INTANGIBLE ASSETS AND STOCK PRICES OF JORDANIAN COMPANIES: AN EMPIRICAL ANALYSIS

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ABSTRACT

The paper is devoted to the question of Valuation of Intangible Assets (IA) of the companies of Jordan and its role in the value creation. The main research objective is to define the impact of fundamental value of both tangible and intangible assets of a company on market value of its assets. As a general approach, the method based on residual operating income (REOI) model as a variant of fundamental value of equity model is used herein for IA evaluation. Developed econometric model is tested on the data of Jordanian companies which are listed on Amman Stock Exchange respectively. In the focus of the research there is both the analysis of the sampled companies as a whole as well as divided into three aggregated sectors: Financial sector, Services sector and Industrial sector. The main directions for further research in this field are outlined.

Keywords: *Intangible Assets, Intellectual Capital, Valuation, Residual Operating Income, Fundamental Value.*

1. Introduction

Rapid technological advancement, deregulation and globalization have forced companies to go through the process of reinventing. That means that they should develop new advantages while undermining strategic advantages of their competitors within an increasingly intensive competitive environment.

Research in the field of intellectual capital (IC) involves the finding for "understanding the roots of a company's value, the measurement of the hidden dynamic factors that underlie the visible company…" [Edvinsson, Malone, 1997, p.11]. In today's knowledge-based economy, two of the most important "hidden dynamic factors" in an organization are knowledge and knowhow which are created by and stored in its people (human capital), relations (relationship capital) and organizational information technology systems and processes (organizational capital). The main findings of IC research suggest that it is the leveraging of these three components that allow an organization to create and sustain a competitive advantage [Edvinsson, Malone, 1997; Stewart, 1997; Stam 2010].

The issue of IA contribution to increasing a company's value has been raised by many researchers. [Edvinsson, Malone, 1997, p. 11] stated that analyzing a company's intellectual capital helps seeing the "roots of company value creation". [Lev, 2003] continuously stresses that intangible assets are "major drivers of company growth and value in most economy sectors".

Practical research does prove the idea.
As [Kozyrev, Makarov, 2003, p. 59] point out, "…according to Charles Handy, the value of a corporation's intellectual capital is usually three to four times bigger than all its tangible assets. In 1996, L. Edvinsson already considered that data outdated. He estimated that the ratio for most companies at 5:1 up to 16:1. In 1996–2001, the importance of intellectual capital was still growing. In other words, value of contemporary companies is mostly defined by their IC".

The growing importance of IA is well illustrated by Interbrand's research represented in [Doyle, 2000, p.298]. The research positively proves that for contemporary companies, a major source of prosperity and most important resource is neither physical capital nor material assets—it is the intellectual capital.
The increasing gap between market and book value of companies spurred reflections on the importance of intangible assets and the way they are measured.

Planning to achieve a certain goal, management must assess company's current state, determine the gap between it and the desired future state, and finally form a sequence of actions needed to address this gap what again proves the actuality of this paper. A company can develop not only investment strategies, but strategies of increasing production, strategic M&A with the knowledge about intangible assets.

The author of the paper aims to make one of the first attempts to make the extensive summary on application of REOI model on Jordanian companies, providing the information on various aspects of the analysis and its interpretation and extracting the key findings. In this article the main objective of the research is to define the impact of fundamental value of both tangible and intangible assets on the market value of assets.The conclusions will be made both on the whole sample of the companies under consideration, as well as from the point of their belonging to a certain field.

The structure of the paper is the following. First the main approached to definition of the main concepts are introduced, then the method which is chosen for evaluation Intangible Assets in the paper is represented

(method of Calculated Intangible Value), the research model the main hypothesis are formulated with providing statistical information about the sample. At the end of the paper the main results and directions for further research are highlighted.

2. The approaches to intangible assets and intellectual capital definition

There exist various approaches to defining the *Intangibles*, *Intangible Assets* and *Intellectual Capital*. Some authors consider these terms to be synonyms, while the others still separate them from each other. Apart from that, a number of authors do not offer any definition, but only separate the basic components, being a part of the concepts referred above. Without claiming the completeness, lets us examine the basic approaches to defining Intangible Assets and Intellectual Capital. At that, we shall firstly give the approaches to the definitions of the concepts, and afterwards consider the composition and structure of Intangible Assets (Intellectual Capital).

According to the opinion of B. Lev, to which the authors of this paper subscribe, the terms Intangible Assets, Knowledge Assets and Intellectual Capital are interchangeable owing to the fact that all three terms are "widely used: Intangible Assets in accounting literature, Knowledge Assets – by economists, Intellectual Capital – in management and law literature; and on the whole they come to the same: to the future benefits that are not embodied materially" [Lev, 2003].

Hence, Intangible Assets, or Intellectual Capital, are defined by B.Lev as "non-physical sources of value (claims to future benefits) generated by innovation (discovery), unique organizational designs, or human resource practices". Intangible Assets, as defined in [Lönnqvist, Mettänen, 2002], are non-material sources of creating a company's value, based on the employees capabilities, organizations' resources, the way of operating and relations with the shareholders. In [Lönnqvist, Mettänen, 2002], as in [Lev, 2003], the terms *Intellectual Capital* and *Intangible Assets* are suggested for interchangeable usage.
In [Starovic, Marr, 2003], a widespread approach is described, under which Intellectual Capital (or Intangibles) is a broader concept than Intangible Assets. In this sense, Intangible Assets are only a part of Intellectual Capital acknowledged as the assets in a company's bookkeeping and accounting records.

The authors assume that narrowing of the Intangible Assets concept only to the assets acknowledged in accounting is unjustified. Such opinion is a result of confusing two different problems. Firstly, what an asset is in general, and secondly, which assets can be acknowledged in accounting and which can not. In view of the fact that under the asset is basically understood any possible future economic benefit, obtained and controlled by a company, as a result of past transactions and events, then all the elements (tangible or intangible) coming within the above definition appear to be a company's assets.
It is quite another matter, if these elements match the criteria of recognition in bookkeeping and accounting or not. Thus, according to [IFAC 38], "intangible asset is an identifiable non-financial asset, having no physical form and serving for production usage or for providing the goods or services, for leasing to others or for administrative purposes." The Russian accounting standards [PBU 14/2000] supplement the enumerated criteria with a range of conditions for "recognition assets by accounting and bookkeeping as intangible".
Thus, the authors' position may be summarized as follows. Any asset, belonging to a company or controlled by it, having no physical or financial (in case of financial investment) form, but capable of producing future economic benefits is an Intangible Asset. The aggregate of Intangible Assets of a company may also be named Intellectual Capital, or Intangibles. At the same time, two subgroups should be distinguished within Intangible Assets: *recognized Intangible Assets* and *non-recognized Intangible Assets* in bookkeeping and accounting

3.   Evaluation of intangible assets: The method of calculated intangible value

The Intangible Assets evaluation problem is immensely complicated and disputable. Apart from the specific character of the evaluated subject (its intangibility), the difficulty of the problem is connected with the fact that in this case the evaluation models do not only give the numerical evaluation, but also in a certain way determine the essence of the evaluated subject. But it is clear that the problem is really important in the century of knowledge-based economy when IA have become the most important resources for a company and when they need to be managed in the best way.

A great number of papers are devoted to the problem of Intangible Assets evaluation. The reviews of various approaches to this kind of assets evaluation are presented in the works of [Andriessen, Tiessen, 2000; Bontis, 2001; Luthy, 1998; Petty, Guthrie, 2000; Sveiby, 2002; Hang, Chang, 2008]. Besides, some Russian researchers also develop the above problem in their works [Kozyrev, Makarov, 2003; Bukhvalov 2004a; 2004b]. The task of this paper does not include the detailed analysis of all existing approaches; therefore we have chosen only one approach for this purpose.

As a general approach used herein for IA evaluation, we have chosen the method of *Calculated Intangible Value (CIV)* offered by T. Stewart [Stewart, 1995]. According to CIV, intangible value of a company is determined as a difference between the company's value (which, in its turn, is determined by the book value of the company's assets and discounted flow of residual operating income) and the possessed value of its tangible assets (determined by the book value of these assets and discounted flow of residual earnings using the average industrial rate of return). This difference characterizes the company's capability to use the Intangible Assets in order to "outrun" the competitors in the industry [Tan et al., 2007].

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This method was chosen due to several reasons. First of all, the method offers $-valuations, what is very useful when the main objective of the paper is to calculate the influence of IA on stock market valuations. This method can also be used for comparisons between companies within the same industry and it is good for illustrating the financial value of Intangible assets, a feature, which tends to get the attention of the CEOs. Finally, because this method is build on long established accounting rules it is easily communicated in the accounting profession.

The calculation of Intangible Assets value in accordance with the chosen valuation method (CIV) is based on the residual operating income (REOI) model as a variant of fundamental value of equity model. *Residual operating income* is a net operating income of a company after cost deduction on all company's capital. In this case investments mean book value of net assets (*NA*) of a company. Consequently, we take here the value of net operating income for the income, i.e. the value of income before interest but after taxes (or earnings before interest – *EBI*) and we take the rate of weighed average cost of all capital (*WACC*) — k_w for the required return.

As mentioned above, the basis for valuation in this paper is the REOI model:

$$V_E^{REOI_J} = E_0^{BV} + \sum_{J=1}^{\infty} \frac{REOI_J}{(1+k_W)^J} = \left[NA_O^{BV} + \sum_{J=1}^{\infty} \frac{REOI_J}{(1+k_W)^J} \right] - D_0 \qquad (1)$$

Where V_E^{REOI} — the fundamental value of equity according to the REOI model;

E_0^{BV}, NA_O^{BV} , D_0 — book value of equity, net assets and debt at the moment (respectively);

$REOI_J$ — residual operating income in year *j*. REOI variant is EVA (economic added value);

k_W — weighted average cost of capital (*WACC*)

The value in square brackets in the formula (1) is a fundamental value of assets according to the REOI model (V_A):

$$V_A^{REOI_J} = NA_O^{BV} + \sum_{J=1}^{\infty} \frac{REOI_J}{(1 + k_W)^J} \tag{2}$$

In technical annex at the end of the paper all assumptions and formula transformations are represented in order to obtain fundamental values of all assets in general and tangible and intangible assets in particular.

The fundamental value of assets formula may be presented as:

$$V_A^{REOI_J} = NA_T^{BV} + \frac{REOI}{k_W} = \left[NA_O^{BV} + \frac{REOI_T}{k_W}\right] + \left[\frac{REOI_I}{k_W}\right] = V_T + V_I \tag{3}$$

Where fundamental value of a company's assets can be divided into the fundamental value of tangible assets (V_T) and intangible assets (V_I) as follows:

$$(a) \quad V_T^{REOI} = NA_T^{BV} + \frac{NA_T^{BV} \times (RONA_{LAVG} - k_w)}{k_w} =$$
$$= NA_T^{BV} \times \left(1 \frac{RONA_{LAVG} - k_w}{k_w}\right) = NA_T^{BV} \times \frac{RONA_{LAVG}}{k_w} \tag{4}$$

$$(b) \quad V_I^{REOI} = \frac{REOI_J}{k_W} = NA_T^{BV} \times \frac{RONA - RONA_{LAVG}}{k_W} \tag{5}$$

4. Technical annex

In this annex all the assumptions and formulas transformation are presented for obtaining fundamental values of tangible and intangible assets.

Here, the residual operating income equals the residual earnings after deducting the cost of invested capital:

$$REOI_J = NOPAT_j - k_W \times NA_{j-1}^{BV} \tag{6}$$

Where NOPAT   — net operating profit after taxes (also *EBI – earnings before interest*), calculated according to the formula:

NOPAT=NI+i× *(1-t)*
Where NI— net income
i— interest
t— income tax rate according to the income statement

If in expression formula (2) we presume that *REOI* value is constant within infinite research period, (*REOI = const*), then model (2) may be presented as:

$$V_A^{REOIJ} = NA_O^{BV} + \frac{REOI}{k_W}$$ (7)

The made assumption complies with the allowance of linear information dynamics (*LID*) that has been formulated by J.Ohlson [Ohlson, 1995]. *LID* is defined as the linear stochastic process, expressing time changes and correlation of accounting and non-accounting variables. *LID* gives forecast for future expected residual earnings value, resting on the actual value of accounting variables and other information at present time.

Let us divide the book value of net assets into two constituents: tangible assets (*NAT*) and intangible assets (*NAI*). The upper index *BV* means that the assets are taken according to their book value:

$$NA^{BV} = NA_T^{BV} + NA_I^{BV}$$ (8)

Let us presume that intangible assets are not reflected in the balance sheet at all, or their part in the book value is small enough to be neglected. Then, expression (8) transforms as follows:

$$NA^{BV} = NA_T^{BV}$$ (8a)

If we accept the above presumption (8a), model (7) turns into:

$$V_A^{REOIJ} = NA_T^{BV} + \frac{REOI}{k_W}$$ (9)

Hence, the *REOI* defines the effect obtained by a company from both tangible and intangible assets. The main problem lies in dividing the general effect into constituent factors. In order to solve the problem, we shall set up the following interconnected assumptions.

Assumption 1.The companies referring to the same industry are characterized by approximately similar structure of assets. Therefore we may presume that one monetary unit invested into tangible assets gives the same return throughout all the companies of the industry.

Assumption 2.The intra-branch differences in return of companies are explained only by exclusive intangible assets of each company.
If to accept the mentioned assumptions, then:
- The return on tangible assets is the same for all companies and equals the average industry return rate;
- The return on intangible assets is the difference between the actual return of a company and average return in industry. In this sense, the effect of intangible assets on general return rate may be either positive (if a company's return rate prevails the average industry return rate), or negative (if opposite).

From the above, we draw two principal conclusions:

- The fundamental value of a company's equity may be either positive or zero (if the average industry return is larger than or equals null);
- The fundamental value of intangible assets may be either positive or negative, if the average industry return is non-negative.

Accepting the above presumptions, we shall distinguish in the REOI model the effects induced by tangible and intangible assets. For that, we shall re-arrange the expression (7) taking into account the presumption (8a) as follows:

$$REOI = NOPAT - k_W \times NA_T^{BV} \pm RONA_{LAVG} \times NA_T^{BV} \qquad (10)$$

Where $RONA_{LAVG}$— industry average return on net assets.

In the result of the re-arrangement we get:

$$REOI = [NOPAT - RONA_{LAVG}k_W \times NA_T^{BV}] + [RONA_{LAVG} \times NA_T^{BV} - k_W \times NA_T^{BV}] \qquad (11)$$

Granting (7) ,equation (11) may be written as follows:

$$REOI = [NA_T^{BV} \times (RONA - RONA_{LAVG})] + [NA_T^{BV} \times (RONA_{LAVG} - k_W)] \qquad (12)$$

The expression in the first square brackets of formula (11a) may be interpreted as residual operational income generated by intangible assets ($REOI_I$); the expression in the second square brackets – as residual operational income generated by tangible assets ($REOI_T$):

$$REOI_I = [NA_T^{BV} \times (RONA - RONA_{LAVG})] \qquad (13)$$

$$REOI_T = NA_T^{BV} \times (RONA_{LAVG} - k_W) \qquad (13a)$$

5. Statistical Information

The research uses the above discussed method (REOI) to evaluate the calculation of intangible capital of all the companies listed at Amman Stock Exchange. There were a total of 243 companies listed at Amman Stock Exchange on 31st December 2012. The companies have been divided into three main sectors representing various industries. The three sectors are: Financial sector, Services sector and Industrial sector.Financial sector consists a total of 112 companies i.e. Banks(15), Insurance companies (27), Diversified Financial Service companies (35), and Real Estate(35).Services sector includes a total of 58 companies which are: Health care (4),Educational services (6),Hotel and Tourism (12), Transportation (13), Technology and Communication (2), Media (2),Utility and Energy (4), and Commercial Services Companies (15).The Industrial   Sector comprises of 73 which includes ;Pharmaceutical and Medical companies (6),Chemical companies(11),Paper and cardboard (3), Printing and Packaging (2),Food and Beverages (11),Tobacco and Cigarettes(2),Mining and Extraction (17), Engineering and Construction (9),Electrical companies (4),Textiles, Leathers and Clothing (6), and Glass and Ceramic (2).For the research we have used the financial data from the Amman Stock Exchange(www.ammanstockexchange.com) for the last three years;2010,2011,2012.The Tax rate was 25% applicable to the Banks and 15% for the rest. A discount rate of 10% was taken for all the companies. The sector wise results are presented in the Tabular form.

Table 1.The results of testing the model (M4) in Financial Sector

($ million)

Industries	Tax Rate	Discount Rate	$RONA_{LAVG}$	RONA	V_A^{REOIJ}	V_T^{REOI}	V_I^{REOI}	Ratio
Banks	25%	10%	0.55%	1.09%	789	528	261	33%
Insurance	15%	10%	0.56%	0.95%	12.50	8.76	3.74	30%
Diversified Financial Services	15%	10%	0.44%	3.52%	13.82	7.36	6.46	46%
Real Estate	15%	10%	1.11%	2.46%	17.51	11.18	6.13	35%
Total					832.83	555.3	277.53	33%

Table 1 shows the total valuation, both of tangible and intangible assets and their ratio categorised in Financial sector. This sector epitomizes the highest number (112) of companies at ASE. Data was collected from all the companies and was sub-grouped into four industries. Banks are on the top as it has intangible assets of about $261 million which is highest amongst all the firms in the Jordan. Real Estate has got the highest average industry ROA(return on net assets) i.e.1.11% .Banks pay the highest tax (25%) among all the companies. The result of REOI valuation found that the Financial sector is having a total of $832.83 million assets of which $277.53 million is intangible assets that is around 33% of total assets that is the highest amongst all the sectors.

Insurance companies had a total of $12.50 million assets of which $3.74 million are intangible. The Diversified Financial Services possesses about $13.82 total assets of which $6.46 million are intangible assets i.e. about 46%, which indicates that Diversified Financial firms are investing more in the creation of intangible assets as compared to other firms in the Financial sector. Real Estate has a total of $17.51 million assets of which $6.13 million are intangible assets.

Table 2.The results of testing the model (M4) in Services Sector

($ million)

Industries	Tax Rate	Discount Rate	$RONA_{LAVG}$	RONA	V_A^{REOIJ}	V_T^{REOI}	V_I^{REOI}	Ratio
Health Care Services	15%	10%	1.79%	2.27%	1.30	1.05	0.25	19%
Educational Services	15%	10%	8.57%	11.93%	4.60	3.59	1.01	21%
Hotels and Tourism	15%	10%	1.41%	2.66%	13.1	8.94	4.16	31%
Transportation	15%	10%	2.33%	6.50%	16.89	10.29	6.60	39%
Technology and Communication	15%	10%	8.29%	12.47%	14.45	10.82	3.63	25%
Media	15%	10%	0.94%	1.26%	1.44	1.15	0.29	20%
Utilities and Energy	15%	10%	1.13%	3.93%	31.36	18.32	13.04	42%
Commercial Services	15%	10%	1.58%	2.30%	8.9	6.8	2.1	23%
Total					92.04	60.96	31.08	34%

Table 2 shows the total valuation, both of tangible and intangible assets and their ratio categorised in Services sector of Jordanian economy. There are a total of 58 firms in this sector which are grouped into 8 industries; Health care ,Educational services ,Hotel and Tourism , Transportation , Technology and Communication , Media ,Utility and Energy , and Commercial Services Companies. Utility and Energy firms have the highest intangible assets $13.04 million which is about 42% of its total assets followed by the Transportation ($6.60 million) . Educational services has got the highest industry ROA which is 8.57% followed by Technology and Communication (8.29%) and Transportation(2.33%).All the eight industries are required to pay 14% tax. The total assets $\left(V_A^{REOIJ} \right)$ of the services sector stood at $92.04 million of which $60.96 million is tangible (V_T^{REOI}) and $31.08 million is intangible (V_I^{REOI}) that is about 34% of total assets.

   The intangible assets of Health care were $0.25 million and Educational services $1.01 million. Hotel and Tourism had $4.16 million intangible assets followed by Technology and Communication ($3.63 million), Commercial services ($2.1 million) and Media (0.29). These industries are required to invest more in their intangible assets as they play an important role in the long term survival of an organization.

Table 3.The results of testing the model (M4) in Financial Sector

($ million)

Industries	Tax Rate	Discount Rate	$RONA_{LAVG}$	$RONA$	$V_A^{REOI_J}$	V_T^{REOI}	V_I^{REOI}	Ratio
Pharmaceutical and Medical companies	15%	10%	1.02%	2.45%	5.30	3.35	1.95	36%
Chemical companies	15%	10%	2.21%	3.62%	1.32	0.95	0.37	28%
Paper and cardboard	15%	10%	4.53%	6.42	1.22	.82	0.40	33%
Printing and Packaging	15%	10%	3.67%	5.70%	2.46	1.64	0.82	33%
,Food and Beverages	15%	10%	1.43%	2.37%	6.19	4.2	1.99	32%
Tobacco and Cigarettes	15%	10%	8.96%	13.54%	3.5	2.1	1.4	40%
Mining and Extraction	15%	10%	9.46%	13.67%	58	43.21	14.79	25%
Engineering and Construction	15%	10%	0.17%	0.23%	8.21	5.34	2.87	34%
Electrical companies	15%	10%	2.13%	3.34%	4.67	2.83	1.84	39%
Textiles, Leathers and Clothing	15%	10%	2.17%	3.43%	5.84	4.24	1.6	27%
Glass and Ceramic	15%	10%	8.34%	13.32%	1.34	0.96	0.38	28%
Total					98.05	69.64	28.41	29%

Table 3 shows the total valuation, both of tangible and intangible assets and their ratio categorised Industrial sector of Jordanian economy. There are a total of 73 firms in this sector which are grouped into 11 industries. Mining and Extraction (9.46%) has got the highest industry ROA followed by Tobacco and Cigarettes (8.96%) and Glass and Ceramic (8.34%).A tax rate of 15% is imposed on all the firms. The total assets of the Industrial sector are $98.05 million of which $69.64 million are tangible and $28.41 million are intangible assets.

Tobacco and Cigarettes (40%) has got the highest percentage of intangible assets followed by Electrical companies (39%) and Pharmaceutical and Medical companies(36%).Mining and Extraction had $14.79 million intangibles while Engineering and Construction had $ 2.87million.Textiles, Leathers and Clothing (27%) had the lowest intangible assets. In the entire sector none of the industry recorded more than 50% intangible assets.

6. Conclusion

Intangible Assets are a company's "weightless wealth" that helps it to obtain real profit. Every company should understand that nowadays paying much attention to Value-based Management in general and to Intangible Assets especially (as they are the key drivers of value creation in the economy of the XXI century) may help to create and develop its core competences and thus yield competitive advantage on the market.

This question is discussed in different publications, where it is said about the problem that the most important resources of a company, which are Intangible Assets, are often not reflected in companies' balance-sheets [Edvinsson, Mallone, 1997; Sveiby, 1997]. That is why a new approach for obtaining a fundamental value of intangible assets on the base of residual operating income (REOI) is developed in the paper. It helps to get the value of those intangibles which are not shown on the balance sheets of companies. Of course the method has some limitations due to the assumptions represented in the Technical annex, but the method is very useful for obtaining $-valuation of Intangible assets for comparing different companies and industries between each other

The research helped to find out the total intangible assets of the Jordanian companies. The total assets of all the three sectors are $1022.92 million of which $685.9 million are tangible assets and $337.02 million are intangible assets. It was found that about 33% of all the assets are intangible. The Intangible assets plays key role in the competitiveness of many firms in the developing economy of Jordan .The intangible assets are not shown in the balance sheet but they are very valuable to the firm.This study was an attempt to evaluate the value of intangible assets, so that the industries invest more in it for its long term success.

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