - innovation (Table 1). We believe that due to the systematic and continuous

interaction of these channels, the most effective work of innovative public sector institutions and private innovation and investment projects is provided.

Table 1 - Interaction of communication channels (knowledge distribution) in the «triangle of knowledge»

Distribution channel in model	Interaction description
Science - education	Interaction is manifested, in particular, in the geographical and interdisciplinary mobility of graduates of universities, the training of specialists with a degree, the accounting of the latest results of fundamental and the applied research in the formation of educational programs that ensures maximum compliance of the competencies of graduates to the requirements of companies
Science - innovations	A central role is played by stimulating the transfer of knowledge through the following tools: models of public-private partnership (clusters, science parks, etc.); commercialization of research supported by the state and protected by intellectual property rights; university research and development (DIR) on a contractual basis; university spin-offs and start-up centres for the transfer of knowledge and technology; business incubators; platforms of open science and innovation
Education - innovations	Collaboration among actors is assessed according to criteria such as the development of the entrepreneurial culture (entrepreneurial spirit) within the framework of (academic) training programs (for example, holders of a doctoral degree for work in companies) and the formation of appropriate competencies (development of business plans, managerial skills, etc.)

Source: compiled by the authors based on [4]

In many countries, in the last decade, there has been an ongoing search for effective instruments of state policy to create institutional conditions for the successful generation of innovations in the context of the development of the knowledge economy and the continuous maintenance of this process in the country. A vivid example of a systematic approach to addressing this issue is the policy of supporting innovation in Finland, which can be considered in terms of implementing the model of the “knowledge triangle.”

Finland substantially outperforms most European states in the innovation sector, in particular in terms of government spending on research and development.

Thus, the share of government spending on R & D since the early 2000s remains at the moment one of the highest

in the world: according to the Global Innovation Index, for over 5 years, the country is among the top 10 innovative countries in the world. As of 2018, Finland ranks 9th in the area of research spending (in % of GDP) [5].

Positioning its economy as “knowledge economy” or “innovation-oriented economy,” the Finnish government pays special attention to the in-depth and comprehensive involvement of their industries in innovation. Based on open innovation and other modern concepts, the country actively uses innovative platforms of interaction between economic actors, which enhances the network effect and accelerates scientific developments. In particular, in Finland, the following innovation development programs were adopted and implemented (Table 2).

Table 2 - Programs of innovation development of the regions of Finland

The original name of the program	Years of implementation of the program	literature
Centers of Expertise I, II, III	1994-2013	[Kavonius, 2013]
Open Innovation Environments	2008-2012	[Turunen, 2010]
Innovative Cities, INKA	2014-2020	[Tekes, 2013]
Six Cities Strategy of Finland: Open and Smart Services	2015-2020	[Six Cities Strategy Office, 2016]

Source: [6]

In parallel with the processes of modernization of innovation policy, Finland has formed a wide network of general and applied universities. Subsequently, the network of higher educational establishments became the basis for implementation of regional innovation development programs, given in the Table 2.

Therefore, regional innovation programs concerned, among other things, with the co-ordination of educational institutions with regional and local enterprises and communities. The interaction involving universities, the private sector and government support is seen by researchers as an applied implementation of the “knowledge triangle” within an open innovation system.

The capital of Finland, Helsinki and Tampere city are a powerful economic region in Finland, with the highest rates of population growth and investment in the country. The three major universities in the region are Tampere University (UTA), Tampere University of Technology (TUT) and Tampere University of Applied Sciences (TAMK).

The vast material base of the VTT Technical Research Center of Finland (VTT) and more than 300 full-time professionals provide support to private companies in the implementation of DIR, especially in those areas that form the core of economically strong local clusters. The integration of science, education and innovation in the

«knowledge triangle» serves as a strategic priority for all three universities. If Tampere University of Technology and Tampere University of Applied Sciences focus mainly on the implementation of the «third mission», especially in business relationships, the University of Tampere focuses more on social sciences and medicine [6].

The basic funding mechanisms of universities do not provide incentives to set up partnerships with businesses or engage in innovation activities. However, they are applied in the practice of the leading state organization: the National Technology and Innovation Agency «Business Finland» (until 2018 called «Tekes»), fully cooperates with private-sector universities.

The «triangle of knowledge» strategy in Finland is implemented at the local level of innovation policy. Thus, in practice, Business Finland is establishing interconnections between universities and the private sector. As a result, there is the implementation, on the one hand, of the «third mission» of universities (socially-oriented, practical mission), and, on the other hand, enterprises and public organizations, of innovation activity.

As a result, the interaction of Finnish universities and private companies in the last decade is more intense than

in many European countries. 33% of companies are involved in a “university-company” partnership, although only 4.9% attach great importance to them [6].

In an effort to preserve the innovative potential of leading Tampere companies, of which 10 are among the world’s market leaders, they invest more than 750 million euros a year in the DiR, with particular attention being paid to the development of a local innovation environment. In recent years, Tampere has seen the highest rates of economic growth in the country and the highest level of private investment in business development, relating to health and wellness and biotechnology segments.

Given the fact that the headquarters of a national television company are based in this company, the strategic importance since it is represented by the digital media sector, closely integrated with the ICT cluster. Information technology and digitalization directly or indirectly affect all clusters in the region.

Let's consider specific examples of interaction between universities of Finland and companies within the framework of the knowledge triangle (Table 3).

Table 3 - The interaction of Finnish universities and private companies within the framework of the triangle of Knowledge (nonmaterial) and physical (material) innovation

The company name	Engaged universities	Company description	Interaction description
1	2	3	4
New Factory International Ltd. (NFI)	University of Tampere (UTA), Tampere University of Technology (TUT) and Tampere University of Applied Sciences (TAMER)	The company manages innovative projects, running by student-owned companies, together with 58 universities in 13 countries (Demola Network). In Finland, NFI provides innovative services globally with the help of digital platform tools	The network unites students of universities and companies in the format of «online offline»: a digital platform helps users find partners, but real interaction takes place in the physical space and is mutually beneficial for both sides of the platform.
Finnish University Property Ltd. (SYK)	Technological University of Tampere (TUT)	Cooperates with Finnish universities in 16 regions, inter alia works closely with the Campus Arena and the Tampere University of Technology. Campus Arena offers innovative services to resident companies. The TUT holds seminars with the participation of students and company representatives and provides for use on campus labs.	The company coordinates the interaction of universities with business in the form of various innovative services and organization of events in a new, specially built on the campus building. At the stage of developing the Campus Arena concept, SYK and TUT actively involved companies, students and university staff in developing the best partner model and spatial solutions. Specialized structures provide resident companies with various support and innovation activities together with the university or external firms.
Finnish Broadcasting Company (YLE)	Tampere University of Applied Sciences	The Finnish television company plays a key role and is based in a building owned jointly by Tampere University of Applied Sciences and Technopolis Ltd. The latter leases production space in four Finnish regions and in five other countries. The main task of Mediapolis is to intensify the flow of innovation from the campus into industry, providing benefits to all platform participants.	YLE Campus - Mediapolis, provides students with the use of audiovisual equipment and studios owned by businesses and educational institutions themselves and allows to collaborate with companies: to participate in studio work, design services, etc. Thanks to this, students can establish useful contacts with employers. Mediapolis offers a technological platform for various innovative projects.

The production of new knowledge within these platforms is based on the integration of its various types and the identification of the links between them. Digital

platforms stimulate the interaction of ecosystem participants (knowledge triangle). However, the establishment of interaction (physical, cognitive, social or institutional) on different platforms occurs differently;

the same can be said about the organization of innovative processes. The two coordinators, Technopolis and SYK (Finnish University Property Ltd), with a total annual turnover of € 100-150 million, own real estate valued at more than € 1 billion, the use of which, in turn, generates the main profits of the owners.

NFI (New Factory International Ltd), which cooperates with all three universities, has an annual turnover of less than EUR 1 million and provides intangible assets to its customers (concepts, software, training services). NFI serves universities and companies, guided by a single global concept of innovative services [6].

The MediaPolis Platform activity is based around the Finnish Broadcasting Company (YLE), and the Campus Arena coordinates Tampere University of Technology with its local business in areas relevant to the University's academic and educational profiles.

Conclusions

The emergence and dissemination of open innovation platforms contribute to the awareness that the traditional (linear) concept of the innovation process is outdated to overcome modern technological challenges. The Triangle of Knowledge is a model that combines the joint efforts of actors (universities, government, firms, etc.) with the innovation process to achieve a synergistic effect.

The Triangle of Knowledge provides support for political decision-making, showing that investments in one of its components produce positive effects for the whole system, including modernizing the labour market, stimulating structural changes in the economy, improving the quality of life of local communities, and so on. Therefore, it should be perceived not as a theoretical concept, but as a practical tool for local innovation policy, proving an example of Finland's "knowledge triangle."

The collaboration of New Factory International Ltd., Finnish University Property Ltd., Finnish Broadcasting Company, and the universities of Tampere (Finland) allows companies to invest effectively in the development and participation in the creation of social innovations, and to universities to focus on market demand and on realization of the "third mission."

We believe that the "knowledge triangle" is not a final concept, but rather a benchmark that stimulates productive interaction between the educational, scientific and business sectors. Political measures based on this approach are intended to expand the academic culture of universities, prompting them to focus not only on scientific excellence and teaching, but also on the development of innovation and solving socio-economic problems.

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