An investigation on the role of intellectual capital efficacy indicators in the financial performance of companies of the Tehran Stock Exchange

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ABSTRACT

In Knowledge-based economy, knowledge and intellectual capital as a source of wealth creation than any other tangible or physical as set are assigned to important positions. This study examines the relationship between intellectual capital and performance of listed companies of the stock exchange. For this purpose, the four key indicators of performance and efficiency of intellectual capital with model "Pulic", the population of listed companies on the Stock Exchange during the period 1385 to 1389, are measured, then the influence of intellectual capital and its components on each of the indicators of financial performance are measured by using Pearson correlation and multiple regression analysis. The results indicate that intellectual capital indicators is directly related to the rate of return on equity, rate of return on assets and the company's market value to book value per share and earnings per share is directly related.

Key words: Intellectual Capital, Intellectual Capital Performance, Financial Performance.

Introduction

One of the main challenges and problems of traditional accounting systems is that the value of intellectual capital is not reflected in financial statements and the reports of business units. Today, the role of intellectual capital in creating value for companies and business units is much more than the role financial capitals play in the units. In this regard, the accounting profession and accountants play an important role in finding effective ways to control and evaluate intellectual capital by means of models and assessment methods.

Traditional accounting methods no longer meet the needs of today's dynamic society, and in order to check the position of each organization in the society some methods involving intangible resources should be used since these intangible resources cause the difference between market value and book value and direct the markets [13]. These factors are not reflected in the balance sheet but are of high influence.

Many existing accounting systems ignore the increasing importance of intellectual property and knowledge in modern organizations and cannot measure the real value of assets. In the other words, there are many limitations in describing actual values of the financial statements of companies. In today's knowledge-based societies, the feedback of the applied intellectual capital is much more important than the applied financial capital [14]. This means that, in the future, compared to intellectual capitals, the importance and role of financial capitals will continue to decline dramatically in determining the potential for sustainable profitability. This issue creates a gap between the real value of companies and organizations and what is applied in the calculations of traditional accounting.

Traditional financial Reporting cannot calculate the real value of a company and can only measure short term financial assets and tangible assets. In the recent decades, companies are especially concerned with the measurement of intellectual capitals for reporting to concerned stakeholders and try to find a method of assessing internal intangible assets and extracting intangible value in organizations [7, 12]. In fact, the Intellectual Capital of provides anew perfect model to see the real value of organizations, and it can be used to calculate the future value of the company. For this reason tendency toward measuring the value of intangible assets of Intellectual Capital is increasing more and more in companies, shareholders(investors) and other stakeholders [12].

Increasing gap between the actual value and book value of the corporation attracts researchers' attention toward the explanation of the invisible value, which is removed from the financial statements. The value which we call it Intellectual Capital and involved in all aspects of the organization like a perfect knowledge, but are neglected. According to the research has done Among 611 Taiwanese countries, ratio of the real market value to
book value is gradually increasing between 1 to more than 5 in 1997 to 2001. The researches show that around 80% of corporation's market value is not reflected in their financial reports [12, 14]. The importance and necessity of current research is the result of the importance of unknown capital (Intellectual Capital) in real value of corporation and their financial performance and then their success and their failure in competitive and complicated position in the market.

The organizations are measuring Intellectual Capital for four reasons which are including of:
1. Improving the internal management 2. Improving reporting to outgoing agencies 3. Exchanging of capital 4. Legal reasons for improving the accounting

At this time there is a gap between_corporate market value and pure tangible assets value which is in fact include of invisible assets and day after day attracts investors attention more and more[4]. In the knowledge- based organization, in which knowledge is a huge part of the product value and also includes of organization wealth and possessions [8].The traditional accounting systems, which is including of tangible assets and also has related information about organizations previous performance. For valuing Intellectual Capital, the largest and the most valuable assets are insufficient. Therefore, strategy of Intellectual Capital for organizations that wants to know well about their performance is more complete [12]. The main issue of this study is to investigate the role and importance of Intellectual Capital in real value of companies and their financial performance; the issue that has important and determining position in success and failure of the companies. On the other hand, because big companies pay more attention to Intellectual Capital. In this research investigate related factors in Intellectual Capital and its role Financial Performance of Companies.

Previous Research:

The term Intellectual Capital was used for the first time by John Kenneth Galbrys. In this definition he said "the Intellectual Thinking" is something beyond the concept of a "pure thinking". Using this attitude means that Intellectual Capital is probably more flexible than Fixed Capital [14].

In one hand the strategic vision of an Intellectual Capital is for creation of knowledge and use this knowledge is to promote the value of the company and on the other hand, designing the mechanisms for reporting qualitative (non-financial ) simultaneously is concern to measure the Financial Intellectual Capital[2].

In financial literature, there are two approaches on Intellectual Capital Management: In the first approach, organizational infrastructure, learning, communication and employees skills become stronger with increasing organizational knowledge to improve the company's long-term performance. This approach is known as a knowledge –based thought school. Followers of this approach believe that if a company has a better Intellectual Capital in business environment will get competitive advantage. In the second approach, Intellectual Capital is considered a kind of economic assets. This approach emphasizes to get profit from Intellectual Capital and is known as an Economic Capital School. The followers of this approach are using models like Capital Market Model by Svyby intangible balance sheet, direct Intellectual Capital model such as return on assets valuation models, such as models of moral rights and economic added value by Byntys by Stuart and added value Intellectual Coefficient model for measuring Intellectual Capital used by Palyk[1].

The Elements of Intellectual Capital:

According to Bonitos division in 1998, choosing one definition between several definition about Intellectual Capital and its elements can say Intellectual Capital is divided in to three categories Human Capital ,Structural Capital( organizational) and Customer Capital[1].

Human Capital:

One of the most important assets of a company is creativity and innovation. In an organization tacit knowledge of employees is one of the most crucial assets of components that effect on the organization's performance. Also Human Capital is a combination of knowledge, skill, creativity, innovation and ability to do their duties which involves Values, Culture and philosophy of the company. And its base of the Intellectual Capital. Intellectual Capital is the foundation that will lead to improve performance and make profit for the company [12].

Structural or Organizational Capital:

Edvinson and Malon define it as a hardware, software, data base, organizational structure, Exclusive organization's right, business signs and all organization ability which supports employees profit [12]. Structural Capital is divided in several categories: Company's Culture, Organizational Structure, Organizational Learning, Operational process and Information System.

Customer or Relationship Capital:

Knowledge is the main subject in the marketing channels and customer relationship and is the main reason in changing Intellectual Capital to Market value and business performance[12].Customer Capital is one of the main part of Intellectual Capital, that value is located in marketing channels and company relation with business and industrial leaders
Companies Financial Performance:

In today's competitive environment, businesses are trying to create a sustainable competitive advantage through improving organizational performance and adapting themselves with the new changes. Most studies about organizational performance were based on financial performance. Organizational performance is one of the most important structures discussed in the research enterprise management performance. And undoubtedly (certainly) it's considered the most important feature in determining Success in Business Company. But in general there is no agreement between experts about what are variables and indicators of the companies. Although the importance of Organizational performance is widely known, but there is a noticeable discussion about technical and conceptual measurement performance issues.

Kaplan and Norton (1992) represent balance score card to define strategy, they used the following parameters: Financial Perspective, Customer Perspective, Internal Process Perspective, Innovation, and employees.

As a result, Organizational performance is a wide combination of intangible receipts like increasing Organizational knowledge and Visible and intangible receipts such as Economical and Financial Results. One of the Tangible organizational performance parameters that can mention include of indicators of profitability such as Assets return, return on equity, return on investment, and profit of each Shares of stock returns; these parameters are also Traditional Performance Parameters. In current research financial parameters or in the other word financial performance is considered.

Research background (review of literature):

Accumulating evidences indicate that there is a positive relationship between Intellectual Capital and Corporation Performance. Lots of researches have done about Intellectual Capital and its relationship with Corporation Performance. One of this research is done by Bontis with aim of investigating three elements in Intellectual Capital it means Customer Capital, Structure Capital, Human Capital; this research is done in Service and non service department in Malaysia. This research shows that structural capital has more influence on the performance of these two industries. Although Human Capital influence is important on these two industries, but its influence on non service companies are more than service companies.

- The first Experimental study is for measuring Intellectual Capital is done in the middle of 1980s by Swedish committee and after that many researches have done for determining companies Intellectual Capital position inside of the countries or between countries. Documentary research shows the efforts to put Intellectual Capital in companies balance sheet is a logical concept and researches which is done by the Jouya shows that this issue is completely academic.

- Bontis in 1998 investigated about the relationship between investment in Intellectual Capital and performance of business units. The result of this research shows that there is a direct and strong relationship with amount of investing in Intellectual Capital and evaluation parameters of business performance units.

- Chen et al. (2005) investigated about the relationship between Intellectual Capital, Market Value and Financial Performance of companies in Taiwan's Stock Market during 1992 to 2002. The result shows that there is a positive Intellectual Capital effect on Financial Performance and Market Value in these companies. This research also shows that Intellectual Capital can be used as a predictor parameter in the future financial performance of companies.

- Cho et al. (2006) investigated about the relationship between Intellectual Capital parameters with value or performance. And ITRI (Advanced Technology Industrial Technology Research Institute) concluded that there is a significant positive and meaningful relationship between Intellectual Capital parameters and companies performance. Second, increasing of Intellectual Capital is related to creating value process and saving strategies in organizations.

- The research was done in 2007 by Bazira and Biskes; they investigated a relation of Intellectual Capital and financial performance (based on three parameters of financial profit in each share, ratio of return equity and annual rate) in 161 Singapore Stock Firms Exchange during 2000 to 2002. The result of this research in different part was remarkable. Intellectual Capital and financial performance of these firms have a significant positive correlation. Also there is a direct relationship between Intellectual Capital and future financial performance of firms with firm's performance. On the other hand, Intellectual Capital's share in firm's performance with industry is different.

- Ruders and Tanja (2007), in their research investigated the effect of Intellectual Capital parameters on financial performance in the Hotel Industry in Slovenia. The result of this research shows that first, there is a positive and meaningful relation between Intellectual Capital parameters and financial performance second, there is a high impact of Communication Capital in compare with other Intellectual Capital parameters on financial performance of companies.

- AnvariRoustami and Seraji (1384) also after evaluating Intellectual Capital in five different ways investigated the relation with Stock Market Companies which proved there is a direct and meaningful relation in three methods and two variations.

- There is another research which is done by Madhoshi and AsgharnejadAmiri (1388). They also evaluated Intellectual Capital and study its relationship with company's financial feedback in Exchange of Investment Companies in Iran. The result of this research shows there is a direct relation between Intellectual Capital and Financial return and Future Financial return in the above mentioned companies.

- From 1930's one of the important issues in setting accounting standards has been the all–inclusive concept of income measurement. A collection of papers related to the debate are present in Brief and Peasnell (1996). Although there has been a long debate on the all–inclusive concept, but little empirical studies have been conducted on the issue.

- Rao and Walsh (1999) study the impact of applying the SFAF No. 130 to a sample of 103 Multinational firms from 11 industries for the 1997 fiscal year. The results indicate that the potential effect is that total comprehensive income is lower than the traditional net income number for a majority of firms studied. A majority of the firms are affected negatively by foreign currency translation adjustments.

- Dhaliwal, Subramanyam, and Trezevant (1999) investigate the relative ability of comprehensive income and net income to summarize firm performance as reflected in stock returns. They find no evidence that comprehensive income is more strongly associated with returns, market value or better predicts future cash flows, income than net income. Their results do not support the claim that comprehensive income is a better measure of firm performance than net income. They raise questions about the appropriateness of items included in SFAS 130, comprehensive income, as well as, the need for mandating uniform comprehensive income disclosures for all industries.

- Maines and McDaniel (2000) study the judgments of nonprofessional investors on different ways of disclosing comprehensive income, i.e., comprehensive income statement and owners' equity. They find that financial–statement format for presenting comprehensive income did not significantly affect nonprofessional investors' acquisition and evaluation of that information, but generally did significantly influence their information weighting and resulting performance judgments.

- Cahan, Courtenay, Gronewoller and Upton (2000) study the usefulness of comprehensive income disclosures in a Statement of Changes in Equity (SCE) in New Zealand. Their results suggest that separation of revaluation increments and foreign currency translation adjustments in a SCE are unnecessary. To be exact, they find no evidence that the individual Other Comprehensive Income (OCI) items provide information that is incrementally value relevant above comprehensive income, and they find no evidence that the incremental value relevance of the OCI items relative to net income increased after the SCE was required.

- Biddle and Choi (2003) investigate the relevance of comprehensive income for decision-making. Their results reveal that among income definitions, comprehensive income defined by Financial Accounting Standards Board Statement 130, dominates both traditional net income and fully comprehensive income in explaining equity returns, but that net income dominates the more comprehensive measures in explaining chief executive compensation.

- Louis (2003) presents an economic analysis of the foreign translation adjustment as another comprehensive income item. He examines the association between change in firm value and the foreign translation adjustment for a sample of manufacturing firms. His study shows that, for firms in the manufacturing sector, the translation adjustment is associated with a loss of value instead of an increase in value.

- Kanagaretnam, Mathieu and Shehata (2004) investigate usefulness of reporting comprehensive income in Canada. They examine the association between market value of equity returns and the components of other comprehensive income to assess the information content of the new disclosures. They, also investigate the predictive ability of the aggregate comprehensive income relative to net income. They provide evidence that each of the four components of other comprehensive income is value relevant in explaining either the market value or the stock returns or both. They find, however, that net income is a better predictor for future firm’s performance than aggregate comprehensive income.

- Arab MazarYazdi and Radmehr (2003) by launching questionnaire ask the opinions of Iranian different financial information users and academics on each item of comprehensive income. They also studied the necessity of reporting such items in separate reports. Their findings indicate that from the respondents’ points of view, disclosure of different items of comprehensive income is required in external reporting, but they find it unnecessary to report each item in a separate report.

- MojtabaheadZaheh and Momeni (2003) using a questionnaire investigate the effects of
comprehensive income statement on users' decision-making. They report that, users of financial information use some measures for management efficiency, investment returns and future cash flows prediction, in their decision-making process. Disclosure of comprehensive income paves the way for evaluation of those measures.

Hypotheses:

Research Variables:
- **The main independent variable**: Intellectual Capital
- **Independent Variables**: Human Capital, Structural Capital, Customer Capital
- **The main variable**: Financial performance of Companies
- **Dependant Variables**: Return on Equity, Return on Assets, Market value to Book Value per share, Earning per share.

![Research conceptual model](chart1.png)

**Chart 1**: Research conceptual model.

Research Method:

**Value Added Intellectual Capital with Pulic Model**:

This model is represented by Pulic, is used in this research, it is measuring quantitative method of Intellectual Capital (AnvariRostami and Rostami, 1382), base of measuring has three dependant variables:
1. Human Capital Efficiency (HCE)
2. Customer investment Efficiency or communication (CEE)
3. Structural Capital Efficiency or organizational (SCE)

For this reason Pulic (1998) studies in condition that ratio of Value Added Intellectual Capital is high, efficacy of Added Value will promote by the means of whole company resources.

The most important advantages of this model are:
1. One of the advantages of this model is that provides a basis for measuring standard and consistency. In fact the methods that can measure exactly Intellectual Capital are limited.

**Development of research hypotheses and Conceptual Model**:

According to literature and research variables; hypotheses are as follows:
1. Intellectual Capital (Human, Structural and Customer) has a relationship with Return On Assets Exchange Companies.
2. Intellectual Capital (Human, Structural and Customer) has a relationship with Return On Assets Stock Exchange Companies.
3. Intellectual Capital (Human, Structural and Customer) has a relationship with Ratio of Market Value to book value per share of Stock Company.
4. Intellectual Capital (Human, Structural and Customer) has a relationship with profit of per share of Stock Companies.

The conceptual model for this study is as follows:

\[
\text{VAIC} = \text{CEE} + \text{HCE} + \text{SCE}
\]

Calculated Value Added of company is as follows:

\[
\text{VA} = \text{I} + \text{DP} + \text{T} + \text{M} + \text{R}
\]

I: Total cost of company
DP: Depreciation Expense of Corporate
D: Dividend Company
T: Tax of the company
M: Equity Capital
R: Accumulated profits of the company
Calculating HCE: salary and wage are one of the parameters of Human Capital and HCE is calculated as follows:

$$HCE = \frac{VA}{HC}$$

HCE: Human Capital Ratio of a company
VA: Total Added Value of a company
HC: Total Capital Expense for salary and wage of the company

Calculating CEE is as follows:

$$CEE = \frac{VA}{CE}$$

CEE: the Coefficient of Performance or Customer Relationship Ratio
VA: Total Added Value of a company
CE: Pure Booked Value of Company assets

Calculating coefficient of SCE that is Structure Capital in a company and the first step to determine is, Calculating structure Capital of firm(SC) that is as follows:

$$SC = VA - HC$$

SC: Structure Capital of firm
VA: Total Added Value of a company
HC: Total Capital Expense for salary and wage of the company

Public said that there is a reverse proportional relationship between SC and HC. As a result, calculating of SCE is as follows:

$$SCE = \frac{SC}{VA}$$

SCE: The Ratio of Structure Capital of company

To investigate the role of Intellectual Capital component on the Financial Performance, we use Regression analysis. Financial Performance parameter is tested in two main relations of test. First investigate the relationship between Intellectual Capital parameters and Financial Performance in the frame of multiple Regression analysis; in the second step, we investigate the role of Intellectual Capital on four Financial Performance parameters. According to gained result from table two, regard of standardized Coefficient and the significance level, the result of regression test reveals that there is a direct and meaningful relationship between three parameters of Intellectual Capital with Return of Equity. And also about three other Financial Performance Parameters return of assets, Ratio of Market Value to book value per share and profit per share from regression supports the existence of positive and meaningful relation between Intellectual Capital parameters and Financial Performance.

### Table 1: The correlation between Intellectual Capital and related factor to Intellectual Capital.

<table>
<thead>
<tr>
<th>Profit per share (EPS)</th>
<th>(MV.BV)</th>
<th>(ROA)</th>
<th>(ROE)</th>
<th>Intellectual Capital (VAIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.456**</td>
<td>0.537**</td>
<td>0.402**</td>
<td>0.242**</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: Multiple regression test.

<table>
<thead>
<tr>
<th>Significant level</th>
<th>Standardized ratio (β)</th>
<th>t</th>
<th>Independent Variable</th>
<th>Dependant Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>0.566</td>
<td>3.624</td>
<td>Intellectual Capital (HCE)</td>
<td>Return On Equity (ROE)</td>
</tr>
<tr>
<td>0.001</td>
<td>0.545</td>
<td>3.711</td>
<td>Structural capital (SCE)</td>
<td>Return on assets (ROA)</td>
</tr>
<tr>
<td>0.005</td>
<td>0.423</td>
<td>2.823</td>
<td>customer capital (CEE)</td>
<td></td>
</tr>
<tr>
<td>0.041</td>
<td>0.456</td>
<td>3.989</td>
<td>Human capital (HCE)</td>
<td></td>
</tr>
<tr>
<td>0.001</td>
<td>0.536</td>
<td>3.102</td>
<td>Structural capital (SCE)</td>
<td></td>
</tr>
<tr>
<td>0.000</td>
<td>0.621</td>
<td>3.182</td>
<td>customer capital (CEE)</td>
<td></td>
</tr>
<tr>
<td>0.001</td>
<td>0.496</td>
<td>3.876</td>
<td>Human capital (HCE)</td>
<td>Ratio of Booked Value to Market Value (MV/BV)</td>
</tr>
<tr>
<td>0.004</td>
<td>0.531</td>
<td>3.121</td>
<td>Structural capital (SCE)</td>
<td></td>
</tr>
<tr>
<td>0.000</td>
<td>0.721</td>
<td>4.132</td>
<td>Customer capital (CEE)</td>
<td>Profit per share (EPS)</td>
</tr>
<tr>
<td>0.000</td>
<td>0.689</td>
<td>3.821</td>
<td>Human capital (HCE)</td>
<td></td>
</tr>
<tr>
<td>0.000</td>
<td>0.589</td>
<td>3.541</td>
<td>Structural capital (SCE)</td>
<td></td>
</tr>
<tr>
<td>0.000</td>
<td>0.611</td>
<td>3.422</td>
<td>Customer capital (CEE)</td>
<td></td>
</tr>
</tbody>
</table>
Table 3 is for completing the result of table 2 and reveals the relationship between Intellectual Capital with Financial Performance parameters. According to table, hypotheses 1 to 4 of this research is accepted with the level of significance of 99%.

<table>
<thead>
<tr>
<th>Acceptance or failure of hypothesis</th>
<th>Meaningful level</th>
<th>Standardized ratio(β)</th>
<th>t</th>
<th>Dependant variable</th>
<th>Independent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptance the first hypothesis</td>
<td>0.000</td>
<td>0.514</td>
<td>3.451</td>
<td>(VAIC)</td>
<td>(ROE)</td>
</tr>
<tr>
<td>Acceptance the second hypothesis</td>
<td>0.000</td>
<td>0.514</td>
<td>3.612</td>
<td>(VAIC)</td>
<td>(ROA)</td>
</tr>
<tr>
<td>Acceptance the third hypothesis</td>
<td>0.000</td>
<td>0.584</td>
<td>3.765</td>
<td>(VAIC)</td>
<td>(MV/BV)</td>
</tr>
<tr>
<td>Acceptance the fourth hypothesis</td>
<td>0.000</td>
<td>0.631</td>
<td>3.655</td>
<td>(VAIC)</td>
<td>(EPS)</td>
</tr>
</tbody>
</table>

Summary and Concluding Remarks:

In this present research looking for measuring Intellectual Capital and its parameters with using Value added Model of Intellectual Capital, effect of three Intellectual Capital parameters (Intellectual Capital, Structural and Customer) on the four indicators of Financial Performance (Return on equity, return on assets, Ratio of Market Value to Book Value per share and profit per share) were tested by using Pearson correlation and regression analysis. And it was observed that all four indicators of Financial Performance with Corporate Intellectual Capital Exchange have a direct relationship.

According to the results can say that there is more emphasis on Intellectual Capital in Organizations and understanding the importance and effect of this factor on total performance of organizations and its positive effect on creating value in organizations, as an effective factor in improving Financial Performance of organizations that should pay attention to this work. Since, according to used model in this research Human Capital has a key role in calculating Intellectual Capital, preparing competitive atmosphere in determining the salary and wage level of employees, efficacy of Intellectual Capital is increasing more and more.

According to the result of this research, there is a direct and meaningful relation between Intellectual Capital and all four performance factors; this issue confirmed the important effect of Human Capital in Financial Performance. And in the other word, b the key role of Human Capital is confirmed in Intellectual Capital and Financial Performance.

Careful look is done in other researches in inside and outside of countries, there is harmony between these entire researches. For example the result of this research confirm the same result in the same foreign researches such as Chen and et al., and also there is a harmony between the result of you and your coworkers who investigate the relation of Financial Performance and Intellectual Capital of Stock Exchange Companies in Singapore. On the other hand, the result of this research is coincident with Madhoshi and Asgharnejad research (1388), Anvari Roustami research (1384) and Seraji and Shams and Khalili (1390).

According to gained result and because of the importance and measurement of Intellectual Capital as an effective factor in Organization Performance; it is suggested to use other techniques of measuring Intellectual Capital, both qualitative and quantitative for investigative relation with other investigating accepted companies performance used in Stock Market. Also calculating Intellectual Capital of companies by using other Financial Methods and measuring that relation with Financial Performance parameters is one the future suggestions for this research.

References


