

УДК 339.9

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## **GENESIS OF MODELS' TRANSFER AND COMMERCIALISATION INTELLECTUAL PROPERTY PRODUCTS IN WORLD ECONOMIC INNOVATIVE DEVELOPMENT**

**Розглянуто особливості інноваційного розвитку світової економіки. Узагальнено теоретичні засади розвитку моделей трансферу і комерціалізації продуктів інтелектуальної власності. Проаналізовано та визначено умови процесу трансферу і комерціалізації науково-технічних розробок.**

*Ключові слова:* трансфер науково-технічних розробок, комерціалізація інтелектуальних продуктів, моделі трансферу технологій, інтелектуальна власність, міжнародна інноваційна система.

**Рассмотрены особенности инновационного развития мировой экономики. Обобщены теоретические основы развития моделей трансфера и коммерциализации продуктов интеллектуальной собственности. Проанализированы и определены условия процесса трансфера и коммерциализации научно-технических разработок.**

*Ключевые слова:* трансфер научно-технических разработок, коммерциализация интеллектуальных продуктов, модели трансфера технологий, интеллектуальная собственность, международная инновационная система.

**The article describes the features of world economy innovative development. Summarizes the theoretical basis for the development of intellectual property transfer and commercialization models. Analyzed and defined the conditions of the transfer and commercialization R&D projects.**

*Key words:* transfer of research and development, commercialization of intellectual products, models of technology transfer, intellectual property, international innovation system.

**Problem statement.** In the current economic climate, where innovative technologies have become a major factor in ensuring the economic growth of countries and their social progress and have become the main driving force to overcome the crisis in the economy, the mechanisms of transfer of innovative technologies become a key factor of improving the dynamics and quality of economic development. As the experience of developed countries shows, the commercialization of intellectual property transfer does not only enhance the scale and speed up the speed of innovation, but also creates additional incentives for scientific research. A characteristic feature of the present stage of today's world development is an intense commercialization of scientific-technical progress and dynamic establishment of an universal international trade regime for intellectual goods. Mentioned features of modern economic development of the world have become dominant because of the intensification of the transfer of new scientific knowledge and technology from the sphere of science in the production – the processes of technology transfer. Therefore there is a scientific and practical problem – specification of categorical basis of innovation and specification of the content of the main elements of innovation.

**Analysis of recent researches and publications.** The theoretical and practical research of commercialization and technology transfer are covered in the works of national and foreign authors Androsov A.; Cherep A., Titov V., Shukshunova V.; Margolina N., Efimov M.; Fedulova L.; Meshko N.; Bleykeni M.; Donald M.; Matthews R.; Gorman M.;

Diamond J.; Segman R.; Gibson D.; Smilor B.; Sang T.; Schroer B.; Jaffe A.; Lerner J; Siegel D.; Basset R.; Gaggs; Daymant R.; Filin M.; Maskus K.

**Determination of the unsolved aspects of the problem.** Despite the large number of publications on the issues under study, some questions still remain underreported, particularly in the modern Ukrainian economic thought. It is necessary to study the evolution of the models of commercialization and transfer of intellectual property and the identification of key management tools, which are specific to each historical model type of transfer of intellectual products.

**Main body.** Transfer of intellectual property or technology transfer is not a new kind of activity. It is proved in the works of scientists that the transfer of technology has existed since the dawn of mankind, when the subject of technology transfer were implicit knowledge, which later evolved into explicit [1; 2]. Since 3000 BC there was no written language, the technology transfer was carried out mainly through language, backed up by exercises and drawings, and a technology transfer took place exclusively in a friendly environment. Segman R. in his study proves that the genesis of the transfer of intellectual products dates back to prehistoric times [3]. The value of his work is in studying of the transfer of technologies from Neolithic times and determining the role of the Arab world in the transfer of technology between the East and the West.

First traditional model of technology transfer (potential assignments) was formed in the period of 1945 – 1950 . The main factor of technology transfer in this period was the quality of technology, in other words, transfer was carried out only if there was demand for a technology [4].

For many years, a common practice for business and science was to exchange information or created devices, prototypes or materials through legal instruments or by providing services, as well as through direct sales. The rapid development of the process of transfer of intellectual products occurred during the period of industrialization, exactly in this period new forms of technology transfer appeared, as well as the first attempts of legal settlement and restriction of this process are noticed.

Evolution of models of transfer of intellectual property rights is caused by the gradual complication of technological cooperation. Also, it can be affirmed that each previous transfer model, with the help of its shortcomings, forms the basis for a new, more efficient model.

Thus, the four-level model of a transfer of intellectual property is the result of improved three-level model by providing the following levels of the process: the creation of knowledge and technology, the distribution of results and commitments, implementation and commercialization.

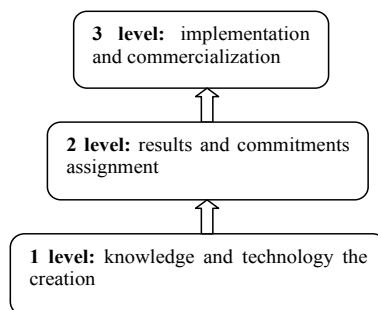


Fig. 1. A three-level model of a transfer of intellectual property

At the first level of this model transfer occurs passively through research reports, research articles and other forms of knowledge transfer. At the second level, the developers

of intellectual products delegate responsibility as the successful transfer takes place only when the knowledge and technology transferred through personal, functional, institutional channels and technology is mastered and understood by users. At the third level, a successful transfer of intellectual property is defined by well-timed and effective transfer of knowledge and the ability of user's resources to implement technology. At the level of commercialization the technology is used on market, success at this level is formed by the successful activity on the previous three levels, and is also determined by market advantages. Commercialization success is measured by return on investment and increased market share [5].

I. Rebentish and M. Ferretti proposed integrated model of transfer of intellectual property, which allows to determine how much effort is needed for the transfer of various technologies and what impact may be caused by the existing competence of the organization. The integrated model describes the transfer as the transfer of material knowledge between the organizations. The process of transfer of intellectual property according to this model includes: 1) the range of transfer; 2) the method of transfer; 3) the architecture of knowledge; 4) the ability of the organization to adaption [6].

The range of transfer is defined as the amount of information, which is included in the product of intellectual property. The range of transfer consists of four types of intangible and tangible knowledge: general knowledge, specific knowledge, process knowledge (equipment) and action. The method of transfer categorizes the process of technology transfer for the following types: 1) the non-personality communication, the personal communication, 3) the group interaction, 4) the physical transfer .

The architecture of knowledge is defined as "characteristic of a structure through which the company defines the knowledge and describes a method by which the company keeps the process information". Architecture of knowledge has four critical elements that affect the process of transfer of intellectual property: 1) technological equipment, 2) experience, 3) procedures, 4) administrative structure of the organization. These elements are associated with the level of complexity of the technology and its compatibility with existing organizations and their financial capacity, as well as the appearance of the possibility of the emergence of resistance. At the present stage, multi-level integrated model of transfer of intellectual property are the most widely used ones.

The development of models of international transfers of intellectual property is affected by the exogenous and endogenous factors: the subjective attitude of each of the participants of the transfer to other participants; geographical location, the quality of the intellectual product , the demand for the product; intellectual and resource capacity of the recipient to the development the technology; legal restrictions; organizational structure of the recipient of the product of intellectual property; the availability of communication between the entities of transfer of intellectual products.

Despite the fact that in each transfer of intellectual property model one or two of the foregoing controlling factors have crucial role, synchronous influence of on the monitoring process should be considered. Also in the context of cooperation between science and industry the existence of a close two-way communication between the participants of transfer of intellectual property becomes an important factor.

The theory of innovation highlights two important processes: first, the transfer of intellectual products – the transfer of information about innovations, that is, the transfer of technology, and, secondly, the commercialization of technologies, as the transformation of innovation into products and services on the market.

The difference between these concepts is that the commercialization of technologies provides for mandatory profit to its owners, and the transfer – the transfer of technology to

the recipient, which carries out its development – is not intended to make a profit.

So, commercialization (sale) provides for the exchange on which the consumer (buyer) pays a fee to the owner of scientific production in a form and in an amount determined by the contract. Commercial forms of transfer of innovations are patent, license agreements, “know-how”, scientific-technical documentation, franchise, providing knowledge-intensive services in the areas of production, circulation and management, including engineering, consulting, informing, management, staff training, as well as contracts and subcontract to carry out joint research and development and other types of transactions relating to the transfer and protection of intellectual property. It should be noted that some of these forms of transfer and the conditions commercialization intellectual property is not even listed in the relevant laws of Ukraine.

In practice, these forms of technology transfer complete each other, especially in large-scale projects in the interstate agreements on investment and industrial cooperation, scientific, technical and industrial cooperation.

To non-commercial forms of transfer and diffusion of technology also refers the international technological assistance (aid). Its objective function is to help developing countries to strengthen market fundamentals of the economy with the help of transfer STR.

In the international practice technological assistance is carried out primarily in the form of technology grants, i.e. free transfer of technologies by developed countries, goods or funds for the purchase of technology, training and retraining of personnel for developing countries. In this case, the grant recipient provides the organization of reception and accommodation of technology, and does not carry any costs associated with the financing of the project [7].

Another form of technological assistance is co-financing, i.e. the complex realization of joint innovation projects with term of partial funding by the country-recipient. In this form, the recipient of technological innovations carries the partial financing costs, which are usually less than half of the cost of the project. Typically, these forms of technological assistance are provided to developing countries or countries that are in the process of transition economy. Thus their implementation can be carried out both at the multilateral (when intergovernmental and regional organizations take part along with the developed countries), as well as on an international basis (the main part in a project of international organizations the World Bank, UN, IMF, IBRD, UNCTAD, UNIDO, UNDP, etc.) [7].

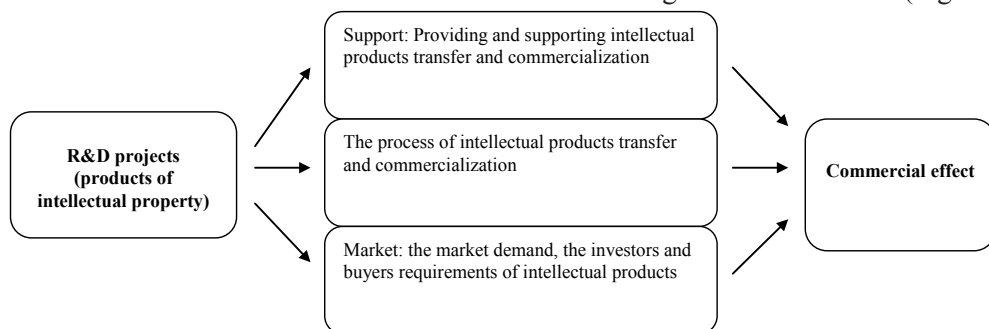
Transmission or transfer of intellectual property – it's not just the spread of scientific-technical information that can be replicated. Transfer of intellectual products is a primary activity, aimed at creating conditions for the immediate, relatively long contact and collaboration among developers with potential buyers. The disadvantages of the organization of preparation scientific research of the institutes and other scientific organizations of Ukraine in the process of transfer are the lack of an appropriate marketing strategy and market research. Ideally, a separate research institutes and laboratories conducted patent research.

As has been previously defined, the commercialization of intellectual property is the process by which the results of scientific-research work are timely transformed into products and services on the market. The results of the commercialization process does not only bring benefits in the form of return on investment in R&D, but also as an increase in production volumes, increasing cash flow, improving the quality of goods and services, the formation of new traits staff development to ensure the sustainable development of enterprises in existing and new markets [8].

Commercialization of development aims to produce commercial results and begins with the discovery of the prospects for commercial use of the new development, and ends

with the implementation of development (technology, product or service provided) on the market and obtaining commercial effect.

The commercialization of research and development in the technology market is an important part of innovation management and as a process requires strategic management at all stages of the promotion of intellectual property in the “Research Institute – The state – Business” in order to select an effective form of obtaining commercial effect (Figure 2).



**Fig. 2. The process and conditions of transfer and commercialization of the products of intellectual property in innovative management of scientific institutions**

The process of commercialization is a complex of organizational and economic measures aimed at making a profit from the market implementation of existing knowledge and development in specific areas of science and technology. According to the methodological recommendations approved by the State Committee on Science, Innovation and Informatization in Ukraine from 13.09.2010 № 18, the mechanism of commercialization in universities and state research institutions must consist of 6 phases: technology audit, marketing research, economic audit, obtaining security documents, promotions, and the conclusion of the contract.

To ensure effective management of transfer products of intellectual property and the commercialization of scientific research except institutional support it is needed to create special units in universities.

Analysis of the national systems of transfer of innovative products in the leading countries with a high level of innovative development once again confirms the decisive role of the state in promoting the commercialization of scientific and technological revolution. State functions are to promote technological development of society, so there are mechanisms of state stimulation of transfer of innovative products (both direct financial support for scientific research and development institutions, and measures to create an attractive environment for enterprises with innovative technology and STR). Transactions on the transfer of intellectual property should cover all costs associated with the acquisition and support of the protection of intellectual property rights, to provide a perpetual royalty-bearing, to establish a minimum level of royalties for a certain period, regardless of the level of sales, have clear goals to be sure that the acquirer licenses intends entering the market, comply with export control regulations.

For Ukraine, it is important to create own stimulate system of transfer of innovative products in the triad “RI – State – Business”, which should be based on the positive experience of a high-tech nations and developing countries. Conceptual components of the technology transfer system should be:

– development of state mechanisms to stimulate commercialization of scientific research institutions, institutional support for the autonomy of academic institutions and universities to transfer knowledge products and management of intellectual property;

– creation of mechanisms for the promotion of innovative technologies in the system “University – Business”;  
– formation of the system of protection of intellectual property rights that encouraged technology commercialization.

In the Ukrainian scientific institutions bulk of knowledge is transferred to the industry through research “on demand”, and not through the sale of licenses or ready-made companies.

**The conclusions.** Considering the above it can be concluded that the beginning of the development of technology transfer is equal to the genesis of human civilization, as an objective need for the transfer of knowledge has existed since prehistoric times.

However, the rapid development of this process took place in the time of industrialization. Precisely in this period new forms of technology transfer appeared, as well as following the first attempt to the right of settlement and limitations of this process. Evolution of models of transfer and commercialization products of intellectual property is caused by the gradual complication of technological cooperation. Also, it can be argued that each previous model thanks to its disadvantages formed the basis for the creation of a new more efficient model.

Difficulties in the commercialization of scientific and technological revolution in Ukraine are primarily related to the lack of the three first links in the infrastructure of a transfer of intellectual property products – non-profit venture capital funds, venture capital firms and small innovative high-tech firms. Therefore it is necessary to work on the development of these important components of the innovation infrastructure.

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*Надійшла до редколегії 20.11.2013.*