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Kharkovyna Oleksii
Postgraduate,
Volodymyr Dahl East Ukrainian National University
ORCID: https://orcid.org/0009-0001-4224-3743

Bielousov Yaroslav
Candidate of Economic Sciences, Associate Professor,
Associate Professor of the Department of Light Industry Technologies,
Volodymyr Dahl East Ukrainian National University
ORCID: https://orcid.org/0000-0002-5830-7553

Харковина О.Г., Бєлоусов Я.І.
Східноукраїнський національний університет
імені Володимира Даля

METHODS FOR ASSESSING THE INTELLECTUAL CAPITAL OF ENTERPRISES

МЕТОДИ ОЦІНЮВАННЯ ІНТЕЛЕКТУАЛЬНОГО КАПІТАЛУ ПІДПРИЄМСТВ

The article provides a comprehensive study of the theoretical and applied aspects of assessing the intellectual capital of enterprises in the current conditions of the knowledge economy. It is determined that intellectual capital plays a key role in the formation of long-term competitive advantages, as it encompasses not only the knowledge, skills and competencies of employees, but also organisational culture, databases, management systems, technologies, customer relations, brand reputation and other intangible assets. Methods for assessing intellectual capital, including quantitative, qualitative and mixed approaches, are considered and systematised. The advantages and limitations of such methods as Skandia Navigator, Intangible Assets Monitor, Balanced Scorecard, VAIC, the intangible assets method, market multipliers and market value added models are highlighted. The feasibility of combining financial indicators with non-financial characteristics is justified, which allows for a more accurate assessment of the effectiveness of intellectual resource use in the context of strategic management. The author proposes an approach to adapting foreign methods to the realities of Ukrainian enterprises, which face a lack of statistical data, an unstable market environment, limited access to capital, and high levels of risk. The advantages of this method include the simplicity of calculations and the availability of financial statements for a number of companies. In addition, this method allows determining the impact of each element of intellectual capital on the results of the enterprise's activities. The main disadvantage of the method under consideration is the abstraction from time factors that can reduce the value of intellectual capital. Intellectual capital valuation is seen not only as an analytical tool, but also as a basis for making management decisions, optimising the cost structure, forming an innovation development policy and increasing the intangible assets of the enterprise. The results obtained can be useful for managers, analysts, investors, scientists and consultants in the field of strategic development of enterprises.

Keywords: *intellectual capital, valuation methods, enterprise, tools, indicators.*

У статті проведено всебічне дослідження теоретичних та прикладних аспектів оцінювання інтелектуального капіталу підприємств у сучасних умовах функціонування економіки знань. Визначено, що інтелектуальний капітал відіграє ключову роль у формуванні довгострокових конкурентних переваг, оскільки охоплює не лише знання, навички та компетентності працівників, а й організаційну культуру, бази даних, систему управління, технології, відносини з клієнтами, репутацію бренду та інші невидимі активи. Розглянуто й систематизовано методи оцінювання інтелектуального капіталу, серед яких кількісні, якісні та змішані підходи. Виокремлено переваги та обмеження таких методик, як Skandia Navigator, Intangible Assets Monitor, Balanced Scorecard, VAIC, метод нематеріальних активів, ринкові мультиплікатори, моделі ринкової доданої вартості. Обґрунтовано доцільність поєднання фінансових індикаторів з нефінансовими характеристиками, що дозволяє більш точно оцінити ефективність використання інтелектуального ресурсу в контексті стратегічного управління. Запропоновано авторський підхід до адаптації зарубіжних методів під реалії українських підприємств, які стикаються з нестачею статистичних даних, нестабіль-

ним ринковим середовищем, обмеженим доступом до капіталу й високим рівнем ризиків. До переваг даного методу можна віднести простоту розрахунків та доступність бухгалтерської звітності ряду компаній. Крім цього, даний метод дозволяє визначити вплив кожного елемента інтелектуального капіталу на результати діяльності підприємства. Головним недоліком розглянутого методу є абстрагування від факторів часу, які можуть знижувати цінність інтелектуального капіталу. Оцінювання інтелектуального капіталу розглядається не лише як інструмент аналітики, а як основа для прийняття управлінських рішень, оптимізації структури витрат, формування політики інноваційного розвитку та нарощування нематеріальних активів підприємства. Отримані результати можуть бути корисними для управлінців, аналітиків, інвесторів, науковців та консультантів у сфері стратегічного розвитку підприємств.

Ключові слова: *інтелектуальний капітал, методи оцінювання, підприємство, інструментарій, показники.*

Formulation of the problem. In modern conditions, the increase in the value of commercial organisations is largely determined by the annual growth of intellectual capital. Therefore, the task of economic entities to effectively manage their intellectual property is one of the most important. This allows organisations to develop highly efficient and competitive economic activities.

Scientific and practical research into human capital as one of the priority structural elements of intellectual capital management by modern economic entities naturally involves a critical rethinking of the instrumental and methodological foundations and computational and analytical algorithms for determining sources of investment in social security and investment in education and development, the values of individual and human capital and the degree of their involvement in the processes of managing the formation and development of organisational capital; a comparative description of the methods of market capitalisation, intellectual added value and the cost method; a consistent study and author's interpretation of the subject-essential content of human and organisational capital as structural elements of intellectual capital management in an enterprise.

Analysis of recent achievements and publications. There are many approaches to the procedure for assessing intellectual capital in scientific economic literature. The works of many domestic scientists [1-8] consider various computational and analytical methods for assessing the effectiveness of the intellectualisation of economic entities, which can be adapted to modern reality. In addition, a large number of instrumental, methodological, and functional-cost tools for comprehensive assessment have been developed, taking into account rating methods, principles of corporate finance formation, financial management provisions, etc., as well as the characteristics and specifics of various sectors of economic activity.

It is the assessment of a company's intellectual capital that is carried out in the interests of a large number of users, for example, in the interests of the enterprise itself to increase the return on intellectual resources and solve strategic tasks, or in the interests of investors to make decisions about investing capital in a company with a certain level of intellectualisation. That is why it is so important to achieve the most reliable and objective assessment of the intellectual capital of modern high-tech enterprises in Ukraine's science-intensive industrial complex, as well as to train management personnel as carriers of intellectual capital, unique competencies, theoretical and methodological knowledge and practical skills, abilities and experience, is represented to one degree or another in many government documents, national programmes, presidential decrees, government resolutions, as well as the Labour Code of Ukraine [1, 2, 3, 4, 5, 6, 7, 8]. In this regard, the study of the main methods of intellectual capital assessment and their comparative analysis, namely the cost method, the market capitalisation method and the intellectual added value method, is of unconditional scientific and practical interest.

Presentation of the main material. The computational and analytical study of the process of managing the formation and development of an enterprise's intellectual capital involves posing and resolving scientific and practical questions of critical rethinking of alternative methods for assessing intellectual capital, namely «direct intellectual capital», «market capitalisation», «direct intellectual measurement of capital»; comparative characteristics of instrumental and methodological means of assessing human and organisational capital in the structure of intellectual capital; interpretation of the main structural elements of organisational capital, which are differentiated into procedures, technologies, management systems, hardware and software, organisational structure, patents, brands, customer relations, etc., as well as the cause-and-effect mechanisms for assessing their economic efficiency and interaction with the human capital of the enterprise.

The calculation and analytical tools for assessing intellectual capital are very heterogeneous and contradictory, since they are immanently endowed with instrumental and methodological specificity and take into account not only theoretical knowledge, practical and applied skills, spiritual, moral, mental and other priorities, as well as valuable potential, etc. In this context, it is necessary to mention the causal mechanisms of interaction between the structural elements of intellectual capital in the process of production and economic activity of enterprises, since the experience and unique professional competencies of personnel directly correlate with organisational and management

processes and mechanisms of socio-economic interaction with customers, on the one hand, and strategic cooperation and public-private partnership stimulate the cognitive skills of personnel and significantly improve the quality of human capital of economic entities.

In addition, it is necessary to take into account the phenomenon of intangibility of the intellectual capital of an enterprise, since it is practically impossible to interpret the scientific and practical potential of the workforce in a mathematically correct form, to obtain an authentic calculation and analytical assessment of creative and cognitive abilities, organisational and managerial talent and intellectual capabilities of employees, their cultural, historical, moral and ethical ideas and imperatives.

The instrumental and methodological mechanisms for determining intellectual capital are of a complex multi-criteria nature, including various socio-economic, accounting, financial and other procedures that complicate the calculation and analytical process many times over and implicitly have individual epistemological advantages and disadvantages. Suffice it to mention, in the context of the above, the fact that accounting methods of defining brand capital as a set of economic assets (e.g. brand awareness, loyal customers) are perceived as quality and positive associations associated with the brand, as well as other components – the infrastructure of goods movement, the length of sales channels, patents, licences, trademarks and other objects based on the so-called registration cost rather than the real value of the intangible asset, which significantly devalues the value of intellectual capital and discredits the reliability of the calculation method.

In addition, we can mention the phenomenon of incorrect economic differentiation of long-term capital investments in the development of intellectual capital and related production and economic costs. For example, expenses for education, training and retraining of personnel, medical services, recreation, safety equipment and occupational safety are classified as expenses in accounting, while at the same time, in socio-economic terms, they represent long-term strategically significant investments in intellectual capital management and, therefore, are a potential source of income.

Similarly, company employees must invest in their consumers (customers) and their relationships. Consumers do not belong to the company, but they invest in its future profits in such a way that the newly created value will belong equally to both shareholders and consumers. Ways to invest in the development of customer capital include development, along with the emergence of new products on the consumer market, and providing consumers with additional rights and individual approaches to buyers, as well as forming various forms of partnership with consumers.

To begin with, we propose to consider the first method, called the “cost approach”, developed by James Tobin [1]. This method is the simplest to use, and to implement it, you need to know the market value of the organisation, as well as the replacement cost. Tobin's ratio formula looks like this:

$$Tobin's\ Q = MVA / RVA, \quad (1)$$

where *Tobin's Q* is the *Tobin's Q*;

MVA “Market Value of Assets” is the market value of the organisation's assets;

RVA “Replacement Value of Assets” is the replacement value of the organisation's assets.

If *Tobin's Q* > 1, the organisation has a high share of intellectual capital; if *Tobin's Q* < 1, the organisation has a low level of intellectual capital.

This method is conditional, as it does not take into account many factors, such as intellectual capital risk. Nevertheless, it is used to obtain a quick assessment and, if necessary, to compare enterprises operating in the same economic sector.

The second method of determining intellectual capital is based on market capitalisation and is calculated using the following formula:

$$Intellectual\ C = MVA – BSV, \quad (2)$$

where: *Intellectual C* – intellectual capital;

MVA – Market Value of Assets;

BSV – Book Value.

Depending on the specifics of the activity, this indicator can be either negative or positive, and serves to determine the level of the organisation's intellectual capital in terms of money. The third method is the most comprehensive and, at the same time, the most complex. This is Ante Pulik's Value Added Intellectual Coefficient (VAIC). The value added intellectual coefficient characterises the contribution of tangible and intangible assets to the value added of an enterprise. The more efficiently a company uses its own potential, the higher the intellectual coefficient.

This model is illustrated in Fig. 1.

As can be seen from Fig. 1, the model is based on the efficiency of using three types of resources:

1. *SCE* «Structural Capital Efficiency» – the added value of structural capital;
2. *HCE* «Human Capital Efficiency» – added value of human capital;
3. *CEE* – Capital Employed Efficiency – added value of physical capital.

Accordingly, the formula looks like the sum of these resources:

$$VAIC = SCE + HCE + CEE, \quad (3)$$

where *VAIC* is the coefficient of intellectual value added;

SCE is the value added of structural capital;

HCE is the value added of human capital;

CEE is the value added of physical capital.

The most convenient way to assess intellectual capital is to use the following algorithm:

1. Calculation of the company's added value.

$$VA = Output – Input, \quad (4)$$

where VA is value added;

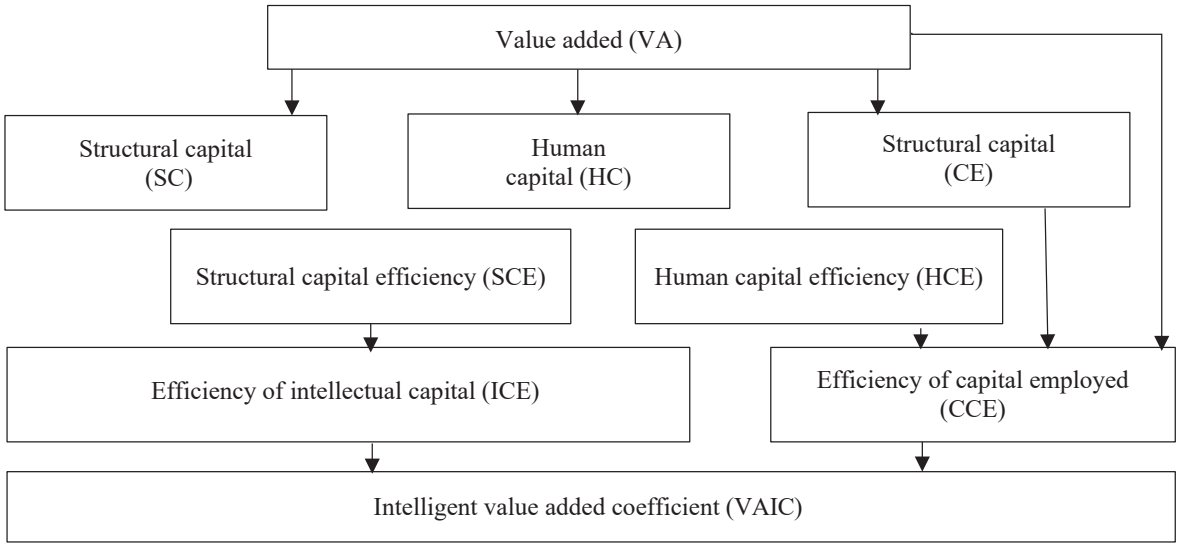

Figure 1. VAIC calculation model

Source: compiled by the author

Output is total income;
Input is the cost of funds spent.

A more detailed version of the calculation is as follows:

$$VA = R + DD + T + EC + D + A, \quad (5)$$

where *VA* – value added;
R – retained earnings;
DD – dividends;
T – taxes;
EC – general expenses;
D+A – depreciation and amortisation.

To calculate the efficiency of human resources use, factors such as remuneration, education level or total investment per employee can be considered.

Human capital is the main factor that influences the development of production and the competitiveness of an enterprise. It is the human factor that determines the efficiency of an enterprise's business activities, since the labour resources that ensure the production process must have the appropriate qualifications, as well as be motivated and professionally competent.

In a simplified version, human capital can be represented as labour costs.

Calculation of human capital efficiency:

$$HCE = VA / HC, \quad (6)$$

where *HCE* – human capital efficiency;
VA – value added;
HC – human capital.

2. Calculating the efficiency of structural capital.

First, it is necessary to determine the value of structural capital:

$$SC = VA – HC, \quad (7)$$

Where: *SC* – structural (organisational) capital;
VA – value added;
HC – human capital.

It is worth noting that human and structural (organisational) capital are inversely related to each other, i.e. *SC* and *HC* are inversely proportional.

Next, it is necessary to calculate the efficiency of structural capital:

$$SCE = SC / VA, \quad (8)$$

where: *SCE* – structural capital efficiency;
SC – structural (organisational) capital;
VA – value added.

3. Calculating the efficiency of intellectual capital:

$$ICE = HCE + SCE, \quad (9)$$

where *ICE* – intellectual capital efficiency;
HCE – human capital efficiency;
SCE – structural capital efficiency;

4. Calculation of the efficiency of the capital employed:

$$CEE = VA / CE, \quad (10)$$

where *CEE* is the efficiency of capital employed;
VA is value added;
CE is invested capital.

5. Calculation of the final indicator (Value Added Intellectual Coefficient):

$$VAIC = ICE + CEE, \quad (11)$$

where *VAIC* is the coefficient of intellectual added value;
ICE is the efficiency of intellectual capital;
CEE is the efficiency of capital employed.

The advantages of this method include the simplicity of calculations and the availability of financial statements of a number of companies. In addition, this method allows determining the impact of each element of intellectual capital on the company's performance. The main disadvantage of this method is abstraction from time factors that may reduce the value of intellectual capital. Table 1 presents the author's interpretation

Table 1

Comparative Characteristics of the Calculation and Analytical Advantages and Disadvantages of Intellectual Capital Valuation Methods

Method	Computational and analytical advantages	Calculation and analytical shortcomings
1. The cost method	Easy to use; Does not require extensive empirical and factual information; Sufficient for comparing poorly diversified companies	Conditional; Does not take into account many economic factors; Not suitable for comparing diversified companies
2. Market capitalisation method	Shows the monetary value of intellectual capital; Easy to use; Does not require extensive empirical and factual information	Difficult to draw conclusions under dynamic conditions; The result can be both positive and negative
3. Intellectual value added method	Provides a qualitative assessment of intellectual capital; Convenient for comparison with other companies; Takes into account the economic dynamics of	Relative calculated analytical complexity in the process of practical application; Requires extensive empirical and factual information

Source: compiled by the author

of the main advantages and disadvantages of the methods used. There are many methods for assessing intellectual capital, for example, the amount of personnel costs; the amount of intellectual property costs; reassessment of additional profits, etc., but some of them are recognised as ineffective, and their testing at enterprises is not possible or economically feasible.

These methods have practical application and can be further tested at enterprises. The use of the methods will allow to determine the quantitative and qualitative assessment of intellectual capital, which makes it possible to judge not only the availability of intellectual resources at a given time, but also to study the dynamics of intellectual changes, as well as to provide a comparative characteristic both at the micro level with other enterprises and at the meso level with the entire industry.

Conclusions. As part of the study of the process of managing the formation and development of intellectual capital of enterprise, the article proposes and empirically substantiates the calculation of the indicator of management of the processes of formation and development of intellectual capital in the context of training and development of employees of enterprise in the system of corporate universities, as a special case of defining the indicator, expanded with consideration of socio-economic features and specifics of the corporate training system.

The author's recommendations on determining the optimal or planned levels of management of the processes of formation and development of intellectual capital are based on two calculation and analytical methods: determination of planned indicators (planned level), and determination of market indicators, which are assessed through the existing methods of intellectual capital assessment (optimal level). Changes in the indicators of management of the processes of formation and development of the enterprise's intellectual capital characterise the deviation of its actual value from the planned or rational values.

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