

ASSESSMENT-BASED MANAGEMENT OF ENTERPRISE'S INTELLECTUAL CAPITAL

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Abstract. *The effective management of the intellectual capital of the enterprise in the modern information economy opens up new opportunities to increase productivity, solve problems that previously seemed almost unsolvable, creates conditions for further development and growth of the enterprise innovative value. This provokes the scientific researches of the authors to focus on certain aspects of the effective management of modern business structures, based on intellectual capital.*

Keywords: *effective management, intellectual capital, management of human resources, modern business structures, management of intellectual capital; management of knowledge*

Formation of intellectual capital at an enterprise is grounded in the quest for effective creation and application of knowledge and information. In managerial decision-making with a view to facilitating formation of intellectual capital, the main target is the increase in the efficiency of intellectual labor and application of its products to contribute to the enterprise's sustainable development. Formation and development of intellectual capital in an enterprise ought to be part of a premeditated action, managed by the managerial staff. The knowledge, skills and information that form intellectual capital are united by management. Managerial tasks aimed at forming the intellectual capital of an enterprise include the following set of actions:

1. planning, organization, control and coordination of creation and development of intellectual capital;
2. creation of conditions for application of innovations, training and preparation of staff for creation, accumulation and augmentation of intellectual capital;
3. creation of an organizational-methodological resource base for development of intellectual capital and conditions for its effective usage;
4. organization, control and regulation of the information flow within the enterprise;
5. observation of the rights for the objects of intellectual property;
6. organization, control and regulation of the information flow between the enterprise and the external environment;
7. planning, organization and control of the usage of intellectual capital within the internal and external environment of the enterprise.

The main factor that forms the intellectual capital of an enterprise is the degree to which its intellectual potential is being used, as well as the intellectual resources at the enterprise's disposal (Fig. 1).

Note. Author's construction, from (Ruus, Payk & Fernstrem, 2008).

Intellectual capital has many essential components whose formation, both on the societal level and that of a particular enterprise, demand considerable effort and time. The formation process for many components, the market, customer, and user capital in particular, is very long, requires considerable financial investment and intellectual effort. In order to develop properly, human capital and information capital require an effective education system, scientific and research activity, and governmental support to foster the intensification of scientific innovations and the issuing of produce with an added scientific value. The components of each of the elements of intellectual capital are outlined in Fig. 2.

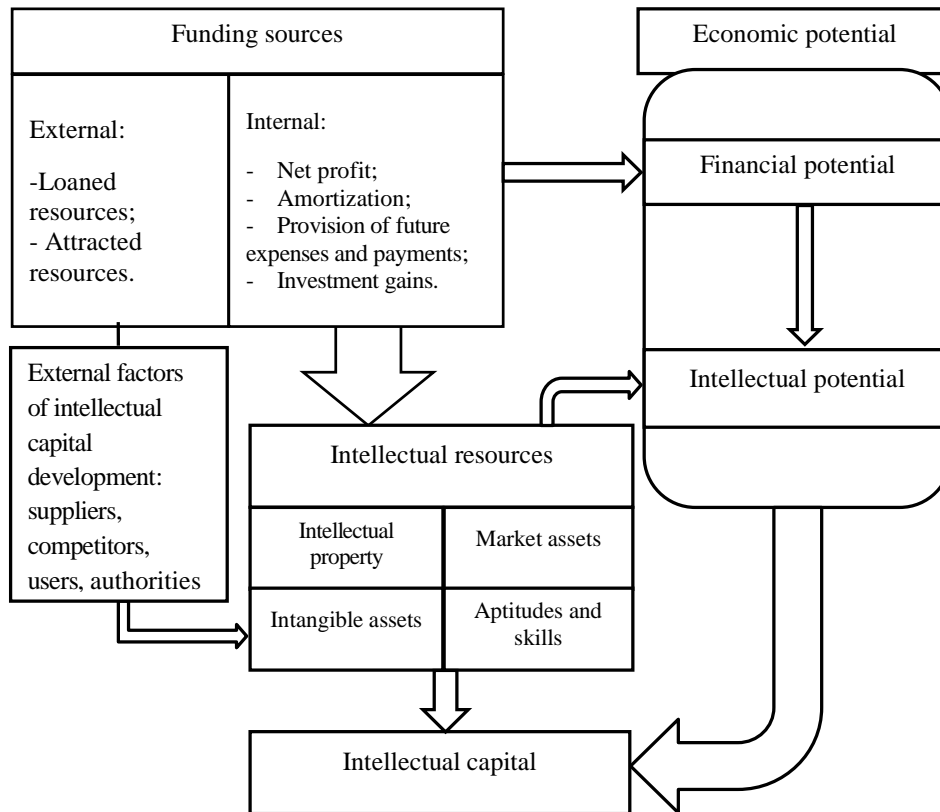


Fig. 1. Intellectual capital development mechanism

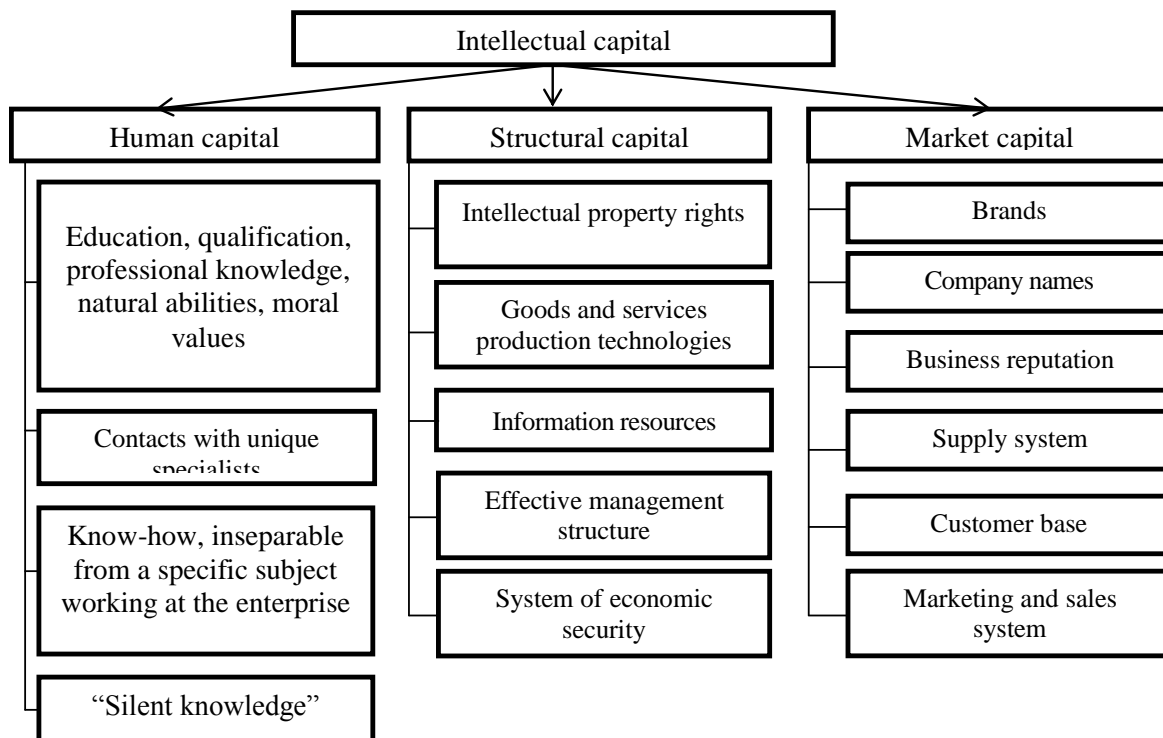


Fig. 2. Structure of intellectual capital /Note. Author’s construction, from (Edvinsson, 1997; Stewart, 1997; Zinov, 2005; Sergeev, 2005; Grishnova, 2011)

When analyzing the formation process of intellectual capital at an enterprise, it is essential to focus on its structural elements and to scrutinize the management peculiarities of each component of intellectual capital

1. *Human capital* is the dominant components in the structure of intellectual capital, as only the staff's high level of professionalism, awareness and experience enables the enterprise to fully realize its existing potential. In the formation process of this component of enterprise's intellectual capital, management should seek to implement the following activities:

- to achieve competitive advantages, the HR-department ought to carry out full monitoring of educational institutions with a view to recruiting the most successful young specialists;
- staff recruitment ought to be oriented to looking out for employees who do not merely possess the required level of education and experience, but are also oriented to acquiring new knowledge (since the concept of intellectual capital prescribes constant staff training);
- the corporate culture and its perception by the employees plays a crucial part in the formation and development of intellectual capital in general as well as promotes loyalty to the common cause;
- it is essential to ensure the prescribed level of occupational safety; companies ought to promote increase in the life expectancy, strengthening of the immune system and boosting of the staff's work capacity;
- raising of the staff's level of education ought to be implemented on a constant scale, which would promote a quicker employees' adaptation to the rapidly changing circumstances that can be observed in the nowadays dynamic world in all types of professions.

2. *Structural capital* as an umbrella term for the procedural, innovation and customer capitals is conceptually inseparable from the specific enterprise, hence it can form and develop only within its boundaries. In this aspect, management ought to strive for implementation of the following activities to contribute to the formation of structural capital as a component of the enterprise's intellectual capital:

- information resources and technologies in the contemporary world are crucial factors that enable adequate and prompt transfer of information and allow for a qualitative analysis of all the aspects of enterprise's operation. Thus, the progressive nature of the applied information technologies determines the success and security of the enterprise from various threats and dangers that occur during "hands-on management". Hence, only ample investments in the information systems and technologies advance a qualitative leap in the strengthening of this aspect of enterprise's intellectual capital;
- intellectual property rights ought to be protected, as insufficient attention to protection of the existing intellectual assets could compromise the enterprise's reputation;
- production technologies of goods and services build up the enterprise's competitiveness; only the use of the most innovative technologies enables progress and development;
- formation of intellectual capital is irrevocably linked to the system of economic security at the enterprise, because in its absence the risk of unexpected losses is rather high which, in its turn, has a negative impact on the collective intellectual capital as a whole;
- an effective management system is a crucial component of enterprise's structural capital since excessive bureaucracy as well as liberalization do not permit to productively use the intellectual resources at the enterprise's disposal;
- formation of the customer component of the structural capital is directly linked with the contact that responsible employees have with the enterprise's customers. Hence, here such factors as company's policy regarding customer treatment, personal relations of the employees and the customers, marketing and PR are essential since they create the external image of the enterprise and impact on its perception by the mass customer;
- formation of the procedural component of intellectual capital is determined by the extent to which this or that process is documented and regulated. Exact regulation of the processes enables the enterprise to achieve their smooth and accurate execution. Yet, on the other hand, excessive severity could impede the flexibility and promptness of the realization of specific processes within the required timeline. So this calls for an adequate approach to achieve optimal use of intellectual resources;
- innovation component (Nenkov, 2014) is critical on the way to achieving the leading growth position on the market. Hence, only paying due attention to it permits to fully capitalize on the enterprise's intellectual capital.

Thus, formation of intellectual capital at an enterprise is a very complex process which requires activation and engagement of a considerable amount of resources, a particular accuracy and a

rational approach to the formation of every component, since an employee would not be able to effectively perform intellectual activity if the enterprise lacks appropriate conditions for each of the components of intellectual capital.

It should be noted that effective management of such a complex asset as intellectual capital is only possible if it is adequately assessed. Traditional accounting instruments do not permit to adequately account for all elements that comprise the total value of the enterprise. This, however, urges scholars to draw up new methods that would allow for a more adequate assessment of intangible assets. In this context, the process of intellectual capital formation plays a key part since such focus on the development of the staff's human capital and the enterprise's structural capital strengthens the company's competitive advantages and promotes a fuller realization of its intellectual potential.

In contemporary economical practice, three fundamental methods are used in asset valuation: expense valuation, income valuation and market valuation. The same methods can also be used in assessment of specific components of intellectual capital. In recent years, various alternative assessment methods have been proposed with a particular focus on non-financial indicators. According to (Luthy, 1998) and (Williams, 2000), these methods can be grouped as follows:

1. Direct Intellectual Capital Methods (DICM) assess the monetary value of intangible assets by distinguishing its various components. Following the identification of these components, they can be assessed separately or by using an aggregating coefficient;

2. Market Capitalization Methods (MCM) permit to calculate the value of intellectual capital or non-material resources as a difference between the market capitalization of the company and the value of its shares capital;

3. Return on Assets Methods (ROA) calculate the company's mean income prior to payment of taxes and divide it by the mean value of company's tangible assets. As a result, the ROA coefficient is obtained, which is then compared to the mean indicators in the specific industries. The difference is multiplied by the mean value of tangible assets to calculate the mean income per year from intangible assets. When the previously obtained mean income is divided by the mean weighed value of the company's capital or by the percentage value, the approximate value of the company's intellectual capital can be calculated.

4. Scorecard Methods (SCM) distinguish various components of intangible assets or intellectual capital, then indicators and indices are determined and outlined in the form of scorecards or graphs. SCM methods are similar to DICM apart from the fact that the monetary value of intangible assets is not calculated. In addition, though, the integral index can be calculated.

5. Proper Measurement Systems (MS) use all directions that have some value for the company and its surroundings and determine the indicators in each of the directions. These indicators are joined in a system of measurement which is usually a conjoint value hierarchy (CVH), and actual data are used to obtain valid calculations of value. These calculations can be combined with financial data to determine the effectiveness of expenses and other indicators.

To adequately assess one or another type of intellectual capital, the most appropriate assessment method must be selected (Table 1).

Table 1. Recommendations for the use of intellectual capital assessment methods

Elements of intellectual capital	DICM	MCM	ROA	SCM	MS
Patents and technologies	+	+	+	+	+
Trademarks	+	+	+	+	+
Copyright objects	+	+	+	+	+
Qualified staff	-	-	-	+	+
Management information software	+	+	+	+	+
Program products	+	+	+	+	+
Distribution networks	-	+	+	+	+
Deposits	-	+	+	+	+
Franchising rights	+	+	+	+	+
Corporate practice and procedures	-	-	-	+	+

Note¹. "+" - expedient application, "-" - inexpedient application.

Note². Author's construction.

Accurate application of an appropriate method in assessing the specific type of intellectual assets yields highly accurate results, which, in their turn, ensure an exact assessment of the enterprise's intellectual capital as a whole. Nowadays scholars have designed a whole array of specific methods for assessment of enterprise's intellectual capital, each of which in one way or another covers the components of intellectual capital as well as permits to dynamically explore the development of each component.

The first more general method for assessing the enterprise's intellectual capital on a general scale is Tobin's q (Tobin, 1969), which gives a numeric representation of the company's place in the market and is calculated as the ratio between the company's market value and the replacement value of its physical assets. Thus, this indicator reflects all the components of the company's value that are not outlined in the balance reports. Alongside such various factors as envisaged future income, brokers' apprehensions, expert opinions and market defects, it indirectly considers intangible assets that are covered by the term "intellectual capital". If Tobin's q is greater than 1, it means that company's market value exceeds its book value and thus the market value includes some unregistered assets of the company.

In practice, Tobin's q can be used to determine the impact of intellectual capital in different industries. Carnegie Group specialists (Stewart, 1991) have calculated the ratio of market value and book value in several industries and have discovered that the more complex the applied technologies are, the more significant the mean industrial impact of this indicator is. In other words, high-tech industries are marked by high values of Tobin's q . The advantages of Tobin's q over integral indicators: object's market value is less vulnerable to change resulting from non-market factors than the market value of the company's shares; Tobin's q method can be applied to all organizational forms of enterprise.

Edvinsson proposed (Edvinsson, 1997) his own method for assessing the intellectual capital of an enterprise. For this purpose, a specific instrument called SkandiaNavigator was designed, which is a type of computer software that uses a matrix of 73 indicators to assess intellectual capital. SkandiaNavigator permits to view human capital in interaction with consumer capital, internal processes and the company's potential for innovation which creates the company's financial value.

Lev's "Value Chain Blueprint" model (Lev's, 2002) is structured on the assessment of the company's potential for innovation. Nine groups of indices are distinguished for assessment that characterize the accumulated and acquired abilities, the business network, the intellectual ability, the technological possibility to implement the innovation, the company's growth perspectives etc.

Authors in (Petrova, & Nenkov, 2015) show an interesting approach to modeling in the field of law.

The Balanced Scorecard is also used in assessment of intellectual capital. This method for valuation of tangible and intangible assets is based on four components – financial, marketing, internal business processes, learning and growth (Kaplan & Norton, 1996). Its advantages are that it is easily comprehensible and can be promptly applied in practice; it allows for determining the cause and effect relations between indicators pertaining to different industries; and it affords possibility for an effective use of the development strategy for the enterprise's intellectual capital and having a qualitative impact on the customer demands and wishes. Yet, the indicators that constitute the given system are not constant, so introduction of Balanced Scorecard requires constant staff training in its use and adapting to the changes in the external environment.

Ukrainian scholars have also designed a method for assessment of intellectual capital on the macro level (Grishanova, & Kozlovs'kyi, 2014). According to this method, the national intellectual capital index is calculated on the grounds of five indicators: human capital, market capital, process capital, renewal capital and financial capital. The advantage of this method is the fact that it encompasses a considerably wider array of factors as compared to the methods developed by international organizations such as the World Bank and the World Economic Forum.

In modern circumstances, the role of intellectual capital is growing ever more quickly. A high level of enterprise's intellectual capital contributes to a higher score in measurement of such company's value and often determines a striking difference of the actual value of the enterprise as compared to the balance indices.

According to the structure of enterprise's intellectual capital and the existing methods for its assessment outlined in Fig. 2, we have established the assessment indicators for each of its elements (Table 2).

Thus, the existing approaches to assessment of enterprise's intellectual capital permit not only to dynamically analyze the changes in the separate components of enterprise's intellectual capital, but also to design a set of actions to be taken for a more effective management of each of these

components. Yet, the multitude of approaches to the assessment of intellectual capital impede a qualitative comparative analysis of various enterprises in that lack of information on the one hand and of a common methodology on the other hand have lead to the situation that those enterprises that nevertheless attempt to perform assessment of intellectual capital can only view the obtained results internally and cannot draw conclusions about the development of intellectual capital in the industry in general. The only way to overcome this contradiction is by unification of the methods for assessment of intellectual capital.

Table 2. Assessment indicators for the components of intellectual capital

No	Component	Indicator
1	Human capital	Coefficient of work experience
		Coefficient of stability
		Coefficient of health
		Coefficient of professional growth
		Coefficient of education
		For employees with higher education
2	Structural capital	Cost of the objects of intellectual property
		Profit from selling of objects of intellectual property
		Specific weight of innovation produce from the entirety of sold products
		Specific weight of certified produce from the total produce assortment at the enterprise
		Specific weight of patent licenses from the entirety of licenses at the enterprise
		Specific weight of investments into RTD from the entirety of investments
		Specific weight of new technological processes from the entirety of technological processes
		Profitability of innovation produce
		Profitability of intangible assets
3	Market capital	Value of enterprise brand
		Market share of the enterprise and the national market
		Market share of the enterprise and the global market
		Coefficient of autonomy
		Coefficient of financial dependency
		Coefficient of absolute liquidity
		Coefficient of current ratio
		Coefficient of quick ratio
		Tempo of market return growth

Note. Author's construction.

Our system of indicators for the assessment of the components of enterprise's intellectual capital enables such unification of the existing indices of assessment since the proposed groups of indicators meet the following requirements: they allow for a full analysis of all the basic components of intellectual capital on the macro level; the choice of indicators is based on the availability of information in the financial books of the enterprise; the suggested indicators are universal and can be applied to enterprises in any industry, and hence also used for inter-industry comparisons.

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