

The object of this study is the essence and directions of improvement of the normative construction of the concept of technology, which is used within the framework of legal regulation of financial support of the innovation process and technology transfer within the framework of the law of the European Union. In the course of summarizing and studying the existing regulations, it was established that they are not unified and differ significantly. This does not meet the needs of participants in the innovation process and subjects of technology transfer. It has been proven that the most negative impact of the disparity of legal regulation occurs during the implementation of means of financial support for innovative processes. The expediency of improving the existing concept of technology definition by fixing its single generalized definition has been substantiated. Authentic definition of technology is proposed as information of an organizational and technical nature about the sequence of production operations, which can be expressed in the form of the results of scientific research, research and design works, a system of objects of intellectual property rights, information of an organizational and technical nature, technological documentation, equipment, tools, machines, and mechanisms. It was substantiated that this definition makes it possible to eliminate most of the identified problems and is formed on the basis of the existing needs of the participants of technology transfer.

The study is aimed at the formation of general theoretical foundations for improving the essence of technology for the purposes of legal support for financial support of innovation processes and technology transfer in the European Union. The research results could be used in the formation of international normative acts, acts of national legislation, and serve as a basis for further scientific research on these issues

Keywords: technology regulation, technology transfer, financial support of technology, technology transfer regulation

DIRECTIONS FOR IMPROVING THE CONCEPT OF TECHNOLOGY FOR THE PURPOSE OF FINANCIAL SUPPORT FOR THEIR TRANSFER WITHIN THE EUROPEAN UNION

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1. Introduction

Technological renewal of the production sector of the economy is the key to the intensive development of any country or society. The share of knowledge-intensive technologies used in the economic system of a certain country determines the level of its economic dominance in world trade. And a public product made by using the latest technologies is able to satisfy the new needs of consumers and create significant competitive advantages for producers.

Such significant advantages of technological renewal predetermine the significant level of interest of economic entities in the transfer of technologies. The intensification of economic relations and development indicates the entry of technology transfer into the domain of public interests. Economically developed countries and international economic entities pay great attention to support, intensification, and stimulation of technology transfer. Various methods and techniques are used for this, starting from the creation of a special legal regime for participants in technology transfer,

ending with direct individual support of key projects. At the same time, the main regulatory focus is exclusively on the stage of technology dissemination from its developer to the economic entity that organizes economic activity. And most normative and regulatory acts determine the mechanisms, guarantees, methods of transferring rights to technology, means of state support and regulation of their transfer. However, inadequate attention is paid to what exactly constitutes such an economic phenomenon as technology. Moreover, different states define its internal nature in different ways. And various interstate entities, such as the European Union, generalizing these approaches, often recommend radically different ways of fixing it in the provisions of their regulatory and legal acts. The different understanding of what exactly technology should be, within the limits of European Union law, has a negative impact on the number of successful examples of technology transfer and the level of their penetration into the production domain. The general direction of the state policy of most countries to create the most favorable conditions for the transfer of technologies is difficult to imagine without the unification of the general approach to understanding technologies. This becomes especially important when it comes to financial support for technology transfer within the European Union since both the investor and the recipient of the financial investment need a clear, predictable understanding of exactly what will be created with their funds. Despite this, the fact remains that the generalization of the essence of the technology has not been done to date.

This determines, on the one hand, the relevance of scientific research on this topic, and, on the other hand, assigns to scientists, on the other hand, the task of forming proposals for improving existing constructs of the concept of technology. It is science that should form such proposals and thereby stabilize and intensify technology transfer and innovation processes.

2. Literature review and problem statement

Issues related to the definition of the essence, features, internal nature, and place of technologies within the innovation process and technology transfer in the law of the European Union are investigated both in general and in the section of their individual elements, both at the national level and within international regulatory documents.

Thus, work [1] examines the issue of compliance of the existing rules of technology transfer with the needs of such participants as scientific and research institutions. It was concluded that the main approach to defining the essence of technologies as a set (system) of objects of intellectual property rights does not meet the needs of technology transfer participants, as it is not able to protect the main idea (basic knowledge). However, within the scope of the specified work, no proposals were formed regarding the improvement of the essence and features of the technology, which are fixed by the provisions of the acts of the current legislation. In this work, only the signs and reasons for the indicated inconsistency were substantiated.

Within the scope of work [2], a study of the compliance of the existing mechanisms of licensing technology transfer within the framework of the law of the European Union and the legislation of the Republic of Serbia was carried out. It was concluded that the proposed understanding of technolo-

gy as a set (system) of objects of intellectual property rights does not meet the needs of technology transfer participants. The provisions of the legislation of the European Union were analyzed, in the part related to the transfer of rights to technology by concluding a corresponding license agreement. It was concluded that the author (developer) of the technology has no means of protecting his personal rights since s/he does not have the right to revoke the license, the terms of which are violated by its recipient. It was concluded that the absence of the right to revoke the license violates the requirements of the antimonopoly and competition legislation of the European Union. However, within the framework of this study, no proposals were made to improve the essence and construction of the concept of technology. Recommendations were only offered regarding those protective clauses that the parties to the relevant license agreement should use to eliminate the identified gap in legal regulation.

Study [3] analyzed the practice of technology transfer on the example of small industrial enterprises of the European Union. A number of reasons and conditions have been formed that negatively affect the transfer of technologies involving small industrial enterprises. Among the main negative factors, the low effectiveness of the existing regulatory mechanisms for fixing the essence of technologies was cited, due to their complexity, confusion, and inconsistency. Although within the scope of this research, it was concluded that the lack of a single unified approach to determining the essence of technology has a negative impact, no ways of eliminating the identified problem were proposed.

In work [4], the reasons and conditions that stand in the way of the transfer of marine technologies were analyzed. Within the framework of this study, it was proved that the main reason for the low level of transfer of marine technologies is the fragmentation of international regulation. The lack of basic concepts and categories (such as technology and technology transfer) has been proven to make the existing maritime technology transfer rules complex and ineffective. This, in turn, has a negative impact not only on the number of those wishing to carry out such a transfer but also on the means of financial support provided within the framework of technology transfer. A number of proposals were made to improve the current international regulation. However, such proposals do not apply to all technologies, but only to marine technologies. There were also no suggestions for improving the essence and characteristic features of technology as a special object of economic and social relations.

When conducting research [5], the ratio of national and international regulation in the field of technology transfer was analyzed. It was proved that the main reason for the low level of examples of technology transfer is the classification of technology as objects of intellectual property law. Conclusions were made that technology plays a different role within economic systems and processes. Such a role cannot be identified exclusively with objects of intellectual property law. It was also concluded that the current legislation of a certain country cannot independently regulate the transfer of technologies, without taking into account the recommendations of international agreements. The main reason for this is that the current level of economic development indicates that the majority of technology transfer operations are of an international (interstate) nature. However, within the scope of this study, no proposals were made to improve the essence and characteristic features of the regulatory design of the technology as a way to eliminate identified regulatory deficiencies.

In the course of study [6], an assessment of the compliance of the legislation of the European Union from the point of view of the presence of obstacles in criminal activity in the field of technology transfer was provided. During the research, it was established that the legislation of the European Union does not meet the existing criminological requirements, as it does not establish any rules for the transfer of technologies in their informational embodiment (form). This leads to the fact that information about dual-purpose technologies (both military and civilian) falls into the hands of terrorist organizations, bypassing existing restrictions. It is proposed to make changes to the legislation of the European Union in order to regulate the status of technology in its information embodiment (form). However, no conclusions were formed regarding the improvement of the essence and features of technology as a whole, with a change in the basic approach to determining its place within economic and social relations.

Work [7] analyzed the compliance of existing mechanisms of financial support of innovative relations and technology transfer, the essence and features of innovations and technologies in the agricultural domain. During the research, it was established that the legislation of the European Union contains numerous provisions, the interpretation of which allows us to conclude that technology is not identified with the system of objects of intellectual property rights but is a broader concept. Emphasis was placed on the fact that, from an economic point of view, technology acts as a special basis for the implementation of economic and economic activities. It has been proven that the current legislation of the European Union, when defining the essence and features of technology, does not unify it with the mechanisms of financial support for innovative activities and technology transfer. As a result, the effectiveness of stimulating innovative relations and technology transfer is significantly reduced. However, within the scope of this research, methods, and directions for solving this problem were not formed, but only a conclusion was formed about its existence. As a result of the research, it was not proposed to make changes and unify the understanding of the essence of technology as a special object of economic and social relations.

All the works reviewed above [1–7] testify to the focus of scientific research on solving the issue of improving the efficiency of technology transfer, through a change in the approach to understanding their essence. No works were found, within which proposals for improving the generalized constructions of defining the essence and features of technology would be formed. But we can talk about the presence of many problematic aspects of the implementation of technology transfer and a high level of private law and public interest in this process.

All this allows us to assert that it is appropriate to conduct a study aimed at forming proposals for improving the construction of the definition of the essence and features of technology. Formed proposals should ensure a higher level of technology transfer efficiency. The conclusions formed within the scope of this study could become the basis for further scientific advancement, as well as the basis for the formation of promising international and national regulatory acts.

3. The aim and objectives of the study

The purpose of our study is to substantiate the directions for improving the understanding of the essence and

characteristic features of technologies, for the purposes of financial stimulation of their transfer in the law of the European Union. The obtained achievements could be useful 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 fundamental approaches to determining the essence and characteristic features of technology within the framework of the legislation of the European Union, to evaluate their shortcomings and advantages;

- to formulate proposals for improving the essence and characteristic features of the technology within the framework of the legislation of the European Union, for the purposes of financial support for their transfer.

4. The study materials and methods

The object of our research is a system of regulatory and legal methods and ways of determining the essence and content of the concept of technology.

The hypothesis of the study assumes that existing regulatory mechanisms for determining and identifying the essence of technology do not meet the actual needs of entrepreneurs and institutions of the European Union and therefore require improvement. When conducting this study, it was assumed that the inconsistency of the existing approach to the definition of technology negatively affects the level of their transfer. The basis for this was an assessment of the essence of technologies under the legislation of the European Union and a further assessment of the relevance of the importance of technologies within the framework of economic and social relations.

In the course of the research, a simplification was used, within which the regional features of the definition of technologies were not taken into account. Such a simplification was used due to the fact that the vast majority of countries profess a special, unique legal regime for their use, the study of which is irrational, as it must be changed in the future.

In the course of the research, the provisions of the European Union and World Trade Organization regulations, information from open sources were used. In addition, recommendations of leading international institutions, statistical information, and public information were used.

When conducting the research, general scientific theoretical methods were used, namely: analysis, synthesis, deduction, induction, comparison, abstraction, generalization, system and functional methods, modeling methods, formal and logical interpretation of the content of scientific and economic categories and concepts.

5. Results of the study of directions for improving the concept of technologies for their financial support

5.1. Study of existing approaches to determining the essence and features of technology within the framework of the legislation of the European Union

A systematic analysis of regulatory approaches within the regulatory systems of the European Union and the countries of the European Union shows the lack of uniformity in the approach to understanding the essence of technology.

The prevailing approach is that technology within the limits of the economic system, economic and civil turnover is perceived as a set (or system) of objects of intellectual property law. At the same time, all other legal statuses that technology can acquire in certain social relations are ignored. The information included in the technology, or the equipment, machinery, and mechanisms in which it was implemented, is not regulated in any way.

The classification of the main approaches to determining the essence of technologies, as a result of the systematization of scientific achievements and approaches enshrined in regulatory documents, is shown in Fig. 1.

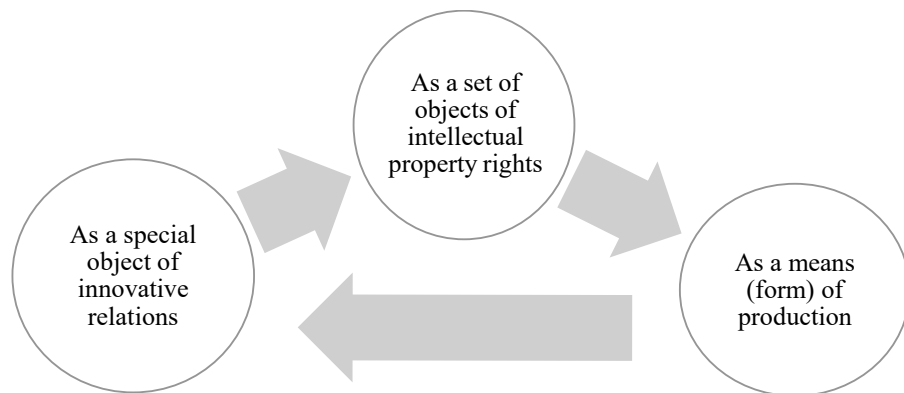


Fig. 1. Classification of the main approaches to determining the essence of technologies

Within the framework of the legislation of the European Union, in general, there are no definitions or categories that would reveal the essence of the concept of technology. The same situation is observed within the normative regulation of financial stimulation of technology transfer. When exercising regulatory influence, the approaches defined by the World Intellectual Property Organization and the World Trade Organization are adopted as a basis. Within this approach, technology is understood as a special complex object of intellectual property law, based on knowledge, experience, skills, processes, structures, and resources.

At the same time, a systematic analysis of the Framework Agreement of the European Union “Horizon Europe” allows us to conclude that for the purpose of financial support for innovations and technologies, the EU uses a broader approach to defining the essence of technologies. Analysis of this legal act shows that financial support is provided to technologies that have found their external manifestation in a large number of special objects of civil and economic turnover. The classification of the main approaches to determining the essence of technologies, according to the Horizon of Europe Framework Program, is shown in Fig. 2.

A similar situation can be observed when studying approaches to the definition of technology within the scientific achievements of other scientists. For the first time, technology in the modern general sense is defined in work [8] as the implementation of a scientific method of processing one thing into another. It was this work that formed the basis of the understanding of technology as a certain means of production, a way of processing raw materials into finished products with other consumer properties. Technology as the main investment object, which has an innovative value for updating the company’s activities, was defined within the scope of work [9]. The identification of technology as the main and key innovative object, which is the basis of

the highly competitive development of both an individual company and the entire economic system, was determined in work [10]. These works became the basis for the development of the concept of technology identification as a special innovative object. A generalized system of understanding technology was reported in [11]. There, technology was defined as a means of production that can be invested in order to obtain an innovative effect. Within economic systems and relations, technology performs several roles (meanings), and the most common is its identification with the means (method) of production. At the same time, technology acts as a means of production. That is, the equipment,

facilities, machines, and mechanisms that are used to process raw materials into finished products. At the same time, such products are endowed with such consumer characteristics that were not achievable before. In addition to the concept of technology as a means of production, the information and data that mediate those production operations, which are used to process raw materials into finished products, are also covered. In other words, this understanding of the essence of technology encompasses its material and informational embodiment.

Next, according to the degree of significance within the limits of economic relations, it is possible to define approaches to identify the essence of technology with innovative objects and objects of intellectual property law [6, 7].

Technology is endowed with all the properties of innovation. Within the innovation process and innovation relations, technology can take the place of innovation because it has the same features. As a result of the implementation of technology, the business entity that implements the technology can gain significant competitive advantages over other participants in economic relations [6–9]. At the same time, technology can also be the result of implementing innovations within a certain economic process. Thus, by implementing new ideas, the manufacturer of certain products can get a new way of processing raw materials into finished products, that is, he can get a new technology. As a result of comparing technology and innovation, we can come to the conclusion that they are common objects within the same type of relationship. However, at the same time, technology is a broader concept, as it can appear in other social relations and is endowed with a wider range of internal features.

The prevalence of technologies within various economic and social relations has led to the emergence of rules on how technologies should be involved in one or another system of relations. With the appearance of the first rules of technology transfer, the problem of determining the essence of technology has significantly intensified. The main guarantee of the effectiveness of any rules regulating social relations is a clear determination of the phenomena and categories that fall under their influence. Because of this, the effectiveness of technology transfer began to directly depend on which of the definitions of technology is the basis of regulatory regulation.

The significant strategic interest that technology arouses in the main regulator of social relations – the state – means

that each of the countries tries to establish its own, special approach to the regulation of technology transfer. At the same time, within the framework of international legislation, there are almost no unified rules for a uniform definition of the essence of technology. Economically developed associations of countries such as the European Union are no exception to this rule.

The lack of a single approach to determining the essence of technology within the framework of the legislation of the European Union (“EU”) is determined on the basis of a systematic analysis of the rules of its transfer. In most EU regulatory acts, technology is understood as an object that exists autonomously and does not require additional definition within the framework of the legal system [1, 7]. This interpretation is determined by those international obligations that were previously accepted by EU member states and defined at the level of a number of international agreements.

Thus, within the framework of the activities of the World Intellectual Property Organization (“WIPO”) in 2005, practical recommendations were formed to determine the essence of technologies [12]. It was proposed to understand it as a special complex object of intellectual property law. An object that includes a system of knowledge, experience, skills, processes, organizational and legal structures, as well as material resources combined with them. At the same time, such an object must be used in the creation, production and supply of goods and services.

At the same time, the World Intellectual Property Organization recommends to participating countries to introduce into their national legal regulation just such a normative approach to determining the essence and legal nature of technologies. It is also proposed to ensure the protection of rights and legitimate interests with the help of legal mechanisms of special protective documents – patents [12].

Within the World Trade Organization (“WTO”), on April 15, 1994, the Agreement on Trade Aspects of Intellectual Property Rights (“TRIPS” Agreement) was adopted [13]. This international document became the main one in regulating the status of objects of intellectual property rights between WTO member countries. This agreement does not define the concept of technology but the rules for its transfer are established. A systematic analysis of the TRIPS Agreement allows us to determine that the transfer of technologies should be understood as the transfer of rights to objects of intellectual property rights [13]. This allows us to conclude that the approach to defining the essence of technology within the WTO coincides with the definition of technology identified within WIPO.

The absence of an official (legal) definition of technology for the purposes of its financial provision and support has a significant destructive effect on the level of their transfer. And the identification of technology with objects of intellectual property law does not meet the needs of the participants in the relations of stimulating the introduction of technologies. This approach does not take into account most of the actually existing manifestations of technology that should be protected by existing regulatory rules. This makes it necessary to improve the existing approach to determining the essence of technology.

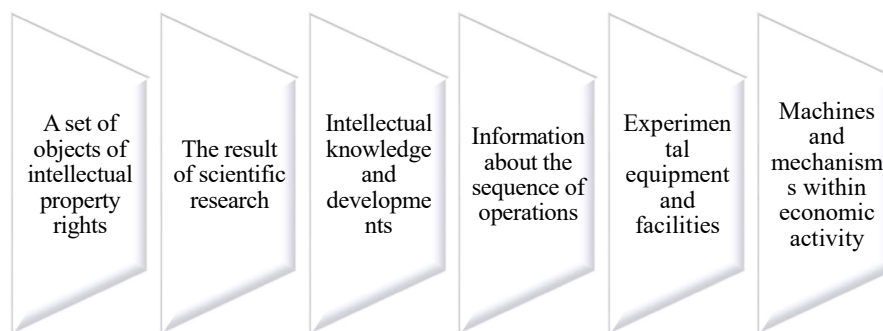


Fig. 2. Classification of the main approaches to the definition of the essence of technologies, according to the Framework Program “Horizon Europe” [14]

5. 2. Study of ways to improve the essence of technology for the purposes of financial support, according to the legislation of the European Union

The identified differences indicate that the official (legal) definition of technology has ceased to meet the needs of participants in economic and social relations, and the EU is trying to eliminate this problem in the following way. The “Horizon Europe” program is a regulatory document that gradually evolves as a result of systematic processing of the results of the implementation of previous means of financial stimulation. It already reflects the recommendations of technology transfer participants who received such facilities. As a result of the improvement of financial support measures for the transfer of technologies, the actual list of objects included in the technology was expanded and adjusted to the needs of the participants of their transfer.

In general, the analysis of all existing approaches to the essence of technology, its place, and the role it plays in economic and social relations, and especially in the implementation of financial support measures for the transfer of technologies, allows us to conclude that the existing regulatory approach to their definition is inconsistent. This indicates the need to eliminate the identified problems since such inconsistencies have an extremely negative impact on the effectiveness of the applied financial support measures for technology transfer [3, 5, 7].

The most expedient way to eliminate all identified shortcomings of the approach to the definition of technology, for the purposes of their financial support, is to fix an updated official (legal) definition of it. This will make it possible to systematize further regulatory mechanisms of regulatory influence and avoid problems related to determining the place and role of technology within economic and social relations. The introduction of a single unified understanding of technologies will stabilize those means of financial support for the implementation of technologies that are provided within the EU. The availability of a generalized updated definition of technology will contribute to a more meaningful implementation of technology transfer. The presence of a definition will simplify the understanding of the essence of the technology and allow the participant of its transfer to obtain more effective protection of their rights.

The updated definition of technology should take into account the purpose of technology within the economic system, which was formed in the course of scientific research. Take into account the practice of using means of financial support for technology and be based on the recommendations of the United Nations Conference on Trade and Development (UNCTAD).

As such a definition, it is advisable to offer the following:

Technology is information (information) of an organizational and technical nature about the sequence of production operations, regarding the processing of raw materials into finished products, which should be expressed in the form:

- the results of scientific research, research and design works;
- systems of objects of intellectual property rights;
- information of an organizational and technical nature, technological documentation;
- equipment systems, equipment, machines, mechanisms.

This definition should be fixed within the Framework Program of the European Union “Horizon Europe”.

6. Discussion of results of the study of directions for improving the regulation of innovative investment

Technology is a special economic phenomenon and object. The general level of economic development of entire countries and branches of industry depends on the degree of mass spread of production technologies. The multifaceted internal nature of technology determines that it is endowed with the ability to act as an object of numerous social and economic relations. Because of this, there are many disputes in scientific circles about how to define the inner nature and characteristic features of technology. Understanding the essence of technology, for the purposes of its financial support, is impossible without defining and identifying its role and place in economic and legal systems. Measures of financial stimulation of technology transfer have always been and will be derived from those branches of legal regulation that determine the nature of technology. It is because of this, first of all, that it is necessary to define what technology is within the framework of leading regulatory approaches, economics, science, and technology.

It can be concluded that within the framework of EU legislation, the main approach is to identify technology with the system of objects of intellectual property rights. The main drawback of this approach to determining the essence of technology is its one-sidedness. Within its limits, other manifestations of technology are not taken into account, such as the results of innovative activity, the information embodiment of technology and the system of equipment and equipment in which it has already been embodied [6]. The main advantage of this approach is that technology transfer participants can receive protection of their rights and interests within the already established system of public protection of intellectual property objects [12].

Scientific works [1–7] also confirm the ineffectiveness of such a regulatory approach, as it does not correspond to the purpose of technology within economic systems and is unable to ensure the rights of participants in technology transfer.

Scientists also argue about the inconsistency of the existing approach to defining the essence of technologies [1–7]. All of them are unanimous in the fact that it is not advisable to reduce the essence of technology exclusively to the system of objects of intellectual property rights. The main drawback of the approach, according to which technology is identified with the object (objects) of intellectual property, is that other manifestations of technology remain unregulated. Thus, the technology that was created as a result of scientific research and research and design works cannot yet receive protection as an object of intellectual property law, however,

it already reflects all the main technological ideas [1]. The information embodiment of technologies (descriptive information and information about the technology) is not at all endowed with the features of an intellectual property object, but it contains everything necessary for the material reproduction of the technology itself [6]. Those equipment, facilities, machines, and mechanisms, which in fact are already a material reproduction of technology, cannot receive full protection at all, because the protection of the rights of objects of intellectual property rights is too formalized [4]. In addition, the role and purpose of technology within economic and social relations indicates a completely different place that it should occupy as the object of these relations [2]. Such a place should be giving technologies the status of means of production [3], an innovative object [5]. For convenience, the main concepts, and approaches to understanding the essence of technology are shown in Fig. 1.

The ineffectiveness of the approach to the identification of technology with the system of objects of intellectual property rights is also determined by the body of the UN General Assembly – the UN Conference on Trade and Development, UNCTAD. Thus, the specified international institution questions the expediency of further normative identification of technology and objects of intellectual property rights. The main reason for this UNCTAD identifies the impossibility of the intellectual property regime to ensure the protection of new objects (software, biotechnological products, circuits of integrated circuits). Violation of antimonopoly restrictions is defined as an additional problem, in the case of establishment of a special mode of use of intellectual objects [15].

Moreover, in the course of its functioning, UNCTAD formed its vision of the essence of technology. So, it was determined that technology is information that can exist in the following forms:

- all forms of industrial property, with the exception of trademarks, service marks and trade names, if they are not part of technology transfer operations;
- know-how and technical expertise in the form of feasibility studies, plans, schemes, models, instructions, manuals, formulas, basic or detailed engineering projects, specifications, and training equipment;
- the results of services involving the involvement of technical consulting and management personnel, personnel training;
- technological knowledge necessary for installation, operation and functioning of installations and equipment, as well as turnkey projects;
- technological knowledge necessary for the purchase, installation and use of machines, equipment, intermediate goods and/or raw materials, which were acquired by purchase, lease, or other means;
- the technological content of agreements on industrial and technical cooperation [16].

The given list of forms of implementation (functioning) of the technology is much broader than the approach envisaged within the framework of EU legislation. In addition to technology as a set of objects of intellectual property law, other objects of civil and economic turnover, which can take the form of technology, are also represented here. The main advantage of this approach is that if it is used, the participants of technology transfer will be able to more effectively protect their rights and legitimate interests. Fixation as a technology of a wider range of objects will make it possible to extend normative guarantees to them, including those

systems of restoration of violated rights guaranteed by the coercive power of the state. The main drawback of this approach is that it needs further development and improvement since neither the norms of national legal systems nor the norms of international law contain detailed rules for the circulation of the listed objects. These UNCTAD recommendations are only the first step on the way to building a unified regulatory approach to determining the essence of technology. They already outline the way to solve many problems of legal regulation of technology transfer, but they are not a universal means of their large-scale elimination.

The derivative nature of measures to stimulate and support the transfer of technologies leads to the borrowing of the technology identification problem inherent in the “mother” branches of legal regulation. Regulatory regulation of stimulating technology transfer in the EU has the same shortcomings as regulatory approaches to determining the essence of technologies. However, the study of the legal regulation of means of financial stimulation of the introduction of technologies allows establishing a number of specific features that cannot be ignored.

Thus, the main regulatory act in the field of innovation support for technology transfer within the EU is the Horizon Europe Framework Program approved by the European Parliament for the period from 2021 to 2027 [14]. It is already the 6th (sixth) program of this type, which includes a system of measures to stimulate and support technology transfer. This regulatory document contains numerous requirements regarding what requirements must be met by candidates for receiving support for the intensification of technology transfer processes. Including what requirements their available innovations and technologies must meet [17]. The program provides for the implementation of such financial support measures as:

- support for fundamental scientific research;
- financing of applied scientific research;
- special interstate defense and industrial programs;
- financing within the framework of the activities of the European Innovation Council;
- grant funding;
- pre-commercial and state procurement;
- financing of Pathfinder and Accelerator activities.

For the purposes of financial support, the correct identification of the object to be supported in the future is critical. According to the effective definition and identification of the technology, the final effectiveness of the spent financial resources will also depend.

As in the situation with other regulatory acts of the EU, within the framework of the “Horizon Europe” program, no formal concept of technology is given, and its main characteristics are not indicated. However, the study of its content allows us to establish that the EU is ready to provide financial support for the implementation and intensification of those technologies, which by their characteristics are different from the system of objects of intellectual property rights. So, within the framework program “Horizon Europe”, financial support can be received by:

- scientific, scientific research institutions, groups of scientists, provided the results of scientific research and research and development works are available, and (or) experimental equipment in which the technology is implemented;
- small and medium-sized enterprises, family enterprises, other economic entities, in whose integral property complexes the technology has already been implemented;

- other formalized (or non-formalized) associations of people or economic entities, if they have technology in the form of intellectual knowledge and developments, information about the sequence of technological operations [10];

- startups possessing any information about the technology, in a form that suits the entity that is ready to support such a startup [18].

In other words, for the purposes of financial support, the EU invests a different, broader understanding of technology than that fixed at the level of international agreements WIPO and WTO. So, along with the system of objects of intellectual property rights, technology can receive financial support if it is implemented in:

- the results of research and development works;
- experimental design of technology;
- implemented in a complete property complex of a small (medium) enterprise;
- embodied in the form of intellectual knowledge and developments, information about the sequence of technological operations;
- implemented in any other form of information about technology.

Graphically, all manifestations of technology regulated by the Horizon Europe program are shown in Fig. 2.

All the given information (data) must reflect the entire system of actions, measures, and operations that need to be implemented to reproduce the technology or represent an already implemented technology that is suitable for the production of experimental batches of finished products.

All the above signs and characteristics of the technology, which will be reflected within the legal regulation of financial support of technologies in the EU, will guarantee the participants of technology transfer the right to receive appropriate means of financial stimulation. The lack of a unified understanding of technology during the implementation of the Horizon Europe program leads to the fact that information of a technological nature, which is different from the system of objects of intellectual property rights, may lose access to means of financial support.

A mandatory condition for the effectiveness of the implementation of the specified changes is that the updated definition of the essence of the technology must be enshrined in the relevant international legal documents. It is expedient to include the framework program “Horizon Europe” among them.

The use of precisely these sources of regulatory fixation will ensure a more effective dissemination of such an understanding of the essence of technology within the entire EU. It is the framework program “Horizon Europe” that is the regulatory document that defines the basic principles of implementing all measures of financial support for technology transfer. Fixing exactly this definition of technology in this international regulatory act will allow to increase the level of effectiveness of the means of financial stimulation of technology transfer.

The proposed directions for improving the essence of the technology are the author’s 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 could 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 research is aimed only at improving the existing approach to determining the essence of technology. It is not excluded that in the case of formation on its basis of the process of changing the status of technologies, 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 solving the issue of the existing inefficient regulatory approach to determining the essence of technologies were proposed. However, all these results do not have signs of integrity and are not aimed at all participants of innovative relations.

The formed approach to defining the essence of technology is explained by the need to solve the identified shortcomings of the existing approach to their role and place within economic and social relations. The proposed areas of improvement solve most of these shortcomings. The results of this scientific research contain conclusions that could become the basis for the formation of official regulatory rules, prospective normative legal acts. The possibility of their implementation within the limits of official regulatory rules is their advantage over similar studies.

In the course of the research, directions were formed, solutions to most of the actual problems that exist when defining the issue of innovative investment. The main advantage is that they are aimed at creating conditions for more effective technology transfer. Formed proposals offer more effective mechanisms for solving existing problems with increasing the efficiency of innovative investment than was proposed in the paper [1]. Also, research results solve problems formed within the framework of works [2–7] in which their authors only outlined the main regularities of the existing state.

This study has inherent limitations arising from the sources of information collected. Information about available technologies is mostly limited in access. The most attractive production technologies, as a rule, are endowed with the legal regime of commercial secrecy. Dual-purpose or defense technologies are restricted in access at the level of state secrets. The same legal regime is established for the consequences of using such technologies. The lack of open access to this information leads to a too high level of abstractness of conclusions about the role and place of technology in the modern economic system.

The main drawback of the study is the lack of objectively systematized information about the use of technologies that are already taking place. Another drawback is that this research is theoretical in nature and when it is conducted there is no possibility to test the results of the research experimentally. National peculiarities 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. It must be taken into account during the practical use of the results of scientific research. And the new normative prescriptions that may be formed should be based on the interpretation of the content and the concept of innovation previously recorded in such a legal system. 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.

The further advancement of our research may consist in the development of legal mechanisms for fixing the essence of technologies, as well as the transfer of technologies. On the basis of this study, it is possible to conduct further scientific research in the field of state regulation and regulatory influence. The main difficulties in the way of further development of this research will be the regional specificity of determining the essence of technologies and technology transfer and different national structures of state regulatory policy.

7. Conclusions

1. It was determined that there is no uniform approach to defining the essence of technology within the European Union. This leads to a destabilizing effect in the implementation of financial support measures for the introduction of technologies and at the level of scaling technology transfer. It has been proven that the identification of technology with objects of intellectual property law is characterized by low efficiency for the purposes of financial support for technology transfer.

2. For the purposes of financial support, it is proposed to define technology as information (information) of an organizational and technical nature about the sequence of production operations, regarding the processing of raw materials into finished products, which is expressed in the form of the results of scientific research, research and development works, the system of legal entities intellectual property, organizational and technical information, technological documentation, equipment, machinery, mechanisms.

The expediency of making changes to the provisions of such international treaties and agreements as the framework program of the European Union “Horizon Europe” has been proven.

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.

Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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