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Assessment of intellectual capital in development of multinational corporations

Abstract

The scientific going is considered near the estimation of influence of intellectual capital on development of activity of enterprise structures. Authorial approach offers in relation to the estimation of influence of intellectual capital on development of activity of enterprise structures (including multinational corporations), that takes into account potential of dynamic of intellectual capital structure.

Keywords

intellectual capital, multinational corporation, estimation, influence, efficiency, dynamic

1 Formulation of the problem

In the conditions of the emergence of the post-industrial paradigm of social development, the key resource is the knowledge and, accordingly, all the factors associated with their creation and dissemination. In this context, the intellectual capital that is created and operates within the framework of business structures becomes of special significance. In large multinational corporations, high-tech processes, search and introduction of advanced products, technologies, etc. are of paramount importance. The growth of the role of intellectual capital in the development of transnational corporations explains the increased attention to this problem in academic circles.

2 Analysis of studies and publications

Questions of the assessment of the intellectual capital of enterprises are highlighted in the works of a number of domestic and foreign authors, including B. Lev, E. Vetrova, E. Kokovina, V. Shkola, V. Shcherbachenko, A. Bykova, M. Molodchik, A. Pulik, J. Ling, J. Dunn, S. Hages-Lucas and others. Despite the large number of studies in this area, the issue of assessing intellectual capital and its impact on the development of business structures (including transnational corporations) is not sufficiently investigated.

The goal and objectives of the research is to systematize and develop the main scientific approaches to assess the impact of intellectual

capital on the development of business structures (including TNCs).

3 The results of the research

At the present stage of global development, the key importance of knowledge attaches particular importance to such an important resource as intellectual capital. Leading actors in today's global business - powerful TNCs - are giving a significant weight to innovation, development and accumulation of their intellectual resources, transforming them into new products, technologies, etc.

With the development of scientific and technological progress, significant and qualitative changes in industrial production, transformed processes of labour, etc. are observed. In our opinion, transnational corporations have the most powerful stock of intellectual resources, taking into account the scale and geography of activities, international experience and potential, financial capabilities and knowledge of the technology. This is due to enormous amounts of funding for human resources development, research and development (R & D), and the implementation of their results in production. You can support the statements of scientists [3] that intellectual capital begins to play a leading role in the development of corporate structure, and this is determined by the following circumstances:

- coverage of the whole set of factors that form the ability of man to work;
- development and widespread use of high technologies in all spheres of human

- activity (production, distribution, exchange, consumption);
- transformation of the international social division of labour of the world economic system, increasing unevenness, based on technological differences in production;
- materialization in technologies, as well as in patents, licenses, models, programs of branch, functional, territorial nature, in all phases of reproduction;
- qualitative transformation of labour - the emergence of the forefront of mental abilities to work, which in turn requires the universality and continuity of education;
- transformation of learning from the process of memorization into the process of creative reflection: creative thinking - creative thinking;
- the expansion of the limits and depth of knowledge acquired in the process of training for the purpose of general and sectoral education;
- increased control over consumption, management of demographic processes: balancing needs and opportunities of society, creating strategic reserves of accumulation, including knowledge, science;
- a proactive development of environmentally friendly, environmentally sound technologies.

It is generally accepted that the intellectual capital is the most valuable factor in the efficiency and development of the corporation. At the same time, in science and practice, the question of

assessing the actual contribution of intellectual capital to the overall result of the enterprise remains insufficiently developed. Most researchers and practices [7; 9] indicate that the main influence of intellectual capital on the development of entrepreneurial structures (including TNCs) is manifested in the creation of a new (additional) value of these structures. According to B. Lev [9], the ability of intellectual capital to create value can be explained by the presence of its specific properties, among which the increasing returns on scales and network effects.

You can agree with many researchers [4; 9; 12] that effective management of intellectual capital affects not only the creation of added value of business structures, but also the improvement of key financial results. The investments in the intellectual capital of enterprises have the impact on all financial results. By developing these approaches, we can propose our own approach to assessing the effects of investing in the development of intellectual capital. According to the materials of the table. 1, the improvement of each of the structural components of the intellectual capital of enterprises (human, structural and organizational capital) significantly affects the improvement of financial results to improve the efficiency of the corporation as a whole.

At the present stage of development, there is a sufficient number of studies devoted to revealing general tendencies and regularities of the contribution of intellectual capital to the

TABLE 1 Classification of HEIs' R&D results as objects of commercialization

Component of intellectual capital	Investitions	Influence of investments on indicators IK	Expected total financial effect of investments
1	2	3	4
Human capital	In increasing the motivation of employees	Contribute to a more complete realization of creative potential of employees, strengthening of motivation of the personnel for creative, more effective work, creation of innovative knowledge	Growth of incomes of employees and enterprises in general
	In training the staff	Facilitates the development of personnel, the formation of new skills and skills that can increase the performance of its work	Reducing extra costs and not receiving profits caused by unproductive employee actions
Structural capital	In innovation	Facilitates the increase of innovation capacity of the enterprise	- increase profits and reduce additional costs associated with unproductive actions;
	To improve existing technologies	It contributes to increasing the technological possibilities of production of larger volumes and more modern products	- reduction of losses and losses from the production of outdated (non-ecological) products;
	In the development and diversification of products or services	Facilitates the expansion of opportunities for the production of new products, sales volumes, geographical and product diversification	- increase of value added.
Organizational capital	In the development of the system of intra-corporate relations, management systems	Promotes the improvement of the intra-corporate climate, the implementation of a relationship of trust, confidence and commitment to the goals of the corporation	Growth of incomes; reduction of losses and losses, increase of aggregate value added

development of entrepreneurial structures. It should be noted that there are different systematic approaches to assessing the intellectual capital of enterprises. Sufficiently common is the systematization presented by E. Vetrova, E. Kokovina [2]. According to the authors [2], the system of the most common methods for evaluating the intellectual capital can be presented:

- direct account methods - the value of the intellectual capital is determined by the sum of the values of its elements. The overall assessment of intellectual capital can be estimated using an aggregated coefficient (Intellectual Asset Valuation, etc.). To assess the corporate culture, this method can be applied with a high degree of subjectivity;
- a model of indirect valuation of the intellectual capital of the organization, based on the fact that the value of intellectual capital includes both intangible assets that are reflected in the balance sheet (patents, property rights to inventories, etc.), and the "goodwill" organization (business reputation), which can be estimated by the level of capitalization (Market Capitalization Methods - MCM), which calculates the difference (ratio) between market capitalization of the company and its share capital (Tobin's q, Market-to-Book Value, etc.). This method does not allow to reveal the contribution of each of the elements, in particular, the contribution of the corporate culture;
- methods based on the evaluation of results from the use of intellectual capital, such as return on assets methods (ROA), value added (EVA, VAIC, Calculated Intangible Value, etc.), Value Added Intellectual Coefficient, VAIC), which does not give a direct estimation of intellectual capital, but is the sum of indicators of the effectiveness of its use;
- Scorecard Methods (SC): Balanced Scorecard (BSC), Skandia Navigator Balanced Score Card, Value Chain Score Board, Business IQ), IAM, and Intellectual Capital Score (IC Rating, Sei-Cho™ and MAGIC, etc.), which can also serve as a means of managing the formation and development of intellectual capital and, according to the authors, are the most adequate for the assessment of all elements of intellectual capital, including and corporate culture.

V. Shkola, V. Shcherbachenko [5] expanded the composition of the system of methods for assessing the intellectual capital of an enterprise proposed by E. Vetrova, E. Kokovina [2], due to:

- the "Researcher of Value" method. This is a method of financial accounting, which calculates and distributes the value of intellectual capital by its components;

- IVM method (comprehensive assessment). This method uses the hierarchy of weighted indicators, which combine among them for the relative estimation of intellectual capital;
- a cost chain method. The use of which is the construction of a matrix of non-financial indicators, grouped according to the stages of innovation activity;
- Interbrand method. Method of brand assessment as one of the components of the intellectual capital of the enterprise;
- method "Broker of Technologies". In accordance with this method, determination of the value of intellectual capital of the enterprise is carried out on the basis of application of 20 audit questions and diagnostics of the results of response processing;
- "Intellectual Capital Index" method. This method involves making settlements based on combining several different indicators into one index and linking changes in intellectual capital with changes in the market;
- Methods of consulting firm Ernst & Young «Measures that Matter». Calculated according to a study of eight factors that are in the spotlight of investors in the stock market and affect the value of intellectual capital. These factors, in turn, unfold in 39 more detailed indicators that are being evaluated;
- techniques Konrad Group's Invisible Balance. This methodology is based on the distribution of intellectual capital into individual capital and structural capital and its evaluation through the use of a system of indicators;
- Knowledge Quick Scan techniques. The method of diagnostics of a company's position in the field of working with intellectual capital is provided, which includes questionnaires and analysis of knowledge management processes;
- methods of "measurement of consumer capital". This methodology allows you to determine the income received by the company from maintaining a relationship with a regular customer, etc.

A. Bykova, M. Molodchik [1] developed a systematic approach to assessing the impact of intellectual capital on enterprise activities. As a result of the research revealed the following laws:

- There is a positive relationship between the level of intellectual capital and the results of the company;
- the influence of intellectual capital on the results of enterprises at the level of developed markets is more pronounced than those that are in the stage of development;
- there is a certain complementary link between

the structural components of intellectual capital, which is expressed in the mutual influence, the presence of synergistic effect, as well as the insignificance of individual elements (in particular, human capital) outside of communication with others.

In general, the assessment of the impact of intellectual capital on enterprise activities is a rather complex issue, which has no unambiguous answer in economic science. The component of this issue is the need for a reliable assessment of the intellectual capital itself. As rightly noted by A. Bykova, M. Molodchik [2], the method of the intellectual value-added factor (VAIC™) is often used among the measurement methods used.

The specified intellectual value added factor is used to measure the impact of intellectual capital on the results of the enterprise. This ratio was developed and proposed by A.Pulik in 2000 [10], which enables the entrepreneurial structure to assess the contribution to the value added of tangible and intangible assets. According to A. Pulik's approach [10], the higher the coefficient, the more efficient the enterprise uses its own potential.

It should be noted that for the first time the influence of the intellectual value added factor on the market value of the enterprise was tested by the author for 30 companies from the FTSE list (a stock index calculated by the Financial Times agency) for the period from 1992 to 1998. The test showed a significant positive relationship between the intellectual capital and growth of market value [11].

The procedure for calculating the intellectual value added coefficient is presented in the formula 1:

$$VAIC = CEE + ICE, \quad (1) [12]$$

where CEE (Capital Employed Efficiency) is an indicator of the efficiency of the use of capital employed or the value of capital employed in value added, by dividing the value added (VA) into invested capital (CE);

VA - value added is the difference between revenue and material costs, excluding labor costs;

CE - the capital employed is calculated as the difference between the currency of the balance sheet and payables;

ICE (Intellectual Capital Efficiency) - The efficiency of intellectual capital, calculated through the efficiency of the use of human and structural capital.

The procedure for calculating this indicator is presented in the formula 2:

$$ICE = HCE + SCE, \quad (2) [11]$$

where HCE (Human Capital Efficiency) is an indicator of the efficiency of the use of human capital or the contribution of human capital to value added, which is determined by dividing the

added value into labor costs;

SCE (Structural Capital Efficiency) is an indicator of the efficiency of using structured capital or the contribution of structural capital to value added, which is determined by dividing the difference between added value and human capital into value added.

According to A. Bykova, M. Molodchik [1], the A.Pulik formula (formula 1) has two peculiarities. The first feature should be that the intellectual factor includes the added value of physical capital. The author of the formula [10] indicates that a higher value of the intellectual coefficient indicates that this company better uses its value added as a result of a larger amount of intellectual capital. According to A.Pulik [10], human and structural capital are inversely related: the more added value human capital creates, the less it creates structural, and vice versa. And the second feature of formula 1 is the fact that in calculating value added costs do not include the cost of labor.

J. Ling, J. Dunn, S. Hages-Lucas [8] presented a scheme for calculating the VAIC™ value-added intellectual value developed by Pulik [10] (Figure 1). One can agree with the opinion of A. Bykova, M. Molodchik [1] that the benefits of the described method are based on the relative ease of estimation and data availability. Although the use of accounting records means that certain components of intellectual capital are not taken into account.

As pointed out by J. Ling, J. Dunn, S. Hages-Lucas [8], VAIC™ is used as an independent variable reflecting the level of intellectual capital of an enterprise to assess the impact of intellectual capital on enterprise development outcomes. At the same time, researchers point out that dependent variables can be selected market value of the company, labor productivity, the growth rate of revenue, profitability of assets, etc.

The research of scientific approaches suggests that many researchers further supplemented VAIC™ with other components of intellectual capital. In particular, M.Chen and his co-authors [6] point out that, in calculations, structural capital should be supplemented by innovation capital and R & D expenditures. At the same time, the authors in their study empirically prove the effectiveness of the proposed approach.

That is, in our opinion, the calculation of the VAIC™ value added value can be done taking into account the most appropriate intellectual capital structure that is dynamic in nature. It should be noted that the use of the investigated method is most suitable for conducting an express assessment of the impact of intellectual capital on the development of business structures (including transnational corporations), given the ease of conduct and the availability of data.

On the basis of the study of materials for

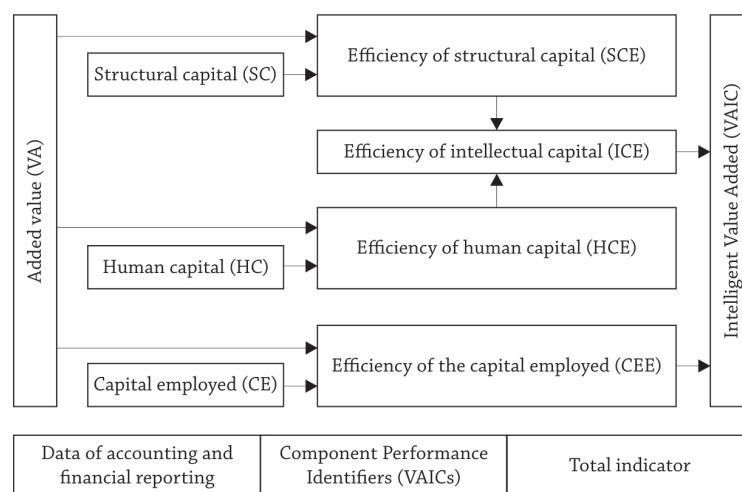


Figure 1 Scheme for calculation of the VAIC™ value added intellectual value [8]

calculating the intellectual value added factor VAIC™ [8; 10] developed its own approach to the calculation of this indicator. Formula 3 shows the calculation of the VAICdin's intellectual value-added coefficient, which adapts the formula 1 by the author according to the proposed structure of the intellectual capital of the enterprise. Taking into account the author's position regarding allocation of the following components in the structure of intellectual capital: human, structural and organizational capital, we consider it necessary to supplement the formula by the following calculations:

$$\text{VAICdin} = \text{CEE} + \text{ICEdin}, \quad (3)$$

where CEE (Capital Employed Efficiency) is an indicator of the efficiency of the use of capital employed or the value of capital employed in value added, by dividing the value added (VA) into invested capital (CE);

VA - value added is the difference between revenue and material costs, excluding personnel costs;

CE - the capital employed is calculated as the difference between the currency of the balance sheet and payables;

ICEdin (Intellectual Capital Efficiency Dinamic) - The efficiency of intellectual capital, which is calculated by compiling the effectiveness of using its components, the composition of which is dynamic.

It is proposed to use as a component of intellectual capital: human capital, structural capital (in the amount of intangible assets and technological capital), organizational capital (in terms of management and development costs of communications). This indicator for these components is calculated by the formula 4 (adapted by the author of formula 2 according to the proposed structure of intellectual capital of the

enterprise [author's development]):

$$\text{ICEdin} = \text{SCE} + \text{NMRE} + \text{TCE} + \text{ACE} + \text{MCE} + \dots \quad (4)$$

where SCE (Skilled Capital Efficiency) is an indicator of the efficiency of the use of human capital or the input of human capital in value added determined by dividing the value added into the cost of human capital;

NMRE (Non material resources efficiency) - an indicator of the efficiency of using intangible resources or the input of intangible resources in value added, determined by dividing the difference between added value and other components of intellectual capital (except for intangible assets) to value added;

TCE (Technological Capital Efficiency) is an indicator of the efficiency of the use of technological capital or input of technological capital in value added, determined by dividing the difference between added value and other components of intellectual capital (excluding technological capital) to value added;

ACE (Administrative Capital Efficiency) - an indicator of the efficiency of the use of managerial capital or the contribution of management capital to value added, determined by dividing the difference between added value and other components of the intellectual capital (excluding management capital) value added;

MCE (Market Capital Efficiency) is an indicator of the efficiency of the use of communication (market) capital or the contribution of communication (market) capital to value added, which is determined by dividing the difference between added value and other components of intellectual capital (except for communication (market capital) value added).

It should be noted that the proposed calculation methodology is not final. It can develop further, as

possible changes in the structure of intellectual capital of the enterprise. Under the influence of rapid changes in the present, intellectual capital is a dynamic phenomenon that is constantly evolving and diversifying. An actual problem remains its assessment, both in general and in structure

4 Conclusions

In the process of research, the main approaches to assessing the impact of intellectual capital on the activities and development of enterprises

(transnational corporations) are highlighted. The structure of intellectual capital of transnational corporations is proposed as a synergistic unity of human, structural and organizational capital. The methodical principles of estimating the contribution of intellectual capital to the activity and development of enterprises (TNCs) are substantiated. The possibility and need for improvement of existing approaches to the estimation of intellectual capital in connection with dynamic changes in the global business environment have been proved.

References

- [1] Bykova A A, Molodchik MA 2011 Vliyanie intellektual'nogo kapitala na rezul'taty dejatel'nosti kompanii Vestnik S.-Peterb. un-ta. Ser. *Menedzhment* **1** 27-55 **E-resource:** <http://www.vestnikmanagement.spbu.ru/archive/pdf/495.pdf>
- [2] Vetrova EN, Kokovina EV 2011 Otdel'nye aspekty upravlenija intellektual'nym kapitalom organizacii *Sovremennye problemy nauki i obrazovanija* **5** 118-26 **E-resource:** <http://www.science-education.ru/ru/article/view?id=4836>
- [3] Radygin A D et.al 2007 *Vneshnie mehanizmy korporativnogo upravlenija: nekotorye prikladnye problemy: monografija* – M.: IJePP, 298 s. **E-resource:** https://iep.ru/files/text/working_papers/104.pdf
- [4] Ruus J 2010 *Intellektual'nyj kapital: praktika upravlenija* - SPb.: Izd-vo «Vysshaja shkola menedzhmenta» 436 s.
- [5] Shkola V Yu 2011 Ekonomichne obgruntuvannia roli intelektual'noho kapitalu u formuvanni innovatsijnoi ekonomichnoi systemy *Marketynh i menedzhment innovatsij* **3**(1) 72-8 **E-resource:** http://nbuv.gov.ua/UJRN/Mimi_2011_3%281%29__11
- [6] Chen M C, Cheng S J, Hwang Y 2005 An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance *Journal of Intellectual Capital* **6**(2) 159-76 **E-resource:** <https://doi.org/10.1108/14691930510592771>
- [7] Drucker P 1995 *Managing in a time of great change* Oxford: Butterworth Heinemann 317 p
- [8] Laing G, Dunn J, Hughes-Lucas S 2010 Applying the VAIC model to Australian Hotels *Journal of Intellectual Capital* **11**(3) 269-83 **E-resource:** https://www.researchgate.net/publication/235316955_Applying_the_VAIC_model_to_Australian_hotels
- [9] Lev B 2001 *Intangibles: Management, Measurement, and Reporting* Washington D.C., 216 p
- [10] Pulic A 2000 *VAIC - An Accounting Tool for IC Management* 2000a **E-resource:** www.vaic-on.net/start.htm
- [11] Pulic A. *MVA and VAIC™ Analysis of Randomly Selected Companies from FTSE 250. Austrian Intellectual Capital Research Center, Graz-London* 2000b. April **E-resource:** www.vaic-on.net/start.htm
- [12] *Transnational Corporations and Economic Development: From Internationalization to Globalization* 2007 - Eds. L.Cuyvers, F.De Beule. Basingstoke, England; N.Y.: Palgrave Macmillan, 558 p