

The object of this study is to determine the essence, place, and role of the guarantees of technology transfer participants in the general system of innovative support measures and the formation of proposals for their improvement. General approaches to determining the essence of guarantees to participants in technology transfer as a special means of regulation were summarized. The experience of the World Trade Organization, the European Union, the Organization for International Cooperation and Development, and other countries has been analyzed regarding the methods and techniques by which these guarantees are provided. It has been established that the existing guarantee systems are not capable of fully meeting all the needs of technology transfer subjects. Guarantees to technology transfer participants were categorized in accordance with formalized criteria. The expediency of improving existing systems of guarantees to participants in the field of technology transfer has been substantiated, and the main directions of such improvement have been formed. A generalized definition of technology as a special object of relations regarding its transfer has been formed. It is proposed to unify the definition of technology at the international and national levels. The expediency of maintaining minimum guarantees of rights for technology developers regarding the amount of remuneration for the transfer of rights to technology and other essential conditions of its transfer was substantiated. Directions for improving the essential terms of technology transfer agreements were proposed.

The study is aimed at forming general theoretical foundations for improving the system of guarantees of participants in relations in the field of technology transfer. The generated research results can be used in the formation of international normative acts, acts of national legislation within the framework of regulation of these relations and serve as a basis for further scientific research on these issues

Keywords: *guarantees for technology transfer participants, protection of technology rights, technology transfer*

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DIRECTIONS FOR IMPROVING THE SYSTEM OF GUARANTEES FOR PARTICIPANTS IN TECHNOLOGY TRANSFER

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1. Introduction

A key factor in the development of any economy in the world is the prevalence of leading knowledge-intensive technologies in its production sector. The degree of competitive advantages that can be obtained as a result of the implementation of technology is the main driver for entrepreneurs. The main task of the state is to create all the necessary organizational, administrative, regulatory, and economic prerequisites for the mass spread of this process. Most of the world's economies belong to the market type. This also

determines the fact that technology transfer mostly takes place on the basis of private law, where its participants are endowed with the same legal status relative to each other. This kind of equal relations minimizes the influence of the state on them and imposes on the participants the obligation to independently use guarantees for their protection.

As the experience of economically developed countries of the world shows, more intensive technology transfer takes place in those countries where the rules for its implementation are provided. From this it can be concluded that the presence of established rules of technology transfer has a

stimulating effect on it. The key element of such regulation is the fixation of a system of special economic, organizational, and administrative guarantees. They act as a special stabilizing factor. The value of the system of guarantees is that they act as a stably existing permanent set of means of support that must be implemented. This obligation is not affected by any economic factors or the will of the state administration. They do not depend on the effectiveness of the innovation process and technology transfer. Guarantees acquire special importance within the framework of private transfer of technologies. In most economically developed countries, technology transfer is a sphere that operates separately from the state, based on self-regulating market mechanisms. However, the relative effectiveness of this approach is recorded in numerous reports, scientific papers, and discussions. The availability of this kind of information indicates that self-regulating market mechanisms are unable to effectively support innovation processes and technology transfer. The shortcomings of private market regulation should be compensated for by means of centralized state intervention agreed at the international level. Among the main market failures in the field of technology transfer, the actual inequality of the parties to its transfer is called. Where the investor, the accelerator of the innovation process, the technology park independently establish the rules and conditions for the transfer of rights to the technology. And the developer of the technology can only choose whether to accept such conditions or refuse them. The introduction of a special system of guarantees in these relations will compensate for this economic inequality and stabilize the process of innovation stimulation. This kind of stimulation will take place through a special procedure for the formation of obligations in the field of technology transfer, based on pre-established imperative structures.

This determines, on the one hand, the relevance of scientific research on this subject, and, on the other hand, entrusts scientists with the task of formulating proposals for a universal system of guarantees for participants in technology transfer. It is science that should form such a system and thereby form proposals for the stabilization and intensification of the technology transfer process.

2. Literature review and problem statement

Issues related to the definition of a system of guarantees for technology transfer participants are the subject of many scientific studies. They are studied both as a whole and in terms of their individual elements, both at the national level and within the framework of international regulatory documents. Thus, work [1] examines obstacles that reduce the efficiency of technology transfer with the participation of scientific institutions. The failure of market mechanisms of self-regulation to meet the needs of technology transfer participants was investigated. The need for state intervention in these market relations was substantiated. The levels of such intervention have been determined through the formation of special guarantees at the level of legislative acts. Proposals were made as to what these guarantees should look like. Fixation of the right to the technology by its developer, the introduction of special essential conditions of technology transfer contracts were called such guarantees. The paper states that the lack of legally defined guarantees is one of the main reasons for the low level of technology transfer. It was determined

that this problem can be solved exclusively with the participation of the state and its authorized bodies. The method of such a solution has been identified by making changes to the existing regulatory documents. However, within the scope of that work, no specific universal mechanisms for the formation of the system of guarantees have been proposed.

In work [2], a study of the guarantee of the owners of the rights to the objects of intellectual property included in the composition of technologies was carried out. It was determined that objects of intellectual property rights do not lose their legal status if they are included in the technology. The international legal acts, which contain certain guarantees for the participants of technology transfer, as well as the experience of Brazil, are analyzed. The reasons for the low level of effectiveness of guarantees to the participants of technology transfer have been established. Their list includes the low level of efficiency of management decisions and the lack of experience of technology transfer participants. However, the cited work does not provide proposals of a universal nature for solving the identified problems.

Within the framework of the conducted research [3], guarantees to owners of objects of industrial property rights within the innovation process and technology transfer were studied. It was determined that patent rights are quite broad and can cover various forms of technology transfer. The most effective guarantee of technology transfer participants is called the absoluteness of the rights to it. However, no proposals were made in the work to improve the system of guarantees for technology transfer participants.

In work [4], the influence of international acts of the World Trade Organization on the system of guarantees of technology transfer participants was studied. It has been identified that the most effective guarantee is to entrust member countries of this international organization with certain obligations to provide special guarantees to participants in technology transfer. However, other options for solving the problem of identification of means of protection of rights were not investigated and no objective assessment of their effectiveness was carried out.

Within the framework of work [5], the experience of Ukraine in the way of implementing the innovative infrastructure of the digital system under the conditions of the transition economy was studied. It was determined in the work that technology transfer needs state support and stimulation. Actions and means by which the state can support innovation processes were formed. It is substantiated that the specific powers recorded in the provisions of the country's legislation perform the guaranteed function of supporting technology transfer. The necessity of applying guarantees of an infrastructural nature by creating and ensuring the activities of special entities is substantiated. They included technology parks, venture funds, technology transfer networks, and public-private partnerships. However, the work did not form a generalized definition of what guarantees are, although their systemic characteristics were provided.

Within the scope of work [6], a detailed study of the processes of information exchange between economically developed countries and countries with a transition economy was carried out. It was established that during the innovation exchange, less economically developed countries accelerate the transfer of technologies by copying the mechanisms of innovation stimulation. It has been established that the joint guarantees of technology transfer participants are guaranteed to lead to the intensification of cross-border

cooperation. Attention was focused on the need for closer cooperation regarding the implementation of a joint system of guarantees for technology transfer participants. However, the work did not systematize the means, methods, and procedures of stimulating influence underlying such guarantees. Approaches to understanding the essence of guarantees to participants of technology transfer were not formed, but only the effect of their implementation within developing economies was investigated.

Work [7] examines the reasons for the successful innovative development of small (medium-sized) enterprises. In the course of the study, it was established that the basis of their successful innovative development is a special system of guarantees provided by the state. However, in the work more attention is paid to how, at the expense of internal management decisions, guarantees of activity provided by the state will be implemented more effectively. There is no critical analysis of what the guarantees to the participants of technology transfer are, nor is their nature investigated.

All the studies reviewed above [1–7] testify to the focus of scientific research on the solution of certain aspects or features of the implementation of the system of guarantees of technology transfer participants. No works were found within which generalized suggestions for improving such a system would be formed. However, we can talk about the presence of many problematic aspects of the implementation of the guarantees of technology transfer participants due to the lack of a generalized understanding of their essence.

All this allows us to state that it is appropriate to conduct a study on the formation of proposals for improving the approach to the essence of the system of guarantees to the participants of technology transfer. The proposed changes should ensure a higher level of technology transfer efficiency, stabilizing the status of its participants. The conclusions formed within the scope of this study can become the basis for further scientific developments, as well as the basis for the formation of promising international and national acts.

3. The aim and objectives of the study

The purpose of our research is to substantiate the areas of improvement of the existing system of guarantees to the participants of relations in the field of technology transfer. The obtained achievements can become the basis for changing the provisions of international acts, rules of the World Trade Organization, internal rules of the member states of the European Union, European Union legislation, national legislation.

To achieve this goal, the following tasks are defined:

- to analyze the essence, structure, and content of existing guarantees to the participants of relations in the technology transfer system;
- to investigate the reasons and conditions that affect the level of effectiveness of guarantees to participants of technology transfer on the process of intensification of technology transfer;
- to formulate proposals for improving the system of guarantees for participants in the field of technology transfer.

4. The study materials and methods

The object of this study is to determine the essence, place, and role of the guarantees of technology transfer par-

ticipants in the general system of innovative support measures and the formation of proposals for their improvement.

The research hypothesis assumes that the existing market mechanisms of self-regulation of technology transfer are not able to meet the needs of the participants in this process and require additional intervention by the state. Existing disparate methods and techniques of state influence (regulation) of technology transfer need generalization and systematization. The formation of personalized methods of state regulation indicates the emergence of new means of regulatory influence. And also, the fact that already existing methods and techniques of state influence need to be improved due to the existing negative impact on the level of intensification of these processes. When conducting this study, it was assumed that the existing system of guarantees to technology transfer participants does not meet their needs. The basis for this was the evaluation of the experience of their application and the low efficiency of market self-regulatory mechanisms of technology transfer.

In the course of the research, a simplification was used, within which phonetically consonant means of innovative support were not taken into account. These included budget guarantees, insurance guarantees, and bank guarantees. These means of support are special manifestations of the general system of means of innovation support and have only a distant relation to the general system of guarantees for participants in technology transfer. In addition, guarantees of rights and legal interests in their generally accepted sense are not taken into account. Guarantees within the scope of this study are studied as a means of state (interstate) regulation of economic (social) relations. A means by which the state (or interstate entities) restricts the absolute freedom of technology transfer participants to compensate for their unequal status.

In the course of the research, the provisions of the European Union and World Trade Organization regulations, as well as information from open sources were used. In addition, recommendations of leading international institutions, statistical information, and public information were used. Formal-logical methods of cognition, methods of modeling, deduction, induction, comparison, methods of formal-logical interpretation of the content of scientific and economic categories and concepts were used to form conclusions.

5. Results of investigating the determination of directions for improving the system of guarantees for technology transfer participants

5.1. Studying the essence, structure, and content of existing guarantees to the participants of relations in the technology transfer system

Guarantees for technology transfer participants are a special means of state regulation of technology transfer, which consists in establishing:

- special duties for government bodies, business entities, and infrastructure technology transfer entities to provide information, training, and resource support;
- special powers for those subjects and participants of technology transfer who, due to the special flow of self-regulating market mechanisms, have an unequal status;
- a special procedure for the emergence, implementation and termination of economic obligations that arise in the course of technology transfer and its implementation in the production sphere of the economy of a certain country.

These components, in their combination and interrelationship, form a special preferential legal regime of regulation aimed at the intensification of innovation processes and technology transfer.

By their internal nature, guarantees can be divided into regulatory, financial, organizational, resource. In addition, the system of guarantees to participants of technology transfer directly depends on how this object is identified in different legal systems. Based on this criterion, it is possible to distinguish three main groups of guarantees that arise from the method of identifying the place of technology in the economic system:

- guarantees regarding intellectual property rights, if the technology is defined as a special type of intellectual property right;
- guarantees in case of identification of technology as an object of innovative legal relations;
- guarantees arising from the status of material embodiment of technology (devices, equipment, facilities).

5. 2. Studying the reasons and conditions that affect the level of effectiveness of the implementation of guarantees to the participants of technology transfer

The main reason for the low effectiveness of the existing system of guarantees to the participants of relations in the field of technology transfer is the lack of a unified approach to determining its status. In some countries, technology is identified as an object of intellectual property rights. These are countries such as the United States of America and Japan. In others – only as an object of innovative relations (Great Britain, Germany, Italy). Certain countries determine only the conditions of the technology's reversibility, without identifying it at the level of the economic object (Netherlands, France). In this case, identification of the technology as such occurs independently, by the parties to the technology transfer agreement. This specificity of identification of the legal status of technology determines the different species and class affiliation of this object in the general structure of the economy. Different ownership determines the use of different guarantees for technology transfer participants. Sometimes identification limits the ability to use certain warranties. In any case, the diversity of approaches to the identification of the essence of technology is the main obstacle in the way of international technology transfer.

Among the main reasons that affect the low level of efficiency are:

- a high level of private law regulation of technology transfer relations. This imposes on its participants the obligation to independently form guarantees and fix them in the relevant contracts. The lack of experience in properly fixing contractual clauses in technology transfer agreements determines their further low efficiency;
- significant anti-competitive restrictions introduced within the world's leading economies. Implementation of the technology gives significant competitive advantages. And most of the countries of the world are forced to introduce a large number of public protection mechanisms that limit the possibilities of implementing guarantees to the participants of technology transfer.

The above circumstances have a decisive influence on the system of guarantees for the participants of relations in the field of technology transfer. It is they who influence their effectiveness, which in turn determines the level of motivation when deciding to enter into technology transfer relations.

5. 3. Research into the formation of proposals for improving the system of guarantees to participants in the field of technology transfer

General proposals for improving the system of guarantees for participants of relations in the field of technology transfer have been formulated:

- unification of the legal status of technology at the level of international regulatory documents of the World Trade Organization, the European Union, and the Organization for International Cooperation and Development;
- introduction of minimum guarantees of rights for technology developers regarding the amount of remuneration for the transfer of rights to technology, other essential conditions of its transfer;
- formation of essential terms of technology transfer contracts at the level of model (typical) contracts with the establishment of the obligation to use them;
- consolidation of technology at the level of national legal systems as a special object of civil or economic (commercial) turnover, which will enable the system of general guarantees for the renewal of violated rights to be used for all participants in economic or civil relations.

6. Evaluating the results of studying the directions of improving the system of guarantees for participants in technology transfer

Within legal science, the term “guarantees of rights and legal interests” has its own special agreed meaning. Using them, it is customary to understand the system of legal norms, organizational means and methods, conditions and requirements provided by acts of legislation, with the help of which protection and protection of rights, freedoms and legitimate interests are carried out. In other words, these are the rights, duties, and responsibilities defined by the legislation of a certain country or an international act, which create conditions for the realization of the rights and freedoms of a certain subject. At the same time, the development of the regulatory system, international acts, and economic relations indicates that the term “guarantee” has acquired a different meaning. A systematic analysis of a number of sources shows that the term “guarantees” acquired its special meaning precisely within the limits of innovative relations and means of stimulating technology transfer.

Thus, the term “guarantees” is an integral part of any innovative support system. It is very often used as a generalizing category, covering the entire system of means and techniques aimed at supporting the implementation of innovations [5]. Often, only those powers that are provided for by the provisions of the legislation of the country where they were recorded are called guarantees [1]. Sometimes, guarantees are tried to be defined due to the special nature of those international documents regulating innovation relations and technology transfer [4].

This is exactly the meaning of the “guarantee” category that can be found in a number of current international regulatory documents. Thus, in 1994, within the framework of the Uruguay Round of the General Agreement on Tariffs and Trade of the World Trade Organization, the Agreement on Trade-Related Aspects of Intellectual Property Rights (abbreviated as “TRIPS”) was adopted [8]. This international document does not provide for a separate regulatory category of guarantee. It is not explained separately. However,

a number of preferences are provided for the participants of technology transfer. And these special “preferences” represent restrictions established in favor of certain participants in technology transfer. Such restrictions play a special role in technology transfer. On the one hand, they set the limit of permissible behavior, thereby limiting the absolute freedom of the participant in this relationship. On the other hand, all introduced restrictions are established to achieve public economic interest. Such restrictions include the subordination of state regulation of the circulation of objects of intellectual property rights to the needs of innovative relations and technology transfer. Creation of prerequisites for investment in the field of technology transfer. Formation of a special set of rights for the participants of these relations. All the listed means operate on the basis of the general mechanism of functioning of the international regulatory document. When a candidate country intends to join (ratify) the participants of any agreement of the World Trade Organization, it must bring its national legislation into compliance with the requirements of this organization. Thus, the provisions of such an international document should be reflected within national legal systems. Including guarantees to the participants of technology transfer, as they are established by the TRIPS agreement. Thus, guarantees in the sense of this international document are special rights and obligations fixed at the level of acts of national legislation of a certain country.

Within the framework program of the European Union “Horizon Europe”, the category of guarantee is used in two meanings [9]. In a broad sense, as a system of all means of supporting innovative development and technology transfer, and in a narrow sense, as one of the means of such support. Such a tool is the budgetary guarantee, as a way of ensuring the fulfillment of contractual obligations at the expense of state (local) budgets. At the same time, within the framework of this framework program, all guarantees to technology transfer participants are structured depending on the type of their recipient. For example, small (medium) enterprises and start-ups are provided with more guarantees than medium and large economic entities [10, 11]. In general, the framework program “Horizon Europe” does not contain a generalized definition of what guarantees are for the participants of technology transfer. However, it operates in this category and contains a number of clarifications about how they should work within the framework of innovative relations and technology transfer.

In any case, this category is very actively used both in regulatory acts and in the practice of technology transfer. The scale of use of the “guarantee” category requires a definition of what exactly they are and what they should be. At the same time, the existing regulation allows us to conclude that guarantees within the scope of innovation processes and technology transfer are not identical to the category of guarantee of rights and legitimate interests. Their role within social relations is completely different. Guarantees of rights and legitimate interests are one of the main social values of the legal system of a certain state. These are the mechanisms that protect every person or business entity on the territory of a certain state. That by means of which rights and legal interests will be protected, and in case of their violation and renewed. At the same time, guarantees within the innovation process and technology transfer play a different role. They are the special method by which the state (or intergovernmental entity) regulates the procedure for fulfilling those obligations that are formed within the framework of technology transfer.

Despite the variety of approaches to the definition of guarantees for technology transfer participants, a systematic analysis of their role and purpose allows us to identify their common features.

First of all, any guarantee should be useful. Its main purpose is to compensate for a certain shortcoming in technology transfer. Guarantees are aimed at ensuring the planned result within the framework of innovative relations and technology transfer. They have their conditional “beneficiary” who will use such a guarantee and actually consume its useful result.

Second, the guarantee must be certain. The probability of its occurrence must be ensured either at the level of coercive power of the state or at the level of a certain international institution. It should be formally defined at the level of a normative act of the national legal system, or at the level of an international treaty (agreement).

The third feature of the guarantee is its availability. The existing system of guarantees should be available to all participants in the system of relations in the field of technology transfer. At the same time, access to the system of guarantees should not depend on the will or formal decision of any state or local authority or international institution.

The fourth is that the system of guarantees must be real. One declaration of certain means or methods of support is not enough. Each guarantee must be accompanied by the obligation of some economic entity or state administration entity, which must ensure the provision (implementation) of such a guarantee. Such an obligation must be fulfilled. And subjects who are guilty of not fulfilling such an obligation should be held accountable for its non-fulfillment.

In general, a guarantee for participants in the field of technology transfer can be called that right or a certain set of stimulating and protective measures that they can reliably count on receiving. At the same time, within each guarantee there is always an obligated entity. That is, the state, authority, institution, or institution that is obliged to fulfill such a guarantee.

All of the above signs allow us to identify guarantees to technology transfer participants as a special direction (form) of state (or interstate entity) intervention in technology transfer relations, in a manner previously determined by legislative acts. In this case, the establishment of guarantees will represent the introduction within the legal system of special restrictions for the participants of these relations. Such restrictions should not depend on the will of the parties to the technology transfer agreement or other transaction. Such restrictions should be established in favor of the subject of technology transfer whose position is unfavorable due to market self-regulation. These restrictions will provide the minimum amount of opportunities that the subject of technology transfer can always count on. These restrictions, in the case of their introduction by the state, will allow to regulate the transfer of technologies, in a way different from the general regulation. And these differences, in their final result, should ensure such conditions of transfer, entry into which will be more attractive for less vulnerable subjects. By implementing a regulatory policy based on the introduction of additional guarantees for technology transfer participants, the state can obtain a special regime for the activities of such entities. This regime can potentially be both discriminatory and stimulative.

The formation of the essence of guarantees to the participants of technology transfer, as a specific means of

regulating technology transfer relations, allows them to be categorized according to several criteria. Thus, according to their nature, they can be divided into regulatory, financial, organizational, resource. Normative includes fixing at the level of acts of national or international legislation, certain powers, the implementation of which will allow applying the system of renewal of violated rights (judicial protection). In this sense, the guarantees to the participants of technology transfer coincide in content with the category of guarantees of rights and legitimate interests. This is also explained by the fact that technology transfer relations are a type of legal relations, and the same mechanisms of protection of rights and legitimate interests apply to them. Financial includes all existing and possible means of financial support and venture financing. Organizational ones should include those aimed at ensuring access to information, training, and previous experience in their use. Resources are guarantees under which technology transfer participants have the opportunity to get access to energy carriers or certain raw materials (materials) that are necessary for the creation of technology.

The system of regulatory guarantees for technology transfer participants directly depends on how this object is identified in different legal systems. Because of this, it is possible to distinguish three main groups of guarantees, which arise from the way of identifying the place of technology in the economic system:

- guarantees regarding intellectual property rights, if the technology is defined as a special type of intellectual property right;
- guarantees in case of identification of technology as an object of innovative legal relations;
- guarantees arising from the status of material embodiment of technology (devices, equipment, facilities).

Guarantee systems for technology transfer participants can be categorized according to many other criteria. However, the systematization of existing guarantees within the framework of technology transfer is not part of the subject of this study but is used only as an additional argument to the conclusions formed.

As a result, it is possible to form authors' definition of guarantees to the participants of technology transfer. First of all, guarantees should be defined as a special means of state regulation of technology transfer. It is this approach that best corresponds to the essence of the "guarantee" category, which has already developed in the field of international technology transfer. The essence of this specific means of regulation must be determined through the establishment of a special scope of duties. This is considered appropriate due to the fact that the fixation of the obligation, established by the coercive power of the state, underlies most actions within the economic system. This range of duties includes the duties of government bodies, business entities, infrastructure technology transfer entities to provide information, training, resource, and other support. It is also appropriate to introduce into the content of guarantees special powers for those subjects and participants of technology transfer who, due to the special flow of self-regulating market mechanisms, have an unequal status. It is advisable to add one more element to the specified elements of the content of guarantees to the participants of technology transfer. Namely, a special procedure for the emergence, implementation and termination of economic obligations arising in the course of technology transfer. Only these elements of the content of guarantees to the participants of technology transfer, in their combination

and interrelationship, are able to form a special preferential legal regime of regulation, aimed at the intensification of innovation processes and technology transfer. Any means of regulating economic relations can be effective only if they complement each other with other methods and techniques of influence.

An interesting example of understanding the essence of technology is the Law of Ukraine "On State Regulation of Activities in the Field of Technology Transfer" [12]. This regulatory document provides for the definition of technology as a special object of social and economic relations. It means: the result of scientific and technical activity, a set of systematized scientific knowledge, technical, organizational, and other decisions about the list, term, order and sequence of operations, the process of production and/or sale and storage of products, provision of services.

A systematic analysis of most leading points of view allows us to establish that the most common definition is that technology is a system of techniques and methods of processing or processing raw materials, materials, and finished products, as well as information about the sequence of execution of the specified economic operations. This definition will be the basis of further scientific research within the scope of this study. This specificity of identification of the legal status of technology determines the different species and class affiliation of this object in the general structure of the economy. Different ownership determines the use of different guarantees for technology transfer participants. Sometimes, identification limits the ability to use certain guarantees. In any case, the diversity of approaches to the identification of the essence of technology is the main obstacle in the way of international technology transfer. The lack of a unified approach to determining the status of technology or its non-determination at the level of national legislation can be identified as the main reason for the low effectiveness of the existing system of guarantees for technology transfer participants. The system of guarantees for technology transfer participants, like any other means of its stimulation and support, should be based on regulatory public rules. It is the fixation of rights, duties, and a special procedure for the fulfillment of obligations on a par with regulatory documents that gives them universally binding force. Conversely, all obligations that will be regulated by other rules, different from normative ones, will have defects of the degree of such obligation. The uniformity of the regulatory regulation of the status of technology at the level of international agreements and conventions and, as a result, at the level of national legislation, allows defining the same guarantees within different economic systems.

At the same time, global economic relations regarding the transfer of technologies continue to develop actively. All participants in innovative relations and circulation of technologies, due to the lack of a clear understanding of what technology is, are forced to independently determine its essence. Independently take active actions aimed at creating guarantees of successful technology transfer. The only instrument (form) within which the participants of these relations can create certain guarantees for themselves is the contract (contracts) in the field of technology transfer.

Contractual mechanisms for regulating the rights and obligations of technology transfer participants have both positive and negative characteristics of their effectiveness. The positives include the flexibility of regulation (the possibility of establishing individual duties and obligations and a per-

sonal, detailed procedure for their fulfillment). In addition, this includes detailing the general algorithm of cooperation regarding the creation of technology, its commercialization or transfer. Also, the contract makes it possible to determine a high degree of planning of those economic operations that are the basis of technology transfer. Negative manifestations of the use of the contract as a technology transfer tool are the lack of experience in drafting contractual clauses and too wide opportunities for waiving one's rights. In other words, in order to properly create an effective system of guarantees, technology transfer participants must possess a wide range of skills and abilities regarding the formation of their text and content. Not all participants in relations related to the creation, transfer of rights and implementation of technologies are endowed with such experience. In addition, the lack of regulatory fixation of the rules for the circulation of technologies leads to the fact that, within the framework of pre-contractual negotiations, the parties to this process are often forced to make significant concessions to each other. Such concessions are often conditioned by economic interest in the results of future cooperation. Such interest often leads to violation of the basic contractual principle of equality of the parties to the contract. And it forces its participants to give up their basic rights. Often, agreements in the field of technology transfer do not contain provisions for remuneration of technology developers or provide for the full transfer of rights to the technology in favor of the investor. Publicly unfair terms of contracts offered by venture capital funds or start-up investors are the main reason for reluctance of technology developers to enter into such communications. This situation must be resolved. It was decided in a way to limit the absolute contractual freedom of the participants in technology transfer. This absolute freedom must be limited solely for the sake of ensuring the general public interests of society and the economy as a whole.

Public national anti-competitive restrictions [4] are another circumstance that has a negative impact on guaranteed systems for technology transfer participants. Their introduction was first discussed in 2013, and the following year, the gradual imposition of anti-competitive restrictions on technology transfer participants began. The reason for this was the special economic characteristics of the technologies. As a result of the implementation or transfer of technologies, new products with new consumer characteristics are often created. This leads to the emergence of new product markets, the basis of which is the functioning of one business entity, a producer of goods with new consumer characteristics. In this state, such a producer is nominally in a monopoly position and can potentially abuse it. As a result, restrictions on the circle of consumers of goods, freedom of pricing, and the number of goods one can sell begin to apply to such a producer. Many successful projects of implementation of new technologies and the entities that implemented them fell under such state influence. In any case, this kind of restriction has an extremely negative effect on the number of participants in the field of technology transfer. A decrease in the number of subjects intending to become a participant in technology transfer has a negative effect on the intensification of technology transfer.

The issue of feasibility and scope of introduction of anti-competitive restrictions is too broad to be analyzed in detail within the scope of this study. That is why this circumstance is simply defined as one that affects the level of effectiveness of guarantees to technology transfer partic-

ipants but is considered on the basis of previous scientific achievements. Without additional critical analysis of all the factors and conditions underlying it.

The above circumstances have a decisive influence on the system of guarantees for the participants of relations in the field of technology transfer. It is they who influence their effectiveness, which in turn determines the level of motivation when deciding to enter into technology transfer relations.

At the same time, technology transfer means the transfer of rights to technology from one participant to another. The rules of such a transfer are established either at the level of individual contracts or at the level of normative and regulatory acts. At the heart of this interaction are active actions to transfer the rights of the developer of the idea for its use to another entity. In any case, the transfer of technology is a process that creates consequences for all participants in this relationship.

Technology transfer can be characterized as an activity related to bringing an idea to the level of its implementation in the production sphere of the economy. Technology transfer participants are guided by the desire to carry out economic activities using technology. The purpose of technology transfer is, as a rule, the establishment of a new production unit within a certain country. All actions, all participants in the field of technology transfer are subordinated to this goal.

All the mentioned conclusions show that none of the existing systems of guarantees to the participants of technology transfer, existing in different legal systems, meets their needs. This indicates that special guarantee systems should be used for technology transfer purposes. They should be based on special means and methods of innovative support, organizational, administrative, resource, and financial means formed taking into account the existing regulatory mechanisms.

Investigating the outlined issues of circumstances that influence the effectiveness of the system of guarantees for technology transfer participants, it is possible to form the main directions for their improvement. These directions also reflect the goal to be achieved as a result of taking actions to improve existing guarantee systems. The purpose of establishing guarantees for technology transfer participants, as for all other means of innovation support and stimulation, depends on the will of the state. Guarantees will have a positive impact only when they are aimed at eliminating the negative impact of failures of market mechanisms. The purpose of their introduction should be aimed at intensifying and supporting innovative processes and technology transfer. The choice of areas of improvement was made solely on the basis of those circumstances that were revealed during previous scientific research and analysis of statistical information. It was the revealed inability of market mechanisms to ensure the realization of the rights and legitimate interests of technology transfer participants that formed the basis of further proposals to improve the guarantee system.

The improvement of the existing systems of guarantees to the participants of relations in the field of technology transfer should take place exclusively in the way of changing those normative acts in which these guarantees are already mentioned. Any other way of improvement will require unjustified actions and processes of a social and political nature. The main thing, within the framework of improving the existing regulation of guarantees of technology transfer participants, is the unification of the legal status of technology at the level of international normative documents of the World Trade

Organization, the European Union, and the Organization for International Cooperation and Development. This will make it possible to form a critical number of unified approaches to the definition of technologies within most economically developed countries. Such a result, on the one hand, will make it possible to become a reference point for the legal systems of other countries, and on the other hand, it will significantly contribute to the intensification of international technology transfer. No less important is the introduction of minimum guarantees of rights for technology developers regarding the essential conditions of its transfer. Such a method of regulatory influence will make it possible to correct the situation of actual inequality of some participants in the transfer of technologies in front of others. Although these restrictions are an intervention in classical market relations, they are aimed at ensuring the rights of those participants who, due to economic dependence, cannot do it on their own. This goal of their introduction should organically fit into most democratic legal systems, as it corresponds to the basic principles of interaction between the state and society. As an additional measure of regulatory influence, within the limits of guarantees to technology transfer participants, there is the formation of compensatory essential conditions and protective clauses of technology transfer agreements. Such formation, under the condition of the functioning of the market economy, is possible only under the condition of limiting the freedom of contract at the level of model (typical) contracts. This regulatory technique is already known within the European Union countries. However, in the practice of applying the legislation of the European Union, indicative standard (model) contracts are used, which can be freely chosen, adjusted, changed by the participants of technology transfer. At the current stage of the transfer of rights to technology, such typical (model) contracts are a way to eliminate the lack of experience of certain participants in these relations. Such a typical (model) contract is used when the participants of technology transfer do not have the necessary level of skills and abilities to fix their guarantees. This approach must be changed. The role of a standard (model) contract, as a conditional guideline that can be freely changed by the parties, does not protect unequal participants. Only when the freedom of the technology transfer agreement will be narrowed, such a typical (model) agreement will be able to perform a protective function. If the participants of the technology transfer are obliged to use the technology transfer agreement, the content of which is already defined at the level of protective clauses, it will have a protective value. But the scope of those rights that cannot be narrowed by concluding a technology transfer agreement will depend on the will of the state authority or institutional entity that will approve the form of such an agreement. This is a shortcoming, but a shortcoming that can be promptly resolved at the level of public dialog and law enforcement practice.

A derivative means of regulating guarantees to technology transfer participants is the establishment of technology at the level of national legal systems as a special object of civil or economic (commercial) turnover. Such a regulatory approach, first of all, will make the transfer of technologies more understandable, and secondly, it will enable the system of general guarantees of rights and legitimate interests for all participants in legal relations. The use of a general system of guarantees and protection of rights and legitimate interests will make technology transfer more stable, predictable, and planned.

Implementation of the established areas of improvement of the existing system of guarantees to the participants of

technology transfer can be implemented by implementing the following measures (actions).

Fixation in international agreements of a unified definition of technology as a system of methods and techniques for handling or processing raw materials, materials into finished products for industrial and technical purposes and consumer goods. It is considered appropriate to propose changes to the provisions of the Agreement on Trade Aspects of Intellectual Property Rights (abbreviated as "TRIPS") and to fix the definition of technology in it as well. A similar concept of technology should be enshrined in a joint decision of the OECD and the Statistical Office of the European Union, within the framework of the approved methodological recommendations on innovation and innovative activity. The definition of technology should be included in the content of the framework program of the European Union "Horizon Europe".

The issue of factual inequality of the parties to technology transfer agreements can be resolved by implementing measures to limit the absolute freedom of the parties to such agreements. A potentially effective way of such a restriction is the introduction of special protective clauses at the level of national legal systems. Protective clauses, which should be included in the content of any technology transfer agreement, regardless of the will of its parties. This is possible only by introducing restrictions on the possibility of freely forming the content of contracts in the field of technology transfer by introducing standard contracts. By approving standard (model) contracts in the field of technology transfer, states and international organizations can not only fix all the specified limitations of contractual freedom in favor of the technology developer. They will be able to establish a predetermined algorithm of interaction between technology transfer subjects and ensure a higher level of rights protection in this area. Within this algorithm, it is possible to fix all stages of technology transfer, fix a minimum set of guarantees of a private law nature and make technology transfer more stable. The clarity and predictability of the future cooperation between the developer and the investor (customer) is guaranteed to intensify and scale this process.

The following warnings should be set in place:

- introduction of a ban on the alienation of all rights to the technology with a simultaneous guarantee to the developer of certain powers regarding the technology that was transferred to the customer (investor, recipient);
- prohibitions on the use of discriminatory provisions of contracts in the field of technology transfer, which would significantly narrow, reduce or deprive the technology developer of his rights.

Another area of improvement of the system of guarantees for technology transfer participants is the process of fixing the status of technology at the level of individual national legal systems. The introduction of technology into internal economic objects will allow all participants of the transfer to apply a general system of protection of rights and legitimate interests. In the absence of such a definition, the rights and legal interests of technology transfer participants will be protected not absolutely, but only relatively. Under such conditions, the process of restoration of violated rights acquires signs of probability. Conversely, in the case of consolidating the status of the technology, the guarantees to the participants of the transfer become more effective.

The main advantages of the proposed regulatory measures within the framework of guarantees to participants

in the field of technology transfer are their universality, the possibility of spreading to an undefined circle of persons and to any types of technology transfer.

Proposed directions for improving the system of guaranteeing participants' rights in the field of technology transfer aimed at increasing its effectiveness. They are the authors' vision of the direction of development of this issue. When forming them, the circumstances that are discussed in scientific circles were taken into account. In general, the identified directions are suitable both for use within the definition of the official rules of their activity and for its further scientific development.

The main advantage of this study is that its results can be used within the framework of the normative technique of forming prescriptions of acts of international legislation or acts of national legislation. Further development of this research will allow obtaining results of practical orientation. On its basis, drafts of international documents can be formed. The study is aimed only at improving the existing approach to the system of guaranteeing the rights of participants in the field of technology transfer. It is not excluded that in the case of formation on its basis of the process of changing their status, the proposed concept will require some refinement. However, in any case, all previous scientific studies [1–7] either did not formulate such proposals or investigated separate aspects of this issue. Thus, various options for increasing the effectiveness of guarantees to technology transfer participants were proposed. This is training, the use of various management tactics, and the open sharing of experience from successful technology transfer projects. However, all these results have no signs of universality and are not able to influence all participants of technology transfer. At the same time, the results of this scientific study contain conclusions that can become the basis for the formation of official regulatory rules, which is their advantage over similar studies.

The main drawback of the study is the lack of objectively systematized information about the effectiveness of the application of guarantees by participants in technology transfer. Regional features of technology identification have a significant negative impact on the research of this issue. The diversity of such approaches determined the significant level of generalization of conclusions and research results. This shortcoming of the study must be taken into account in the case of further study of the outlined issues. Especially in the case when, on its basis, research will be conducted on the peculiarities of the means of protection of violated rights within the boundaries of individual countries.

7. Conclusions

1. The definition of guarantees for technology transfer participants has been formed, as a special means of state regulation of technology transfer, which consists in establishing:

- special duties for government bodies, business entities, and infrastructure technology transfer entities to provide information, training, and resource support;

- special powers for those subjects and participants of technology transfer who, due to the special flow of self-regulating market mechanisms, have an unequal status;

- a special procedure for the emergence, implementation and termination of economic obligations arising in the course of technology transfer and its implementation in the production sphere of the economy of a certain country.

Such duties, powers, and the order of their execution, in their combination and system, should form a special preferential legal regime of regulation aimed at the intensification of innovation processes and technology transfer.

2. The relative effectiveness of the existing system of guarantees for technology transfer participants was established due to a number of objective circumstances. The main reason for the relative effectiveness of the system of guarantees for technology transfer participants is the regional specificity of defining the essence of technology.

3. Proposals for improving the system of guarantees in the field of technology transfer have been formulated:

- unification of the essence of technology at the level of normative documents of the World Trade Organization, the European Union, the Organization for International Cooperation and Development;

- introduction into national legal systems of minimum regulatory rights guarantees for technology developers regarding the essential conditions of its transfer;

- formation at the level of model (standard) contracts, a set of compensatory essential conditions and protective clauses, with the establishment of the obligation to use them and the impossibility of changing them at the will of the parties;

- regulation at the level of national legal systems of technology as a special object of economic (commercial) or civil turnover, which will allow the system of general guarantees of rights and legitimate interests to be used for all participants in technology transfer.

Conflicts of interest

The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study and the results reported in this paper.

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Data availability

All data are available in the main text of the manuscript.

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