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A debate on Some Methods for Measuring the Intellectual Capital

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Abstract – The interest on measuring the intellectual capital has caused the development of different methods of measuring it. This paper reviews the literature pertaining to the measuring of intellectual capital. Since intellectual capital is at the crux of sustainable competitive advantage, the researches field of intangibles assets is an exciting area for both: researchers and practitioners. Unfortunately the measurement of such intangible assets is difficult. A variety of methods has surfaced in an attempt to measure intellectual capital and this paper aims to analyze them and underline their strengths and weaknesses.
Keywords: intellectual capital, intangible assets, measurement, analysis.

I. INTRODUCTION

Measuring intellectual capital is fundamental and very important in order to compare different organizations, to estimate their real value or even to control their improvement year by year. In addition, to improve the way in which organizations manage its intellectual resources that produce value and make some benefits in consequences maximizing advantages for the organization. Nevertheless, to measure intellectual capital is necessary to specify exactly what the measurement methods are, which the best are and which are appropriate for the organization to choose for measure its assets in proper way. Properly using intellectual capital measurement methods can cause the creation of competitive advantage and in consequence create development of the whole organization at the present day.

II. THE CONCEPT OF INTELLECTUAL CAPITAL

Today the intellectual capital is a key factor in company's profitability. Intellectual capital (IC) consists of the stock and flow knowledge available to an organization. These can be regarded as intangible resources, which together with tangible resources comprise the market value of a business. There is no generally accepted definition of intellectual capital. However, many have offered views that provide a general concept. One of the most succinct definitions of intellectual capital is given by Stewart as packaged useful knowledge [5]. He explains that this includes an organization's processes, technologies, patents, employees' skills, and information about customers, suppliers, and stakeholders. Various other definitions use concepts such as ability, skill, expertise, and other forms of knowledge that are useful in organizations.

A comprehensive definition of intellectual capital is offered by Brooking "*Intellectual capital is the term given to the combined intangible assets which enable the company to function*" [2]. Important underlying concepts in these definitions include the notion that intellectual capital is something that is knowledge based, captured in an identifiable form, and useful in organizations. These definitions and underlying concepts provide a useful foundation for understanding intellectual capital.

III. ANALYSIS METHODS OF MEASURING INTELLECTUAL CAPITAL

There are a number of reasons why organizations measure their intellectual capital such as: to help organizations formulate their strategy, assess strategy execution, assist in diversification and expansion decisions, and use these as a basis for compensation; and finally to communicate measures to external stakeholders.

The methods of measuring of intellectual capital are in fact a simplification of reality and an approximation of the exact value. However, these methods enable to identify a trend, which demonstrate whether the organization is results are better or worse than in the previous analysis. In this sense the system of measuring intellectual capital may be compared to the scales: it may never capture the exact value, but it is important to know whether the value identified is higher or lower than before [3].

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There are several groups of methods of measuring the intellectual capital, which can be used in order to evaluate these assets. Some of these methods were attempts made by different companies for their internal use rather than the development of a universal measuring method.

But they still exist and are basis to create new methods. According to the references overview, all methods can be divided into four main groups [1, 2, 4, 5]:

1. Direct Intellectual Capital Methods, DIC;
2. Market Capitalization Methods, MCM;
3. Return on Assets Methods, ROA;
4. Scorecard, SC;

To assist managers in deciding when they want to use one of the methods of measuring intellectual capital above was made a comparative study of them, presented in Table 1.

As a result of comparisons can record that the choice of methods for measuring intellectual capital has a number of similarities and use the following steps:

1. Use one of the intellectual capital structures;
2. Establish assets that come into the measurement process to obtain the desired results;
3. Measuring intellectual capital is a period of time;
4. Reviewing and adjusting aim to avoid possible errors occurring during the performance measurement process.

Table 1. A synthesis of the measuring method of intellectual capital

Method	***Characteristics***	***Strengths***	***Weaknesses***
DIC	- estimate the economic value of intangible assets by identifying their components - have to be used in conjunction with the SC methods when standard indicators are defined	- allows separate evaluation of the different components of intellectual capital - provides a comprehensive picture of an organization's intellectual wealth - measurements are based on events - better representation of cause-effect relationship than in the case of financial methods	- this method is specific to a particular category of organizations, and the comparison is difficult - not appropriate for benchmarking or comparisons - the more components are analyzed and the more values are obtained, the harder it is to conduct the evaluation
MCM	- based on the market capitalization	- allow comparison of organizations in a particular field - provides a monetary value of intellectual capital - appropriate for benchmarking and comparisons.	- is not suitable for an overview of the development - a purely economic focus limits the perspective
ROA	- based on return on assets	- appropriate for benchmarking and comparisons - the method is suitable to compare different organizations in the same sector - is based on traditional accounting rules, and is therefore easily understood by accountants and finance professionals	- it is characterized by lack of information constituting intellectual capital - a purely economic focus limits the perspective
SC	- identify the components of the Intellectual Capital and generate indices and indicators that are reflected in graphs for scorecards	- provides a comprehensive examination of intangible assets and performance than methods based on monetary measurement - it is optimal for detecting and correcting errors - a wide scope of results that may help to rectify the company's current policies	- sensitive to the changes of the context - the amount of resulting information may be hard to analyze; it is difficult to obtain a single numeric result.

IV. INSTRUMENTS FOR MEASURING INTELLECTUAL CAPITAL

In these methods of measuring intellectual capital several models have been developed to help achieve further measurements are presented considering several criteria: the type method which includes the model of intellectual capital, the formula intellectual capital calculation, the formula market value-calculation, characteristics, advantages and disadvantages.

There are currently various measurement models intellectual capital that seeks to consolidate financial

aspects of issues relating to intangible value. Most of these models consider intellectual capital as something that is not visible, but includes value the skills, organizational processes and relationships with customers [4].

The most popular measurement models as well as the most widely used or just the easiness of their applications of all non-financial measurement methods are: Technology Broker, The Value Explorer, Tobin's Q Ration, Market to Book value, EVA, MVA, Balanced Scorecard, Skandia Navigator. The measurement models for the intellectual capital are presented in Table 2, considering the criteria listed previous.

Table 2. Analysis the instruments of measuring intellectual capital

Model	***Method***	***Intellectual capital***	***Market value***	***Advantages***	***Disadvantages***
Technology Broker (Annie Brooking)	DIC	IC=Human capital + Infrastructure assets + Intellectual property assets + Market assets	IC + Tangible assets	- the method evaluates intellectual capital of the company - importance of the intellectual property - related to the objectives of the company - integrated method	- subjectivity in transforming quantitative results into qualitative - does not take into account synergies - does not have a time horizon - subjective classification of IC
The Value Explorer (Andriessen & Tiessen)	DIC	IC=Human capital + Structural capital+ Client capital	-	- monetary valuation of IC - projection of results into the future - works well for companies whose activity is based on patents	- takes into account only essential competences - does not take into account synergies of the assets - quantitative value is not reliable and has redundant elements - it is not an integrated method
Tobin's Q Ration (James Tobin)	MCM	$q=\frac{market\ value}{assets\ replacement\ value}$	-	- offers a global view - not necessary to calculate the rate of return - useful for comparing enterprises	- hard to obtain the necessary information (replacement costs) - depends on the market
Market to Book value (Stern Stewart and Luthy)	MCM	$q=\frac{market\ value}{assets\ replacement\ value}$	-	- relatively stable - useful for comparing enterprises -may be used even if the results are negative	- does not provide the exact value of the intellectual capital: the represented items are not intangible assets - sensitive to accounting standards
EVA (Stern Stewart & Co.)	ROA	EVA = (ROI – WACC) x Invested Capital	-	- enables one to analyze individual business units - enables one to see the real growth of the company - a good starting point - easy to use and appropriate for making comparisons	- does not consider future performance - may lead to inconsistencies - business profitability has to be higher than the financing costs - higher accuracy demands a more complicated evaluation procedure - short-term focus

MVA(Stern Stewart & Co.)	ROA	MVA = Market value – invested capital	-	- allows to determine expectations of the results delivered by the strategies that may be adopted - incorporates expectations of the sector	- does not take into account the opportunity cost of the invested capital - does not take into account the dividend - cannot be applied at the level of business units - is not valid for companies not listed on the stock exchange
Balanced Scorecard (BSC) (Robert Kaplan y David Norton)	SC	IC = Perspective of the client + Internal perspective + Perspective of the employee + Financial perspective	IC	- analysis of horizontal strategic measures - evaluates the contribution of every link in the value chain and its overall performance - easy to understand, no prior experience needed - attention to the needs of the stakeholders - can be applied to companies and organizational areas - takes into account interrelations	- weak financial analysis - indicators have to be chosen carefully - subjective indicators - rigid model
Skandia Navigator (Lief Edvinsson)	SC	IC = Human Capital + Structural capital (= Client capital + Organizational capital)	Financial capital (past) + Intellectual Capital (present and future)	- incorporates financial elements - improved predictive ability - a broader view of the company - can be adapted to any company	- experienced personnel are needed for the application - it is difficult to apply the same methodology to different types of capital and their relations - does not analyze synergies between the areas

Number of models for measuring intellectual capital is increasing, showing their importance, and the difficulty of finding a metric for something so intangible. The new rule of the knowledge economy requires new solutions. Traditional approaches in accounting, finance, management cannot provide the most efficient and effective organization solutions, prompting them to turn them out intellectual capital measurement models to know the actual organization [1, 6].

V. CONCLUSION

Despite the importance given to these methods of measuring intellectual capital, even if it offers a high degree of transparency of the organization and operations of intellectual wealth, they may not provide a complete picture of the following reasons:

- What changes are to be measured assets are intangible in nature which also makes it hard to measure;
- Not reside in a single individual, but relations between individuals;
- There is separable temporal location;
- Little surprise measurable aspects of the production process,
- The connection between these forms of capital and economic growth is weak, almost nonexistent.

Important is that intellectual capital is no longer seen as a stock, a durable good but a sustainable process. The indication is that every organization should begin to measure the components of intellectual capital because they are a source of competitive advantage. Having control over these intangible assets allows control internal security on the one hand and effective external communication.

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