The problems of intellectual property market development have been investigated. It is proved that without the successful functioning of this market it is impossible to ensure the innovative development of the country. The characteristics of the intellectual property market, as well as the factors restraining its development, have been determined. The most important of them are significant volumes of outflow of Ukrainian scientists to foreign countries, low quality of Ukrainian patents, high level of counterfeiting and piracy, corruption pressure on the development and use of intellectual property, insufficient level of material support, etc. Therefore, the purpose of this study is to develop measures to strengthen the factors that contribute to the development of the intellectual property market and reduce the negative impact of factors on the Ukrainian technological market. To achieve the goal, it is proposed to introduce organizational and legal measures to improve the working conditions of employees of the main scientific institution of the country, the National Academy of Sciences (NAS) of Ukraine, the institutes of which produce most intellectual developments, as well as to form special financial and material mechanisms to support innovation at the expense of budget funds.

Using the example of reforming the institutes of NAS, according to the proposed measures, proposals have been formed to preserve scientific personnel, intensify the cooperation of scientific institutions with business, built on the interest of all parties in the field of technology commercialization. Counteraction to counterfeiting is proposed to be carried out taking into account a more accurate calculation of the commercial risks to which business entities are exposed in the manufacture and use of innovations. It is recommended to strengthen the level of legal protection of exclusive rights. Legislative initiatives on the development of the intellectual property market have been formed, which relate to changes in patent legislation regarding utility models and bringing it to EU conditions

Keywords: intellectual property, market, development, legislation, economy, financing, counterfeiting, franchising

UDC 338.4
DOI: 10.15587/1729-4061.2023.273850

FORMATION OF ECONOMIC AND LEGAL MEASURES FOR THE DEVELOPMENT OF THE MARKET OF INTELLECTUAL PROPERTY OBJECTS

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Received date 28.11.2022
Accepted date 07.02.2023
Published date 28.02.2023

How to Cite: *Maslak, M., Pererva, P. (2023). Formation of economic and legal measures for the development of the market of intellectual property objects. Eastern-European Journal of Enterprise Technologies, 1 (13 (121)), 113–124. doi: https://doi.org/10.15587/1729-4061.2023.273850*

1. Introduction

No developed economy in the world can fully do without the creation and functioning of the national intellectual property (IP) market. In parallel with this, a tendency is being formed to create a commercial component based on innovations and new advanced technologies. But, as evidenced by the results of many studies, some methodological and theoretical issues of regulation of market relations in the field of intellectual property remain not fully resolved despite the fact that there is great interest in this area [1–5].

The IP market, which is a separate component of the world commodity market, is very branched, marked by the dynamics of development, has a significant impact on the national and world macroeconomics. Some trends and specific features give grounds to analyze the conditions and patterns of economic, scientific, and technical development of different regions of the world in correlation with the degree of their integration into the world IP market [6]. Therefore, it is important and relevant to study the existing trends in the state, features and directions of development, existing problems and obstacles, primarily the national market of IP objects.

World realities of the development of national economies determine as the main factor of competitiveness of the region, state, industry and industrial enterprise the innovation of their production and commercial activities and the availability of a real opportunity to quickly adapt to rapid market changes. Ukraine is actively developing the existing potential of intellectual support for its activities, including the development of innovation and entrepreneurship in the field of innovation [7–9]. At the same time, at this time, sufficiently effective economic and legislative conditions have not yet been created for the development of intellectual and innovative activity in this country. All this predetermines conducting a detailed study of the factors that impede the effective development of the national market for intellectual property and developing measures to reduce their destructive action and negative impact on this market.

2. Literature review and problem statement

A comprehensive study of the IP market, the problems of its involvement in national and international innovation

and investment processes are sufficiently multifaceted and are interdisciplinary in nature. These questions have been the subject of many scientific studies [1, 2, 10–15]. At the same time, the essence of the category "intellectual property market" in the scientific literature has not yet received an unambiguous definition. In order to clarify the methodological essence of this concept, it is necessary to conduct a more detailed analysis of the existing definitions and provide proposals for their clarification and development.

The authors of study [1] define the intellectual property market as "a set of economic relations between industrial property entities for the purpose of buying and selling industrial property (inventions, industrial designs, utility models, trademarks, service marks, appellation of origin of goods, termination of unfair competition) at prices established on the basis of the interaction of supply and demand due to competition" [1]. This definition, firstly, is extremely general; secondly, it does not reproduce the actual pricing policy in the IP market, which is sufficiently specific; thirdly, the methodological definition of the market itself will not be able to counteract unfair competition.

Work [12] indicates that "the intellectual property market is a system of economic relations regarding their purchase or sale." The above definition is generally true not only for IP but also for any goods and services represented on the relevant market. At the same time, this definition does not reproduce any specifics of an intellectual product (and there are a lot of this specificity on the IP market). The work also focuses on the presence of a number of problems in the development of the IP market but basically their consideration is reduced to stating their presence and the need to take certain measures to eliminate them.

More specificity in this definition is provided by researchers of market features and problems of IP [11] who define the IP market as "a system of economic relations regarding the purchase and sale of intellectual property" [11]. This opinion is fully supported in work [15]. But even in this definition, the system of economic relations is not entirely clear, which is generally characteristic of the national economy or for the entire national market. Factors that hinder the development of the IP market or impede its effective functioning are not considered by these researchers, focusing their attention only on the fact that the IP market is just beginning its active development.

A researcher of legal support for the sale and purchase of IP objects [14] reduces the intellectual property market only to industrial property, defining it as one where "the economic implementation of scientific and technological achievements in the form of objects of industrial property rights is ensured" [14].

It is necessary to agree with the statement of the authors of work [13] that for the successful intellectual and innovative activity of the enterprise, the IP market is practically the only opportunity to concentrate all available resources on achieving commercial goals. Note that they are limited to an industrial enterprise at the initial stage of its intellectual and innovative activity. Quite often, industrial enterprises first sell their intellectual achievements, and already at further stages of enterprise development and the life cycle of an intellectual asset, they gradually conduct an appropriate revision of their market concept in order to practically use the results of their intellectual activity in their production. At the same time, the authors of that study did not pay attention to the questions of determining the capabilities of the enterprise to overcome the existing problems in the IP market at the stages of the life cycle of its intellectual product. The presence of such difficulties in the market activity of an industrial enterprise is indicated in work [13].

European researchers of the IP market [2] rightly point to the presence of features in the functioning of this market, which form its shortcomings and to a certain extent establish obstacles to the effective development of this market in terms of the national characteristics of its participants. In particular, there is a certain complexity in the national structure of the world market, as indicated in study [9]. Industrialized countries (USA, Great Britain, France, Germany, South Korea, Japan, etc.) determine more than 90 % of the world IP market. Study [10] draws attention to the shortcomings of theoretical and methodological support for determining the valuation of intellectual and innovative technologies, which leads to errors in pricing for IP objects and the establishment of overestimated or underestimated (discriminatory) prices on them. In the first case, consumers of intellectual products suffer to a certain extent, in the second – its developers.

Other researchers of the economic essence and problems of IP market development [4, 6, 16–19] are overwhelmingly limited to studies of its partial indicators, on the basis of which it is possible to directly or indirectly assess the effectiveness of the IP market, the presence or absence of threats to its effective functioning. In particular, in [6], the characteristics and indicators traditional for the IP market are used: market capacity growth reduction of interethnic barriers to entry into it for other countries and enterprises, optimization of pricing policy and development of market infrastructure. Particular attention is paid to ensuring the implementation of national and international legislation and the fight against counterfeiting in [4], and in [19] – to the processes of international support for the commercialization of IP objects. Without denying the importance and significance of these processes, we note that more important for assessing the effectiveness of the IP market are functions that are directly the subject of market relations.

At the same time, given the rather dynamic nature of this area of research and the continuous change in its actual content, the economic and legal aspects of the IP market have not yet been sufficiently investigated. Therefore, a detailed study of the intellectual property market is necessary, especially the factors restraining its development, which are associated with the commercialization of IP objects.

In the Ukrainian economic science, the concept of the IP market has appeared relatively recently, so quite a lot of problems and tasks that concern it have not been studied enough. The main reason for this situation is the lack of fundamental scientific, theoretical, and practical developments in the intellectual and innovative sectors that can encourage the top management of industrial enterprises to take active actions in the field of market application of the results of innovation.

3. The aim and objectives of the study

The purpose of this study is the formation of scientific and methodological provisions and practical recommendations for determining the factors of containment of the effective development of the IP market and the formation of scientifically based proposals to overcome them or to the maximum extent reduce their negative impact on the effectiveness of intellectual and innovative activities of an industrial enterprise. This provides a real opportunity to apply the results in practice, to regulate and manage intellectual and innovative processes in an industrial enterprise, in particular in the field of formation and use of market concepts of intellectual property.

To accomplish the aim, the following tasks have been set:

– to identify and justify the factors of restraining the development of the IP market;

– to study the position of Ukraine and individual foreign countries in the world IP market;

– to consider the factors of containment of the development of the Ukrainian IP market and to develop measures to reduce their impact;

– to form and justify legislative initiatives for the development of the Ukrainian IP market.

4. The study materials and methods

The object of the study is the process of effective functioning of the intellectual property market. The subject of the study is a set of theoretical and methodological provisions and practical recommendations for reducing the impact of negative factors on the development of the technological market.

The main hypothesis of the study was the development and justification of proposals for the development of the national IP market.

To achieve the tasks, in the study we used methods of system analysis, structural approach, induction and deduction, observation and comparison. These methods were used to form and substantiate factors restraining the development of the IP market, conceptual provisions for the study of their theoretical and methodological essence and the formation of proposals to reduce their negative impact on the development of the national IP market.

On the basis of theoretical concepts, an analysis was made of the possibility of applying them in the practice of scientific institutions and industrial enterprises in the field of their intellectual and innovative activities. According to official statistics [7, 10, 16], the largest number of fundamental intellectual and innovative developments comes from the institutes of the NAS of Ukraine, for whose employees, unlike, for example, from university scientists, this work is the main one. Based on this, the study used the method of comparative analysis to form the level of material and technical support of the scientist at the National Academy of Sciences of Ukraine.

As a research methodology, a consistent consideration of the negative impact of factors restraining the development of the Ukrainian IP market is proposed. This approach can be used in assessing the impact of problems in the development of the national and world IP market on the economic results of intellectual and innovative activities of industrial enterprises.

5. Results of studying the factors that restrain the development of the intellectual property market

5. 1. Identification and justification of factors restraining the development of the intellectual property market

The results of studying the dynamics of world and national markets allow us to state that the main long-term trend in the development of world IP markets is the growth of commercial transactions with goods and services containing IP objects with a significant expansion of the range of the latter. A key factor in the development of IP markets remains the process of forming a digital ecosystem. Under the new conditions of digital transformation, goods and services containing IP objects are becoming the center of global technological confrontation and a fierce struggle for the right to own and use them. Inequality is growing in the IP markets: the top 10 countries of the world account for more than 80 % of all international applications for registration of industrial designs under the Hague system [20, 21]. These data are fully consistent with the data that indicate countries that consistently occupy the top lines in the global rankings of innovative development and competitiveness.

A large share of international trade in IP objects is occupied by trade in licenses. The general trend in the development of the world economy has become the concentration of IP in several regions, industrialized countries occupy a prominent place in international trade in licenses. The development of global IP markets directly depends on the effectiveness of the use of IP market regulation tools, it should be subordinated to the goal of creating an environment in which creativity is encouraged and innovation is valued. However, the main problem of regulatory instruments is their "delay": most countries solve the problems of regulating IP markets and cross-border movement of goods containing IP objects related to the use of new technologies within the framework of the current technological structure. For the effective development of IP markets, it is necessary to take into account the prospects for the functioning of markets for high-tech goods containing IP objects.

The state of the intellectual property market both in the world and in this country is not satisfactory. With the growing importance of IP for the national economy and the emergence of new business models related to intellectual property, a completely new market for many Ukrainian business entities is developing – the intellectual property market. At the same time, in the scientific and production community at this time there is a wide range of opinions that there are serious shortcomings in the Ukrainian IP market. This provided us with grounds for conducting a special study in order to identify and substantiate the most important problems that both the world and especially the domestic intellectual property market are currently facing. Improving the current and future situation in these matters will help improve the situation on the IP market.

To improve all sorts of conditions for its effective functioning, it is necessary to overcome a number of factors that hinder its development (Fig. 1).

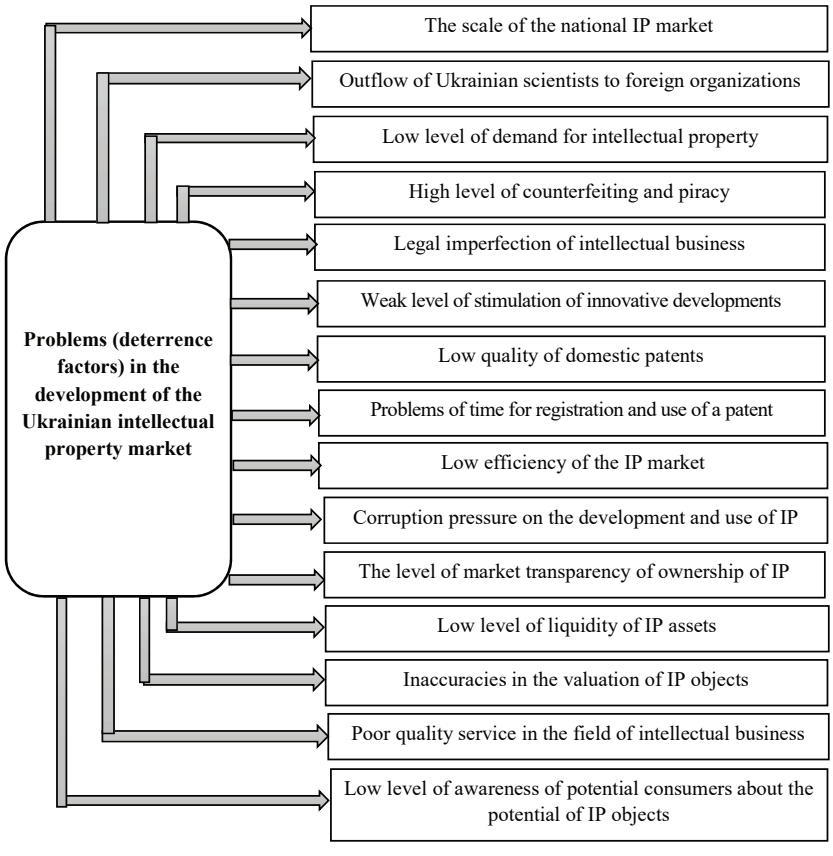

Fig. 1. Factors restraining the development of the intellectual property market

5. 2. Research of the position of Ukraine and individual foreign countries in the world intellectual property market

The first factor, which was employed for the relevant analysis, reproduces the volume (scale) of the Ukrainian IP market. Indeed, Ukrainian IP market is relatively small compared to European, Asian, or American. Small not only in terms of the size of the economy but also in its integration into world value chains (Table 1).

It follows from the data in Table 1 that in almost all major segments of the IP market, this country occupies very insignificant positions. The most important segment of the IP market is the segment of patents for inventions. Table 1 shows that here the leaders in the world are China, the United States, Japan, and the Republic of Korea. These countries are at this time the technological leaders of the world. Ukraine occupies a very modest place in this segment with hundredths of a percentage (patent applications under the international procedure were taken into account), which indicates that there are certain problems with the development and functioning of this segment.

Things are somewhat better in Ukraine in the segments of "industrial designs" and "utility models". One of the reasons for this situation is that utility models in the United States and a number of industrialized countries are not patented, only inventions deserve attention. This has led to complete Chinese hegemony in the utility model market (in 2021 – 97.5 % of the world market).

Large businesses always have significant commercial advantages over small ones, which fully applies to indicators of market efficiency. Therefore, in order to significantly improve the situation with market problems in the field of IP, Ukrainian science needs a significant increase in intellectual activity in the innovation activities of enterprises and organizations. Of course, such a task urgently requires investment support, an increase in the amount of funding for intellectual and innovative developments. The state of state support for these works is insignificant, and Ukraine has very limited opportunities to increase it under difficult conditions of economic recovery. The structure of financing scientific developments in recent years is given in Table 2.

Table 1

The share of Ukraine and individual foreign countries in the world IP market

IP market segments	Countries of the world (share in %%)									
	1	2	3	4	5	6	7	8	9	10
2015										
Patents for invention	100	38.3	20.47	11.05	7.44	2.32	0.60	0.8	0.72	0.07
Industrial designs	100	47.22	3.40	2.57	6.06	4.73	5.39	0.54	1.08	0.67
Utility models	100	10.61	0.00	0.58	0.72	1.16	0.00	0.00	0.00	0.72
Trademarks	100	33.17	5.98	3.99	2.73	1.47	3.27	1.38	0.88	0.34
2018										
Patents for invention	100	46.4	17.95	9.44	6.32	2.02	0.48	0.63	0.68	0.03
Industrial designs	100	52.79	3.50	2.38	2.39	3.35	3.20	2.05	0.89	0.61
Utility models	100	9.66	0.00	0.25	0.29	0.60	0.00	0.00	0.00	0.42
Trademarks	100	51.47	4.47	3.58	1.85	1.54	2.09	1.39	0.69	0.27
2021										
Patents for invention	100	45.7	9.98	8.79	6.93	1.89	0.44	0.64	0.63	0.03
Industrial designs	100	55.48	3.67	2.31	2.31	2.25	2.23	2.38	0.73	0.40
Utility models	100	97.5	0.00	0.20	0.17	0.40	0.00	0.00	0.00	0.18
Trademarks	100	54.35	5.06	2.45	1.86	1.55	1.69	1.29	0.98	0.23

Note: 1 – the whole world; 2 – China; 3 – USA; 4 – Japan; 5 – Republic of Korea; 6 – France; 7 – Germany; 8 – Great Britain; 9 – Switzerland; 10 – Ukraine.

Source: compiled by the author according to WIPO [22]

Table 2

The structure of science financing in Ukraine and other countries of the world

Country	Funding structure, %%		
	Total	Budget financing	Extra-budgetary financing
Ukraine	100	43.1	56.9
Japan	100	14.6	85.4
China	100	20.2	79.8
South Korea	100	20.5	79.5
USA	100	23.0	77.0
United Kingdom	100	25.9	74.1
Germany	100	27.8	72.2
Finland	100	28.3	71.7
Austria	100	29.8	70.2
Lithuania	100	32.0	68.0
Latvia	100	34.3	65.7
Poland	100	35.4	64.6
Iceland	100	36.0	64.0
Greece	100	40.6	59.4
Estonia	100	42.8	57.2
Norway	100	48.0	52.0

Source: compiled according to [23]

The data Table 2 show that the share of state funding for research and development in most developed countries does not exceed 30 %. Ukrainian 43.1 % do not demonstrate the progressiveness of funding sources and urgently need to diversify them. It should be noted that the share of funds (about 20 %) of Ukrainian customers is low, which includes funds from industrial enterprises of the state (4.7 %) and non-state (14.8 %) segment of the economy; funds of non-profit organizations (0.1 %) and funds of universities (0.1 %) [24]. The outlined state of affairs implies the need to borrow the experience of other countries in more active involvement of the business sector in innovative processes.

But in Ukraine there is not a very good situation when Ukrainian entrepreneurs are not yet fully aware of the importance of investing in research and development, their active commercialization. Therefore, it is necessary to actively influence scientific and innovative developments, initiate their implementation, involve entrepreneurs and industrialists in their implementation, even to a certain extent forcibly. In the practice of foreign countries, financial organizations that invest in innovation activities have additional financial incentives from the state. For example, one of the most promising methods of attracting resources of the banking sector to finance intellectual and innovative processes is state guarantees for the return of targeted loans to innovation.

5. 3. Research of factors restraining the development of the intellectual property market and development of measures to reduce their impact

Ukraine has a great potential for technological, scientific, and innovative development but, at the same time, the level of practical use and effective commercialization of scientific and technological developments that ensure the entry into the market of progressive competitive products in order to increase the level of competitiveness of enterprises and organizations of the real sector of the economy remains low. The number of innovatively active enterprises is constantly decreasing, the share of which in the total number has decreased to 15 %. Note on this occasion that the same indicator for European countries exceeds 60 %. The situation is aggravated by the fact that the majority of innovatively active enterprises mainly invested in the purchase of new equipment (up to 60 % of all costs). It should be noted that the most important indicator that characterizes the demand for IP objects – the cost of innovatively active enterprises for the purchase of new (external) knowledge (just these are purely intellectual acquisitions) – has decreased significantly and amounts to almost a meager UAH 35 million (this is about USD 1 million) (Table 3).

A steady decrease in demand for the results of intellectual and innovative activities, which is manifested in a decrease in the number of innovatively active enterprises and their costs for the acquisition of external knowledge, is explained by many factors. Among them, it is necessary to highlight the legal imperfection of intellectual business, a significant number of offenses in the field of IP (primarily related to counterfeiting and piracy), the presence of which significantly increases the level of commercial risks and reduces the investment attractiveness of industrial enterprises in the formation of demand for IP objects. The global intellectual community is trying to use all available opportunities to combat the production, distribution and import of counterfeiting. But, according to the latest UN data, sales of counterfeit products are only growing annually.

Table 3

Dynamics of indicators that form the demand for IP objects in Ukraine

Indicators of demand for IP objects	Years of observation							
	2015		2016		2020		2021	
	Total	%%	Total	%%	Total	%%	Total	%%
Innovatively active enterprises, pcs.	825	17.4	833	18.8	719	15.9	758	16.7
Their costs for innovative needs, in total, millions. UAH (40 UAH=1$)	13,814	100.0	23,230	100.0	14,221	100.0	19,347	100.0
Including for subsequent needs, millions UAH (40 UAH=1$):								
Internal research	1834.2	13.26	2064.0	8.92	2449.8	17.10	3232.3	16.71
Commissioned research	205.3	1.49	394.2	1.71	468.9	3.29	645.70	3.34
Purchase of equipment and software	11,141.2	80.61	19,828.9	85.29	10,185.1	71.61	13,326.4	68.89
Acquisition of external knowledge	84.91	0.61	64.21	0.31	37.49	0.29	58.90	0.30
Other	557.39	4.03	878.69	3.77	1079.7	7.71	2,083.7	10.76

Source: compiled according to [24]

Most likely, there is not a single sector of the economy and not a single country where there is no counterfeiting. The total material and legal losses from counterfeiting are very difficult to assess. According to the data of the IP agency of the European Union (EUIPO) and the Organization for Economic Cooperation and Development (OECD), only in European countries up to 7 % of imports (more than 120 billion euros annually) is counterfeiting [25, 26]. The volume of world trade in counterfeit goods reaches USD 509 billion, which is 3.3 % of world commodity trade. According to preliminary estimates of the World Trademark Review, in 2022 the volume of trade in counterfeiting reached USD 991 billion. According to these organizations, the 20 most popular categories of goods account for more than 94 % of the value of world trade in counterfeit goods (Table 4).

Table 4

The most popular areas of activity in the use of counterfeit products

Product category	Share in the world volume of counterfeiting (%)	The cost of counterfeiting ($ billion)
Electric machines and electronics	35.0	138.0
Jewelry	12.6	49.8
Optical, photographic, medical equipment	6.7	26.7
Knitted clothes	6.3	24.8
Machines and mechanical devices	5.0	19.7
Footwear	3.5	13.9
Clothes and accessories not knitted	3.4	13.6
Toys and games	3.0	11.8
Furniture	2.9	11.5
Vehicles	2.5	10.0
Leather products; handbags	2.1	8.5
Other finished textile products	2.0	8.1
Food	1.6	6.2
Plastic and its products	1.5	6.1
Perfume and cosmetic products	1.4	5.4
Other industrial products	1.2	4.6
Pharmaceutical products	1.1	4.4
Watches	1.1	4.2
Knitted fabrics	0.7	2.6
Tobacco	0.6	2.3

Source: compiled by the author according to [25, 26]

The Ukrainian Alliance against Counterfeiting and Piracy (UAPP) conducted a study of public opinion. The results of this survey show that in Ukraine only 15 % of citizens are sure that they have never bought fake products. At the same time, students and high school students in more than 50 % of cases deliberately purchased fakes, and 25 % do not mind continuing to buy counterfeiting, in which they do not see anything criminal because funds for original products are always not enough [27].

Insufficient consideration of commercial risk in the production and consumption of counterfeit goods leads to extremely negative results in the field of intellectual and innovative activities. The study also revealed the facts that almost all branches of Ukrainian industry are in the zone of counterfeit risk. But the fashion sector suffers the most, where material and intellectual losses were incurred by 93 % of enterprises, electronics and electrical engineering (83 %), sports (78 %), household appliances (73 %), toys and various kinds of games (69 %), beauty and personal care items (65 %) [28].

Conducted research in the field of counterfeit economics indicates that both the world and national innovation economies are formed on the intellectual component, which is the main factor for successful innovative development. Protection of intellectual property rights is an area of greatest relevance and importance for both the international community and Ukraine. Therefore, an extremely important problem in the development of the IP market in Ukraine is the production and distribution of counterfeiting, which causes multimillion-dollar losses to the national economy.

The active development of the national IP market requires appropriate incentives, first of all, for developers (creators) of IP objects, as well as for improving the indicators of state effective support for the functioning of the IP market. Many different countries are introducing effective innovation policies aimed at the practical use of the results of development and research, at stimulating the processes of development, implementation and use of innovations and IP objects in the real sector of the economy, stimulating development patent work at universities and research institutions with the subsequent transfer and commercialization of inventions and other IP objects.

In Ukraine, it is necessary to form special financial and material mechanisms for supporting intellectual and innovative activities. For example, to introduce a system of bank loans and project financing of intellectual and innovative enterprises using soft loans for the long term (preferential or full repayment of interest rates, compensation for the fate of the loan by state institutions). It is also important to provide refinancing to banks for targeted lending to intellectual and innovative enterprises up to 5 years at a reduced percentage.

Nevertheless, the primary object for stimulating the effective development of the IP market in Ukraine should be the direct carriers (owners) of intellectual potential. They require organizational and legal reform of organizations-developers of IP facilities (institutes of the National Academy of Sciences, university research units, and innovative departments of industrial enterprises) with the preservation of scientific personnel, intensification of cooperation of scientific institutions with business built on the interest of all parties in the commercialization of intellectual technologies.

Brain drain is a negative phenomenon for Ukraine, when talented scientists leave the country and continue their research activities in another country, usually with better working conditions. Economic statistics do not provide accurate data on the number of scientists who left this country during the thirty years of independence. It is only known for sure that the largest number of scientists left the country in 1996 – 267 people. The decline in active scientific emigration occurred only after 2004 but did not stop. According to official data, from 1991 to 2014, more than 1600 scientists left Ukraine. Most scientists went to the United States. But since 2015, officially the migration of scientists has ceased to be counted [29]. At the same time, surveys in recent years show that the mood for moving to other countries (especially among young scientists) has not changed much. For example,

in 2016, at least 20 % of scientists had a strong desire to go to another country [27, 29]. Among the reasons for such intentions that dominate are low wages, the dominance of bureaucracy, low prestige of scientific activity, low level of funding for development and research, political and social instability [29].

These reasons are not groundless: a 2017...2020 study among scientists of the National Academy of Sciences shows that more than 50 % of scientists are of low-income, and in other studies, the authors concluded that every year the situation only worsens. About 60 % of scientists do not have the necessary equipment, and 30 % – even a personal computer at their workplace [27]. Some research results among young scientists of the NASU are given by us in Table 5.

Table 5

Material and technical support for the scientist at NASU

The workplace is provided/not provided with	Department of the National Academy of Sciences (NASU), %%						In general, at NASU, %%
	1	2	3	4	5	6	
I have everything I need	2.70	0.00	7.00	2.90	13.0	7.10	5.90
I don't have a computer	43.2	40.0	23.3	32.4	30.4	14.3	33.8
I do not have a printer (other office equipment)	48.6	40.0	27.9	26.5	43.5	42.9	35.2
I do not have access to the Internet	27.0	20.0	2.30	0.00	17.4	28.6	15.0
I do not have scientific literature	21.6	11.4	20.9	23.5	34.8	7.10	24.0
No access to paywalled papers	67.6	45.7	58.1	73.5	56.5	92.9	64.8
No hardware	29.7	97.1	69.8	94.1	13.0	7.10	55.1
No support staff	24.3	51.4	44.2	55.9	43.5	21.4	40.1
No work phone	2.7	0.00	2.3	0.00	0.00	0.00	5.60
Other	8.10	5.70	4.70	2.90	4.30	7.10	5.60

Note: 1 – history, philosophy, and law; 2 – biochemistry, physiology, and molecular biology, 3 – physics and astronomy, 4 – chemistry, 5 – informatics, 6 – economics.
Source: compiled by the author according to [27]

The data [27] demonstrate the unsatisfactory state of the socio-economic situation of Ukrainian scientists – the main carriers and producers of intellectual property, on whom the development of the national IP market largely depends. Some of the problems considered can be solved by intangible means. In particular, it is possible to provide scientists with access to foreign publications on the Internet with the conclusion of international agreements and the creation of national special resources. Elimination of bureaucratic obstacles and additional programs in the field of teaching by scientists can also improve their material condition.

5. 4. Formation of legislative initiatives for the development of the Ukrainian intellectual property market

The legislative system of Ukraine in the field of intellectual property is in continuous transformation. According to the results of research [21, 30, 31], the quality of Ukrainian patents is an important problem in the development of the IP market. Please note that a patent is a certain document that legitimizes authorship for a scientific result and the exclusive right of the patent owner to use the patent within a specified period. In Ukraine, the patent protects one of the types of IP: invention, industrial design, or utility model. This is where certain problems arise and they relate primarily to useful models and urgently need to be addressed at the legislative level.

Utility models are a type of invention, but, unlike it, they have a slightly shorter protection period (only 10 years in this country, from 6 to 10 years abroad) and more loyal conditions for patentability. Since 2003, the Civil Code of Ukraine has changed the definition of the essence of the utility model: "A utility model is considered suitable for acquiring intellectual property rights to it if, according to the law, it is new and suitable for industrial use" [32]. The presence of an inventive level is not required, and the term for issuing a patent for a utility model is significantly shorter (from 5 to 12 months) than for an invention (up to two years). The change in the definition and object of the utility model has led to a sharp increase in the filing of applications for this type of IP and, accordingly, the issuance of patents for utility models.

At the same time, practice shows that the legislative decisions adopted were imperfect, as they led, firstly, to a deterioration in the legal protection of inventions in general; secondly, they provoked the development of patent trolling and ignoring inventions using a utility model; thirdly, they launched mass patenting of well-known devices and processes; fourthly, they created difficulties in recognizing in court an invalid patent for utility models, which indicates obvious (already known) technical and organizational decisions; fifth, contributed to the emergence of high investment risks; sixthly, they formed a number of patent applications for a utility model that is not typical for European countries in comparison with similar applications for domestic inventions; seventhly, they initiated the submission of applications by some foreign enterprises to leave the Ukrainian IP market, since, in their opinion, it is impossible to provide legal protection of their IP at the required level.

The shortcomings of the legal basis of the utility model in this country have repeatedly been the subject of hearings in the Verkhovna Rada (in particular, October 5, 2010, October 15, 2014) and in publications of well-known IP specialists [21, 30, 31, 33–35]. But attempts to change something did not change a significant number of patents (practically having no scientific and practical value) for utility models submitted in this country. For Ukrainian scientists, it became a rule for filing a large number of patent applications for utility models compared to inventions, which created the appearance of scientific growth, development of the IP market, but the attractiveness of the patent for utility models for the most part was insignificant and did not contribute to attracting investments and sharply dissonated with the practice in this area of the European Union. For example, in 2018, almost 5 times more applications for utility models (8980 applications) were submitted in Ukraine than for inventions (2107 applications), which is quite far from a positive assessment. In particular, in Poland, which is our neighbor, for each utility model patent there are 9 patents for inventions [31].

One of the negative consequences of this condition was the inability in court to recognize a patent for a utility model as invalid if it technically contains novelty criteria but there are no indicators of the inventive level or at least an inventive step. Despite these shortcomings, the correction of

the situation was not a priority in the activities of the State Department of Intellectual Property and Ukrpatent and the necessary projects were not developed before the legal change of the utility model.

It is also important that among the EU member states and the UK [27]:

– in six countries, there is simply no protection of rights for utility models (Sweden, Luxembourg, Great Britain, the Netherlands, Belgium, Ireland);

– in five countries there is a requirement for an inventive level (France, Germany, Spain, Denmark, Austria);

– in two countries, legal protection is possible only for three-dimensional objects (Greece, Italy). In Italy, the requirement of an inventive step also applies;

– in two countries (Spain, Finland) there is a requirement of an inventive step, and there is also a judicial removal from the right protection.

These data clearly show that Ukraine, being a candidate for EU membership, needs to change the patent legislation regarding utility models and bring it to the conditions of the EU.

Ukrainian legislation began the fight against patent trolling using an unpopular significant increase in rates for patenting utility models (Resolution of the Cabinet of Ministers of Ukraine No. 496 of 12.06.2019). Some data from that to some extent scandalous Resolution, are given in Table 6.

Table 6

Rates of payment of application fees for inventions (I) and utility models (UM)

Types and purpose of fee	Collection rates before the Resolution No. 496, UAH				Collection rates in accordance with Resolution No. 496, UAH			
	Enterprises and organizations		Non-profit institutions		Enterprises and organizations		Non-profit institutions	
	I	UM	I	UM	I	UM	I	UM
Per application	800	800	80	80	1,600	2400	320	960
For the examination	3,000	–	300	–	6,000	–	1,200	–
For the publication of the issuance of a patent	200	200	20	20	400	600	80	240
Total:	4,000	1,000	400	100	8,000	3,000	1,600	1,200
Annual patent validity fee for 1–6 years	2,800	2,800	280	280	5,600	8,400	1,120	3,360
Total:	6,800	3,800	680	380	13,600	11,400	2,720	4,560

Source: compiled by the author according to [21, 35]

The data provided and the comparison of the rates of fees in Ukraine with the current rates in the EU indicate their complete discrepancy. In the EU countries, there is no increase in the rates of fees for actions related to the protection of rights to utility models in comparison with the protection of the rights of inventions. The existing practice indicates the absence of any substantiated data on the actual costs of legal protection of the rights of utility models, since for the same work (in particular, the issuance of a protective legal document) the costs in this country are one and a half times higher than for the protection of inventions. Such a legislative approach is divorced from the real practice of patenting and the existing interests of inventors. The Ministry of Economy, using fiscal methods, is trying to reduce the number of patent applications for a utility model by applying outdated mechanisms that have not been used for a long time both in the EU and in countries that usually demonstrate large volumes of patent applications for utility models.

It should be noted that the patenting process abroad is quite expensive. The fee for services and duty for foreign patenting depend, firstly, on the size of the application, the number of positions of the invention formula, the professional accuracy of answers to expert questions, the duration of consideration and the fee of a foreign patent attorney. The final amount is, in the USA, starting at USD 10 thousand, in Australia – starting at USD 2.5 thousand, in Canada – starting at USD 3 thousand, in Japan – starting at USD 25 thousand, in the EU countries – starting at USD 2.5 thousand per country. The general patent for all EU countries will cost the Ukrainian applicant almost EUR 25 thousand [31].

As a recommendation to legislators – do take into account the relevance and importance at this stage of development of the Ukrainian economy the existence of legal protection of utility models, which can certainly be useful at the stage of creating an intellectual business, marketing support of new products in the IP market and is used in the practice of the European Union. The most important in this case is the construction of a system for protecting the exclusive rights of utility models with minimization of cases of their unfair use.

Important for the development of the IP market is the waiting time for obtaining a patent. In Ukraine, it depends on what type of patent is being considered. The procedure for registering a patent for an invention is 16–24 months. A utility model can be registered in 6–9 months. Note that the patent registration process directly correlates with the processes of starting commercial use of innovative development. At the same time, industries where the update is very fast (for example, electronics, pharmaceuticals) may suffer. Obtaining a patent in two years can lead to its commercial obsolescence and a significant reduction in commercialization opportunities of this intelligent development.

Extremely important for the effective development of the IP market is the objectivity and accuracy of the mechanism of valuation of the results of innovation. The valuation of an IP object directly affects the size of market (transfer) prices, which are one of the determining factors shaping the IP market.

Valuation of IP objects can be carried out for different purposes and at the same time it is possible to obtain different assessment results. The most widely used are two types of IP valuation: IP market value assessment and IP investment value assessment [4, 7, 11, 12, 15, 16]. The market value of IP is the amount of money for which IP could be sold on the date of the valuation after the marketing elaboration of the target market and the availability of all commercial information. It is in this form that Article 3 of the National Standard No. 1 "General principles of valuation of property and property rights" interprets the market value. The concept of "market value", which is given in Standard No. 1 without any comments, can be applied to IP objects. A separate assessment of the value of patents and licenses for the purpose of selling them on the sale market is an assessment of their market value. Investment value is the value of an asset for a particular investor or group of investors for specified investment purposes. Article 25 of National Standard No. 1 defines it as the value used for

transactions that require additional investments or other material costs. The definition of "investment value" can also be used in relation to IP rights when they are introduced as a component of the authorized capital of a new enterprise. It should be noted that this definition should not be identified with the determination of the market value of the property that is invested, that is, with the market value of property rights to intellectual property objects, defined as the share of the contribution).

6. Discussion of results of studying the factors that restrain the development of the intellectual property market

Identification, justification and to a certain extent reduction of the negative impact of factors restraining the development of the IP market (Fig. 1) allows breathing new progressive elements into the existing market-oriented provisions. In particular, the use of an updated more specific methodology for the meaning of the term "intellectual property" compared to existing definitions allows researchers and manufacturers of intelligent technologies to more accurately and more effectively position their developments in certain segments of the intellectual property market, and consumers of intellectual products to significantly reduce the time to search and purchase them.

It is important to strengthen the methods and means of combating counterfeit products (Table 4). In contrast to the existing provision, it is proposed to carry out a more accurate scientifically based determination of the commercial risk of the production and use of counterfeit and counterfeit goods.

Significant shortcomings were identified in the legislative support for the effective functioning of the intellectual property market. To the greatest extent, this concerns the material support and stimulation of the processes of development, distribution, and use of IP objects (Table 5). The shortcomings in this area, as rightly indicated by researchers in various scientific publications, in the study it is recommended to eliminate by forming special financial and material mechanisms for supporting intellectual and innovative activities: systems of bank loans and project financing of intellectual and innovative enterprises using soft loans for the long term (preferential or full repayment of interest rates, compensation for the fate of the loan by state institutions). It is also important to provide refinancing to banks for targeted lending to intellectual and innovative enterprises up to five years at a reduced percentage. The relevance of this proposal is explained by the fact that the unsatisfactory state of intellectual activity of most enterprises in the real sector of the economy is explained not only by the lack of financial resources directed to the intellectual sphere, but also by the lack of an effective economic policy in Ukraine that stimulates intellectual development. The economic interest of most enterprises in quick profit supplants the important tasks of scientific and technical development of the economy, despite the fact that at this time economic development is in direct relationship with dependence on the ability of the economic mechanism to create and consume intellectual innovations. Delay in the formation of the state strategy and tactics of activating the intellectual and innovative sphere of activity, which is a component of the state innovation policy, leads to an even greater decline in innovative production, an increase in the dependence of the Ukrainian economy on developed countries.

The problems of material incentives are closely related to the financial support of scientists. The implementation of the proposed measures will significantly affect their attempts to leave domestic science and develop science in foreign countries with greater material benefits.

Of particular importance for the effective functioning of the IP market is patent trolling, the presence of which to a certain extent provokes the existing legislation (Table 6). The introduction of the submitted proposals into the current patent legislation can significantly improve the existing market position of Ukraine in the field of patents and inventions segment.

At the same time, the market for any goods cannot be sufficiently effective without the appropriate infrastructure. As for the IP market, special attention should be paid to poor-quality service in the field of intellectual business. The results of the research show that the franchising market practically does not work in Ukraine, the outsourcing market is very weak in relation to IP, etc.

A detailed analysis of the growth dynamics of the number of franchisors in Ukraine [36] provides grounds to note that franchising, as a very important type of intellectual business based on IP law, is still just beginning to develop in Ukraine. Six or seven years ago, the franchising market had certain prospects for its development, now we have again moved almost to the very beginning of an active revival. This indicates that Ukrainian entrepreneurs still do not know enough about the commercial possibilities of franchising, many representatives of this business, it is too early to even call enterprises. At the same time, the development of the franchising market is possible only in those conditions when the national economy and intellectual business are actively developing.

As for outsourcing, we note that in general, the market for outsourcing services is divided into two main segments:

a) outsourcing of intellectual and innovative services (research, implementation of innovative projects, processing of various information arrays; programming, technology transfer, patenting, commercialization of IP objects, etc.) and industrial outsourcing;

b) industrial outsourcing – includes the performance of certain auxiliary operations and functions to ensure production and commercial activities (accounting, logistics, warehousing, repair, maintenance of technological equipment, etc.).

The segment of intelligent outsourcing in world practice is quite large, which testifies to the relevance and importance of outsourcing in the field of intellectual property. The use of intelligent outsourcing in many enterprises is due to the desire to concentrate the main efforts on the main activity of the enterprise and achieve certain competitive advantages in its market by reducing costs while increasing the efficiency of its production. The effect of the use of intelligent outsourcing, according to expert estimates, allows outsourcing to reduce operating costs by almost 35 % and increase the profitability of investments in innovation by an average of almost 6 %, while accelerating the rate of increase in income.

In Ukrainian practice, the use of intelligent outsourcing has not yet acquired the required size. In most cases, every innovative industrial enterprise tries to independently develop its scientific and intellectual spheres of activity, without relying on the material and legal support of the state. The main reason for this situation is the excessive fears of innovatively active enterprises about the theft of their ideas

and scientific results. And for this they have sufficiently objective grounds, among which the following ones stand out as the most significant: corruption pressure on intellectual business and the absence of (actual) right to a fair trial. In such an environment, the innovative achievements of enterprises do not survive because intelligent technologies, like science, do not multiply in captivity. Therefore, the use in the practice of work primarily of industrial enterprises of recommendations for organizational and legal regulation of intellectual and innovative activities will provide them with more effective tools to improve the efficiency of the technological market.

Not all problems were successfully solved. In particular, it is quite difficult to eliminate the manifestations of corruption in the intellectual sphere, not enough attention at the legislative level is paid to reducing the volume of counterfeit and counterfeit goods. Certain limitations in the study are caused by the lack of open access to statistical information that characterizes the dynamics of changes in the global and national technology markets. In addition, there are a number of problems of the national technological market, which are not fully considered and on which there are grounds to continue and develop the results and determine the directions of new scientific research to improve the economic and legal foundations of the IP market. In particular, it is very difficult to conduct legal business in Ukraine because the existing legal framework is formed in such a way that the entrepreneur cannot work successfully without certain offenses, which allows the system to constantly hold him/her hostage. Corruption and bias of the judiciary, arbitrariness of security forces and fiscal authorities, continuous threat of raiding present the main problems for the successful development of the intellectual property market. And as long as there is corruption in the civil service, this country will represent a favorable environment for the illicit enrichment of corrupt officials, and it will be quite difficult for creative teams and individuals to change the existing situation. Only if corrupt officials feel uncomfortable in Ukraine, then comfortable conditions will come for the effective work of innovators, scientists, researchers, entrepreneurs. Only then will the IP market receive effective messages for its effective development.

The use of the proposed methodological recommendations in the practice of innovation of industrial enterprises allows us to provide an important connection between the processes of development, distribution, and use of intellectual property and their required quality. The conducted research of the world and national IP market allowed us to form a number of effective measures to reduce the negative impact of factors restraining the development of the Ukrainian technological market and create positive trends in its state at the world level.

7. Conclusions

1. The factors of containment of the Ukrainian IP market have been identified and substantiated. The main ones include:

– small scale of the national technological market;

– low level of demand for intelligent developments;

– low quality of Ukrainian patents;

– imperfection of the methodological base of valuation of IP objects;

– poor-quality service and legal imperfection in the field of intellectual business;

– the presence of corruption pressure on the processes of development and use of intellectual and innovative technologies.

2. The study of segments of the world IP market occupied by Ukraine and leading foreign countries suggests that the Ukrainian IP market is relatively small compared to the European, Asian, or American market not only in terms of the size of the economy but also in its integration into world value chains, occupying weak positions in almost all the main characteristics of the IP market. Leading positions in the world market are taken by the segment of patents and inventions where the leaders are China, the United States, Japan, and the Republic of Korea. Ukraine has a very modest place with hundredths of a percent, which indicates the presence of certain problems with the development and functioning of this segment of the world IP market. Somewhat better cases in Ukraine in the segments of "industrial designs" and "utility models", the reason for which is that utility models in the USA and in a number of industrialized countries are not patented, only inventions deserve patent attention.

3. Particular attention is paid to the most important factors in curbing the development of the national intellectual property market. The low level of demand for intellectual development is explained by the almost meager costs of innovatively active enterprises for the purchase of new (external) knowledge, which in recent years has decreased significantly and reached almost USD 1 million per year. The high level of counterfeit products is explained by the commitment of the majority of Ukrainian consumers (up to 85 %) to the purchase of counterfeit products, which is provoked by their low price. Unsatisfactory financing and stimulation of innovation activity leads to an outflow of national talents outside Ukraine, a significant decrease in the scientific and technical potential of the country and its capabilities to create smart technologies.

4. Legislative initiatives have been formed to reduce the negative impact of factors restraining the development of the national IP market. They mainly concern the need to change patent legislation regarding utility models and bring it to EU conditions. The unpopular decision of the Cabinet of Ministers of Ukraine to significantly increase the rates for patenting utility models does not lead to a decrease in the level of patent trolling but only exacerbates the existing shortcomings of the Ukrainian market of intellectual property.

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.

Funding

The study was conducted without financial support.

Data availability

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

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