

MEASUREMENT OF INTELLECTUAL CAPITAL IN A COMPANY

Artur Paździor

College of Enterprise and Administration, Poland
a.pazdzior@wspa.pl, apaz@interia.pl

Maria Paździor

College of Enterprise and Administration, Poland
amarys@interia.pl

Abstract:

The article raises the issue of intellectual capital. Owing to the fact that this is a relatively new notion, among economists and practitioners of management there is no consistency with regard to the essence and the role of this capital in an organization. It therefore contributes to formation of discrepancies in perception and measurement of its effectiveness. The article presents the best known definitions, classifications and methods of evaluation of intellectual capital. The attention was focused on synthetic and analytical methods which are most often applied when measuring effectiveness of company's intellectual capital. Intellectual capital, identified with human capital, human resources, intellectual property, intellectual assets, or knowledge resources, in the age of knowledge-based economy plays a crucial role almost in each organization. Such a situation makes a credible reflection of its value and effectiveness a priority in the process of increasing the competitive advantage of a company. Clearly, it is difficult to plan, implement and control the process within which there are elements the value of which has not been fully reflected in the structure of resources of an organization. According to the conducted literature review of measurement methods of intellectual capital effectiveness, it seems that the evaluation process of values of intangible resources is necessary in a company's strategy implementation. However, it should be pointed out that in spite of undertaken attempts, still there is no a synthetic indicator which would fully reflect the value of the most precious resource of a 21st century organization, which is intellectual capital.

Keywords: intellectual capital, synthetic methods, analytical methods.

1. ESSENCE OF INTELLECTUAL CAPITAL

Intellectual capital is a relatively new notion, therefore in the subject literature there is no consistency in the definition of this approach. The notion is sometimes identified with human capital, human resources, intellectual property, intellectual assets or knowledge resources.

The genesis of the expression itself is not unambiguous. According to S. Kasiewicz, elements of the intellectual capital concept can be found in J. Rea's publication from 1834 entitled "The Sociological Theory of Capital" (Kasiewicz, Rogowski & Kicińska, 2006, p. 65). Also E.H. Chamberlin, who examined the impact of diversity of resources owned by a company on competition and profits, referred to the idea of intellectual capital (Chamberlin, 2003, p. 220–232).

When analysing numerous definitions of intellectual capital, two basic directions of its interpretation may be noted. In the first one, it is assumed that intellectual capital is identified only with the human factor, in the second one, on the other hand, it is extended with systems, procedures and structures which support seeking optimal intellectual efficiency and relations of the co-workers network.

The first direction was presented, among others, by W.L. Hudson who specified human's intellectual capital as a combination of genetic heritage, education, experience, attitudes towards life and business (Mikuła, Pietruszka-Ortyl & Potocki, 2002, p. 46). Another author who referred the intellectual capital only to knowledge acquired by employees is A. Ward. According to him, intellectual capital is the sum of "islands of knowledge" existing in a company (Mikuła, Pietruszka-Ortyl & Potocki, 2002, p. 58), and it is the task of managers to competently coordinate knowledge of employees for the purpose of implementation of the strategy determined by the company.

Currently, T. Stewart defines intellectual capital in a slightly broader way. He writes about "intellectual material" consisting of knowledge and experience, which may be used for creating wealth, but also draws attention to intellectual property (Jarugowa & Fijałkowska, 2002, p. 58). It is worth pointing out that intellectual property is legally defined as the property of patents, trade marks and copyright. S.M.H. Wallman has a similar approach. He also stresses that intellectual capital is not only the power of the human mind, but also a brand, trade marks and assets booked in historical values, which in the course of time have transformed into something of substantial value (Edvinsson & Malone, 2001, p. 10).

The majority of specialists subscribe to even a wider definition of intellectual capital. An example may be J. Fitz-enz who claims that intellectual capital is "intellectual property of the company and a complicated strand of processes and culture, connected with a network of various kinds of relations and human capital (Fitz-enz, 2001, p. 23). On the other hand, he calls firm's ability to obtain values from the owned intellectual capital "the intellectual potential". This explanation, apart from intelligence of employees and intellectual property, also considers relations between the employed, their environment and structure in which they operate.

L. Edvinsson and M. S. Malone interpret intellectual capital in the following manner: "it is studying the roots of company's value, measurement of hidden factors that are the grounds for a visible company, buildings and products" (Edvinsson & Malone, 2001, p. 16). These factors include human capital and structural capital.

A. Brooking proposes an even more precise division. According to it, intellectual capital includes four components (Jarugowa & Fijałkowska, 2002, p. 60): market assets, assets associated with the human factor, assets concerning infrastructure, and intellectual value.

K. E. Sveiby has an interesting approach. He identifies intellectual capital with intangible resources. On the basis of the model known as the Intangible Assets Monitor created by himself, he distinguishes three concepts of intellectual capital: individual competencies as well as internal and external structure of an organization (Jarugowa & Fijałkowska, 2002, p. 92).

To sum up, it may be concluded that despite various interpretations and classifications of intellectual capital, their common denominator are factors based on broadly understood knowledge. This knowledge is often distinguished at the level of three areas which in the opinion of H. Saint-Onge and C. Armstrong are interrelated and jointly affect creation of values of intangible resources of an organization (Bukowicz & Williams, 2000, p. 223). These factors are difficult or, in the opinion of some people, impossible to capture in the system of financial reporting. In literature, the aspect of intellectual capital relatively often refers to L. Edvinsson's interpretation, which was created on the basis of Skandia. Intellectual capital can be understood as skills owned by organizations to explore and capitalize ideas (technological, organizational, productive, etc.) in order to improve growth in the value of the whole company.

2. MEASUREMENT METHODS OF INTELLECTUAL CAPITAL

Intellectual capital management and assessment of its effects is not possible without its measurement. This measurement is a difficult task. Intellectual capital of a company is strictly related to the type of activity, business environment, history and culture of a given organization. It is a highly individualized category. Perhaps, a universal model or technique for evaluation of this capital will never be developed.

In the subject literature, as well as in practice of many companies numerous attempts to determine the value of this capital are taken. This is demanded by investors and the boards of capital partnerships. So far, the decisions made by them have not included or intuitively estimated the effects of intellectual capital. Lack of reliable evaluation of this capital results in the fact that decisions on capital markets are particularly exposed to various types of speculations. This applies in particular to knowledge-absorbing companies. This fact is proved by, for instance, considerable changes in the prices of shares of the web companies which in the last decade were characterized with exceptionally large range of changes of market capitalization values.

The result of the previous searches are suggestions of many methods of measurement of intellectual capital. One of the most popular classifications of these methods is their division into two groups: synthetic and analytical.

2.1. Synthetic methods

The simplest synthetic measurement method of intellectual capital is to define the difference between the market value of a company (a partnership) and its accounting value (Stewart, 2002). This method is based on the assumption that market price of shares always reflects the real value of a company, that accidental factors have no impact on it. Meanwhile, in practice,

what was pointed out in the previous subitem, situations of underestimation or overestimation of value of companies also happen. The weaknesses of this method is high sensitivity of the company's intellectual capital values to changes occurring in the environment (e.g. deregulation of the market). This limits, despite its simplicity, its common use for measurement of intellectual capital.

It is also worth paying attention to Tobin's q index (Bonis, 2001), which is a relation of the market value of the resource to the cost of its reproduction. When reproduction costs of the company's assets are lower than the market value of the company, then investors (owners) achieve a higher than normal rate of return on involved capitals. This index meets the first two criteria proposed by T. A. Steward. Its structure is simple, though definition of the replacement value of assets is laborious and time-consuming. This index allows one to determine the added value thanks to intellectual capital. However, it is necessary to remember, similarly to the previous method, that the measurement result is affected by fluctuations in share prices caused by temporary (accidental) factors. In spite of that, this index can be used for analysis of intellectual capital in companies of the same industry operating on similar markets, having similar tangible assets. Furthermore, testing the dynamics of this index allows one to monitor changes in intellectual capital of a given company. A systematic growth in the value of this index proves the growing role of intellectual capital in creating value for the owners, whereas decrease in its value proves deteriorating effectiveness of intangible assets. It is impossible, however, to measure activities creating intellectual capital by means of it.

Another index of synthetic measurement of intellectual capital is the calculated intangible value (*CIV*). It is defined as a result of comparison of the average (from three years) rate of return from assets of the company with the average rate of return from the assets in a given industry (sector) (Kiciński, 2006). Measurement of intellectual capital with this method is based on credible accounting information. Its basis are values used in fundamental analysis. Speculative behavior of stock investors do not have impact on them. It is not a very complex method, however, the strategy implemented by the company does not find full reflection in it (measurement is conducted on the basis of historical values, which have to be related to the currently implemented the strategy). Similarly to the previous two methods, the value created thanks to the application of particular components of intellectual capital cannot be directly estimated. This method may be used for studying business competitiveness within a given industry (sector), as well as for observation of dynamics of intellectual capital in specific companies.

Another way of measurement of intellectual capital belonging to synthetic methods is Knowledge Capital Earnings (*KCE*). This is a method prepared by B. Leva (Mintz, 1999, p. 3). It is based on the assumption that intellectual capital does not produce any value. Only owing to its implementation, productivity of material and financial resources grows. For this reason, in order to measure this capital, benefits received by the company have to be accordingly divided between three basic resources (material, financial and knowledge) (K. Śliwka). In this method, as opposed to the previous one, measurement of intellectual capital is only partially based on market values. An important role is attributed to the forecasted result. In this way, not only is history considered, but also expected future results of the strategy implemented by the company. The method may be used for testing changes in intellectual capital in single companies, as well as for interplant comparisons within a given sector (industry). Similarly to the previous method, in this one, particular components of intellectual capital are also not estimated.

The group of synthetic methods may also cover A. Pulić's method, in which the main index of assessment is value $VAIC^{TM}$ (*intellectual index of the added value*) (Pulić, 2004, p.11). In this method, means used for employment and employee training are treated as investments, rather than costs of current operations of a company, whereas intellectual capital is treated equally with financial capital. The basic evaluation criterion of work is the added value, which is defined as the sum of operating profit, costs of work (gross remuneration and benefits for employees) and depreciation. Physical capital, human capital and structural capital participate in creating this value.

The starting point in the $VAIC^{TM}$ analysis is calculation of the added value, considered to be the most credible determinant of success in business, owing to the fact that it does not submit easily to manipulation. The added value is then compared to the involved physical capital identified with the net accounting value of assets. By dividing the added value by net assets, the index of physical capital is calculated. This is a synthetic measure of effectiveness of intangible (not visible) resources use of the company. The cognitive value of this index is created as a result of tests of its dynamics (e.g. in a five-year period) and through comparison of its quantity with relevant values for competitive companies, medium values in the industry. Similar assessments can be made with regard to partial indices. In the latter case, information about effectiveness of use of different types of resources are received.

This method, just like the one discussed earlier, is quite simple. It is entirely based on internal information coming from accounting books. This makes the conducted calculations reliable and easy to verify. It is excellent for conducting comparative studies. Thanks to its implementation, effectiveness components of intellectual capital (human and structural) can be specified, it may be also assessed if the company creates or destroys value. However, it is worth noting that in this method, as opposed to B. Lev's method, it is not the value, but effectiveness of intellectual capital what is estimated.

Among the methods of measurement of intellectual capital discussed so far, the following have found the greatest application in practice: the method of calculated intangible value (*CIV*), the method of profit from the capital of knowledge (*KCE*), and the method of intellectual index of added value (*VAIC*). It results from relative simplicity of these methods and quite an easy access to empirical data, necessary for calculation of relevant indicators.

2.2. Analytical methods

One of the best known analytical methods is the so-called Skandia Navigator. Skandia AFS was the first company in which an attempt to calculate intellectual capital was taken. It was associated with the shareholders' interest why the stock value of the company's shares may exceed the accounting value. At the beginning of the 1990s, L. Edvinsson along with specialists from Skandia began research, the result of which would have allowed to answer the above question. In Skandia, working on that answer resulted in creation of a report on intellectual capital (*Identification of intellectual capital*), which was presented in May 1995.

The model prepared by Skandia, named Skandia Navigator, is a process model supported by the computer system Dolphin. It contains 164 measurement metrics, which were divided into intellectual (91) and traditional (73). These metrics cover five business areas of the company: financial, client, process, human and development. Within each area, a specific set of indices describing a given intangible resource is suggested.

Skandia Navigator is undoubtedly the most popular analytical model of measurement of intellectual capital. Thanks to identification and reporting of various areas of activity being the sources of intellectual capital, it allows for obtaining a complex image of intangible assets of the company. It does not, however, allow to define the value of this capital. Skandia Navigator is not a universal tool, and selection of indicators may be subjective. In spite of that, it has gained recognition of financial markets and exchanges regulators. In the opinion of these institutions, investors need such a report very much.

Another method was prepared by K-E. Sveiby in 1997 for the needs of monitoring intangible assets (*Intangible Assets Monitor - IAM*) (Heising, 2001). This method is based on the assumption that the only source of generating profits is human capital, efforts of which are reflected in the structure of internal and external resources of the organization. The set of indicators proposed for use in this method was divided into three main groups: internal structure indicators, external structure indicators and individual competences indicators. Above this division, in each of the groups, indicators concerning growth, regeneration, effectiveness and stability were additionally distinguished.

The discussed measurement method differs from the previous ones only in the criteria of evaluation of intangible assets and a different set of proposed indicators. However, selection of these indicators is based to a large extent on subjective opinions of analysts. These results in a fact that assessment performed with this method may not be objective. Clearly, one may select such indicators for evaluation of particular components of intangible assets, which in the conditions of a given company look great, ignoring other more important. In such a situation, the spatial analysis, as a result of which it would be possible to compare effectiveness of using intangible assets between companies in the same industry, loses some of its importance.

3. CONCLUSIONS

In many companies, intellectual capital is the most valuable resource. Such positioning of intangible factors within the hierarchy of the resources of the organization should encourage a growing number of scientists to more actively search for more and more effective methods of their measurement and methods of record in the system of accounting. It is important, as full reflection in reporting of intellectual capital value, in the opinion of many managers, will contribute to higher effectiveness in personnel strategy of companies. It is difficult to plan, implement and control the process, the main goal of which is pursuing the increase in productivity of a resource, the value of which is difficult to measure, and which cannot be precisely placed within the structure of property components of the organization.

Thanks to the growing efficacy of measurement methods of intellectual capital, it seems possible to pursue more completely the primary goal of companies, which is maximization of value in a long period. Value, not only in the context of the future profits and streams of cash, but also with regard to the increase in satisfaction of all groups involved in the business environment. It is important first of all from the point of view of employees, whose work in many cases is not assessed in a proper way, which would enable elimination of unprofessional factors, and focus on behaviours increasing effectiveness of the whole organization.

REFERENCE LIST

1. Bukowiz, W. R. & Williams, R. L. (2000). *The Knowledge Management Fieldbook*. London, Financial Time, Prentice Hall.
2. Clulow, V., Gerstman, J., & Barry, C. (2003). The Case of a Financial Service Firm. *Jurnal of European Industrial Training*, 5.
3. Edvinsson, L., & Malone, M. S. (2001). *Kapitał intelektualny*. Warszawa, PWN.
4. Fitz-enz, J. (2001). *Rentowność inwestycji w kapitał ludzki*. Kraków, Oficyna Ekonomiczna.
5. Jarugowa, A., & Fijałkowska, J.(2002). *Rachunkowość i zarządzanie kapitałem intelektualnym*. Gdańsk, ODDK.
6. Kasiewicz, S., Rogowski, W., & Kiciński, M. (2006). *Kapitał intelektualny – spojrzenie z perspektywy interesariuszy*. Kraków, Oficyna Ekonomiczna.
7. Mikula, B., Pietruszka-Ortyl, A., & Potocki, A.(2002). *Zarządzanie przedsiębiorstwem w XXI wieku*. Warszawa, Difin.