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RESEARCH OF BASIC MODELS OF TRANSFER OF INTELLECTUAL AND INNOVATIVE TECHNOLOGIES AND DIRECTIONS OF THEIR DEVELOPMENT

Abstract. *The article examines various forms and methods of transfer of intellectual technologies in the period from 1950 to the present time. It is substantiated that at different stages of social development, the ways of transferring intellectual technologies are different. At the initial stage, technology transfer was mainly carried out on the basis of agreements between top managers. After the industrial revolution, these processes were implemented at the expense of mandatory external investments in production capital. Today, technology transfer is mainly carried out through market-oriented commercial forms. Thus, technology transfer increasingly demonstrates its unique market-oriented characteristics, the specific features of which can be manifested in the following types and characteristics.*

Keywords: *technology transfer, commercialization, methods and models, use, technological market, industrial enterprises*

In the world at this time there is a certain unbalanced development of technology and techniques. Different countries and different enterprises use different technologies in their production and commercial activities in terms of technical efficiency. In a general sense, they can be classified into the following five levels: disruptive technologies, advanced technologies, intermediate technologies, primary technologies, and primitive technologies. Of course, each business entity tries to improve the condition of its production and technological base. We are constantly observing trends in the movement from primitive to breakthrough technologies. This difference in levels of technological development, technical efficiency and production functions creates a unique technical potential of different technologies, as well as gives it unique inertia and a specific direction of movement. While there is a difference in technological potential between technological forms, technology

will permanently move from high potential to lower potential This will manifest itself in the fact that technologically developed countries, regions, industries and enterprises will transfer their work to technologically backward countries, regions, industries and enterprises. At the same time, the practice of technology transfer shows that in the process of technology-oriented the level of success and the effect of technology transfer are positively changing, which will be accompanied by a certain decrease in the commercial potential of technology.

It should be noted that technology transfer at the very beginning was mostly an unconscious activity. With the development of society, technology transfer is becoming increasingly utilitarian. To this day, it is difficult for us to see the phenomenon of blind and purposeless technology transfer. The utilitarian nature of technology transfer is mainly reflected for economic purposes. Whether it is the technology provider or the demand side, they all put them first market opportunities and commercial value. The transfer of technology in order to weaken the level of competition and strengthen one's own competitive advantage is ultimately also necessary to satisfy economic interests. As for the transfer of technology to achieve certain political, military, environmental and other "super-economic" goals, this is only a way or form of realizing the common interests of the country. Therefore, it is no exaggeration to say that in the modern world, technology transfer between countries, departments, industries and enterprises has completely supplanted the space for unconscious activity and is closely connected with utilitarianism.

Therefore, we can assert that innovation activity at this time is one of the most important factors in the formation of effective economic, political and social directions of development of industrial enterprises. At this time, innovative products are successfully promoted to national and international markets using technology transfer mechanisms. At the same time, the scientific community has not yet created unified effective mechanisms for technology transfer, which does not allow to sufficiently effectively join the international technology transfer of innovative products. All this actualizes the task of scientific research of mechanisms and models of technology transfer, development of specific proposals for their development and improvement.

Theoretical and practical issues of technology transfer, as the most important mechanism of innovative development, were considered in the studies of such scientists as Illiashenko S.M. [Illiashenko S.M., 2017], Hee Jun Choi [Hee Jun Choi, 2008], Mrykhina O.V. [Mrykhina O.V., 2018], Stasiuk Yu. M. [Stasiuk, 2012], Kosenko A.V. [Kosenko, 2018], Kobieliava T.O. [Kobieliava, 2017], Kocziszki D. [Kocziszki, 2017], Kosenko O.P. [Kosenko, 2015], Mansfield E. [Mansfield, 1975], Nagy S. [Nagy, 2018], Pererva P.G.

[Pererva, 2019], Ramanathan K. [Ramanathan, 2011], Sazali Abdul Wahab [Sazali, 2009], Virchenko V.V. [Virchenko, 2013] and others. Despite the significant scientific and methodological achievements of modern researchers, at present the theory and practice of technology transfer between industrial enterprises has been studied only fragmentarily. The issues of theoretical and methodological her actor remain not fully worked out. In particular, the development of conceptual foundations for the formation of methods and models of technology transfer.

The article is aimed at studying the theoretical and practical aspects of technology transfer in innovation activity of industrial enterprises.

Research results. The development of the Ukrainian economy is hampered by the incomplete use of intellectual and innovative potential. This opinion is confirmed in the absence of effective scientific and technical cooperation between various researchers, developers of innovations and industrial production, which ultimately leads to a significant lag behind our country and in technological, and scientific directions. The transfer of intellectual technologies can be defined as the process of dissemination of fundamental scientific and technical knowledge, which makes it possible to move from theory directly to its technical use in practice. Technology transfer is the process of transferring technology from a specific person or Organizations, as well as owning or maintaining it, to other persons or organizations on commercial or non-profit grounds. This kind of transfers can take place between research teams (technology developers), business structures of any size (small, medium, large), governments of countries (officially or informally, openly or secretly).

Technology transfer is strategically important in the components in the research and innovation activities of the enterprise and an effective mechanism of interaction between research and research and production processes at enterprises and, individual researchers and creative individuals who are interested in the industrial implementation of the results of their developments both in their own countries and abroad. The effective implementation of methods and models of technology transfer allows industry to intensify the processes of introducing science-intensive developments in its production and commercial activities and significantly strengthen competitive advantages. R National technology transfer provides opportunities to accelerate innovation at all levels (corporate, regional, national, international). Development and improvement of intelligent technology transfer processes is essential for assessing the benefits that consumers have received as a result of technology transfer, as well as scientifically based ways and methods to achieve them.

In fact, technology transfer is defined as the transfer of intellectual technology, which is legally formalized by concluding a bilateral or multilateral agreement between individuals and / or legal entities. The content of such agreements establishes, change or terminate property (exclusive) rights and obligations in relation to this technology and/or its individual components. All possible relationships between the owners of an innovative product and its buyers (consumers) are regulated primarily by the laws of Ukraine "On Innovation Activity" [4], "On Priority Directions of Innovation Activity in Ukraine" [5]. These laws determine the need and importance of creating a legal framework for the concentration of innovative resources of our country on the basic directions of scientific and technological development.

Unlike physical goods, the use value of intellectual products is not fully transferred during the transfer process. If the transfer is sometimes carried out in physical form, but the physical form is only a carrier or material frills of intellectual technology. After completing the transaction, despite the fact that the use value of the goods has been transferred to the other party, the transmitter still retains this knowledge. The use value of technical knowledge exists in non-physical forms, such as graphics, skills, methods, models, etc. In essence, only the rights to use are transferred, which in no way affects the ownership of the person transferring intellectual technology. In this sense, the use value of a technical product is not fully transferred during the transfer process. Because of this, the technology provider can continue to sell the technology many times, and if there are no restrictions, the buyer of the technology can also continuously resell the resulting technology until everyone has mastered the technology. This reproduces the repetitive nature of technology transfer, accelerates social development and technological progress and brings enormous material benefits to humanity.

At different stages of social development, methods of transferring intellectual technologies are different. At the initial stage, technology transfer was mainly carried out on the basis of agreements between top managers. After the Industrial Revolution, these processes were mainly implemented through mandatory external investment in productive capital. Today, technology transfer is mainly carried out through market-oriented commercial forms. Thus, technology transfer increasingly demonstrates its own unique market-oriented characteristics, the specific features which can manifest themselves in the following types and characteristics:

- the acorn of market supply and demand limits both the probability and cost of transferring intelligent technology;

- significant influence on transfer processes is exercised by the actual cycle of the technological product, the cost of its transfer, the majestic alternative cost, the institutional environment, the potential economic value of the transfer and so on;
- hastate technology transfer has a strong relationship with the market processing of material goods that its consumer receives, and the timing and efficiency of the use of technology is closely related to the quality of the main product;
- competition not only stimulates the acceleration of the transfer of those who need technology, but also increases the limitation of the monopoly of technology providers on the continuation of the process of technology transfer.

The well-known researcher of innovation processes Mansfield E. [Mansfield, 1975] in the last century (early 1970s) confidently proved that the most important process that determines the efficiency of industrial production of the country is the transfer of intelligent technologies. With changes in technological levels of development and corresponding cycles of innovation processes, models of practical implementation of technology transfer are changing. Since that time, active work begins on the creation and substantiation of various models of intellectual technology transfer (Figure 1).

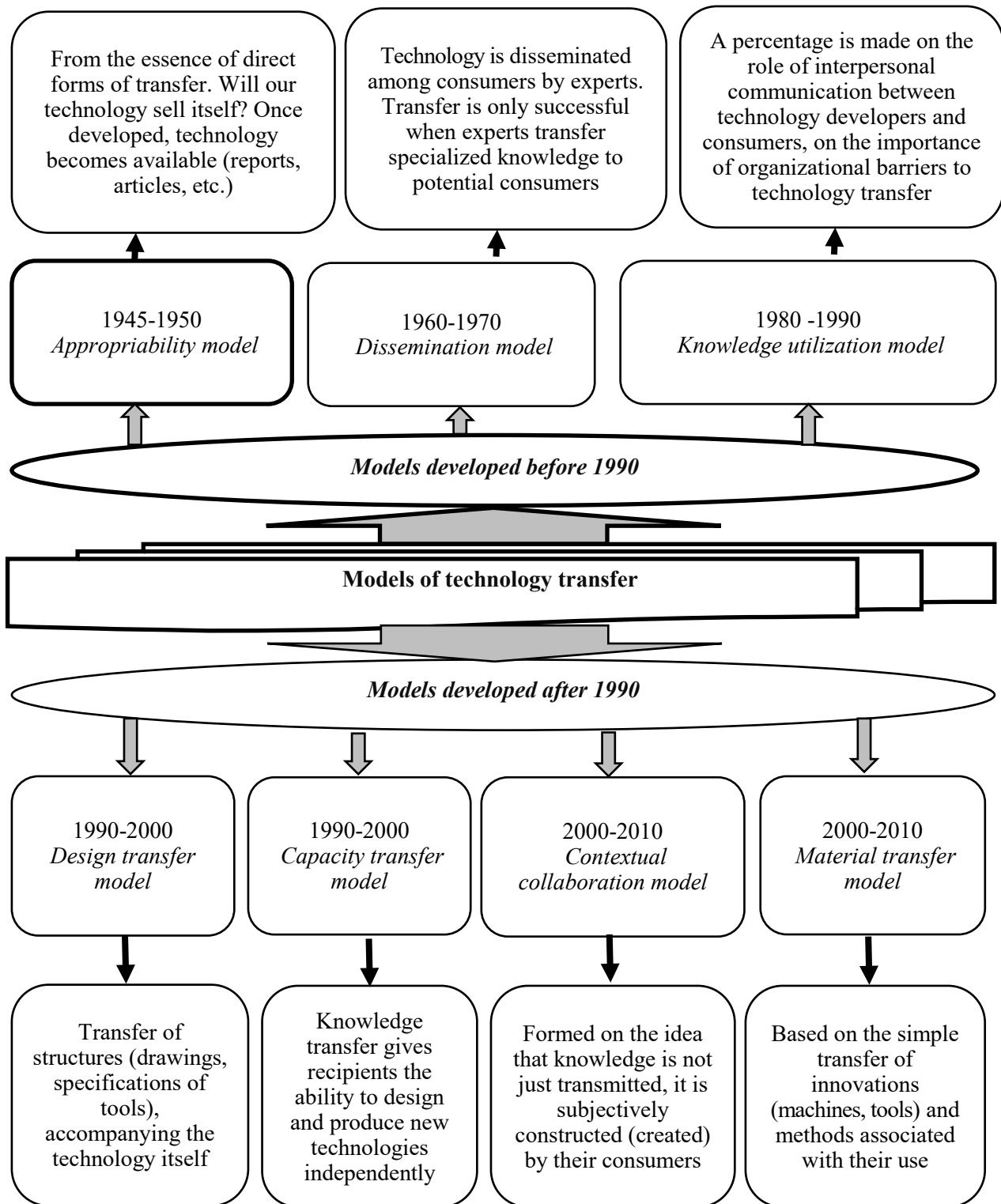


Figure 1. Technical and economic characteristics of the first models of transfer and commercialization of intellectual and innovative technologies
 (formed by authors using [Hee Jun Choi, 2008; Mrykhina, 2018; Stasiuk, 2012; Ramanathan K. [Ramanathan, 2011; Sazali, 2009])

The technology transfer models presented in Fig. 1 were used mainly to ensure the success of transmission processes. At the same time, their use did not provide certain

guarantees of this success. The considered models, as a rule, are not integrated and are rather effective. The transfer process at that time urgently needed to develop new models in accordance with the latest views. Therefore, in 2010, a "*role shifting model of technology transfer*" was developed, in the function of which the task of creating new innovations [Hee Jun Choi] was introduced. This model describes the processes how consumers themselves can become a developer of innovative and intellectual technologies, that is, change their status in the transfer process (from consumers of intellectual technologies under certain conditions to become their suppliers).

According to the results of the study, there is a fairly large number of models and methods of intellectual technology transfer. Therefore, there is a need for a certain classification of previously popular and existing models of technology transfer. In this regard, we offer several methodological approaches to the classification of existing models of technology transfer.

Approach №1 – from the point of view of completeness of technical content, the transfer of intellectual technology can be divided into two types: "transplantation" and "vaccination".

Transplantation type of transfer in technology concerns the entire content of technology. Most foreign expansions of multinational companies implement technology transfer using this method. The transplantation model depends little on the originality of the technological system of technology development and has high efficiency. This is a short path of innovative development for countries or regions that are "catching up" to achieve abrupt development of technology and economy. The so-called "abrupt development" refers to the non-standard behavior of laggards that catch up with technological leaders at a certain stage of development under certain historical conditions. Abrupt development is a kind of rapid development that must be achieved as soon as possible, subject to the law of development.

Technology transfer by "grafting" refers to the transfer of technology, which is carried out through the transfer of a part of the technology, for example, a certain unit technology or key process equipment. The consumer receives the original technological system as the parent base, and subsequently grafts into it external advanced technology, thereby entailing feature updates and ensuring the efficiency of the original technological system. Obviously, this method of technology transfer largely depends on the originality of the technological level of the recipient (consumer) of the technology, since the conditions for such the conformities are relatively strict. Despite the fact that the cost of the procedure for transferring technology in

this way is relatively low, the size of the risks in the vaccination chain is relatively high. As a rule, this type of transfer is used by countries, regions and enterprises with relatively balanced technical capacity.

Approach №2 – from the point of view of the difference in technology carriers, the intelligent transfer model is recommended to be divided into three types: technology transfer of "material type", "intellectual type" and "type of workforce".

Gear models and "material type" technology refers to the transfer of technology caused by the transfer of objects. From a technical point of view, objects that appear in the form of means of production and products of labor are the materialization and objectification of a specific intellectual technology, and the fact of its existence and transfer is directly related to this material object, the production of which is carried out using the technology that is transferred, can be reflected from this. Therefore, when physical objects are reassigned or move in space, respectively, a certain intellectual technology is transmitted, which is the main form of the so-called "hard" technology transfer.

Transmission models and technologies in the "intelligent" mode and application of technology transfer, the main task of which is to disseminate knowledge of new and innovative specialized scientific theories, skills, production experience and scientific methods. It does not depend on the very fact of transferring physical objects. This type of technology transfer is commonly referred to as "soft technology" transfer. Currently, commodity transactions in forms of knowledge, such as patented technology, technical know-how, process formula, and information intelligence in the marketplace, are the main forms through which this kind of technology transfer model is implemented.

Gear models and technologies based directly on their developers (people, scientists, inventors, creators). "Human" technology transfer is a relatively ancient way of transferring technology in human society, which is a technology transfer caused by the flow (movement in space) of people with intellectual skills. For example, different forms of displacement, such as migration, recruitment, exchanges and training in different locations (different countries), can initiate and the corresponding transfer of intelligent technology. This is done because, no matter what specific form intelligent technology takes, it exists with the people who created it, so it is understood, mastered and used by these people. Therefore, the flow of human resources is usually be accompanied by technology transfer. In particular, this applies to such technological innovations that are inseparable from their carrier (creator, researcher, scientist, professional staff) and can only be transferred with him personally. During World

War II, fleeing war and fascist persecution, a large number of scientists from Europe, especially Germany, fled to the United States, and many leading technologies from these countries, especially nuclear technology, were transferred with them to the United States, which allowed this country to actively and effectively develop in the technological field.

The above three types of intelligent technology transfer demonstrate the characteristics of transfer from material technology to intangible technology and from solid technology to scientifically activated technology. In terms of the complexity of the transfer, due to the presence of different requirements for the conditions for the implementation and support of this kind of transfer, in general, the complexity of transferring technology of "material type" is relatively less than of transmission and technology in "intelligent" model. However, in terms of technology transfer efficiency, transmission models and "human" type technologies are often greater than others, i.e. talent transfer is the most effective way to transfer technology.

Approach № 3 – from the point of view of the function of intelligent technology, their transfer (transfer) is recommended to be divided into two main modes: transfer of process technology and transfer of product technology. In the most general terms, there are two main forms of technology in the industrial technology system: technology in form and process and technology in form and product. Each of these forms contains a number of closely related individual technologies, which together form the technical basis of social production and commercial Activity. From the point of view of a specific production process, the technological process is a technical prerequisite and material means for the formation of product technology, which directly determines the technical productivity and production capacity of the product.

From the point of view of the overall social production process, product technology is often a unit of process technology (in a broad sense, the essence of process technology itself is a specific product), which, in turn, affects the overall level and efficiency of process technology.

In fact, any industrial technology is not omnipotent in its functions, but has different only inherent in it. In the case where intelligent technology focuses on influencing the production process and contributing to increased efficiency and output, we refer to such technology transfer as process technology transfer. Otherwise, when technology focuses on influencing the results of the production process, it helps to improve the technical content of products and expanding functions, we call this technology transfer of product technology.

In general, technology transfer in agriculture and extractive industries mainly relates to process technologies, while technology transfer in manufacturing, information industry, construction, and other industries mainly relates to product technologies. At the same time, process technology and product technology have strong consistency in functions. Therefore, in the process of technology transfer, product technology renewal is often achieved through transfer process technology, or process technology transformation is carried out through the transfer of product technology.

Conclusion. The modern development of society is accompanied by the introduction of new innovations that require a mechanism for their implementation. Today, one of the most effective ways to transfer innovations is technology transfer. However, the country has insufficiently formed and worked out mechanisms, tools that would effectively ensure the implementation of technology transfer of an innovative product at the state level.

In the Ukrainian economy, due to the weak force of interaction between scientific organizations and business structures, the development of the system and models of transfer of intellectual and innovative technologies is carried out at an unsatisfactory pace. Insufficient dissemination of innovative technologies contributes to the fact that the country loses real opportunities for the effective use of innovative potential in the most important areas of scientific and technological progress, which can lead to consolidation in the Ukrainian economy of extensive development model. Our country needs to create an effective infrastructure for successful technology transfer, including units for problems and tasks of innovative technology transfer, and to continue the successfully launched creation of technology transfer centers both at the national and regional levels.

It should also be noted that since the prospects for technology transfer are multilevel and the classification criteria are numerous, technology transfer can be divided into direct and indirect, sincere and insincere, general technology and special technology, international and domestic, limited and broad, etc. All of them in a certain way reproduce indignity and connections between different modes, the number of which is quite large. The above distributions of technology transfer methods relate only to the value of practice and far from exhaust all methods and models of intelligent technology transfer. At the same time, the difference between different types of technology transfer modes is only of relative importance. In fact, in the process of technology transfer, most of them are dominated by a certain compatible mode with other modes or is directly a mixed mode of transfer of intellectual and innovative technologies.

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