STUDYING FACTORS THAT AFFECT INTELLECTUAL CAPITAL PERFORMANCE IN LISTED BANKS IN TEHRAN STOCK EXCHANGE

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ABSTRACT

Intellectual capital, knowledge management and intangible assets are three important factors for determining the value of an organization, since, in the present era they have attracted much attentions, we study the impact of some financial ratios on the value added of intellectual capital in the banking industry and the method of this study is correlation, the correlation between financial ratios and value added of intellectual capital. We used Rahavard Novin software for data collection and SPSS and EVIES software for data analysis. The research period is from 2007 to 2012 and we used multiple regression models for statistical method. The results of the research hypotheses testing indicate there is no significant relation between intellectual capital performance and relative efficiency of the bank, however, there is a negative relation between intellectual capital performance and barriers to entry, and banking and ratio of staff costs, and there is a direct, positive relation between intellectual capital performance, banks profitability and bank risk.

Keywords: Intellectual Capital, Efficiency, Risk, Added Value of Intellectual Capital Coefficient, Profitability

INTRODUCTION

In today’s economy-driven environment, intangible assets as well as tangible assets play a key role in organizations for more successes, any organization is trying to develop an economy and knowledge-based system, because these are parts of endless resources and considered as key components of any organization. Among them, intellectual capital is the most important intangible asset of any organization. It is considered as a valuable means to develop the key assets of an organization; it is based on science and knowledge and plays a very important role for any organization to achieve continued successes. One of the problems of traditional accounting is its inability in measuring knowledge-based organizations. (Anderson, 2004) Hence, in the current era that intellectual capital is the essential foundation for future dynamism and success of a company, it is necessary to determine key resources and stimulations of intellectual capital performance, they help companies to be more efficient, effective and innovative. Moreover, gaining competitive advantage requires more intellectual capital and less financial and physical resources. Since different individuals like shareholders, managers, researchers and politicians are interested in intellectual capital, the main purpose of this research is to highlight the role of those factors that affect intellectual capital performance in the listed banks in Tehran Stock Exchange, hereby, bank managers can use this research to design and implement intellectual capital strategies and guide banks toward achieving their standards of developments in order to create value in their firms. We chose banking sector for this research because intellectual capital than physical capital in baking sector is more important than other sectors in organizational performance.

Theoretical Foundations of the Research

Definitions of Intellectual Capital

In management literature there are various definitions and interpretations of intellectual capitals and generally there is no comprehensive definition of them and it is difficult to find a concise definition because it is a new matter, however, everybody believes intellectual capital is a set of knowledge that can be useful for production targets. The most important definitions of intellectual capital are as follows:
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1. It is believed that intellectual capital is a useful package of knowledge that includes organizational processes, technologies, patent, staff skills and information about customers, suppliers and beneficiaries. (Stewart, 1997)
2. Intellectual capital is a combination of total assets of a company that help it to perform its activities. (Brooking, 1996)
3. Intellectual capitals are sum of human and structural capitals. Moreover, they include organizational experiences and technologies, relationships with customers and professional relationships that provide competitive advantage. (Edvinsson, 1997)

Background and Review of Experts’ Viewpoints on Intellectual Capital

A big Swedish company named Skandia offered the concept of intellectual capital for the first time in 1991. The roots of intellectual capital are profound. An economist named John ContGalberot used the term intellectual capital for the first time in 1969. In 1980, basic idea of intangible value often named goodwill was introduced and the gap between book value and market value increased and very first efforts for measuring intellectual capital were in the late 80s. There was an attachment for annual report of Skandia Company that showed the inventory of its intellectual capital. In the late 90s, many researchers became interested in the subject of intellectual capital and there were different articles and meetings on it.

Experts in the field of intellectual capital believe intellectual capital has three components: human capital, structural capital and relational capital.

1. **Human Capital**: employees create intellectual capital through their competence, attitude and mental agility. The most important components of human capital of an organization are skills, the depth and breadth of workforce. Human resources can be regarded as the soul and mind of intellectual capital. This capital alongside the staff exit at the end of a workday but structural and relational capital stays unchanged. Human capital includes skills and competencies of workforce and their knowledge of matters that are important and necessary for success of the organization.
2. **Relational Capital**: this capital includes all the relations between one organization and an individual or another organization. These individuals and organizations could include customers, staff, suppliers, legal authorities, communities, creditors, investors, etc.
3. **Structural Capital**: it includes non-human reservoirs of knowledge and involves databases, organizational charts, instructions of executable processes, strategies, action plans and generally everything that is more valuable than its material value to an organization. Structural capital involves a wide range of essential elements. The most important ones usually are important executable processes of an organization, its structure pattern, policies, information flows, components of database, leadership and its management risk, corporate culture and bonus for employees (Manesh and Amini, 2012).

Factors that Affect Intellectual Capital Performance

**Bank Efficiency**

In the banking industry, some factors could be considered as determining factors of intellectual capital performance such as bank efficiency, barrier to entry, efficiency of investment in intellectual capital, bank profitability and bank risk (Bannany, 2008).

Human capital plays an important role in reducing the production cost of the bank and separating products that must express in the increase of bank market share through attracting more customers (Bannany, 2008).

We can assume that bank efficiency is with human capital and there must be a positive relation between human capital performance and market share of banks.

In banking industry, two indices of market share are used for measuring bank efficiency.

Based on Deposits.

Based on Assets.

It is better to use relative measurement for total assets in comprehensive measurement circumstances because there are different resources for efficiency, for example intangible assets.
Barriers to Entry
Those firms that face serious barriers to entry do not take steps to encourage and motivate their staff to innovate and such circumstances may have a negative influence on staff performance (human capital). Deepories concluded there are different methods for measuring barriers to entry in banking industry. In here, the ratio of fixed assets to total assets indicates the necessary amount of investment to enter sector (Bannany, 2008). It seems this ratio is more appropriate than other ones to indicate the concept of barriers to entry. Hence, the ratio of fixed assets to bank total assets is used to indicate barriers to entry of the market.

Efficiency of Investment in Intellectual Capital
Human capital can be defined as total value of investment in training staff, their competence and future (Kanan, 2004). Human capital as an investment (staff costs) creates value for a company and help it (it is determined based on ratio of staff costs to bank total assets), hence, this investment is more efficient and it should get bigger share from investment to create value for itself. This investment must encourage bank staff (human capital) to innovate, for example they should produce new products or provide new services, business processes to maintain efficiency of investment in intellectual capital. The ratio of staff costs to bank total assets is for indicating efficiency of investment in intellectual capital (Bannany, 2008).

Bank Profitability
Profitability means the ability of a firm in achieving revenue and profit. Net income or profit is the only index for profitability measurement. Generally, the financial results of any company can be classified as positive results from achieving income and negative results from suffering loss. Managers may need time to study the reasons of losses. Losses can be considered as unusual outcomes and managers should handle them carefully. If managers spend their times in finding the reasons of losses, they will not find enough time for doing useful activities like encouraging their staff to innovate that may lead to an increase in profit. On the other hand, incomes (profit) may be considered as normal financial outcomes and managers might quit doing useful activities like encouraging staff to innovate that may lead to profit. Hence, it is expected to be a positive relation between bank profitability and human capital performance. Annual net profit before tax dived by equity is used for indicating bank profitability.

Bank Risk
Risk means the possibility of a loss, whether a financial or non-financial loss as a result of carrying out an activity that is based on division of the Basel Committee, risk in a bank like credit risk, market risk and operational risk. It is obvious there is a positive relation between level of risk and return on investment. A percentage of intangible assets is an index for determining the relevance of future performance of a company and assets risk (Paton and Zolneka, 1997).

Research Background
Foreign Studies
Mavirdos Dimeterious (2004) studied intellectual capital performance in the banking sector in Japan and he concluded there is a significant difference between different groups of banks in Japan, moreover, there is a difference between Japanese banks and some European banks like Austria.
Chun-gu (2005) studied the intellectual capital performance of commercial banks in Malaysia. According to the results, although Hong Kong Bank has lesser physical capital than Mie Bank has, due to the highest intellectual capital coefficient, it is the most efficient domestic bank.
Majd Al Banni (2008) studied those factors that affect intellectual capital performance in England Banks. According to the results, IT systems, barriers to entry and return on investment in intellectual capital have negative impact and relative efficiency of bank, bank profitability and bank risk have positive impact on human capital performance.

Domestic Studies
Namazi and Ebrahimi (2010) studied the impact of intellectual capital on the current and future financial performance of listed companies in Tehran Stock Exchange. They concluded regardless of firm size, debt
structure and past performance, there is a significant, positive relation between capital and the current and future financial performance of the companies and industries.

Hemanti and Mehrabi (2010) studied the relation between intellectual capital and return on capital of listed companies in Tehran Stock Exchange and they realized there is a positive correlation between intellectual capital, financial performance and the firm performance. Moreover, the share of intellectual capital in future performance of the company is different in various industries and there is no relation between growth rate in capital and firm performance.

Anouri Rostami and HasanSohrabi (2005) studied the relation between intellectual capital and the value of stock market of listed companies in Tehran Stock Exchange and they understood calculating intellectual capital through the difference between market value and book value of the companies has stronger relation with the value of stock exchange of the companies in industry.

**Research Hypotheses**

Given the research subject, the research hypotheses are as follows:

*Hypothesis One*: There is a positive relation between relative efficiency of a bank and intellectual capital performance in listed banks in Tehran Stock Exchange.

*Hypothesis Two*: There is a negative relation between barriers to entry of an industry sector and intellectual capital performance in listed banks in Tehran Stock Exchange.

*Hypothesis Three*: There is a positive relation between the ratio of staff costs and intellectual capital performance in listed banks in Tehran Stock Exchange.

*Hypothesis Four*: There is a positive relation between bank profitability and intellectual capital performance in listed banks in Tehran Stock Exchange.

*Hypothesis Five*: There is a positive relation between bank risk and intellectual capital performance in listed banks in Tehran Stock Exchange.

**Research Method**

The method of this research is correlation because our purpose in to indicate the relation between the financial ratios and intellectual capital, regarding the aim, it is an applied research, since we are looking for some answers for the mentioned problems.

**Domain of Study and Population**

The research population includes all the banks that have some activities in Tehran Stock Exchange during a 5-year period from 2007 until 2012, since the population is limited, we have decided to study the entire population and avoid sampling. We selected the active companies in banking industry then we studied them, there are seven companies as follows:


**Research Variables, Measurement Methods and Elaborating the Research Analytical Model**

Mainly, in any research, one of the most important steps is determining variables. A variable is anything that changes numerically and can get different numerical values. They are some characteristics that researchers can observe, control or manipulate them. Generally, there are two types of variable: independent variable and dependent variable (Khavandkar and Mottaghi, 2009). The main and dependent variable of this research is value added (performance) of intellectual capital in bank i in year t.

The method of value added of intellectual capital (VAIC) that has offered by Pulic, will be used for measuring intellectual capital performance, because applying the mentioned theoretical reasoning is easier than other methods and it is as follows:

Output efficiency-Gross income

Input – Operating costs (Except for personal expenses)

\[
\text{Staff costs} = \text{HC} \quad \text{Input} - \text{Output} = \text{VA} \\
\frac{\text{VA}}{\text{CA}} = \text{VA(Physical Capital)} \\
\frac{\text{VA}}{\text{HC}} = \text{VA(Human Capital)}
\]
VAHC+VACA= VAIC (VA Intellectual Capital)

**Independent Variables and Their Measurement Methods**

For this research, we used five important financial ratios and we calculated them based on the information of the financial statements of listed companies in Stock Exchange and they are as follows.

<table>
<thead>
<tr>
<th>Financial ratio</th>
<th>Measurement method</th>
<th>The kind of relation with the dependent variable (value added of intellectual capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HASSit – efficiency (output) in bank i in year t</td>
<td>Book value of assets ratio of bank i in year t divided by the total market value of the assets of bank i in year t</td>
<td>There is a positive relation between bank efficiency and intellectual capital performance.</td>
</tr>
<tr>
<td>FASSit – barriers to entry in bank i in year t</td>
<td>Book value of the ratio of fixed assets to total assets of bank i in year t</td>
<td>There is a negative, reverse relation between barriers to entry in banking industry and intellectual capital performance.</td>
</tr>
<tr>
<td>SREVit – return on investment in intellectual capital in bank i in year t</td>
<td>Book value of the ratio of staff costs to total assets of bank i in year t</td>
<td>There is a positive relation between staff costs and intellectual capital performance.</td>
</tr>
<tr>
<td>ROEit – profitability of bank i in year t</td>
<td>Book value of annual net income before tax divided by equity in bank i in year t</td>
<td>There is a positive, significant relation between bank profitability and intellectual capital performance.</td>
</tr>
<tr>
<td>ITAGASSit – risk in bank i in year t</td>
<td>The ratio of intangible assets to total assets of bank i in year t</td>
<td>There is a positive, significant relation between risk bank and intellectual capital performance.</td>
</tr>
</tbody>
</table>

**Research Analytical Model**

For this research in order to test the hypotheses, we will use correlation analysis method. In this research, it will be calculated by multivariate regression pool model and the following equation.
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$$VAIC_{it} = \alpha_0 + \alpha_1 hassIT + \alpha_2 FASS_{it} + \alpha_3 SREV_{it} + \alpha_4 ROE_{it} + \alpha_5 ITAGASS_{it} + U_{it}$$

VAICit – value added (performance) of intellectual capital in bank i in year t
HASSit – efficiency (output) in bank i in year t
FASSit – barriers to entry in bank i in year t
SREVit – efficiency of investment in intellectual capital in bank i in year t
ROEit – profitability in bank i in year t
ITAGASSit – risk in bank i in year t based on intangible assets to total assets

Data Analysis

For data analysis and extracting descriptive statistics, we used SPSS software and for extracting inferential statistics, we used Views software, afterwards, by using pool data, sectional data and time series, by providing multiple regression models based on pool least-squares (PLS), we did the present study.

Hypotheses Testing

To test the hypotheses, we used pool least-squares (PLS) based on fixed effect method and the results of it are in the tables below.

Table 2: Coefficients of regression model of pool least-squares based on fixed effect method

<table>
<thead>
<tr>
<th>Components of model</th>
<th>Coefficients ($\beta$)</th>
<th>Standard error</th>
<th>t-statistic</th>
<th>Significance level (Sig)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>9.15</td>
<td>0.32</td>
<td>28.76</td>
<td>0.00</td>
</tr>
<tr>
<td>Profitability of bank i in year t</td>
<td>1.20</td>
<td>0.38</td>
<td>3.17</td>
<td>0.006</td>
</tr>
<tr>
<td>Barriers to entry in bank i in year t</td>
<td>-2.29</td>
<td>0.44</td>
<td>-5.16</td>
<td>0.0001</td>
</tr>
<tr>
<td>Risk in bank i in year t</td>
<td>2.13</td>
<td>0.77</td>
<td>2.78</td>
<td>0.01</td>
</tr>
<tr>
<td>Sufficiency (output) in bank i in year t</td>
<td>-1.77</td>
<td>1.22</td>
<td>-1.45</td>
<td>0.17</td>
</tr>
<tr>
<td>Efficiency of investment in intellectual capital in bank i in year t</td>
<td>-0.10</td>
<td>0.03</td>
<td>3.31</td>
<td>0.0047</td>
</tr>
<tr>
<td>AR(1)</td>
<td>-0.33</td>
<td>0.23</td>
<td>-1.43</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Table 3: Significance test for the model

<table>
<thead>
<tr>
<th>Durbin-Watson test</th>
<th>Hausman test</th>
<th>F-Limer test (probabilities)</th>
<th>Hardy-Weinberg principle (Probabilities)</th>
<th>Significance level (Sig)</th>
<th>F-statistic</th>
<th>Coefficient determination ($R^2$)</th>
<th>Adjusted coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.21</td>
<td>0.04</td>
<td>0.0973</td>
<td>0.00</td>
<td>0.00</td>
<td>1.99</td>
<td>0.28</td>
<td>0.30</td>
</tr>
</tbody>
</table>

We used multiple regression model based on pool least-squares to study the simultaneous effect of all financial variables described in the five hypotheses. Given the table (2), significance level of ratio of intangible assets to total assets of bank i in year t, ratio of assets of bank i in year t divided by total value of bank assets, intercept point, bank profitability, ratio of fixed assets to total assets of bank i in year t are
significant at 95%-confidence level. According to the t-statistic, the effect of their coefficients and the impact direction are confirmed, i.e. the relation between the ratio of intangible assets to total assets of bank i in year t, the ratio of assets of bank i in year t divided by total value of bank assets with value added of intellectual capital and bank profitability is positive (direct). Moreover, there is a negative (reverse) relation between the ratio of fixed assets to total assets of bank i in year t and value added of intellectual capital. According to the table (3), almost 0.31 of changes are related to value added of intellectual capital of these five financial variables. Durbin-Watson static shows lack of correlation of the independent values. Stationary state of the research variables is mentioned in table (3). When absolute value of Hardy statistic resulted from critical value (that is usually at 5 percent level) is lesser, assumption on durability is confirmed, as you can see the value of it at the level of all of the variables is lesser than five percent. Hence, the variables are static. We used F-Limer test to determine pool and panel data. The data is pool. In this test, the null hypothesis is resulted from using pool data and the other hypothesis indicated the usage of panel data. Since the level of probability is fewer than ten percent, the rest indicates the data is pool. In Hausman test, the null hypothesis shows the usage of fixed effect method and the other hypothesis indicates the usage of random effect method. Probability is less than 0.1; hence the fixed effect method is better.

CONCLUSION

Conclusion and Recommendations

Give the results of regression model, barriers to entry in an industry sector and the ratio of staff costs (efficiency of investment in intellectual capital) have a negative impact on intellectual capital market and it shows in order to improve human capital performance that is a part of intellectual capital, necessary investment by encouraging staff to perform their duties or to innovate is impossible. The mangers of the mentioned banks do not pay attention to human capital and from their perspectives; this may indicate bad indices, moreover, the coefficient of bank profit and bank risk are significant statistically. On the other hand, bank profitability and bank risk have a positive impact on intellectual capital performance and from the perspective of the banks mangers it potentially indicates good indices. There have been no studies on this case in Iran, hereby; we cannot compare our results to other results. However, the results of our study do no match to the Al Banni’s research results; it indicates the lack of attention toward intellectual capital in banks of Iran. It is due to their managers’ weakness. Hence, organizations in Iran must pay more attention to intellectual capital concept in order to improve their efficiency and profitability through improving human capital performance (staff) and intellectual capital performance.

Offering some recommendation for future studies:
- Using other variables that affect intellectual capital performance for studying their impacts on it
- Doing similar studies on one or some particular industries or the entire Tehran Stock Exchange or outside of it
- Studying the impact of IT systems on intellectual capital performance in banks in Iran
- Doing similar studies during a 10-to-15-year period

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