

25. How Industry 4.0 can work for the marine and shipbuilding sectors. Available at: <https://www.abb-conversations.com/2019/05/how-industry-4-0-can-work-for-the-marine-and-shipbuilding-sectors/#:~:text=Emissions%20reductions%20and%20cost%20reductions%20will%20be%20major%20drivers%20for%20Marine%204.0.&text=Analysis%20of%20Industry%204.0%20investments,and%20improve%20efficiency%20by%204.1%25>
26. Tehnologii tsifrovizatsii v Rossii – nastala epoha peremen. Available at: <https://center2m.ru/digitalization-technologies>

*Assessment of intellectual property is an important process of commercialization of scientific and technical developments of enterprises of all forms of ownership. This is carried out to determine the value of intellectual property objects (IPO) in connection with the transfer of ownership (purchase, sale) to the corresponding object, the conclusion of a license agreement for the IPO use, accounting for IPO in accounting, contributed to the authorized capital, etc. Under such conditions, the problem of IPO underestimating significantly reduces the efficiency and effectiveness of enterprises. At the same time, the uniqueness of many types of intellectual assets and the impossibility of their visual assessment determine the expediency of systematizing methodological approaches to assessing the value of intellectual property assets to ensure an objective assessment of the value of intellectual property. This will help increase the profitability and business value of the enterprise.*

*The aim of research is to develop theoretical and methodological provisions and substantiate practical recommendations for improving information and methodological support for assessing the value of intangible assets, taking into account the requirements of regulatory documents and the availability of the necessary information. Based on the results of the study, methodological approaches to determining the value of intangible assets are systematized. According to the financial statements, the value of intangible assets of the leading enterprises of Ukraine and their share in the total value of assets were analyzed. The features of the assessment of intangible assets in accordance with accounting standards have been determined, a methodological approach to the assessment of the value of intellectual property has been developed, it allows to reasonably choose a method for assessing IPO based on the analysis of available information. It is proved that the lack of objective information on the value of IPO significantly reduces the value of assets of Ukrainian enterprises in comparison with the leading companies in the world, reduces their investment attractiveness and does not contribute to economic development*

*Keywords: intellectual property, intangible assets, income approach, comparative approach, cost approach*

UDC 330.142  
DOI: 10.15587/1729-4061.2021.225772

# INTELLECTUAL PROPERTY ASSESSMENT: DEVELOPMENT OF INFORMATION AND METHODOLOGICAL SUPPORT IN CONDITIONS OF LIMITED INFORMATION

**T. Momot**

Doctor of Economic Sciences, Professor, Head of Department\*  
E-mail: [vmomot@gmail.com](mailto:vmomot@gmail.com), [momot@kname.edu.ua](mailto:momot@kname.edu.ua)

**M. Karpushenko**

PhD, Associate Professor\*  
E-mail: [Mariamaria1864@gmail.com](mailto:Mariamaria1864@gmail.com)

**S. Prylypko**

Doctor of Law, Professor, Head of Department  
Department of Private Law  
Law and Management Institute of the  
Yaroslav Mudryi National Law University  
Metalistiv str., 17, Kyiv, Ukraine, 03057  
E-mail: [sn.prylypko@gmail.com](mailto:sn.prylypko@gmail.com)

**N. Mushchynska**

PhD, Associate Professor  
Department of Land Administration and  
Geographic Information Systems\*\*  
E-mail: [muschynska@gmail.com](mailto:muschynska@gmail.com)

**D. Momot**

Postgraduate Student\*  
E-mail: [momotdaryna@gmail.com](mailto:momotdaryna@gmail.com)

\*Department of Financial and Economic Security,  
Accounting and Auditing\*\*

\*\*O. M. Beketov National University of Urban Economy in Kharkiv  
Marshala Bazhanova str., 17, Kharkiv, Ukraine, 61002

Received date 23.12.2020

Accepted date 03.02.2021

Published date 26.02.2021

Copyright © 2021, T. Momot, M. Karpushenko, S. Prylypko, N. Mushchynska, D. Momot

This is an open access article under the CC BY license

(<http://creativecommons.org/licenses/by/4.0>)

## 1. Introduction

In modern conditions of the digital economy, the number of commercial transactions carried out with objects of intellectual value is constantly growing. Such operations include:

- independent creation of various objects of intellectual property;
- implementation of intellectual property into the authorized capital of the enterprise;
- purchase and sale of an enterprise (business);

- privatization, corporatization, reorganization (merger, acquisition, etc.) or restructuring of an operating enterprise;
- purchase and sale of patents and licenses; valuation and accounting of intangible assets and others.

The valuation of intellectual property is regulated by a number of legislative and regulatory documents. So, according to the Regulation (standard) of accounting 8 “Intangible assets” (hereinafter R(S) A 8), an intangible asset is a non-monetary asset that has no tangible form and can be identified [1].

That is, intellectual property rights are inherently part of intangible assets. Therefore, the approaches by which intangible assets are assessed, according to certain legislative and regulatory documents [1, 2], are quite related to intellectual property.

In accordance with the norms of clause 17 R(S) A 8 “Intangible Assets” [1] or International Accounting Standard 38 “Intangible Assets” (hereinafter IAS 38 “Intangible Assets”) [2], the cost of such expenses includes: wages workers, created such an asset, material costs, other costs and the like. Sometimes the cost of such self-created intangible assets is generally not assessed at all, since the costs of creation were not allocated to a separate group of expenses and were not taken into account as the cost of the created object.

According to legislative and regulatory documents [3–9], the assessment of IPO is carried out by certain regulated methods. This is a complex process based on principles that reflect socio-economic factors and patterns in the formation of the value of an enterprise’s property.

Objects of intellectual property rights include various types of intangible assets, in particular:

- objects of copyright and related rights, including the right to various works (literary, artistic, musical works, computer programs);
- objects of industrial property (the right to industrial designs, inventions, utility models, trade marks);
- other objects of intellectual property (scientific discoveries, rationalization proposals, commercial secrets), etc.

Sometimes such rights are not accounted for or are measured only at the cost of the actual costs incurred in connection with the registration of an intellectual property.

All this leads to the investor receiving distorted information that does not reflect the fair value of the intellectual property.

At the same time, accounting for intellectual property objects allows to both create an additional asset that is of commercial interest to third parties, and defend your interests in court if there are precedents for the use of such assets by other persons.

Therefore, the assessment of the value of any object of intellectual property rights is very important for a reliable assessment of the value of such assets, primarily in the practice of enterprises. This makes it possible to carry out capitalization into intangible assets, carry out further revaluation, and assess the value of assets for the further sale of such objects.

So, the systematization of methodological approaches to the assessment of intellectual property objects and the determination of the most priority one, taking into account the needs of users and the availability of the necessary information, is relevant in modern conditions of digital technologies.

---

## 2. Literature review and problem statement

---

The theoretical and methodological basis of the study is formed by the scientific works of scientists on the application of information and methodological support for assessing the value of IP. In particular, it is proved that according to the results of the analysis of changes in the structure of investments in all developed countries of the world over the past 40 years, investments in intangible assets have significantly increased, that is, funds are directed to the acquisition or creation of intellectual assets related to knowledge (software, research and development (R&D), design and development, artwork, market research, training and new business processes, etc.). The authors note the complexity of the processes of applying modern tools for assessing the value of IP, which involves taking into account many factors [10].

Focusing on the need to take into account such factors as: the specifics of doing business, economic conditions and strategic management provides another focus of the process of assessing intangible assets [11]. This approach is important, but does not take into account the use of methods for IPO assessment in the context of insufficient information.

It should be noted that some studies [12] are limited to the use of the discounted cash flow method as part of the income approach to IPO assessment, which reduces the validity of the results and requires improvement of information and analytical support in the direction of strengthening the integrated use of various approaches to assessing the IPO value of IP.

The loss of intangible assets and their assessment according to international standards is also an important subject of research [13], while not focusing on the features of the application of methods for assessing intangible assets.

The assessment of innovations in accounting was carried out in [14]. It is emphasized that in traditional accounting, innovations are usually recognized as expenses and are not covered by the concept of an asset, since they do not meet strict recognition criteria. It offers a solution to this issue with the help of integrated reporting, which can be used to assess innovation in terms of creating value for the company. At the same time, the authors do not pay attention to the analysis of methodological approaches to assessing the value of intangible assets.

A radical solution is proposed in [15], where it is noted that the use of traditional methods for assessing IPO is a complex process that does not always allow to obtain the desired result. The authors proposed a comprehensive valuation model combining seven indicators of patent value. This methodology allows decision-makers to choose the solution that best suits their strategy for achieving future innovation goals. However, the proposed approach can be applied only for certain types of IPO, which limits its application.

According to the efficient markets hypothesis, as stated in [16], the price of a firm’s shares reflects the investors’ perception of the current and future profit potential of all its assets, including both tangible and intangible. At the same time, it has been proven that the valuation of the value of this type of intangible asset as a brand is significantly related to stock prices. However, the authors limit themselves only to the study of one type of IPO, but do not apply various methodological approaches to assessing the IPO value.

Taking into account the complexity of the process of assessing intangible assets, in [17] it is proposed to dis-

tinguish three stages of determining their fair value. At the first stage, the principles that form the basis of the methodology are determined. At the second stage, a study of international experience in conducting a fair valuation of intangible assets is conducted. At the third stage, the specifics of enterprises' own methods of fair valuation of intangible assets are determined. But the study suggests that enterprises independently choose methods for evaluating intangible assets, taking into account the cost of conducting an assessment, the degree of measurement uncertainty, and others. An analysis of the possibilities of using methods, taking into account the availability of certain information, can be a solution option.

Sufficiently justified is the proposal given in the study [18] on the assessment by the method of determining the economic effect. Indeed, it allows for the measurement of the expected costs and revenues from activities related to the use of intangible assets, between the respective reporting periods, taking into account the indicators of economy, efficiency and effectiveness. This approach concretizes the definition of profit from the use of intangible assets, taking into account the following main criteria as reliability, objectivity, universality, consistency, reliability, adequacy, practicality. The author emphasizes the need to use methods and parameters that should be understandable [18], without paying attention to the limited or insufficient information available on the assessment of the IPO value.

The problem associated with the comparison of methods for evaluating intangible assets is considered in the study [19]. It is this problem that remains unsolved. It is argued that the most common methods of the income approach include methods of direct capitalization, discounting cash flows, excessive profits, royalties, exemption from royalties. The authors argue that the use of the income approach is dominant, but again attention should be paid to the lack of necessary information that can interfere with the valuation process.

Recently, great attention has been paid to the impact of the consequences of the COVID-19 pandemic on all aspects of the life of both people and enterprises. The paper [20] considers aspects of the influence of the current situation on intellectual property and its consequences, the peculiarities of accounting and assessment of innovative products in modern conditions. However, the authors do not offer specific methods for assessing the value of intangible assets in the absence of the necessary information.

Having analyzed the main conceptual provisions of the proposals set forth in [10–20], it should be concluded that the current state of information and analytical support for the IPO valuation is characterized by the lack of a unified approach to the valuation of intangible assets. This is due to the fact that each IPO is a unique object and requires the use of reasonable information and methodological support for assessing the IPO value using a reasonably chosen method for assessing IPO based on the analysis of available information. Therefore, it is necessary and timely to generalize the realities of the valuation of intangible assets, to critically analyze valuation methods, to improve the information base on which the valuation is based, and to develop recommendations on the procedure for assessing intellectual property objects in conditions of limited information.

---

### 3. The aim and objectives of research

---

The aim of research is to develop theoretical and methodological provisions for the IPO assessment, which will justify practical recommendations for improving the information and methodological support of this process, taking into account the requirements of regulatory documents and the availability of the necessary information.

To achieve the aim, the following objectives are set:

- to analyze statistical data on the value of intangible assets and their share in the total value of assets;
- to investigate the peculiarities of the valuation of intangible assets in accordance with international and national accounting standards;
- to determine and systematize the features of the valuation of intangible assets using various methodological approaches and available information;
- to form information and methodological support for the assessment of intellectual property in conditions of limited information.

---

### 4. Materials and methodology for the assessment of intellectual property objects

---

The theoretical and methodological basis of the study was the scientific works of leading scientists in the field of assessing the value of intellectual value [10–20]. The informational component of such studies made it possible to determine and systematize the features of the assessment of intellectual property assets using various methodological approaches and to form information and methodological support for such a process in conditions of limited information.

Legislative and normative acts in the field, regulating the application of information and analytical support to the IPO assessment [1–9], made it possible to analyze approaches and establish certain patterns that made it possible to form information and analytical support.

The study is based on a systematic approach, within which the following methods are applied: abstract-logical analysis – to determine and systematize the features of the assessment of intangible assets using various methodological approaches and available information, theoretical generalization – to form information and methodological support for the IPO assessment, systemic and statistical analysis – to determine the main trends in investing in intangible assets and to conduct a comparative analysis of indicators of the value of intangible assets and their share in the composition of assets, a graphical method – with a visual presentation of theoretical and methodological material.

The data accumulated from information sources published on the website of the Ministry of Statistics of Ukraine [21], Smida [22], official web portals of enterprises [23, 24], Macrotrends [25] are used as an information base for the study.

On the basis of the indicators of the Ministry of Statistics [21], using statistical methods, the tendencies of changes in investments in intangible assets in recent years and their share in the total volume of investments were determined (Table 1).

Table 1

## Investments of Ukrainian enterprises (statistical indicators), million USD [21]

No.	Total	2015	2016	2017	2018	2019	Changes 2019/2015
		11379.51	13210.89	15978.13	20901.48	26788.39	135.41
1	Investments in tangible assets	10613.47	12775.98	15393.04	19587.16	25783.33	142.93
2	Investments in intangible assets	766.04	434.91	585.10	1314.32	1005.06	31.20
3	Of which software and databases	204.51	232.27	292.03	342.25	438.56	114.44
4	Share of investments in intangible assets	6.73	3.29	3.66	6.29	3.75	-44.28
5	Share of investment in software	1.80	1.76	1.83	1.64	1.64	-8.89

Note: recalculation was carried out at the rate of the National Bank of Ukraine as of 2015–2019.

From the data of the Smida resource [22] and the websites of enterprises [23, 24], the value and share of intangible assets of some enterprises in Ukraine at the beginning of 2020 were determined (Table 2).

Table 2

## The value of intangible assets of leading companies, thousand USD [22–24]

No.	Company name	Initial value of intangible assets	Book value of intangible assets	Drift coefficient, %	Share in the total value of assets, %
1	PJSC Obolon	1887.40	258.71	86.3	0.1
2	JSC Ukrtransgaz	8792.21	5261.65	40.16	0.06
3	SE NNEGC "Energoatom"	24575.19	14941.17	39.2	0.15
4	JSC "Khar'kovoblenergo"	1137.34	663.98	41.6	0.3
5	DTEK Dneprovskie elektroseti	2321.91	673.90	70.9	0.2
6	CJSC "Dneprospeetsstal"	2157.65	308.33	85.7	0.09
7	PJSC "Arcelor-Mittal Kryvyi Rih"	27035.98	14538.47	46.2	0.34
8	State Enterprise "Kharkov Machine-Building Plant FED"	2627.63	2545.41	3.1	10.9
9	State Enterprise "Ukrainian Geological Company"	96.90	63.11	34.8	0.7
10	PJSC "Motor Sich"	841.50	455.38	54.1	0.04

Note: recalculation was carried out at the rate of the National Bank of Ukraine at the end of 2019

Indicators of the Macrotrends resource [25] made it possible to determine the value and share of intangible assets of world companies in the total value of assets (Table 3).

Such calculations provide information on the value of intangible assets and allow conclusions to be drawn regarding the specifics of the valuation.

Table 3

## The value of intangible assets of world companies, billion USD [25]

Enterprise	2019		2020	
	Intangible asset value	Share in the total value of assets, %	Intangible asset value	Share in the total value of assets, %
Walt Disney company (USA)	103,508	53	96,862	48
Soft Bank Group (Japan)	101,033	31	55,054	16
Oraclecorp. (USA)	49,058	45.1	47,507	41.1
Exxon Mobil Corporation (USA)	37,387	14	35,187	13.8
Johnson&Johnson(USA)	81,282	51.5	81,313	47.63
Boeing Company(USA)	11,398	8.5	10,924	7.2
Facebook(U-SA)	19,609	14.7	19,673	12.35
Intel(USA)	37,103	27.17	35,997	22.93
Mastercard(U-SA)	5,438	18.6	5,666	17.9
General Electric(USA)	37,387	14.0	35,187	13.8

## 5. Results of the study of the assessment of objects of intellectual value discussion

## 5.1. Analysis of statistical data of companies on the value of intangible assets and their share in the total value of assets

In the modern economic space, the concept of "Intellectual property appraisal" (English) is used – determining the value of the volume of rights to the results of intellectual activity, the ownership of which provides their owner with a certain benefit. This assessment is used in many countries, but in some cases, intellectual property remains underestimated. For example, the value of Internet sites, databases, computer programs developed by businesses for personal use, the value

of brands, etc. In most cases, the value of such assets consists of the cost of creating such assets.

Analysis of investments in intangible assets (Table 1) shows that their share is very small. From data in Table 1, it should be concluded that investments in intangible assets increased by 27.33 % in 2015–2019, but not as much as investments in tangible assets – by 135.77 %. From intangible assets, software increased more – by 108.12 %. If to consider the share of investments in intangible assets, it is possible to see that it is very small and amounts to 3–6 %. At the same time, this share has decreased significantly. This indicates either that enterprises pay little attention to the development of intellectual property, do not finance the development of new technologies, or do not assess intellectual property objects accordingly.

Confirmation of the fact that Ukrainian enterprises do not properly assess intangible assets is the indicators of intangible assets reflected in the financial statements of Ukrainian enterprises (Table 2). Indeed, the share of intangible assets in the total asset value of all analyzed companies is less than 1 %. An exception is the State Enterprise “Kharkiv Machine-Building Plant FED”, where the share of intangible assets is more than 10 %.

In addition, in all considered enterprises, the share of intangible assets, except for State Enterprise “Kharkiv Machine-Building Plant FED”, is worn out by 30 % or more. That is, they are obsolete and not renewable. The financial statements also reflect that enterprises do not revalue intangible assets, even though these intangible assets will continue to bring economic benefits to the enterprise.

At the same time, in the United States of America, the value of some companies is more than 50 % of intangible assets. This is due to the fact that the United States is home to many of the world’s largest IT companies, such as Apple, Google and Facebook, since the Internet is one of the “intangible” areas of business. This conclusion is confirmed by calculations of the percentage of the value of intangible assets in the total assets of world leading companies.

From the above data, it should be concluded that the value of intangible assets in the Walt Disney company was the highest – 96,862 billion USD. In 2020, the share of intangible assets ranged from 53 % to 48 % of the total value of assets. This is due to the specifics of the activity, since the company owns

the copyright for films and makes a profit from this. The value of Johnson & Johnson’s intangible assets is 51.5–47.63 %, that is, they really make up the majority of the company’s asset value. Undoubtedly, under such conditions, the value of intangible assets is measured by certain methods precisely at fair value.

Since intangible assets are in most cases unique and cannot be valued visually, special approaches must be used and valuation methods are valid.

**5. 2. Features of the valuation of intangible assets in accordance with international and national accounting standards**

Assessment of intellectual property objects that relate to intangible assets is carried out using accounting standards – R(S)A 8 “Intangible assets” [1] and IAS 38 “Intangible assets” [2].

Schematically, the assessment according to the standards can be displayed as follows (Fig. 1).

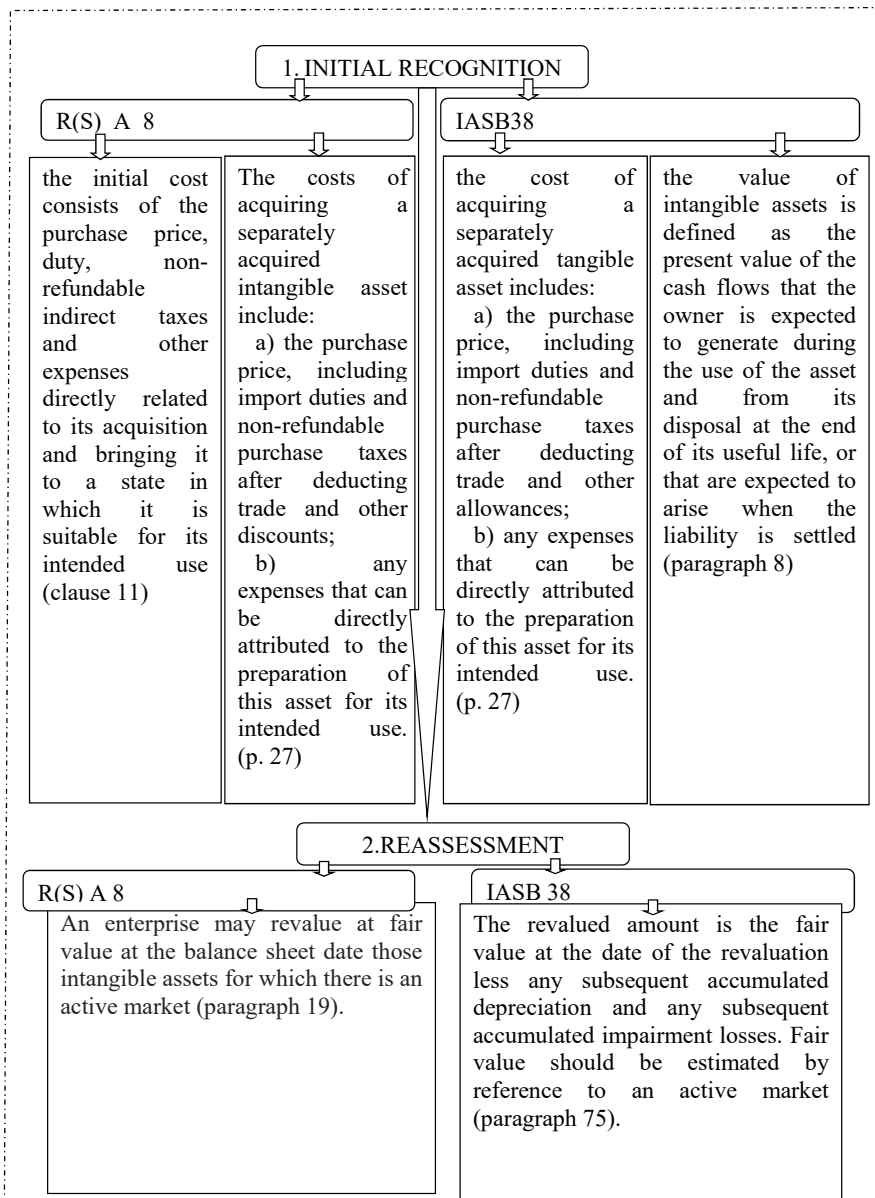


Fig. 1. Assessment of intangible assets in accordance with accounting standards (own development)

From those shown in Fig. 1 of the statements, it can be concluded that at the time of initial recognition in accordance with the standards, a cost estimate is provided, that is, a cost approach. But at the same time, IASB 38 “Intangible Assets” contains definitions of value and income method. Subsequently, during revaluation, the cost is determined by a comparative approach.

**5. 3. Features of the assessment of intangible assets taking into account the available information**

The assessment of intellectual property objects is carried out by applying the approaches generally known in international practice: profitable, costly and comparative. The same approaches to the assessment are used by domestic researchers, meets the requirements of the National Standard No. 4 “Assessment of property rights of intellectual property” [4].

Let’s consider in more detail the methods of assessing intellectual property that are used in international and national practice. Taking into account the norms of the National Standard No. 4 “Assessment of intellectual property rights” and the development of scientists [10–20], it is advisable to highlight the following assessment methods that are used most often (Fig. 2).

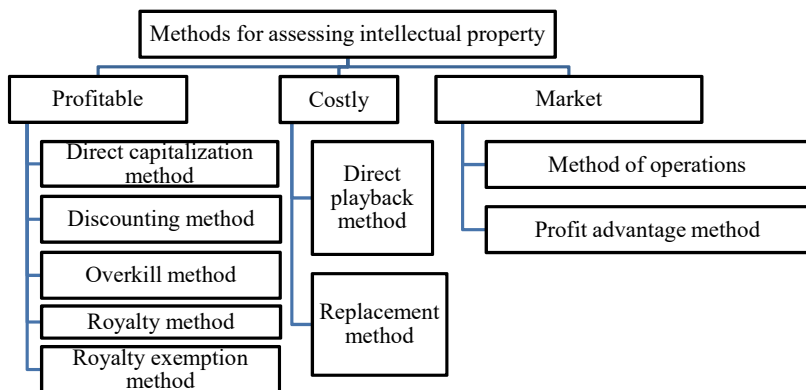


Fig. 2. Methods for assessment of intangible assets (own development)

Consider the features of the application of various approaches.

The income approach is based on an assessment of value based on the determination of expected income, that is, it is applied if it is possible to establish income from the use of such an asset. Within the framework of this approach, methods of direct capitalization, discounting of cash flows, excessive profits, royalties, and exemption from royalties are distinguished. The royalty method is most often used in international practice, with the price of licenses being determined based on the cost of royalties over the period of use of intangible assets. An alternative is the royalty exemption method. This approach estimates the proportion of a company’s profits that is attributed to the intellectual property based on the royalty rate that the company would pay to use the asset if it did not own the asset. In other words, the value of the asset is equal to the cost of the royalty from which the company is exempted by owning the asset. This method applies a royalty rate based on available market data for licenses that include similar assets, industries, territories and other characteristics.

It should be noted that at first glance, the income approach is the most optimal. Indeed, according to R(S) A 8 “Intangible assets”, an intangible asset should be accounted

for in the balance sheet if the company subsequently receives future economic benefits from the sale or use of the intangible asset [2]. That is, a priori, an enterprise recognizes intangible assets subject to forecasting certain economic benefits. But in fact, it is not always possible to assess economic benefits or income, since in conditions of economic instability, many factors can negatively affect the projected income indicator.

In contrast to the income approach, the cost approach is based on determining the amount of expenses required to restore or replace the subject of assessment. The direct reproduction method relies on establishing the present value of the creation (development) or acquisition costs at the date of valuation of certain intellectual property rights.

The replacement cost is determined based on the present value of the costs of creating or acquiring an object of intellectual property rights, similar to intellectual property rights that are being estimated. This object can replace the one assessed according to certain indicators.

The comparative approach is used if there is a sufficient amount of necessary information on prices for such objects. The set of comparison parameters is formed from factors affecting the value of intellectual property rights.

In accordance with the Methodology for the assessment of intellectual property rights during the application of the comparative approach, it is necessary to take into account three important aspects [5]:

- 1) whether there is information available regarding the sale of similar objects of intangible assets;
- 2) or information on sales prices and conditions is available contracts;
- 3) analytical information is available on the impact of certain features and characteristics of intellectual value objects on their value.

Since intellectual power is a specific type of asset, it is very difficult to find analogues, and therefore to carry out such an assessment.

In the absence of the specified information, it is necessary to consider the possibility of conducting an independent study by the appraiser.

As a result, the market value of intellectual property is determined by adjusting the selling prices of similar items, taking into account adjustments.

However, taking into account the peculiarities of this approach, let’s believe that the main disadvantage of the comparative approach is the impossibility of finding an analogue for comparison in a number of cases and indicators for adjusting the value.

**5. 4. Information and methodological support for the assessment of intellectual property in conditions of limited information**

The substantiation of the method for assessing intellectual property is associated with the characteristics of various objects of intellectual property and the method of obtaining them. They are unique and this excludes the possibility of using a single approach to the calculation and in each case requires an individual approach, which is based on taking into account certain aspects.

An essential role in the choice of methods for assessing intellectual property is played by the information that is the basis for the assessment. The first and most preferred

assessment method among the listed methods is profitable approach – indeed, it is who meets the requirements of international standards, since it focuses on future economic benefits. And, as it is known, it is international standards that should take precedence when determining the fair value of assets. But reliable information about the size of future economic benefits is not always available. In addition, for intellectual property objects used not only at the city or country level, but also distributed at the global level, it is the income approach that can provide a reliable estimate. Indeed, the revenues from their use can amount to billions of dollars, and in some countries the value of such assets is a tiny percentage.

The second method that should be applied in the absence of the necessary information is the cost approach. It is based primarily on national accounting standards. Its use is advisable if there is no information on the amount of income, but there are available indicators indicating the amount of expenses for the creation of intellectual property. In the absence of reliable information on the amount of costs, a comparative approach should be used. The necessary information can be collected on the basis of additional studies of similar objects.

Thus, the choice of a method for assessing intellectual property objects requires an assessment of the available information from the standpoint of the possibility of further analytical calculations.

The assessment procedure should begin with the analysis of the objects being assessed, the establishment of certain restrictions, the determination of the necessary parameters, the analysis of the results obtained.

The results of the research made it possible to form a model of information and methodological support for the assessment of intellectual property objects in conditions of limited information, which allows, taking into account the available information, to reasonably choose the IPO method (Fig. 3). It is important to note that in the absence of the necessary information for the application of these assessment methods, approximate estimates based solely on the views of experts are used. The quality of the expert assessment depends significantly on the experience and competence of the expert.

Schematically, the choice of the method for assessing intellectual property and carrying out the assessment procedure is presented in the following form (Fig. 3).

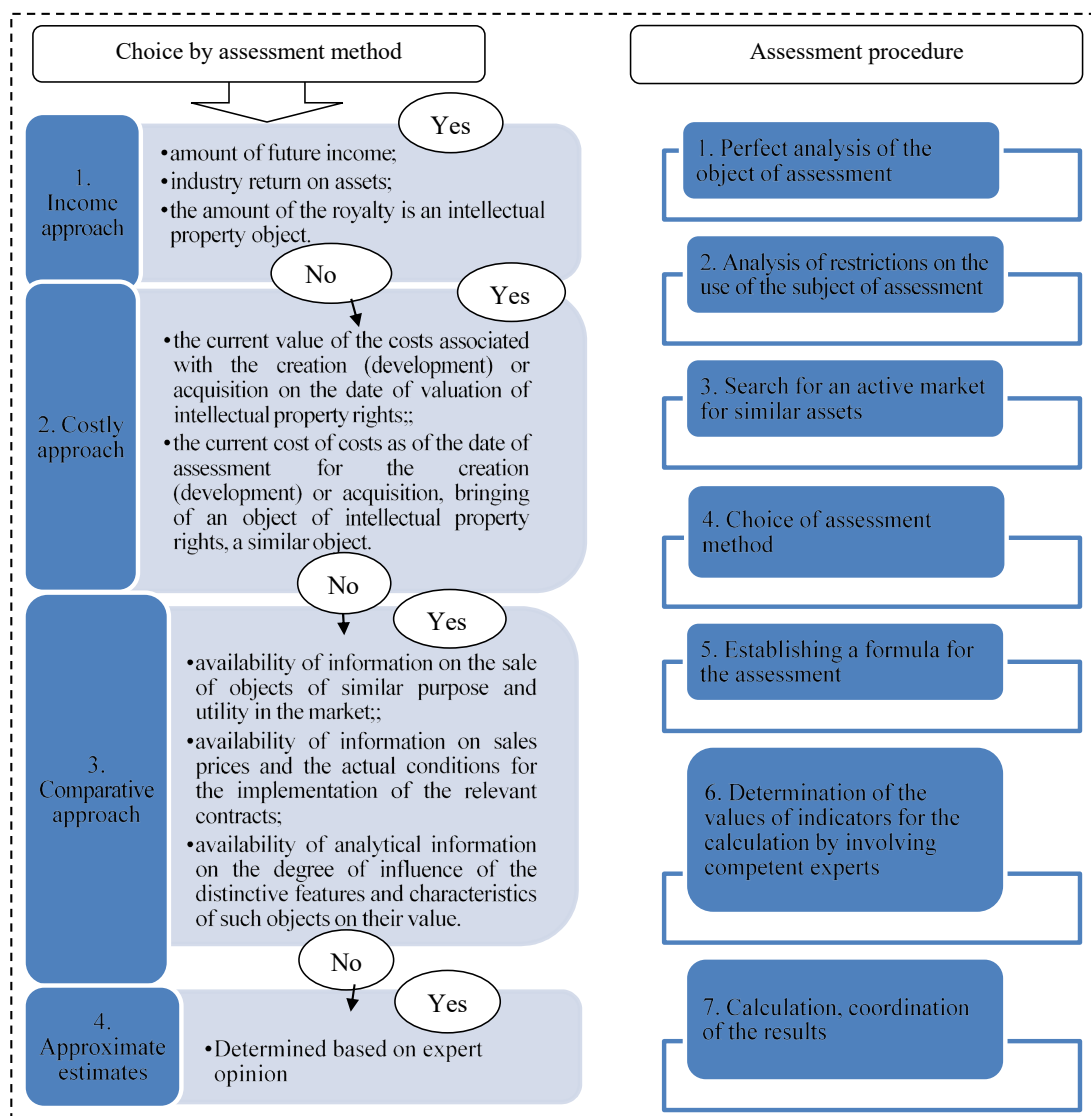


Fig. 3. Model of information and methodological support for the assessment of intellectual property in conditions of limited information (own development)

Thus, the formed information and methodological support for the assessment of intellectual property in conditions of limited information provides for the opportunity to reasonably select the most adequate method for assessing the value of the IPO of the available information and consistently carry out the assessment procedures.

---

## 6. Discussion of the results of the creation of theoretical and methodological provisions for the assessment of intellectual property

---

Calculations of the share of the value of intangible assets in the total value of assets indicate that in world companies it sometimes amounts to more than 50 % (Table 2). But for most Ukrainian enterprises, their cost is less than 1 % (Table 3). The size of investments in intangible assets of enterprises is also insignificant (Table 1). From this, it should be concluded that the indicators of the valuation of intangible assets are distorted. This is most likely due to the lack of the necessary information and the cost estimate.

The study carried out a study of various methods of valuation of intangible assets, in contrast to the study [13], which mentions valuation methods only according to international accounting standards. According to national and international accounting standards, it is established that the assessment is based on both economic benefits (income) and costs. As a result of a joint analysis of the research of specialists and normative acts, it was found that OIP is carried out by three methods – profitable, costly and comparative. Each of the methods has its own advantages and disadvantages due to the limited information available.

In the study, in contrast to work [17], where it is proposed to independently choose methods for assessing intangible assets, taking into account the costs of the assessment, the degree of measurement uncertainty and others, the proposed sequential procedure for assessing and choosing a particular assessment method based on the available information. It should be borne in mind that the income approach is the most recommended for use, since it is that allows to display the size of future economic benefits. If such information is available, then the method is used that requires its use. At the same time, in the works of researchers, these issues are not sufficiently discussed and a clear sequence of actions to determine the cost of evaluating an object has not been established.

So, the proposed model of information and methodological support for the assessment of intellectual property assets in conditions of limited information contains the necessary information that must be taken into account during the assessment and allows to reasonably choose a specific assessment method. In addition, the model highlights the issues of the order of the assessment, specifying the sequence of actions.

But the study has certain drawbacks. Indeed, in conditions of limited information, due attention is not paid to the procedure for determining the amount of income, taking into account the level of distribution of the intellectual property object – regional or global. Such a calculation should have certain features and contain appropriate assumptions.

This problem can be deepened and investigated further, taking into account the likelihood of certain risks associated with forecasting income.

---

## 7. Conclusions

---

1. The analysis of statistical data of companies on the value of intangible assets and found that their value in some US companies exceeds 50 % of assets, but sometimes vice versa – so, in Ukrainian leading companies, their value is less than 1 % of the value of assets, that is, they are undervalued, their cost is accounted for at the initial cost of their creation.

2. Investigated the procedure for assessing intangible assets in accordance with IASB 38 “Intangible assets” and P (S) A 8 “Intangible assets”, as a result of which it was established that the initial assessment according to the standards is based on the cost approach, the revaluation is carried out on the basis of the comparative approach.

3. The features of the valuation of intangible assets by the income, cost and comparative approach have been determined. As a result of the study, it was found that the income approach is the most optimal, since it corresponds to the main essence of assets – bringing economic benefits. But in fact, it is not always possible to assess economic benefits, since in conditions of economic instability, many factors can negatively affect the projected income indicator. It was found that the cost approach in terms of content is the simplest and corresponds to the procedure for calculating the value of intangible assets in accounting – the cost of objects includes all costs associated with the acquisition or creation of intangible assets. But the cost with this approach is negligible. The comparative approach is used if there is a sufficient amount of necessary information on prices for similar objects, but since IPOs are specific, it is very difficult to find such objects, and, therefore, to determine such information.

4. The research results made it possible to form a model of information and methodological support for the assessment of intellectual property objects in conditions of limited information. This model contains the necessary information that must be taken into account during the assessment, the procedure for conducting the assessment with the specification of the sequence of actions. The use of this development makes it possible to solve the problem of choosing a method for assessing IPO.

---

## References

1. Polozhennia (standart) bukhhalterskoho obliku 8. Nematerialni aktyvy No. 242 (1999). Available at: <https://zakon.rada.gov.ua/laws/show/z0750-99#Text>
2. Mizhnarodnyi standart bukhhalterskoho obliku 38 (MSBO 38). Nematerialni aktyvy No. 929\_050 (2012). Available at: [https://zakon.rada.gov.ua/laws/show/929\\_050#Text](https://zakon.rada.gov.ua/laws/show/929_050#Text)
3. Pro otsinku maina, mainovykh prav ta profesiynu otsinochnu diyalnist v Ukraini No. 2658-III (2001). Available at: <https://zakon.rada.gov.ua/laws/show/2658-14#Text>



4. Natsionalnyi standart No. 4. Otsinka mainovykh prav intelektualnoi vlasnosti No. 1185 (2007). Available at: <https://zakon.rada.gov.ua/laws/show/1185-2007-%D0%BF#Text>
5. Metodyka otsinky mainovykh prav intelektualnoi vlasnosti No. 740 (2008). Available at: <http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0726-08>
6. European Valuation Standards. Guidance Note 8 «Valuations of Intangible Assets» (2003). TEGoVA. Available at: <http://www.tegova.org>
7. European Valuation Standards (2016). TEGoVA. Available at: <https://www.tegova.org/en/p4912ae3909e49>
8. International Valuation Standards 2017. Available at: <http://www.cas.org.cn/docs/2017-01/20170120142445588690.pdf>
9. RICS Valuation – Global Standards 2017. Available at: <https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/valuation/red-book-2017-global-edition-rics.pdf>
10. Haskel, J., Westlake, S. (2021). Capitalism without Capital: The Rise of the Intangible Economy (an excerpt). *Journal of Economic Sociology*, 22 (1), 61–70. doi: <https://doi.org/10.17323/1726-3247-2021-1-61-70>
11. Osinski, M., Selig, P. M., Matos, F., Roman, D. J. (2017). Methods of evaluation of intangible assets and intellectual capital. *Journal of Intellectual Capital*, 18 (3), 470–485. doi: <https://doi.org/10.1108/jic-12-2016-0138>
12. Russell, M. (2016). The valuation of pharmaceutical intangibles. *Journal of Intellectual Capital*, 17 (3), 484–506. doi: <https://doi.org/10.1108/jic-10-2015-0090>
13. Chalmers, K., Clinch, G., Godfrey, J. M., Wei, Z. (2011). Intangible assets, IFRS and analysts' earnings forecasts. *Accounting & Finance*, 52 (3), 691–721. doi: <https://doi.org/10.1111/j.1467-629x.2011.00424.x>
14. Dainienė, R., Dagilienė, L. (2014). Accounting-based Valuation of Innovation: Challenges and Perspectives. *Procedia - Social and Behavioral Sciences*, 156, 589–593. doi: <https://doi.org/10.1016/j.sbspro.2014.11.246>
15. Wang, X., García, F., Guijarro, F., Moya, I. (2011). Evaluating patent portfolios by means of multicriteria analysis. *Revista de Contabilidad*, 14 (1), 9–27. doi: [https://doi.org/10.1016/s1138-4891\(11\)70020-6](https://doi.org/10.1016/s1138-4891(11)70020-6)
16. Kirk, C. P., Ray, I., Wilson, B. (2012). The impact of brand value on firm valuation: The moderating influence of firm type. *Journal of Brand Management*, 20 (6), 488–500. doi: <https://doi.org/10.1057/bm.2012.55>
17. Alexandrov, A. V. (2016). Fair valuation of intangible assets in the accounting system. *International Research Journal*, 6 (48), 6–9. doi: <https://doi.org/10.18454/IRJ.2016.48.021>
18. Dyba, V. (2016). Methodological basis for estimation of intangible assets of corporation. *Investytsiyi: praktyka ta dosvid*, 13, 23–28.
19. Moroz, O., Azarova, A., Goda, K. (2012). Methods of assessment of intellectual property objects. *Ekonomichnyi analiz*, 10 (2), 422–425.
20. Kadirovich, R. N., Juraevna, T. M., Shaomin, L. (2021). Improving The Intangible Assets Accounting: In A Pandemic Period. *Psychology and Education Journal*, 58 (1), 28–42. doi: <https://doi.org/10.17762/pae.v58i1.652>
21. Statystychni pokaznyky. Available at: <http://www.ukrstat.gov.ua/>
22. Finansova zvitnist aktsionerlykh tovarystv. Available at: <https://smida.gov.ua/db>
23. Balans (Zvit pro finansovyi stan). Available at: [https://fed.ua/wp-content/uploads/finzvit\\_2019\\_year.pdf](https://fed.ua/wp-content/uploads/finzvit_2019_year.pdf)
24. Ofitsiynyi sait DP Ukrainka heolohichna kompaniya. Available at: <https://ukrgeol.com/ua/finzvit/>
25. Finansova zvitnist mizhnarodnykh kompaniy. Available at: <https://www.macrotrends.net/>

## ABSTRACT AND REFERENCES

## TRANSFER OF TECHNOLOGIES: INDUSTRY, ENERGY, NANOTECHNOLOGY

**DOI: 10.15587/1729-4061.2021.225526**  
**COMPARATIVE ASSESSMENT OF THE INFLUENCE**  
**OF A TECHNOLOGICAL FACTOR ON ECONOMIC**  
**GROWTH (p. 6–15)**

**Boris Kheyfets**

Institute of Economics of the Russian Academy of Sciences,  
 Moscow, Russian Federation  
 Financial University under the Government of  
 the Russian Federation,  
 Moscow, Russian Federation

**ORCID:** <http://orcid.org/0000-0002-6009-434X>

**Veronika Chernova**

Peoples' Friendship University of Russia, Moscow, Russian Federation  
 Institute of Marketing State University of Management,  
 Moscow, Russian Federation

**ORCID:** <http://orcid.org/0000-0001-5951-9091>

The study focuses on the extent to which the technological factor affects economic growth and analyzes its role in enhancing socio-economic differentiation. We develop a methodology for ranking countries according to the level of their technological effectiveness using the specific index. Correlation and regression analysis is used to identify technological factors in economic development. Approbation of the approach took place on the example of the United States and China. The data obtained demonstrate that the increase in R&D costs and the export of high-tech products has a positive effect on economic growth. R&D spending provides 31.6 % to 41.9 % of GDP growth for the United States and China, respectively. Exports of high-tech products support GDP growth at the level of 2.7 % to 4.7 %. The research findings confirm that the technological factor encourages economic development through more efficient allocation of resources, the spread of innovations and the growth of high-tech exports. Regression models have proved this relationship. China ranks first in the index of technological effectiveness and is followed by the United States and Japan. Such countries as Kazakhstan, Brazil and Ukraine are lagging significantly behind some technologically advanced European nations (Romania, Poland, Bulgaria), as well as Turkey and Mexico. Analysis of data from a sample of 30 countries showed that technological differentiation is a direct cause of overall inequality. To bridge this technological gap, it is expedient to develop the existing technological potential in a consistent manner, while concentrating efforts on high-tech sectors capable of strengthening the foundation of the economy.

**Keywords:** economic growth, innovations, global competitiveness, high-tech exports, production platform, USA, China.

### References

1. The Global Competitiveness Report (2019). World Economic Forum. Available at: [http://www3.weforum.org/docs/WEF\\_TheGlobalCompetitivenessReport2019.pdf](http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf)
2. Lenchuk, E. B. (2020). Is Russia ready for a technological breakthrough? *The Economic Revival of Russia*, 1 (63), 43–49.
3. Kongoli, F. (2016). Role of science and technology in sustainable development. 2016 Sustainable Industrial Processing Summit and Exhibition Plenaries. Available at: [http://www.flogen.org/pdf/sips16\\_524FS.pdf](http://www.flogen.org/pdf/sips16_524FS.pdf)
4. Chang, C.-P., Lee, C.-C. (2010). Globalization and Economic Growth: A Political Economy Analysis for OECD Countries. *Global Economic Review*, 39 (2), 151–173. doi: <https://doi.org/10.1080/1226508x.2010.483835>
5. Guaita Martínez, J. M., de Castro-Pardo, M., Pérez-Rodríguez, F., Martín Martín, J. M. (2019). Innovation and multi-level knowledge transfer using a multi-criteria decision making method for the planning of protected areas. *Journal of Innovation & Knowledge*, 4 (4), 256–261. doi: <https://doi.org/10.1016/j.jik.2019.01.001>
6. Kheyfets, B. A. (2020). What route will Russia take along one difficult Chinese path. Moscow: Institute of Economics of the Russian Academy of Sciences, 62. Available at: [https://inecon.org/docs/2020/publications/Kheyfets\\_paper\\_2020.pdf](https://inecon.org/docs/2020/publications/Kheyfets_paper_2020.pdf)
7. Akberdina, V., Kalinina, A., Vlasov, A. (2018). Transformation stages of the Russian industrial complex in the context of economy digitization. *Problems and Perspectives in Management*, 16 (4), 201–211. doi: [https://doi.org/10.21511/ppm.16\(4\).2018.17](https://doi.org/10.21511/ppm.16(4).2018.17)
8. Chapter 4. Technology and inequalities (2018). *Inequality in Asia and the Pacific in the era of the 2030 Agenda for Sustainable Development*. United Nations ESCAP, 63–77. doi: <https://doi.org/10.18356/fe937adc-en>
9. Brynjolfsson, E., McAfee, A. (2014). *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. New York: W.W. Norton & Company, 336.
10. Berg, A., Krueger, A. O. (2003). Trade, Growth, and Poverty: A Selective Survey. *IMF Working Papers*, 03 (30), 1. doi: <https://doi.org/10.5089/9781451844931.001>
11. Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. *Applied Economics*, 38 (10), 1091–1110. doi: <https://doi.org/10.1080/00036840500392078>
12. George, G., Lin, Y. (2016). Analytics, innovation, and organizational adaptation. *Innovation*, 19 (1), 16–22. doi: <https://doi.org/10.1080/14479338.2016.1252042>
13. Daejeon Declaration on Science, Technology, and Innovation Policies for the Global and Digital Age (2015). OECD. Available at: <http://www.oecd.org/sti/daejeon-declaration-2015.htm>
14. Raghupathi, V., Raghupathi, W. (2017). Innovation at country-level: association between economic development and patents. *Journal of Innovation and Entrepreneurship*, 6. doi: <https://doi.org/10.1186/s13731-017-0065-0>
15. Popović, G., Erić, O., Stanić, S., Krajišnik, M. (2019). Education, technological changes and economic development of Bosnia and Herzegovina. *International Journal of Cognitive Research in Science, Engineering and Education*, 7 (2), 77–86. doi: <https://doi.org/10.5937/ijcrsee1902077p>
16. Romanova, O. A., Korovin, G. B., Kuzmin, E. A. (2017). Analysis of the development prospects for the high-tech sector of the economy in the context of new industrialization. *Espacios*, 38 (59), 25.
17. Litau, E. (2018). Entrepreneurship and economic growth: A look from the perspective of cognitive economics. *ICEME 2018: Proceedings of the 2018 9th International Conference on E-business, Management and Economics*, 143–147. doi: <https://doi.org/10.1145/3271972.3271978>

18. Dosi, G. (1982). Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change. *Research Policy*, 11 (3), 147–162. doi: [https://doi.org/10.1016/0048-7333\(82\)90016-6](https://doi.org/10.1016/0048-7333(82)90016-6)
19. Hu, A. G. Z., Jaffe, A. B. (2007). IPR, innovation, economic growth and development. Available at: [http://policydialogue.org/files/events/Hu\\_Jaffe\\_IPR\\_Innovation\\_Econ\\_Growth\\_and\\_Dev\\_Paper.pdf](http://policydialogue.org/files/events/Hu_Jaffe_IPR_Innovation_Econ_Growth_and_Dev_Paper.pdf)
20. Färe, R., Grosskopf, S., Tremblay, V. J. (2012). Market Power and Technology. *Review of Industrial Organization*, 40 (2), 139–146. doi: <https://doi.org/10.1007/s11151-012-9334-z>
21. Özak, Ö. (2018). Distance to the pre-industrial technological frontier and economic development. *Journal of Economic Growth*, 23 (2), 175–221. doi: <https://doi.org/10.1007/s10887-018-9154-6>
22. Pavlov, V. (2018). Innovative strategy as a factor in the development of the high technological sectors of the economy. *Norwegian Journal of Development of the International Science*, 17 (4), 38–44.
23. Buchinskaya, O., Dyatel, E. (2019). Influence of high-technology exports and foreign charges for the use of intellectual property on economic growth. *Journal of New Economy*, 20 (2), 114–126. doi: <https://doi.org/10.29141/2073-1019-2019-20-2-7>
24. Akcali, B. Y., Sismanoglu, E. (2015). Innovation and the Effect of Research and Development (R&D) Expenditure on Growth in Some Developing and Developed Countries. *Procedia - Social and Behavioral Sciences*, 195, 768–775. doi: <https://doi.org/10.1016/j.sbspro.2015.06.474>
25. Dzhadan, I. (2019). Theoretical principles of the correlation between the country's industrial and technological development and the state's economic security. *Norwegian Journal of Development of the International Science*, 11-3 (36), 9–14.
26. Liao, Y., Loures, E. R., Deschamps, F., Brezinski, G., Venâncio, A. (2018). The impact of the fourth industrial revolution: a cross-country/region comparison. *Production*, 28. doi: <https://doi.org/10.1590/0103-6513.20180061>
27. Baneliene, R., Melnikas, B., Strazdas, R., Tolocka, E. (2018). Innovation activities and the impact of investment in R&D on economic growth: Assessment and modelling. *Terra Economicus*, 16 (4), 66–76. doi: <https://doi.org/10.23683/2073-6606-2018-16-4-66-76>
28. Desmet, K., Greif, A., Parente, S. L. (2020). Spatial competition, innovation and institutions: the Industrial Revolution and the Great Divergence. *Journal of Economic Growth*, 25 (1), 1–35. doi: <https://doi.org/10.1007/s10887-019-09173-3>
29. Javed, Z., Munir, K. (2016). Impact of export composition on economic growth in South Asia. Available at: [https://mpraub.uni-muenchen.de/71519/1/MPRA\\_paper\\_71519.pdf](https://mpraub.uni-muenchen.de/71519/1/MPRA_paper_71519.pdf)
30. Hossain, Md. M. (2018). Dynamic growth rate of U.S. economy. Available at: [https://mpraub.uni-muenchen.de/91042/1/MPRA\\_paper\\_91042.pdf](https://mpraub.uni-muenchen.de/91042/1/MPRA_paper_91042.pdf)
31. Brinca, P., Duarte, J. B., Oliveira, J. G. (2019). Investment-specific technological change, taxation and inequality in the U.S. Available at: [https://mpraub.uni-muenchen.de/91463/1/MPRA\\_paper\\_91463.pdf](https://mpraub.uni-muenchen.de/91463/1/MPRA_paper_91463.pdf)
32. Molina, J. A., Velilla, J., Ortega, R. (2016). Entrepreneurial activity in the OECD: Pooled and cross-country evidence. Available at: [https://mpraub.uni-muenchen.de/71592/1/MPRA\\_paper\\_71592.pdf](https://mpraub.uni-muenchen.de/71592/1/MPRA_paper_71592.pdf)
33. Dewangan, V., Godse, M. (2014). Towards a holistic enterprise innovation performance measurement system. *Technovation*, 34 (9), 536–545. doi: <https://doi.org/10.1016/j.technovation.2014.04.002>
34. Kim, S. Y. (2013). Government R&D funding in economic downturns: Testing the varieties of capitalism conjecture. *Science and Public Policy*, 41 (1), 107–118. doi: <https://doi.org/10.1093/scipol/sct040>
35. Freeman, C., Soete, L. (2009). Developing science, technology and innovation indicators: What we can learn from the past. *Research Policy*, 38 (4), 583–589. doi: <https://doi.org/10.1016/j.respol.2009.01.018>
36. Ernst, H., Conley, J., Omland, N. (2016). How to create commercial value from patents: the role of patent management. *R&D Management*, 46 (S2), 677–690. doi: <https://doi.org/10.1111/radm.12210>
37. World Development Indicators. The World Bank Group. Available at: <https://databank.worldbank.org/source/world-development-indicators>
38. Wierds, P., Van Kerkhoff, H., De Haan, J. (2013). Composition of Exports and Export Performance of Eurozone Countries. *JCMS: Journal of Common Market Studies*, 52 (4), 928–941. doi: <https://doi.org/10.1111/jcms.12114>
39. Kurzweil, R. (2001). The law of accelerating returns. Available at: <https://www.kurzweilai.net/the-law-of-accelerating-returns>
40. Cricelli, L., Greco, M., Grimaldi, M. (2016). Assessing the open innovation trends by means of the eurostat community innovation survey. *International Journal of Innovation Management*, 20 (03), 1650039. doi: <https://doi.org/10.1142/s1363919616500390>
41. Storey, C., Cankurtaran, P., Papastathopoulou, P., Hultink, E. J. (2015). Success Factors for Service Innovation: A Meta-Analysis. *Journal of Product Innovation Management*, 33 (5), 527–548. doi: <https://doi.org/10.1111/jpim.12307>
42. Digital Economy Report 2019. Value Creation and Capture: Implications for Developing Countries (2019). UNCTAD. Available at: [https://unctad.org/system/files/official-document/der2019\\_en.pdf](https://unctad.org/system/files/official-document/der2019_en.pdf)
43. China extends lead in number of TOP500 supercomputers, US holds on to performance advantage. Available at: <https://www.top500.org/news/china-extends-lead-in-number-of-top500-supercomputers-us-holds-on-to-performance-advantage/#:~:text=The%20June%202019%20list%20had,and%20China%20with%2029.9%20percent>
44. Dominguez Lacasa, I., Jindra, B., Radosevic, S., Shubbak, M. (2019). Paths of technology upgrading in the BRICS economies. *Research Policy*, 48 (1), 262–280. doi: <https://doi.org/10.1016/j.respol.2018.08.016>
45. Solar power statistics in China 2019 (2019). Solar Feeds. Available at: <https://solarfeeds.com/solar-power-statistics-in-china/>
46. Vickers, C., Ziebarth, N. L. (2019). Lessons for Today from Past Periods of Rapid Technological Change. UN Department of Economic and Social Affairs (DESA) Working Papers. doi: <https://doi.org/10.18356/c2f6be59-en>
47. Marjit, S., Ray, M. (2017). Export profitability, competition and technology. *International Review of Economics & Finance*, 47, 35–45. doi: <https://doi.org/10.1016/j.iref.2016.10.001>
48. Saborowski, C., Haddad, M. E., Lim, J. J. (2010). Trade Openness Reduces Growth Volatility When Countries Are Well Diversified. *Policy Research Working Papers*. doi: <https://doi.org/10.1596/1813-9450-5222>
49. Accelerating the digital transformation of European industry and enterprises (2016). European Union. Available at: [https://ec.europa.eu/growth/content/accelerating-digital-transformation-european-industry-and-enterprises\\_en](https://ec.europa.eu/growth/content/accelerating-digital-transformation-european-industry-and-enterprises_en)

**DOI: 10.15587/1729-4061.2021.225639**  
**DEFINING THE SOCIO-DEMOGRAPHIC PREDICTORS OF PRIORITY INVESTMENT IN THE CONTEXT OF TASKS FOR THE FINANCIAL SUBSYSTEM OF STARTUP-MANAGEMENT (p. 15–25)**

**Larisa Ligonenko**

Kyiv National Economic University named after Vadym Hetman,  
Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0001-5597-5487>

**Yevhen Borysov**

Kyiv National Economic University named after Vadym Hetman,  
Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0001-8273-8655>

**Larysa Hromozdova**

Kyiv National Economic University named after Vadym Hetman,  
Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-4077-9229>

**Iryna Deineha**

National Aviation University, Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0001-8712-250x>

**Serhii Leontovych**

The National Defence University of Ukraine named after Ivan  
Cherniakhovskiy, Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-0393-1869>

**Inna Kosiak**

National Pedagogical Dragomanov University,  
Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-2996-1679>

**Pavlo Volotivskiy**

The National Defence University of Ukraine named after  
Ivan Cherniakhovskiy, Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-1479-883X>

**Yevhen Marco**

Center for Military and Strategic Studies  
The National Defence University of Ukraine named  
after Ivan Cherniakhovskiy, Kyiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-9165-8072>

This research has investigated the retrospective trends in financing startups in Ukraine corresponding to the socio-demographic characteristics of startupper (founders). Studying the dependences between the amount of funding and the qualitative characteristics of startupper has made it possible to determine the socio-demographic predictors of making a positive decision regarding the financing of startups.

As the current study has shown, in order to receive an investment, a startupper must meet the investor's expectations regarding reliability, qualifications, experience, and potential prospects. The investor analyzes not only the business idea of the startup but also the potential recipient for compliance with a series of socio-demographic predictors such as gender, age, level, and specialization of education. It has been proven that the largest amount of funding for startups in Ukraine is received by male funders, aged 35 to 45, who have a higher technical education. Startup investors consider such startupper a priority for their investments since they see the least risks and a high probability of successful deployment of invested funds.

The identified investors' preferences when choosing startup founders can be extrapolated to the startup environment of any country, however, they may change over time, depending on the specificity of the situation in the investment country.

To rationally solve problems in the financial subsystem of startup management, it is necessary to preliminarily determine the socio-demographic predictors of priority investment of startups of the respective country and area of activity. The practical tools for determining such predictors have been tested during this study.

The practical significance of the research is due to the growing pace of development of startup technologies, the need to improve the effectiveness of the startup management financial subsystem, and increase the efficiency of the startup support infrastructure.

**Keywords:** startup, startupper, startup management, financial support to startup management, priority startup investment, socio-demographic predictors.

**References**

1. Start-up Barometer Europe (2020). Available at: <https://startup.ey.com/wp-content/uploads/2020/04/EY-Startup-Barometer-Europe-April-2020-ENG.pdf>
2. Start-up-Barometer Germany (2020). Available at: [https://startup.ey.com/wp-content/uploads/2020/01/EY-Startup-Barometer-Januar-2020\\_ENG.pdf](https://startup.ey.com/wp-content/uploads/2020/01/EY-Startup-Barometer-Januar-2020_ENG.pdf)
3. Startup Barometer. Startap Barometr 2020. Issledovanie rossiyskogo rynka tekhnologicheskogo predprinimatel'stva. Available at: <https://ict.moscow/research/startap-barometr-2020-issledovanie-rossiiskogo-rynka-tekhnologicheskogo-predprinimatelstva/>
4. Oe, A., Mitsuhashi, H. (2013). Founders' experiences for startups' fast break-even. *Journal of Business Research*, 66 (11), 2193–2201. doi: <https://doi.org/10.1016/j.jbusres.2012.01.011>
5. Berger, E. S. C., Kuckertz, A. (2016). Female entrepreneurship in startup ecosystems worldwide. *Journal of Business Research*, 69 (11), 5163–5168. doi: <https://doi.org/10.1016/j.jbusres.2016.04.098>
6. Banerji, D., Reimer, T. (2019). Startup founders and their LinkedIn connections: Are well-connected entrepreneurs more successful? *Computers in Human Behavior*, 90, 46–52. doi: <https://doi.org/10.1016/j.chb.2018.08.033>
7. Nahata, R. (2019). Success is good but failure is not so bad either: Serial entrepreneurs and venture capital contracting. *Journal of Corporate Finance*, 58, 624–649. doi: <https://doi.org/10.1016/j.jcorpfin.2019.07.006>
8. Gloor, P. A., Fronzetti Colladon, A., Grippa, F., Hadley, B. M., Woerner, S. (2020). The impact of social media presence and board member composition on new venture success: Evidences from VC-backed U.S. startups. *Technological Forecasting and Social Change*, 157, 120098. doi: <https://doi.org/10.1016/j.techfore.2020.120098>
9. Ukraine. Database by dealroom.co. Available at: [https://ukraine.dealroom.co/transactions.rounds/f/all\\_locations/all\\_of\\_Ukraine](https://ukraine.dealroom.co/transactions.rounds/f/all_locations/all_of_Ukraine)
10. Nasledov, A. D. (2011). SPSS 19: Professional'niy statisticheskiy analiz dannyh. Sankt-Peterburg: Piter, 400.

**DOI: 10.15587/1729-4061.2021.225524**  
**ESTIMATION OF STATE FINANCIAL SUPPORT FOR NON-PRIORITY TERRITORIAL UNITS USING THE EXAMPLE OF BRIDGE CONSTRUCTION (p. 26–34)**

**Iaroslava Levchenko**

Kharkiv National Automobile and Highway University,  
Kharkiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-4979-1101>

**Igor Britchenko**

State Higher Vocational School Memorial of Prof. Stanislaw  
Tarnowski, Tarnobrzeg, Poland

**ORCID:** <http://orcid.org/0000-0002-9196-8740>

The article discloses the problem of distributing state financial support based on an integrated approach. The study has proved the urgency and necessity of state support for the lowest priority territorial units (regions). It answers the research question of what components need to be included in the methodology for determining state financial support. A comprehensive method for estimating the share of public funds is proposed, taking into account the investment attractiveness of a region (oblast) and the risk of the corresponding region (oblast). To achieve this goal, the following general scientific and special methods and research techniques were used in the work, such as comparative analysis of scientific literature and information sources based on methods of comparison, systematization, and generalization; generalization of the analysis results, as well as logical generation of conclusions and integral assessment.

Since the problem of financing the construction and reconstruction of bridges is relevant for a number of countries, this technique was tested using an example of bridge construction.

According to the obtained results, territorial units (regions) that are not leaders in priority for the investor and have a high level of riskiness of investing financial resources become eligible for state financial support. The problem of financing such regions can be solved only through state support. The results of calculations show that the distribution of financial resources with the available volume of public finances  $K=1$  allocated for support is carried out proportionally. An integrated approach made it possible to identify 10 territorial units (oblasts) for funding, with the oblasts with the worst priority factors receiving the largest share of state financial support.

This study is of practical interest to government agencies in the distribution of public funds, and it is of theoretical importance to researchers dealing with issues of financial security and public administration.

**Keywords:** government funding, financial support, government support, financing model, bridge construction.

## References

- Del Grosso, A., Inaudi, D., Pardi, L. (2002). Overview of European activities in the health monitoring of bridges. First International Conference on Bridge Maintenance, Safety and Management. Barcelona. Available at: <https://www.researchgate.net/publication/229004961>
- Manukov, S. (2018). Sotni evropeyskih mostov nahodyatsya v avariynom sostoyanii. *Ekspert*. Available at: <https://expert.ru/2018/08/17/sotni-evropeyskih-mostov-nahodyatsya-v-avariynom-sostoyanii/>
- Pucci, A., Giresini, L., Sassu, M. (2019). Method for sustainable large-scale bridges survey. IABSE Symposium, Guimarães 2019: Towards a Resilient Built Environment Risk and Asset Management. doi: <https://doi.org/10.2749/guimaraes.2019.1034>
- Di Sarno, L., da Porto, F., Guerrini, G., Calvi, P. M., Camata, G., Prota, A. (2018). Seismic performance of bridges during the 2016 Central Italy earthquakes. *Bulletin of Earthquake Engineering*, 17 (10), 5729–5761. doi: <https://doi.org/10.1007/s10518-018-0419-4>
- Pelke, E. (2020). The main directions taken by road bridges in Germany in the twentieth century. *Proceedings of the Institution of Civil Engineers - Engineering History and Heritage*, 173 (1), 14–25. doi: <https://doi.org/10.1680/jenhh.19.00002>
- Hendricks, A., Volovich, N. V. (2018). Renovation in East Germany: the program of support of “disappearing” cities. *Property relations in the Russian Federation*, 5 (200), 26–42. doi: <http://doi.org/10.24411/2072-4098-2018-15002>
- Pochti polovina latviyskih mostov - v plachevnom sostoyanii (2018). Available at: <http://baltijal.lv/news/read/31002>
- Prato, C. A., Gerbaudo, C. F., Ceballos, M. A. (2002). Case Studies of Failure, Damage Assessment, and Repair of Multispan Bridges in Argentina. *Rehabilitating and Repairing the Buildings and Bridges of Americas*. doi: [https://doi.org/10.1061/40613\(272\)14](https://doi.org/10.1061/40613(272)14)
- Milani, C. J., Kripka, M. (2012). Diagnosis of pathologies in bridges of the road system in Brazil. *Constructii*, 1, 26–34. Available at: [https://www.researchgate.net/profile/Moacir\\_Kripka/publication/237101774\\_Diagnosis\\_of\\_pathologies\\_in\\_bridges\\_of\\_the\\_road\\_system\\_in\\_Brazil/links/0046351b88c3b4f50d000000.pdf](https://www.researchgate.net/profile/Moacir_Kripka/publication/237101774_Diagnosis_of_pathologies_in_bridges_of_the_road_system_in_Brazil/links/0046351b88c3b4f50d000000.pdf)
- Esteves, I. C. A., Medeiros-Junior, R. A., Medeiros, M. H. F. (2018). NDT for bridges durability assessment on urban-industrial environment in Brazil. *International Journal of Building Pathology and Adaptation*, 36 (5), 500–515. doi: <https://doi.org/10.1108/ijbpa-04-2018-0032>
- Khozhepko, V. V., Chernova, V. A. (2010). Brazil: current situation, problems and tendencies of innovative development. *RUDN Journal Of Economics*, 4, 53–58. Available at: <http://journals.rudn.ru/economics/article/view/11886/11316>
- Backward Regions Grant Fund. Available at: <https://www.india-stat.com/social-and-welfare-schemes-data/27/backward-classes-schemes/27905/backward-regions-grant-fund-brgf/411976/stats.aspx>
- Backward Region Grant Fund for all Arunachal districts. Available at: <https://timesofindia.indiatimes.com/city/guwahati/Backward-Region-Grant-Fund-for-all-Arunachal-districts/articleshow/27236041.cms>
- Pipinato, A. (2018). Extending the lifetime of steel truss bridges by cost-efficient strengthening interventions. *Structure and Infrastructure Engineering*, 14 (12), 1611–1627. doi: <https://doi.org/10.1080/15732479.2018.1465103>
- Gil, N., Beckman, S. (2009). Introduction: Infrastructure Meets Business: Building New Bridges, Mending Old Ones. *California Management Review*, 51 (2), 6–29. doi: <https://doi.org/10.2307/41166478>
- Parker, F. (1931). Constructing and Financing Toll Bridges. *The Journal of Land & Public Utility Economics*, 7 (2), 127. doi: <https://doi.org/10.2307/3139049>
- Danette Bonano-Rodríguez, V. (2017). La colaboración público-privada para la provisión de autopistas, carreteras y puentes. Madrid, 360. Available at: <https://eprints.ucm.es/40889/>
- Cangiano, M., Anderson, B., Alier, M., Petrie, M., Hemming, R. (2006). Public-Private Partnerships, Government Guarantees, and Fiscal Risk. *International Monetary Fund*, 100. doi: <https://doi.org/10.5089/9781589064935.058>
- Levchenko, Ya. S. (2020). Teoretiko-metodologicheskie osnovy finansovogo obespecheniya mostostroeniya Ukrainy v ramkah gosudarstvenno-chastnogo partnerstva. *Sofiya*. Available at: [https://www.academia.edu/41818798/ТЕОРЕТИКО\\_МЕТОДОЛОГИЧЕСКИЕ\\_ОСНОВЫ\\_ФИНАНСОВОГО\\_ОБЕСПЕЧЕНИЯ\\_МОСТОСТРОЕНИЯ\\_УКРАИНЫ\\_В\\_РАМКАХ\\_ГОСУДАРСТВЕННО\\_ЧАСТНОГО\\_ПАРТНЕРСТВА](https://www.academia.edu/41818798/ТЕОРЕТИКО_МЕТОДОЛОГИЧЕСКИЕ_ОСНОВЫ_ФИНАНСОВОГО_ОБЕСПЕЧЕНИЯ_МОСТОСТРОЕНИЯ_УКРАИНЫ_В_РАМКАХ_ГОСУДАРСТВЕННО_ЧАСТНОГО_ПАРТНЕРСТВА)
- Guo, S., Shi, Y. (2018). Infrastructure investment in China: A model of local government choice under land financing. *Journal of Asian Economics*, 56, 24–35. doi: <https://doi.org/10.1016/j.asieco.2018.04.001>
- Kukacka, J., Kristoufek, L. (2020). Do “complex” financial models really lead to complex dynamics? Agent-based models and multifractality. *Journal of Economic Dynamics and Control*, 113, 103855. doi: <https://doi.org/10.1016/j.jedc.2020.103855>
- Kukla, W. (2018). The infrastructure of road transport in Poland in shaping the state security. *Transport Economics and Logistics*, 80, 139–148. doi: <https://doi.org/10.26881/etil.2018.80.15>

23. Britchenko, I. G., Cherniavska, T. A. (2017). Transport security as a factor of transport and communication system of Ukraine self-sustaining development. *Scientific Bulletin of Polissia*, 1 (1 (9)), 16–24. doi: [https://doi.org/10.25140/2410-9576-2017-1-1\(9\)-16-24](https://doi.org/10.25140/2410-9576-2017-1-1(9)-16-24)
24. Mattar Nasser, R., de Moraes, R. F. (2014). O Brasil e a segurança no seu entorno estratégico: América do Sul e Atlântico Sul. *Ipea*, 284. Available at: [https://www.ipea.gov.br/portal/images/stories/PDFs/livros/livros/livro\\_brasil\\_seguranca.pdf](https://www.ipea.gov.br/portal/images/stories/PDFs/livros/livros/livro_brasil_seguranca.pdf)
25. Pashinskiy, M. (2020). Krupnye i dlinnye: v kakom regione strany bol'she vsego mostov. Available at: <https://gmk.center/infographic/krupnye-i-dlinnye-v-kakom-regione-strany-bolshe-vsego-mostov/>
26. Smyrnov, O., Borysenko, A., Trynova, I., Levchenko, I., Marchenko, A. (2020). Determining the technical and economic parameters for designing hybrid power units for the budget segment. *Eastern-European Journal of Enterprise Technologies*, 1 (8 (103)), 43–49. doi: <https://doi.org/10.15587/1729-4061.2020.194642>
27. Sardak, S., Samoilenko, A. (2014). National Economies Intellectualization Evaluating in the World Economy. *SSRN Electronic Journal*, 9-10 (2), 4–7. doi: <https://doi.org/10.2139/ssrn.3508400>
28. Terlikowski, P., Paska, J., Pawlak, K., Kaliński, J., Urbanek, D. (2019). Modern financial models of nuclear power plants. *Progress in Nuclear Energy*, 110, 30–33. doi: <https://doi.org/10.1016/j.pnucene.2018.09.010>
29. Muczyński, A. (2020). Financial flow models in municipal housing stock management in Poland. *Land Use Policy*, 91, 104429. doi: <https://doi.org/10.1016/j.landusepol.2019.104429>
30. Snieska, V., Zykiene, I. (2015). City Attractiveness for Investment: Characteristics and Underlying Factors. *Procedia - Social and Behavioral Sciences*, 213, 48–54. doi: <https://doi.org/10.1016/j.sbspro.2015.11.402>
31. Akbulayev, N., Aliyev, Y., Ahmadov, T. (2019). Research models for financing social business: theory and practice. *Heliyon*, 5 (5), e01599. doi: <https://doi.org/10.1016/j.heliyon.2019.e01599>
32. Mindlin, Y., Stolyarov, N., Novikova, N., Smolentsev, V., Tikhomirov, E. (2018). Evaluation of competitive advantages of regional economic clusters. *Revista ESPACIOS*, 39 (31). Available at: <https://www.revistaespacios.com/a18v39n31/a18v39n31p14.pdf>
33. Urbancikova, N., Burger, P. (2014). Financing Clusters from Public Funds in the European Countries. *Journal of Applied Economic Sciences*, 9 (1 (27)). Available at: [https://www.researchgate.net/publication/262791406\\_Financing\\_Clusters\\_from\\_Public\\_Funds\\_in\\_the\\_European\\_Countries](https://www.researchgate.net/publication/262791406_Financing_Clusters_from_Public_Funds_in_the_European_Countries)
34. Angelis-Dimakis, A., Dimaki, K. (2016). Identifying Clusters of Regions in the European South, based on their Economic, Social and Environmental Characteristics. *REGION*, 3 (2), 71. doi: <https://doi.org/10.18335/region.v3i2.81>
35. Coletti, M., Di Maria, E. (2015). The rush for cluster initiatives: cluster organisation and management in Central Europe. *International Journal of Entrepreneurship and Innovation Management*, 19 (5-6), 327–342. Available at: <https://www.deepdyve.com/lp/inderscience-publishers/the-rush-for-cluster-initiatives-cluster-organisation-and-management-0sfcKSigpR>
36. Pro zatverdzhennia Metodyky otsiniuvannia roboty tsentralnykh i mistsevykh orhaniv vykonavchoi vlady shchodo zaluchennia investytsiy, zdiysnennia zakhodiv z polipshennia investytsiynoho klimatu u vidpovidnykh haluziakh ekonomiky ta rehionakh i vidpovidnoi formy zvituv. *Nakaz Ministerstva ekonomiky Ukrainy vid 17 lypnia 2006 r. No 245*. Available at: <https://zakon.rada.gov.ua/laws/show/z0459-04#Text>
37. Vorkut, T., Volynets, L., Bilonog, O., Sopotsko, O., Levchenko, I. (2019). The model to optimize deliveries of perishable food products in supply chains. *Eastern-European Journal of Enterprise Technologies*, 5 (3 (101)), 43–50. doi: <https://doi.org/10.15587/1729-4061.2019.177903>
38. Orlowski, L. T. (2012). Financial crisis and extreme market risks: Evidence from Europe. *Review of Financial Economics*, 21 (3), 120–130. doi: <https://doi.org/10.1016/j.rfe.2012.06.006>
39. Koeffitsient variatsii (Variation coefficient). Available at: <https://wiki.loginom.ru/articles/variation-coefficient.html>
40. Mustafakulov, S. (2017). Investment Attractiveness of Regions: Methodic Aspects of the Definition and Classification of Impacting Factors. *European Scientific Journal*, ESJ, 13 (10), 433. doi: <https://doi.org/10.19044/esj.2017.v13n10p433>
41. Levchenko, Y. (2019). On the way to European integration: how and who can invest in construction and reconstruction of Ukrainian bridges? *Eastern Europe: Economy, Business and Management*, 6 (23). doi: <https://doi.org/10.32782/easterneurope.23-22>
42. Collier, P., Pattillo, C. (2000). Investment and Risk in Africa. *Investment and Risk in Africa*, 3–30. doi: [https://doi.org/10.1007/978-1-349-15068-7\\_1](https://doi.org/10.1007/978-1-349-15068-7_1)
43. Abuzayed, B., Al-Fayoumi, N., Arabiyat, T. S. (2018). Does Investors' Fear Gauge in a Mature Market Matter? Evidence from the MENA Region. *The Journal of Wealth Management*, 21 (1), 71–87. doi: <https://doi.org/10.3905/jwm.2018.21.1.071>
44. Lee, S. L. (2001). The risks of investing in the real estate markets of the Asian region. Available at: <http://centaur.reading.ac.uk/27114/1/0601.pdf>
45. Singh, R., Bhattacharjee, J. (2019). Measuring Equity Share Related Risk Perception of Investors in Economically Backward Regions. *Risks*, 7 (1), 12. doi: <https://doi.org/10.3390/risks7010012>

---

**DOI: 10.15587/1729-4061.2021.225512**  
**IMPROVING THE DESIGNING OF MARINE TETHERED SYSTEMS USING THE PRINCIPLES OF SHIPBUILDING 4.0 (p. 35–48)**

**Volodymyr Blintsov**

Admiral Makarov National University of Shipbuilding,  
Mykolayiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-3912-2174>

**Kostiantyn Trunin**

Admiral Makarov National University of Shipbuilding,  
Mykolayiv, Ukraine

**ORCID:** <http://orcid.org/0000-0001-6345-6257>

This paper considers the issues and theoretical aspects related to improving the design of maritime tethered systems (MTSs) with flexible links (FLs) using underwater towed systems (UTSs) as an example. That allows them to be used in the early stages of design by implementing the principles of Shipbuilding 4.0 and BIM technologies. Such regimes have not previously been described by existing mathematical models (MMs). The expected result of the current study is a significant decrease in the cost of different resources. At the same time, the basic reliable results of design solutions could be obtained already in the early stages of design.

The theoretical basis of the proposed method for improving the design of MTS with FL is the improved design concept (IDC) for MTS with FL while the tool base of the method is a special modeling complex (SMC). The use of IDC along with SMC at the research (pre-prototype) design phase reduces the number of MTS design stages.

The proposed method to improve the design of MTS with FL, based on the MM that notates the dynamics of MTS FL and MTS with FL, makes it possible to investigate different modes of operation of almost all

MTS classes. That allows devising the recommendations for predicting possible operational loads in order to design their elements. At the same time, there is an opportunity to improve the existing methods for calculating and designing MTS with FL with the required properties and parameters, and to bring them to the level of engineering application.

The application of SMC at the pre-prototype design stage makes it possible to avoid the use of physical modeling of the operational regimes of MTS with FL associated with the full-scale testing on the high seas.

**Keywords:** MTS design improvement, Shipbuilding 4.0, BIM Technology.

## References

- Kokushkin, V. A. (2019). Tsifrovaya transformatsiya: printsipy i osnovnye napravleniya; ozhidaniya i riski dlya proektnogo upravleniya. *Materialy XX MNPК «Morinteh-Praktik» «Informatsionnye tehnologii v sudostroenii»*. Sankt-Peterburg.
- Tuchkov, A. (2017). Poka v sudostroenii net dolzhnogo ponimaniya, chto takoe informatsionnaya model', no budushchee otrasli budut opredelyat' molodye spetsialisty. Konferentsiya «Morinteh-Praktik 2017. Informatsionnye tehnologii v sudostroenii». Available at: [https://isicad.ru/ru/articles.php?article\\_num=19326](https://isicad.ru/ru/articles.php?article_num=19326)
- BIM tehnologii v stroitel'stve: chto eto takoe i zachem oni nuzhny. Available at: <https://www.dmstr.ru/articles/bim>
- Haugen, G. K., Grahl-Madsen, M. (2004). Dynamic Analysis of a Towed Underwater Vehicle System: Model Validation. 23rd International Conference on Offshore Mechanics and Arctic Engineering. doi: <https://doi.org/10.1115/omae2004-51080>
- Trunin, K. S. (2017). Mathematical model of two connected elements of the flexible links of the marine lash system. Collection of Scientific Publications NUS, 2, 3–12. doi: <https://doi.org/10.15589/jnn20170201>
- Feng, D. K., Zhao, W. W., Pei, W. B., Ma, Y. C. (2011). A New Method of Designing Underwater Towed System. *Applied Mechanics and Materials*, 66-68, 1251–1255. doi: <https://doi.org/10.4028/www.scientific.net/amm.66-68.1251>
- Trunin, K. S. (2017). Dynamics of a marine lash system with a flexible link. Collection of Scientific Publications NUS, 3, 3–10. doi: <https://doi.org/10.15589/jnn20170301>
- Minowa, A., Toda, M. (2019). A High-Gain Observer-Based Approach to Robust Motion Control of Towed Underwater Vehicles. *IEEE Journal of Oceanic Engineering*, 44 (4), 997–1010. doi: <https://doi.org/10.1109/joe.2018.2859458>
- Hover, F. S. (1993). Methods of Positioning Deeply-Towed Underwater Cables. Available at: <https://apps.dtic.mil/dtic/tr/fulltext/u2/a268917.pdf>
- Trunin, K. S. (2017). Equations of dynamics of the flexible connection element of the marine tethered system. Collection of Scientific Publications NUS, 1, 18–25. doi: <https://doi.org/10.15589/jnn20170104>
- Ranmuthugala, S. D. (2000). Computer Simulation and Investigation of Underwater Two-Part and Multi Tow Systems. University of Tasmania. Available at: [https://eprints.utas.edu.au/21317/1/whole\\_RanmuthugalaSusanthaDevapriya2001\\_thesis.pdf](https://eprints.utas.edu.au/21317/1/whole_RanmuthugalaSusanthaDevapriya2001_thesis.pdf)
- Blintsov, O. (2017). Development of the mathematical modeling method for dynamics of the flexible tether as an element of the underwater complex. *Eastern-European Journal of Enterprise Technologies*, 1 (7 (85)), 4–14. doi: <https://doi.org/10.15587/1729-4061.2017.90291>
- Quan, W., Zhang, Z., Zhang, A., Zhang, Q., Tian, Y. (2015). A geometrically exact formulation for three-dimensional numerical simulation of the umbilical cable in a deep-sea ROV system. *China Ocean Engineering*, 29 (2), 223–240. doi: <https://doi.org/10.1007/s13344-015-0016-0>
- Blintsov, V., Trunin, K. (2020). Construction of a mathematical model to describe the dynamics of marine technical systems with elastic links in order to improve the process of their design. *Eastern-European Journal of Enterprise Technologies*, 1 (9 (103)), 56–66. doi: <https://doi.org/10.15587/1729-4061.2020.197358>
- Buckham, B., Nahon, M., Seto, M., Zhao, X., Lambert, C. (2003). Dynamics and control of a towed underwater vehicle system, part I: model development. *Ocean Engineering*, 30 (4), 453–470. doi: [https://doi.org/10.1016/S0029-8018\(02\)00029-X](https://doi.org/10.1016/S0029-8018(02)00029-X)
- Ditrih, Ya. (1981). *Proektirovanie i konstruirovaniye: Sistemniy podhod*. Moscow: Mir, 456.
- Makedon, Yu. A. (1980). *Proektirovanie v sudostroenii*. Leningrad: Sudostroenie, 280.
- Rach, V. A. (2000). Pryntsypy formuvannya kontseptsiy. *Visnyk Derzhavnoi sluzhby Ukrainy*, 3, 93–95.
- Trunin, K. S. (2017). Computer model of the dynamics of a marine tethered system with flexible connection. Collection of Scientific Publications NUS, 4, 3–13. doi: <https://doi.org/10.15589/jnn20170401>
- Trunin, K. S. (2020). Designing of deck cable winches of marine tethered systems with flexible links by using mathematical models dynamic's description. *Shipbuilding & marine infrastructure*, 1 (13), 4–16. doi: [https://doi.org/10.15589/smi2020.1\(13\).1](https://doi.org/10.15589/smi2020.1(13).1)
- Trunin, K. S. (2017). Testing of a computer program for the dynamics of the model of a marine tethered system with flexible connection. *Shipbuilding & marine infrastructure*, 1 (7), 95–108. Available at: <http://eir.nuos.edu.ua/xmlui/handle/123456789/2678>
- Stanić, V., Hadjina, M., Fafandjel, N., Matulja, T. (2018). Toward shipbuilding 4.0 - an industry 4.0 changing the face of the shipbuilding industry. *Brodogradnja*, 69 (3), 111–128. doi: <https://dx.doi.org/10.21278/brod69307>
- Building Information Modeling – tehnologii XXI veka. Available at: <https://uscc.ua/ru/news/building-information-modeling-tehnologii-xxi-veka>
- Forecast for Shipbuilding 4.0. Available at: <https://www.usweproject.eu/outcomes/forecast-for-shipbuilding-4-0>
- How Industry 4.0 can work for the marine and shipbuilding sectors. Available at: <https://www.abb-conversations.com/2019/05/how-industry-4-0-can-work-for-the-marine-and-shipbuilding-sectors/#:~:text=Emissions%20reductions%20and%20cost%20reductions%20will%20be%20major%20drivers%20for%20Marine%204.0.&text=Analysis%20of%20Industry%204.0%20investments,and%20improve%20efficiency%20by%204.1%25>
- Tehnologii tsifrovizatsii v Rossii – nastala epoha peremen. Available at: <https://center2m.ru/digitalization-technologies>

DOI: 10.15587/1729-4061.2021.225772

INTELLECTUAL PROPERTY ASSESSMENT:  
DEVELOPMENT OF INFORMATION AND  
METHODOLOGICAL SUPPORT IN CONDITIONS OF  
LIMITED INFORMATION (p. 48–56)

**Momot Tetyana**

O. M. Beketov National University of Urban Economy in Kharkiv,  
Kharkiv, Ukraine

ORCID: <http://orcid.org/0000-0001-7397-3565>

**Karpushenko Maria**

O. M. Beketov National University of Urban Economy in Kharkiv,  
Kharkiv, Ukraine

ORCID: <http://orcid.org/0000-0001-9280-4812>

**Prylypko Sergii**

Law and Management Institute of the Yaroslav Mudryi National  
Law University, Kyiv, Ukraine

ORCID: <http://orcid.org/0000-0001-9763-0719>

**Mushchynska Natalia**

O. M. Beketov National University of Urban Economy in Kharkiv,  
Kharkiv, Ukraine

**ORCID:** <http://orcid.org/0000-0001-6294-9180>

**Momot Darina**

O. M. Beketov National University of Urban Economy in Kharkiv,  
Kharkiv, Ukraine

**ORCID:** <http://orcid.org/0000-0002-6026-541X>

Assessment of intellectual property is an important process of commercialization of scientific and technical developments of enterprises of all forms of ownership. This is carried out to determine the value of intellectual property objects (IPO) in connection with the transfer of ownership (purchase, sale) to the corresponding object, the conclusion of a license agreement for the IPO use, accounting for IPO in accounting, contributed to the authorized capital, etc. Under such conditions, the problem of IPO underestimating significantly reduces the efficiency and effectiveness of enterprises. At the same time, the uniqueness of many types of intellectual assets and the impossibility of their visual assessment determine the expediency of systematizing methodological approaches to assessing the value of intellectual property assets to ensure an objective assessment of the value of intellectual property. This will help increase the profitability and business value of the enterprise.

The aim of research is to develop theoretical and methodological provisions and substantiate practical recommendations for improving information and methodological support for assessing the value of intangible assets, taking into account the requirements of regulatory documents and the availability of the necessary information. Based on the results of the study, methodological approaches to determining the value of intangible assets are systematized. According to the financial statements, the value of intangible assets of the leading enterprises of Ukraine and their share in the total value of assets were analyzed. The features of the assessment of intangible assets in accordance with accounting standards have been determined, a methodological approach to the assessment of the value of intellectual property has been developed, it allows to reasonably choose a method for assessing IPO based on the analysis of available information. It is proved that the lack of objective information on the value of IPO significantly reduces the value of assets of Ukrainian enterprises in comparison with the leading companies in the world, reduces their investment attractiveness and does not contribute to economic development.

**Keywords:** intellectual property, intangible assets, income approach, comparative approach, cost approach.

**References**

- Polozhennia (standart) bukhhalterskoho obliku 8. Nematerialni aktyvy No. 242 (1999). Available at: <https://zakon.rada.gov.ua/laws/show/z0750-99#Text>
- Mizhnarodnyi standart bukhhalterskoho obliku 38 (MSBO 38). Nematerialni aktyvy No. 929\_050 (2012). Available at: [https://zakon.rada.gov.ua/laws/show/929\\_050#Text](https://zakon.rada.gov.ua/laws/show/929_050#Text)
- Pro otsinku maina, mainovykh prav ta profesiynu otsinochnu diyalnist v Ukraini No. 2658-III (2001). Available at: <https://zakon.rada.gov.ua/laws/show/2658-14#Text>
- Natsionalnyi standart No. 4. Otsinka mainovykh prav intelektualnoi vlasnosti No. 1185 (2007). Available at: <https://zakon.rada.gov.ua/laws/show/1185-2007-%D0%BF#Text>
- Metodyka otsinky mainovykh prav intelektualnoi vlasnosti No. 740 (2008). Available at: <http://zakon.rada.gov.ua/cgi-bin/laws/main.cgi?nreg=z0726-08>
- European Valuation Standards. Guidance Note 8 «Valuations of Intangible Assets» (2003). TEGoVA. Available at: <http://www.tegova.org>
- European Valuation Standards (2016). TEGoVA. Available at: <https://www.tegova.org/en/p4912ae3909e49>
- International Valuation Standards 2017. Available at: <http://www.cas.org.cn/docs/2017-01/20170120142445588690.pdf>
- RICS Valuation – Global Standards 2017. Available at: <https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/valuation/red-book-2017-global-edition-rics.pdf>
- Haskel, J., Westlake, S. (2021). Capitalism without Capital: The Rise of the Intangible Economy (an excerpt). *Journal of Economic Sociology*, 22 (1), 61–70. doi: <https://doi.org/10.17323/1726-3247-2021-1-61-70>
- Osinski, M., Selig, P. M., Matos, F., Roman, D. J. (2017). Methods of evaluation of intangible assets and intellectual capital. *Journal of Intellectual Capital*, 18 (3), 470–485. doi: <https://doi.org/10.1108/jic-12-2016-0138>
- Russell, M. (2016). The valuation of pharmaceutical intangibles. *Journal of Intellectual Capital*, 17 (3), 484–506. doi: <https://doi.org/10.1108/jic-10-2015-0090>
- Chalmers, K., Clinch, G., Godfrey, J. M., Wei, Z. (2011). Intangible assets, IFRS and analysts' earnings forecasts. *Accounting & Finance*, 52 (3), 691–721. doi: <https://doi.org/10.1111/j.1467-629x.2011.00424.x>
- Dainienė, R., Dagilienė, L. (2014). Accounting-based Valuation of Innovation: Challenges and Perspectives. *Procedia - Social and Behavioral Sciences*, 156, 589–593. doi: <https://doi.org/10.1016/j.sbspro.2014.11.246>
- Wang, X., Garcia, F., Guijarro, E., Moya, I. (2011). Evaluating patent portfolios by means of multicriteria analysis. *Revista de Contabilidad*, 14 (1), 9–27. doi: [https://doi.org/10.1016/s1138-4891\(11\)70020-6](https://doi.org/10.1016/s1138-4891(11)70020-6)
- Kirk, C. P., Ray, I., Wilson, B. (2012). The impact of brand value on firm valuation: The moderating influence of firm type. *Journal of Brand Management*, 20 (6), 488–500. doi: <https://doi.org/10.1057/bm.2012.55>
- Alexandrov, A. V. (2016). Fair valuation of intangible assets in the accounting system. *International Research Journal*, 6 (48), 6–9. doi: <https://doi.org/10.18454/IRJ.2016.48.021>
- Dyba, V. (2016). Methodological basis for estimation of intangible assets of corporation. *Investytsiyyi: praktyka ta dosvid*, 13, 23–28.
- Moroz, O., Azarova, A., Goda, K. (2012). Methods of assessment of intellectual property objects. *Ekonomichniy analiz*, 10 (2), 422–425.
- Kadirovich, R. N., Juraevna, T. M., Shaomin, L. (2021). Improving The Intangible Assets Accounting: In A Pandemic Period. *Psychology and Education Journal*, 58 (1), 28–42. doi: <https://doi.org/10.17762/pae.v58i1.652>
- Statystychni pokaznyky. Available at: <http://www.ukrstat.gov.ua/>
- Finansova zvitnist aktsionernykh tovarystv. Available at: <https://smida.gov.ua/db>
- Balans (Zvit pro finansovyi stan). Available at: [https://fed.ua/wp-content/uploads/finzvit\\_2019\\_year.pdf](https://fed.ua/wp-content/uploads/finzvit_2019_year.pdf)
- Ofitsiyniy sait DP Ukrainaska heolohichna kompaniya. Available at: <https://ukrgeol.com/ua/finzvit/>
- Finansova zvitnist mizhnarodnykh kompaniy. Available at: <https://www.macrotrends.net/>



## АНОТАЦІЇ

## TRANSFER OF TECHNOLOGIES: INDUSTRY, ENERGY, NANOTECHNOLOGY

**DOI: 10.15587/1729-4061.2021.225526****ПОРІВНЯЛЬНА ОЦІНКА ВПЛИВУ ТЕХНОЛОГІЧНОГО ФАКТОРА НА ЕКОНОМІЧНЕ ЗРОСТАННЯ (с. 6–15)****Б. А. Хейфец, В. Ю. Чернова**

Дослідження спрямоване на оцінку впливу технологічного чинника на економічне зростання, аналізується його роль у посиленні соціально-економічної диференціації. Запропоновано методику ранжирування країн за рівнем технологічності на основі відповідного Індексу. Шляхом кореляційно-регресійного аналізу виділяються технологічні фактори економічного розвитку. Апробація підходу проходила на прикладі США і Китаю. Отримані дані демонструють, що збільшення витрат на НДДКР та експорту високотехнологічної продукції позитивно відбивається на економічному зростанні. Витрати на НДДКР забезпечують від 31,6 % до 41,9 % приросту ВВП для США і Китаю відповідно. Експорт високотехнологічної продукції підтримує приріст ВВП на рівні від 2,7 % до 4,7 %. Згідно з результатами доведено, що технологічний фактор сприяє економічному розвитку за рахунок більш ефективного розподілу ресурсів, поширення інновацій та зростання високотехнологічного експорту. Регресійні моделі підтвердили цей взаємозв'язок. За Індексом технологічності Китай знаходиться на першій позиції рейтингу, далі йдуть США і Японія. Такі країни як Казахстан, Бразилія, Україна значно відстають за рівнем технологічного розвитку від ряду країн Європи (Румунії, Польщі, Болгарії), Туреччини та Мексики. Аналіз даних по вибірці 30 країн показав, що технологічна диференціація є безпосередньою причиною загальної нерівномірності. Для подолання технологічного розриву рекомендується послідовно розвивати наявний технологічний потенціал, спрямовуючи зусилля на високотехнологічні сектори, які здатні зміцнити фундамент економіки.

**Ключові слова:** економічне зростання, інновації, глобальна конкурентоспроможність, високотехнологічний експорт, виробнича платформа, США, Китай.

**DOI: 10.15587/1729-4061.2021.225639****ВИЗНАЧЕННЯ СОЦІАЛЬНО-ДЕМОГРАФІЧНИХ ПРЕДИКТОРІВ ПРІОРИТЕТНОГО ІНВЕСТУВАННЯ В КОНТЕКСТІ ЗАВДАНЬ ФІНАНСОВОЇ ПІДСИСТЕМИ СТАРТАП-МЕНЕДЖМЕНТУ (с. 15–25)****Л. О. Лігоненко, Є. М. Борисов, Л. В. Громоздова, І. І. Дейнега, С. П. Леонтович, І. В. Косяк, П. Б. Вологітський, Є. І. Марко**

Об'єктом дослідження стали ретроспективні тренди фінансування стартапів в Україні в кореспонденції з соціально-демографічними характеристиками стартаперів (фаундерів). Вивчення залежностей між обсягами отримання фінансування та якісними ознаками стартаперів дозволило визначити соціально-демографічні предиктори прийняття позитивного рішення стосовно фінансування стартапів.

Як показало проведене дослідження, для отримання інвестиції стартапер повинен відповідати очікуванням інвестора щодо надійності, кваліфікації, досвіду та потенційної перспективності. Інвестор аналізує не тільки бізнес-ідею стартапу, а й потенційного реципієнта на предмет відповідності його ряду соціально-демографічних предикторів, таких як стать, вік, рівень та спеціалізація освіти. Доведено, що найбільші обсяги фінансування стартапів в Україні отримують фаундери чоловічої статі, віком від 35 до 45 років, які мають вищу технічну освіту. Інвестори стартапів пріоритетними для своїх вкладень вважають саме таких стартаперів, оскільки бачать в них найменші ризики та високу вірогідність успішного освоєння інвестованих коштів.

Виявлені уподобання інвесторів при виборі фаундерів стартапів можуть бути екстрапольовані на стартап-середовище будь якої країни, проте, вони можуть змінюватися з часом та залежно від специфіки ситуації в країні інвестування.

Для раціонального розв'язання задач в фінансовій підсистемі стартап-менеджменту, необхідним є попереднє визначення соціально-демографічних предикторів пріоритетного інвестування стартапів відповідної країни та сфери діяльності. Практичний інструментарій визначення таких предикторів є апробованим у даному дослідженні.

Практична значимість дослідження обумовлюється зростаючими темпами розвитку стартап-технологій, необхідністю підвищення результативності фінансової підсистеми стартап-менеджменту та зростанням ефективності функціонування інфраструктури підтримки стартапів.

**Ключові слова:** стартап, стартапер, стартап-менеджмент, фінансове забезпечення стартап-менеджменту, пріоритетне стартап-інвестування, соціально-демографічні предиктори.

---

**DOI: 10.15587/1729-4061.2021.225524**

**ВИЗНАЧЕННЯ ДЕРЖАВНОЇ ФІНАНСОВОЇ ПІДТРИМКИ НЕПРІОРИТЕТНИХ ТЕРИТОРІАЛЬНИХ ОДИНИЦЬ НА ПРИКЛАДІ МОСТОБУДУВАННЯ (с. 26–34)**

**Я. С. Левченко, І. Г. Брітченко**

Розглянуто проблему розподілу державної фінансової підтримки на підставі комплексного підходу. Доведено актуальність і необхідність державної підтримки найменш пріоритетних територіальних осередків (областей). Дана відповідь на дослідницьке питання: «Які компоненти потрібно включити в методику визначення державної фінансової підтримки». Запропоновано комплексну методику визначення долі державних фінансових засобів, що враховує інвестиційну привабливість регіону (області) і ризик відповідного регіону (області). Для досягнення поставленої мети в роботі були використані такі загальнонаукові та спеціальні методи і прийоми дослідження: порівняльний аналіз наукової літератури та інформаційних джерел на основі методів порівняння, систематизації та узагальнення; узагальнення результатів аналізу, логічна генерація висновків та інтегральної оцінки.

Оскільки проблема фінансування будівництва та реконструкції мостів актуальна для ряду країн, дана методика була апробована саме на прикладі мостобудування.

Згідно з отриманими результатами під державну фінансову підтримку потрапляють територіальні осередки (області), які не є лідерами за пріоритетністю для інвестора і мають високий рівень ризикованості вкладення фінансових коштів. Проблема фінансування таких регіонів може бути вирішена тільки за допомогою державної підтримки.

Результати розрахунків показують, що розподіл фінансових коштів при наявному обсязі державних фінансів  $K=1$ , що виділяються на підтримку, здійснюється пропорційно. Комплексний підхід дозволив визначити 10 територіальних осередків (областей) для фінансування, при цьому області з найгіршими показниками пріоритетності отримують найбільшу частку фінансової державної підтримки.

Дане дослідження практично цікаво державним органам управління при розподілі державних коштів, а теоретично – дослідникам, що займаються питаннями фінансового забезпечення та державного управління.

**Ключові слова:** Державне фінансування, фінансова підтримка, державна підтримка, модель фінансування, мостобудування.

---

**DOI: 10.15587/1729-4061.2021.225512**

**УДОСКОНАЛЕННЯ ПРОЕКТУВАННЯ МОРСЬКИХ ПРИВ'ЯЗНИХ СИСТЕМ З ВИКОРИСТАННЯМ ПРИНЦИПІВ СУДНОБУДУВАННЯ 4.0 (35–48)**

**В. С. Бліщов, К. С. Трунін**

Розглянуто проблеми та теоретичні аспекти удосконалення проектування морських прив'язних систем (МПС) з гнучкими зв'язками (ГЗ) на прикладі підводних буксируємих систем (ПБС). Це дозволяє використовувати їх на ранніх стадіях проектування за рахунок впровадження принципів Суднобудування 4.0 та ВІМ-технологій. Такі режими раніше не описувалися за допомогою існуючих математичних моделей (ММ). В результаті цього дослідження очікується суттєве зниження витрат різноманітних ресурсів. При цьому основні достовірні результати проектних рішень можуть бути отримані вже на ранніх стадіях проектування.

Теоретичною основою запропонованого метода удосконалення проектування МПС з ГЗ є концепція удосконалення процесу проектування (КУП) МПС з ГЗ, а інструментальною основою метода є спеціальний моделюючий комплекс (СМК). Використання КУП та СМК вже на стадії дослідницького (доескізного) проектування дозволяє зменшити кількість етапів проектування МПС.

Запропонований метод удосконалення процесу проектування МПС з ГЗ, заснований на ММ опису динаміки ГЗ МПС та МПС з ГЗ, дає можливість дослідити різні режими експлуатації практично всіх класів МПС. Це дозволяє розробити рекомендації з прогнозування можливих експлуатаційних навантажень для проектування можливих експлуатаційних навантажень для проектування їх елементів. При цьому з'являється можливість удосконалити існуючі методи розрахунків і проектування МПС з ГЗ з необхідними властивостями та параметрами, довести їх до рівня інженерного додатка.

Використання СМК вже на стадії до ескізного проектування дає можливість відмовитись від використання фізичного моделювання режимів функціонування МПС з ГЗ, пов'язаного з проведенням натурних випробувань у відкритому морі.

**Ключові слова:** удосконалення проектування МПС, Суднобудування 4.0, ВІМ-технології.

---

**DOI: 10.15587/1729-4061.2021.225772**

**ОЦІНКА ІНТЕЛЕКТУАЛЬНОЇ ВЛАСНОСТІ: РОЗРОБКА ІНФОРМАЦІЙНО-МЕТОДИЧНОГО ЗАБЕЗПЕЧЕННЯ В УМОВАХ ОБМЕЖЕНОЇ ІНФОРМАЦІЇ (с. 48–56)**

**Т. В. Момот, М. Ю. Карпушенко, С. М. Прилипко, Н. Ю. Мушинська, Д. Т. Момот**

Оцінка інтелектуальної власності є важливим процесом комерціалізації науково-технічних розробок підприємств усіх форм власності. Це здійснюється для визначення вартості об'єктів інтелектуальної власності (ОІВ) у зв'язку з передачею прав

власності (купівлі, продажу) на відповідний об'єкт, укладанням ліцензійного договору на використання ОІВ, врахування ОІВ в бухгалтерському обліку, внесенням до статутного капіталу тощо. За таких умов проблема недооцінки ОІВ суттєво знижує ефективність і результативність діяльності підприємств. При цьому унікальність багатьох видів інтелектуальних активів та неможливість їх візуальної оцінки обумовлюють доцільність систематизації методичних підходів до оцінки вартості ОІВ для забезпечення об'єктивної оцінки вартості інтелектуальної власності. Це сприятиме збільшенню прибутковості та вартості бізнесу підприємства.

Метою дослідження є розробка теоретико-методичних положень та обґрунтування практичних рекомендацій щодо удосконалення інформаційно-методичного забезпечення оцінки вартості нематеріальних активів підприємства з врахуванням вимог нормативних документів та наявності необхідної інформації. За результатами дослідження систематизовано методичні підходи до визначення вартості нематеріальних активів. За даними фінансових звітів проаналізовано вартість нематеріальних активів провідних підприємств України та їх частку в загальній вартості активів. Визначено особливості проведення оцінки нематеріальних активів відповідно до стандартів обліку, розроблено методичний підхід до оцінки вартості інтелектуальної власності, що дозволяє обґрунтовано обрати метод оцінки ОІВ на підставі аналізу наявної інформації.

Доведено, що відсутність об'єктивної інформації щодо вартості ОІВ суттєво знижує вартість активів підприємств України у порівнянні з провідними компаніями світу, що зменшує їх інвестиційну привабливість та не сприяє економічному розвитку.

**Ключові слова:** інтелектуальна власність, нематеріальні активи, дохідний підхід, порівняльний підхід, витратний підхід.