Intelectual capital (IC) models – a comparative approach

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INTELLECTUAL CAPITAL (IC) MODELS – A COMPARATIVE APPROACH

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Abstract: *This paper presents a comparative analysis of some intellectual capital models. The analysis is based on four criteria: the main concepts and classifications on which the models are based on, the analysis of functional characteristics, the analysis of operational performances, limitations.*

Keywords: intellectual capital, measurement, evaluation, models.

1. INTRODUCTION

For the comparative analysis, we propose four criteria:

1. The main concepts and classifications on which the models are based on
2. The analysis of functional characteristics
3. The analysis of operational performances
4. Limitations

The main concepts and classifications on which the models are based on are extremely important, because the interpretation of results makes sense and can lead to the formulation of relevant suggestions only in the reference system defined from the beginning.

In the second part of the analysis (the analysis of the functional characteristics), we shall distinguish between IC measurement models and IC valuation models. Most of the times, the authors do not make any distinctions

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between these two concepts, which are used interchangeable. In his book, "*Making Sense of Intellectual Capital – Designing a Method for the Valuation of Intangibles"*, Andriessen (2004) insists upon this problem, trying to clarify some confusion that exist mainly due to the embryonic stage of the field. He considers that valuation requires an object to be valued, a framework for the valuation, and a criterion that reflects the usefulness or desirability of the object. If the criterion is defined in monetary terms, then we have a financial valuation. If the framework does not include a criterion for value, but does involve a metrical scale, then the method is a measurement one (Andriessen, 2004).

Therefore, the difference between valuation and measurement is this criterion that reflects the optimal value of the object to be valued. By valuation, we establish how close to that optimal value is the object under valuation.

In order to better illustrate this difference, we are going to present a small example. One of the indicators used in the IC models developed so far for universities is the Number of articles per professor. In a typical measurement model, this indicator may be 3 articles per professor. Is this good or bad? How relevant is this information for us? A valuation model goes one step further. If we establish from the beginning that the optimal value for this indicator is four articles per professor, the indicator already tells us more. Therefore, the valuation requires also a measurement in advance. However, we may have a valuation without having a measurement in advance. We can illustrate this by using a metaphor for a famous Romanian ballad "Mioriţa": "Who has ever known / Who has seen my own / Shepherd fine to see / *Slim as a willow tree*"[3]. If the main character is slim as a willow tree, we need no measurement in advance.

By analyzing the operational performances, we try to answer to the following issue: How easy or difficult is for the model to be implemented (from the point of view of collecting and processing data) and how useful is this information for the managers and for the external stakeholders? Usually, the models that are simple from the conceptual point of view can be easily implemented, but the relevance for the various stakeholders is somehow limited. In the last part of the analysis, we shall present the limitations of each model analyzed.

[3] English translation by ***William D. Snodgrass***

2. INTELLECTUAL CAPITAL MODELS

The models we are going to analyze according to the four proposed criteria are: Market-to-Book Value, Tobin's Q Ratio, Balanced Scorecard, Sveiby's Intangible Asset Monitor and Skandia Navigator.

2.1. Market-to-Book Value

1. The market-to-book value is one of the best known measures of intangible assets. It is calculated as the difference between the market value of a firm and its book equity (Bouteiller, 2002). The market value of a firm is the price per share multiplied by the total number of shares outstanding. The book value of the firm is the difference between the assets and the liabilities. Therefore, what is left in the market value after accounting for the fixed assets must be the intangibles (Stewart, 1999).

2. It is a simple method, but it is among the few that provide a numerical value for the intellectual capital. It is therefore a valuation method.

3. This indicator can be easily computed for the companies listed on the stock exchange market. Moreover, when computed as a ratio instead of a difference, we can make year-to-year comparisons for the same company or with companies from the same industry. However, the relevance of this method for the managers is quite low (Stewart, 1999). For the external stakeholders, a high value could indicate an increased potential for the respective company.

4. There are several problems associated with this method. The price per share is influenced by factors outside the control of the management (an external perspective on the company). If the price per share had a 10% decrease in only one day, does that mean our intangible assets decreased in only one day, too? Also, the book value that is calculated depends on the national or the international standards under which the accounts have been prepared (Bouteiller, 2002), being an internal perspective on the company. Andriessen (2003) argues that these two different perspectives cannot be subtracted. As we mentioned previously, another issue refers to the usefulness of that value: how does this value help the managers or other stakeholders in their decisions regarding the company?

2.2. Tobin's Q Ratio

1. The Q Ratio compares the market value of an asset with its replacement cost and can be computed for individual assets or for the company as a whole (Stewart, 1999).

2. As with the Market-to-Book value, Tobin's Q is a valuation model.

3. Tobin's Q was not developed as a measure of intellectual capital, but can be used as one since Federal Reserve Chairman Alan Greenspan has noted that high Q and market-to-book ratios reflect the investments made in technology and human capital (Stewart, 1999). Nevertheless, besides this assertion the high Q Ratio reflect the investments in technology and human capital, there does not appear to be any empirical evidence linking Tobin's Q with any underlying cause (van den Berg, 2002).

When Q Ratio is very high (for example 2, which means that an asset is worth twice its replacement cost) the company is getting extraordinary returns on that asset. And this is a good example of the contribution of intellectual capital to the performance of the company: since you and your competitors presumably have the same fixed assets, there must be something else – people, systems, customers – that are unique and that allow you to make more money (Stewart, 1999).

Tobin's Q does not differ significantly from the market-to-book ratio, but Tobin uses the replacement cost of tangible assets instead of their book value. In this way, many of the difficulties with the market-to-book ratio are neutralized (*apud* van den Berg, 2002).

4. Tobin's Q and Market-to-Book value give an aggregate view of the intangibles at a certain moment in time; therefore their practical usefulness for the management of the company is not very significant. We believe that these two ratios show what has been quite obvious for a long time: that the accounting measures used by the companies provide the management and the other stakeholders of the company with less and less reliable information.

2.3. Balanced Scorecard

1. The Balanced Scorecard, created by Robert Norton and David Kaplan, allows managers to translate the company's mission and strategy into a comprehensive set of performance measures (Arveson, 1998; van den Berg, 2002). Norton and Kaplan describe this model as follows: "*The balanced scorecard retains traditional financial measures. But financial measures tell the story of past events, an adequate story for industrial age companies for which investments in long-term capabilities and customer relationships were not critical for success. These financial measures are inadequate, however, for guiding and evaluating the journey that information age companies must make to create future value through investment in customers, suppliers, employees, processes, technology, and innovation.*" (*apud* Arveson, 1998).

This model suggests that we look at the organization from four perspectives: the Learning and Growth Perspective, the Internal Business Processes Perspective, the Customer Perspective and the Financial Perspective. Then we should develop metrics, collect data and analyze these data from the above mentioned perspectives (van den Berg, 2002).

Over the years, Norton and Kaplan have made interesting shifts in vocabulary. In their first papers on Balanced Scorecard, they do not mention intangible assets as drivers of future performances. Instead, they use in this purpose the concept of core competencies. In the last years, however, they use more and more often the IC vocabulary (Andriessen, 2004).

2. Targets play an important role in this model and the improvements in the various areas are measured relative to these targets. It is therefore a valuation method.

3. Integrated software solutions have facilitated a lot the process of collecting and processing data for this model. Moreover, these integrated solutions provide help in translating the major objectives at the company level to employee level objectives, thus involving everybody in accomplishing and monitoring them. From the managers' point of view, Balanced Scorecard helps companies translate strategy into action. Moreover, the performance is not evaluated only from the financial perspective.

4. Although most of the papers published so far gave almost unconditioned support to this model, recent research questions some of the premises on which this model is based. The principal premise on which Balanced Scorecard is based is that a business strategy can be viewed as a set of hypotheses about cause-and-effect relationships. However, recent research testing the validity of the BSC's claim to be a causal model of financial performance has found mixed empirical evidence (van den Berg, 2002).

This model does not prioritize the objectives and does not offer any kind of information on how some measures taken in one area can affect performance in other areas (for example, how the investments in employees' training had an impact in the organizations' financial performances).

2.4. Sveiby's Intangible Asset Monitor

1. Sveiby uses the term intangible assets and classifies them in three categories: internal structure, external structure and individual competence. The monitor contains indicators for each of the above mentioned categories, according to four major areas: Grow/Volume, Innovate/Renew, Utilize efficiently, Minimize risk, thus resulting a 3x4 matrix. In more recent papers, the first two areas appear as one, thus resulting a 3x3 matrix. For each element of the matrix, the company will identify 1-2 relevant indicators.

2. It is an IC measurement model.

3. As with the BS, this model can be integrated in the company's informatic systems, therefore facilitating the collection and processing of data. For the external structure, several stakeholders are taken into consideration, thus increasing the relevance for managers. The managers will select the indicators according to the company strategic priorities (Kok, 2006), thus increasing the effectiveness of the model.

4**.** Sveiby's IAM offers a static perspective on the organizational intellectual capital. Moreover, being a measurement method, it does not present the status of the company in comparison with an ideal, pre-established state. However, comparisons can be made on yearly basis for the same company. As the indicators are company specific, it is complicated to make company to company comparisons.

2.5. Skandia's Intellectual Capital Navigator

1. The taxonomy provided in the Market Value Scheme, another important contribution of Edvinsson and his team, is widely used by those interested in the field of intellectual capital. The total Market Value of a firm is composed by its Financial Capital and its Intellectual Capital. The Intellectual Capital is made by Human and Structural Capital. The Structural Capital at its turn is made by Customer and Organizational Capital. The Organizational Capital is Innovation Capital plus Process Capital. Skandia's IC Navigator has five areas of focus: Customer, Human, Process, Renewal and Development and Financial, providing a holistic view of the organization.

2. It is one of the best known models of IC measurement.

3. Edvinsson work contributed extensively to IC measurement (Andriessen, 2004). The Skandia example is probably the most cited model in the literature.

According to the five areas of focus, each company needs to develop its own list of indicators, starting from the vision and mission of the company. Edvinsson and Malone (1997) present a list of indicators used at Skandia, which comprises more than 160 indicators. They shorten the list to 111 indicators, which can be applied, according to the authors, in any organization (Andriessen, 2004). The intellectual capital of the organization is computed following the formula IC=*i*C, where i is an efficiency coefficient computed with the help of 9 indicators, and C is an absolute monetary value, computed with the help of 21 indicators (van den Berg, 2002; Andriessen, 2004). Complementing indicators with narratives and sketches are a plus to managers and other various stakeholders.

4. Although the authors claim that this instrument will help a company "navigate towards the future", things are a little bit different in reality. The indicators show where the company is, and not where it needs to get. It is a positioning instrument rather than a navigating one (Andriessen, 2004).

As with other measurement models, we cannot tell whether a certain value for an indicator is good, very good, as we do not have some optimal values in order to make comparisons. Moreover, there are no elements that can help us clarify some cause-effect relationships. We might notice problems in some areas, but this

instrument does not contribute to identify the causes to the problems (Andriessen, 2004).

3. CONCLUSIONS

The number of IC models in continuously increasing, due to the attention given to this field by more and more business people and academics and to the difficulty of finding an appropriate method. All the models developed so far may have weaknesses, but provide companies with new perspectives. In this paper we propose four criteria for analyzing some existing models: the main concepts and classifications on which the models are based on, the analysis of functional characteristics, the analysis of operational performances, limitations.

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