

Intellectual Capital and Intangible Assets Analysis and Valuation

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***Abstract.** Today the intellectual capital is a key factor in company's profitability. Two major forces have driven the high performance workplace over the past two decades: globalization and increasing in technological changes. In this environment, the intellectual capital and intangible assets is fundamental to success. In the new economic competition, knowledge assets provide a sustainable competitive advantage. The measurement is fundamental to support management decision in allocation investment and investor's decision regarding the value versus price. In our research we consider a group of Romanian listed companies on Bucharest Stock Exchange and analyze the importance of intangible value into the total market value of the equity. From accounting point of view the importance of intangible assets is very low but from the market evidence was indicated 47% importance of intangible value in total market value for the Romanian listed companies.*

Key words: intellectual capital; intangible assets; analysis and valuation; valuation methods.

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1. Introduction

Intellectual capital 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.

Bontis (1998) defines intangible resources as the factors other than financial and physical assets that contribute to the value-generating processes of a company and are under its control.

Today the intellectual capital and intangible assets are the key factor in company's profitability and success. In actual economic competition there are two major trends:

1) Globalisation is probably the most important force affecting the contemporary world: people, cities, companies, markets, economies etc. In this context there are new opportunities (or threats) for businesses:

a) *New markets.* Today cross border activities and transactions are commonplace. The internationalisation of finance processes or geographical decentralization of production continues to grow ("des-industrialization of the West").

b) *New products and new services.* Increasing flows of peoples and ideas across space, development of multinational corporations etc. affect the products boundaries.

2) The second trend is the major increasing of technological change, emerging the new information and communication technologies. This has resulted in a decline in the price

information and in the rapid growth in international electronic networking.

The intangible point of view looks at the economy or individual entity as a combination of three ingredients: resources, flows and transformations of resources. Resources could be tangible, financial or intangible.

The intangible perspective stressed on resources that are not material and considered the importance of this hidden wealth for companies and the national economy.

Drucker (1993) considers that intangible assets induced a process of transformation of the society. His process has created a society in which the major resource is knowledge. In the "knowledge society" values are created not by the allocation of capital or labour but by innovation.

In accordance with Drucker (1993) there are three phases in the development toward the "knowledge economy":

1. Industrial Revolution (1750-1880), companies used knowledge to produce tools and products;

2. Production Revolution (1880-1956), companies used knowledge to improve labour processes;

3. Management Revolution (after 1945), companies use knowledge to improve knowledge.

2. Intellectual capital definition

In the 1990s was developed the concept of intellectual capital, when people realized that two problems regarding the company's management

and valuation are only two sides of the same coin:

- what you want to manage you have to measure;
- what you can measure you could manage.

Intellectual Capital represents the fusion between these two streams of thought (Roos et al., 1997).

Today the (intangible) economy is based on intellectual capital and the prime commodities are knowledge and information.

Markets of all types require information in order to function. Investors must know what sellers are offering and what is the price in comparison with value. A couple of studies observed increasing the importance of IC and intangible value 60-75% in corporate value (Lev, 2000).

On the other hand intellectual capital management has been found to be significant for the firm's long-term success. Firms managing their IC outperform other companies (Brennan, Connell, 2000).

The intellectual capital of an organization is formed by its human capital (the know-how of its employees) and by "*its structural capital (its organization and its intellectual property)*" (Encyclopédie de la gestion et du management, 1999, p. 110).

Analyzing this definition we can see that the central point of the intellectual capital theory is given by a new approach, which considers knowledge (human or organizational) as a specific resource, and even as a capital, with all

the related consequences, for the individual or for the firm. Marshall, for instance (cited by Nahapiet, 1998, p. 245), considers that "*capital consists in a great part of knowledge and organization...Knowledge is our most powerful engine of production*", this being, in fact, the economists' point of view on the issue. The management science has brought, afterwards, many contributions on the topic (Stewart, Kogut & Zander, Nonaka & Takeuchi, Spender etc.).

The emergence and fast development of the intellectual capital concept have also touched, in the most pragmatic ways, the accounting and finance fields. Therefore, it is a real challenge to measure and value the intellectual capital of a firm, especially due to the fact that financial reporting has not yet developed an accurate set of tools in order to disclose it to its beneficiaries. "*We easily admit the importance of immaterial issues, but at the same time we omit to make the efforts justified by their importance*" (du Montcel, 1997, p. 1722), this referring to accounting measurement, recognition, disclosure and normalization.

The concept has a strategic importance for the business valuation, and the specialists are looking for practical means to properly value this key element for the firm, especially in the present economic context, characterized by an increasing number of mergers and acquisitions (with two main consequences – determining the value of the business and determining the post-transaction strategy of the firm). Guillard and Roussel consider that the great loss

of the HP-Compaq titles after 2001 (a loss of value of 7.6 %, in a growth context for the market) is due to the improper management of the intellectual capital and especially of the human capital, after the '99 gigantic merger (Guillard, Roussel, 2005, p. 401).

3. The structure of intellectual capital

The roots of the intellectual capital concept run deep. The economist John Kenneth Galbraith developed the term “Intellectual Capital” in 1969 and Peter Drucker spoke about “knowledge workers”.

“Intellectual capital is intellectual material – knowledge, information, intellectual property, experience – that can be put to use to create wealth” (Stewart, 1997).

The intellectual capital of an organization is formed by its human capital (the know-how of its employees) and by its structural capital (its organization and its intellectual property).

The major components of intellectual capital are human capital (which is the potential of company’s intangible value) and intellectual assets and intangible properties.

Human capital is the knowledge residing in the heads of employees that is relevant to the purpose of the organization. A good human capital management could create intangible value for the company.

Intellectual capital and its major components

Table 1

Potential intangible value	Intangible value	
Human capital	Intellectual assets	
➤ Experience	• Programs	• Methodologies
➤ Know – How	• Invention	• Documents
	• Databases	• Drawings, Designs
➤ Skills	Intellectual property	
➤ Creativity	• Patents, Copyright	• Trademarks, Trade Secrets

In the context of business valuation it is important to understand the value of the entire company like a sum off all assets (tangible and intangible). In this context we could classify the company assets in:

a) Generic assets

This class includes things that are generally not differentiable, such as land and buildings, other fixed assets (machinery and equipments), cash, receivables, inventories etc.

b) Unique assets

Represent an unique set of assets. No other company has exact set of skills, abilities, knowledge, innovations, patents, trademarks, copyrights or secret process.

These assets are not only unique but are also difficult to duplicate. If another firm wished to duplicate them it would take a considerable amount of time and resources to do so.

c) Differentiable assets

This class of assets is often not unique. It includes assets such as manufacturing and distribution, which while similar to those found in competing firms are different in some ways from those of competitors. For example, although all companies in the steel industry have fabrication facilities, no

two are alike. They differ in size, shape, complexity, production rate, cost structure.

In the Figure 1 we present the market value of the company between the liquidation value of the generic assets and market value of generic assets plus intangible assets market value.

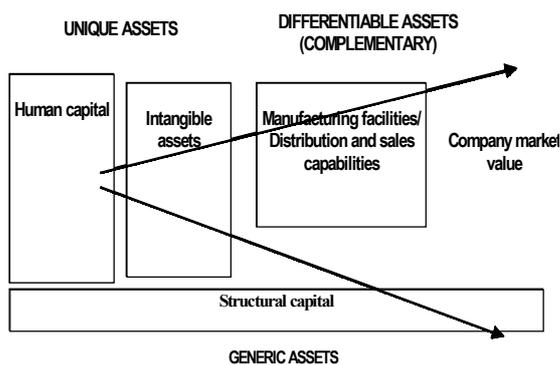


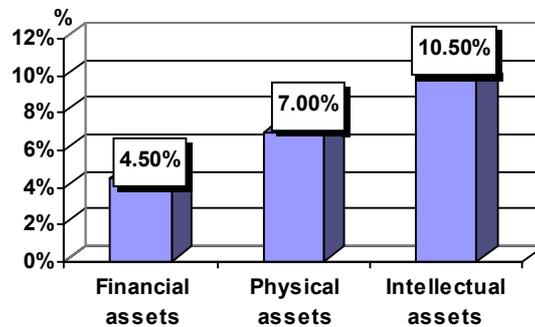
Figure 1. Assets structure of company

In the actual economic context the role of the management is to create a company value over the value of generic assets. Today the success of the company depends on the management ability to change human capital (the potential value) into an intangible assets of the company (like as brand, patent, trade secrets, copyright etc.).

4. Intellectual capital valuation. Romanian listed companies intangible value – case study

Intellectual capital valuation is a new and provocative issue in the last two decades. Today investments in intellectual assets are more profitable than investments in physical and financial assets. Based on Lev (2000) investments in intellectual assets

represent a 10.5% return in comparison with 7% return on investments in physical assets return or 4.5% return in financial assets.



Source: Baruch Lev, New York University.

Note: return on investments in financial assets is based on 10-year average return on US treasury bonds; return on investments in physical assets is based on average ROE for all companies with physical assets and inventories; return on investments in intellectual assets is based on average ROE for the computer software and biotechnology industries.

Figure 2. Average after tax returns on financial, physical and intellectual assets

In accordance with Petty and Guthrie (2000) point of view, there is no generally accepted theoretical model for understanding and measure IC. On the last 25 years several models have been developed:

Economic Value Added (EVATM)

EVATM method of value measurement has its bases in the traditional accounting. As defined by Stern Stewart, EVATM is the difference between a company's net operating income after taxes and its cost of invested capital (equity plus debt).

The goal in calculating EVATM is to arrive at earnings that are close to cash and compare with the return on invested capital.

EVA™ is not a very new concept because it is an economic term related with income and capital concepts. In 1890 the economist Alfred Marshall defined economic profit as total net gains less the interest on invested capital at the current rate.

Market Value Added (MVA™)

MVA™ method, similar to EVA™ derives from the Alfred Marshall concept of “economic profit”. MVA is the difference between actual market value of the company (invested capital) and the present value of invested capital. In other words MVA™ is the difference between “cash out” or what investors could get by selling at the present conditions of firm and market, and “cash in” or what investors contributed over the years from the beginning of the firm.

Tobin's Q Ratio

Named *Q ratio* or *q* this is the market value of invested capital relative to assets replacement cost (Tobin, 1969). The economist Tobin, a Nobel Prize winning, developed it as a measure to help predict investment decision independent on macroeconomic factors such as interest rate. Tobin's Q ratio was not developed as a measure of intellectual capital, but former Federal Reserve chairman Alan Greenspan has noted that high Q and market to book ratios reflect the value of investments in technology and human capital (Stewart, 1997).

Norton and Kaplan's Balance Score Card (BSC)

BSC was created by Robert Norton and David Kaplan to help managers to transform organization's strategy into a reliable set of performances. This will

provide the framework for a strategic measurement and management system. The BSC was developed considering the ability of a company to mobilize and develop its intangible assets.

BSC suggests a view of the firm from four perspectives: Customer, Financial, Internal Business Process and Learning plus Growth (Kaplan and Norton, 1996).

Skandia's IC Navigator

The IC navigator was developed by the Edvinsson and Malone into a Swedish financial services firm named Skandia (Edvinsson, Malone, 1997).

The presumption in this method was that the difference between market and book value of the company represent the value of intellectual capital.

The concept in Skandia IC Navigator was that the market value of a company is equal with Financial Capital plus Intellectual Capital.

Market Value = Financial Capital + Intellectual Capital

Market Value = Financial Capital + (Human Capital + Structural Capital)

Sveiby's Intangible Assets Monitor (SIAM)

Sveiby considers that financial statements are not a good measure of a company's wealth and most of the value of a firm is in “invisible knowledge-based assets”.

In accordance with Sveiby, the market value of a company consists of its visible equity and three kinds of intangible assets (Sveiby, 1997).

The visible equity is represented by the book value of the assets and intangible assets are:

- external structure: brands, customer relations;
- knowledge capital: internal structure with management system, legal structure, R&D, software etc.;
- knowledge capital: individual competences with education and experience of the people from the firm.

The Brooking Methodology

Brooking (1998) developed a model to consider the value of the IC belonging to a company.

In accordance with Brooking point of view the components of intellectual capital are:

- market assets: brands, distribution channel, customers relationship;
- intellectual property: copyrights, patents, trade secrets, etc.;
- human centred assets: education and work related knowledge and competences;
- infrastructure assets: management processes, networking, information system.

MVA, EVA and Tobin Q Ratio do not directly measure IC, they were response to the fact that book value of assets of the firm was lacking in valuable information. For our research purpose will calculate Tobin Q ratio and also the

gap between market value and asset value (similar with MVATM methodology).

For analysing the Romanian listed companies intangible value we considered a sample with 14 Romanian listed companies. There are the major Romanian firms with the following illustrative figures for the period 2004-2005:

Data for 14 Romanian listed companies sample

Table 2

mil.Euro

Indicator	2004	2005	%
Total assets	8.716	13.175	51,2%
Total equity	4.165	5.910	41,9%
Operating revenues	3.074	4.034	31,2%
Profit Before Tax	82	770	841,6%
Market value (capitalization)	5.604	11.003	94,9%

Note: values in Euro based on average exchange rate (flow indicators) and end of the year exchange rate (stock indicators)

Our research follows two major objectives:

1. If the book value of intangible assets is important considering the financial reports for sample companies;
2. If the intangible value is important or if the market value exceed the net asset book value (Tobin Q ratio).

Considering the first issue we observe that the importance of intangible assets book value was very low and with a decreasing trend: from 0.4% intangible asset value in 2004 to 0.2% in 2005.

Intangible value ratio

Table 3

mil. Euro

Indicator	2004	2005	%
1. Intangible assets book value (sample figures), mil.Euro	135	32	-76.3%
2. Intangible/ Total assets value	0.4%	0.2%	-50.0%
3. Total equity market value (capitalization)	5.604	11.003	94.9%
4. Net asset (book value)	4.256	5.810	36.5%
5. Indicated intangible value (not recorded in balance sheet)	1.348	5.193	274.0%
6. Indicated intangible value/equity market value	24%	47%	91.8%
7. Tobin Q (Market Value/Asset Value)	1.33	1.89	42.8%

Considering the companies from the sample we observed a decreasing in book value of intangibles from 135 to 32 mil. Euro.

The maximum value of this ratio is 2.9% in case of BRD Company which acquired bank software in 2004. After that, because of amortization, the intangible value of BRD dropped from 340 mil. RON (2004) at around 30 mil. RON (2005).

The minimum value of this ratio is 0% in case of SIF Oltenia in 2004.

In this case it's obvious that from accounting point of view that Romanian listed companies has a small intangible book value. We consider this is due to internal creation of intangible value, and in this case, in accordance with IAS 38 – Intangible assets the company will not record the intangible value.

The second question was related with the existence of intangible value in the total market value of the companies.

We estimate the market value of the equity like average price multiply with number of share issued by the company and after that we deduct the book value of net assets. The difference represent indicated intangible value not recorded in the balance sheet.

Considering data from the sample we have the follow conclusions:

- The market value of the equity (14 companies) increasing with 95% in 2004-2005, from 5.604 mil. Euro to 11,013 mil. Euro;
- The book value of assets (most of them tangible assets) increasing with 37% in 2004-2005, from 4,256 mil. Euro to 5,810 mil. Euro;

- Indicated intangible value is the difference between total equity market value and net assets book value and recorded a large increase from 1,348 mil. Euro in 2004 to 5,193 mil. Euro in 2005;
- The average indicated intangible value growing up from 24% to 47% in equity market value.

The figures from the table 3 help as to observe increasing the gap between the market value of the equity and net asset value in case of the Listed Romanian companies. This is a trend that explains increasing in the importance of intangible value near the value reported for other developed markets (average intangible value is 60-75% in accordance with Lev 2002).

On the other hand there is a small amount of intangible value recorded in the financial reports. We consider that is because of undeveloped market in terms of mergers and acquisitions operations. In accordance with IAS 38 – Intangible Assets and IFRS 3 – Business Combination when intangible assets were internal created could be recorded only when are confirmed by a transaction (merger or acquisition).

5. Conclusions. Further research

In the new economic competition, knowledge assets provide a sustainable competitive advantage. The measurement is fundamental to support management decision in allocation investment and the investor's decision regarding the value *versus* price.

In our research we considered a group of 14 Romanian listed companies and we have trying to understand the importance of intangible value into total market value of the equity.

From accounting point of view the importance of intangible assets is very low (only 0.2% intangible asset in total assets value in 2005).

From the market evidence there is an important gap between market value of equity and the accounting indicated importance of intangible value. Based on our sample the intangible value in total market value is near the figures reported

in different research studies for developed countries (47% in 2005 for the Romanian companies versus 60-75% in developed economies).

The trend of the growing importance of intangible resources is obvious. The intellectual capital community and also the financial and accounting community are the movements than can explore this uncharted territory. Possible further intellectual capital research: measuring the value of intellectual capital, describing and explaining the company's success from the IC perspective, methods to diagnose firms problems using IC perspective etc.

References

- Andriessen, D. (2004). *Making Sense of Intellectual Capital*, Elsevier Inc
- Brennan, N., Connell, B., „Intellectual Capital: current issues and policy implications”, *Journal of Intellectual Capital*, 1(3), 2000
- Bontis, N., “Intellectual Capital: an exploratory study that developes measures and models”, *Management decisions*, no. 36, 1998, pp. 63-76
- Brooking, A. (1998). *Intellectual Capital: core asset for the Third Millenium Enterprise*, International Thomson Business Press, London
- Copeland, T. et al. (1990). *Valuation: measuring and managing the value of companies*, John Willey & Sons, New York
- Drucker, P.(2003). *Post-capitalist society*, New York: Harper Business
- Edvinson, L, Malone, M. (1997). *Intellectual Capital: realizong your company's true value by finding its hidden brainpower*, Harper business, New York
- Lev, B., “New accounting for new economy”, 2000, *available at www.stern.nyu.edu/~blev/*
- Lev, B. (2002). *Respons to your questions concerning my testimony before your committee*, New York University, Leonard Stern School of Business
- du Montcel, H.T.(1997). *Investissement immatériel*, Encyclopédie de gestion, Economica, Paris
- Nahapiet, J., Ghosal, S., “Social Capital, Intellectual Capital, and the Organizational Advantage”, *The Academy of Management Review*, Vol. 23, No. 2 (Apr. 1998), pp. 242-266
- Nakamura, L. (2003). *A trillion dollar a year investment and the New York Economy*, in *Intangible Assets: values, measures and risks*, New York: Oxford University Press
- Petty, R., Guthrie, J., “Intellectual Capital literature review: Measurement, reporting and management”, *Journal of Intellectual Capital*, Vol. 1(2), 2000

- Reilly, R., Scweihs, R. (1999). *Valuing Intangible Assets*, Mc Graw-Hill, New York
- Roos, J. et al. (1997). *Intellectual Capital. Navigating the new business lanscape*, Mcmillan Business, London
- Stan, S., Anghel, I. et al. (2006). *Capitalul intelectual al întreprinderii*”, IROVAL, București
- Stewart, Th. (2001). *The Wealth of Knowledge, Currency Doubleday*, New York
- Stewart, Th., “Intellectual Capital: The New Wealth of Organization”, *Currency Doubleday*, 1997, New York
- Sveiby, K., “Methods for measuring intangible assets”, 2002, available at www.sveiby.com/articles/IntangibleMethods.htm
- Tobin, J. “A General equilibrium approach to monetary theory”, *Journal of Money, Credit and Banking*, Vol. 1(1), 1969
- *** International Valuation Standard Committee (2007), *GN 4 – Intangible assets*, available at www.ivsc.org
- *** International Accounting Standard Committee (2005), *IAS 38 – Intangible Assets, IFRS 3 – Business Combination*, available at www.iasc.org.uk

The list of analysed companies

Name	ALRO SLATINA	ANTIBIOTICE IASI	BANCA COMERCIALA CARPATICA SIBIU	SC BIOFARM SA
Symbol	ALR	ATB	BCC	BIO
Industry	Metal	Health	Financial	Medical
Fiscal Code	1515374	R1973096	R11447021	R341563
Web address	www.alro.ro	www.antibiotice.ro	www.carpatica.ro	www.biofarm.ro

Name	BRD - Groupe Societe Generale Bucuresti	IMPACT BUCURESTI	OTELINOX TARGOVISTE	OLTCHIM RM VALCEA
Symbol	BRD	IMP	INX	OLT
Industry	Financial	Construction	steel	Chemical
Fiscal Code	361579	1553483	921641	1475261
Web address	www.brd.ro	www.impactsa.ro	www.otelinox.ro	www.oltchim.ro

Name	SIF BANAT CRISANA ARAD	SIF MOLDOVA BACAU	SIF TRANSILVANIA BRASOV	SIF MUNTENIA BUCURESTI
Symbol	SIF1	SIF2	SIF3	SIF4
Industry	Financial services	Financial services	Financial services	Financial services
Fiscal Code	2761040	2816642	3047687	3168735
Web address	www.banat-crisana.com	www.sifm.ro	www.transif.ro	www.sifmuntenia.ro

Name	SIF OLTENIA CRAIOVA	SC PETROM SA
Symbol	SIF5	SNP
Industry	Financial services	Oil
Fiscal Code	4175676	1590082
Web address	www.sifolt.ro	www.petrom.ro