

The Study of the Relationship Between Intellectual Capital and Financial Performance of the Listed Companies in Tehran Stock Exchange

¹Ali Daneshi, ¹Isa Bakhtiyari Mansourabad and ²Ali Pirzad

¹Department of Accounting, Science and Research Branch, Islamic Azad University, Kohgilouye and Boyer Ahmad, Iran

²Department of Management, Dehdasht Branch, Islamic Azad University, Dehdasht, Iran

Abstract: In this current research, the relationship between intellectual capital and some financial ratios of listed companies in Tehran Stock Exchange were studied and wanted to find out whether there is any relationship between intellectual capital and some financial performance such as Return on Assets, Return of Equity, net profit margin ratio to sales and each share price ratio to earning among the listed companies in Tehran Stock Exchange in the first place and which ratio has the more significant relationship to intellectual capital in the second place. Intellectual capital means a part of a company total capital or asset which is knowledgebase and the company is its owner. In an overall classification, intellectual capital includes three parts which are called human capital, structural capital (organizational) and customer capital (relationship). In this research, deductive-inductive method was used and library method-Stock Exchange archive-was utilized in order to acquire the needed data for theoretical issues and financial data based on the audited financial statements of under study companies. In order to do this study, the above mentioned ratios were compared with intellectual capital during the research years. By analyzing the acquired data during a 5 year period 2008 to 2012, the results of the study with showed that intellectual capital has got a considerable influence on some financial ratios of the listed companies in Tehran Stock Exchange.

Keywords: Financial performance, intellectual capital, return of equity, return on assets

INTRODUCTION

In recent years, the world exchange level and movement towards knowledgebase economy has resulted in a paradigm shift of the regnant economy and the age came to an end when the manager played the role of finding a way to make an optimum combination of products and target markets and to eliminate the obstacles before entering products to these markets and we can see the knowledgebase and data-based economy which is based on intangible assets and intellectual capital. In such an atmosphere, intellectual capital and organizational knowledge have been considered more as competitive advantage.

During the second half of the 20th century, according to Watson (2003), the role and importance of knowledge in economy and commerce has highly changed and from the 1990s, the economy growth pattern has essentially changed and finally knowledge replaced the financial and physical capital in the world economy. In other words, the knowledgebase economy replaced the industrial economy and knowledge as the creative factor for value and possession replaced possession creation main factors in industrial economy such as land, labor, money, machines, etc.

In the knowledgebase economy, intellectual knowledge and capital have given a more important place in comparison to other tangible and physical assets.

Parker (1996) believes that in current comparative markets in which the organizations goals is to achieve more market share through creating comparative advantages, an organization success relates to utilizing and managing intellectual knowledge and capital all over the organization.

LITERATURE REVIEW

The modern economy originated from information and knowledge has played a role in increasing the significant importance of intellectual capital in researches and commerce.

Currently, according to Nolan (2005), managers have noted to some issues such as knowledge and creativity and consequently knowledge-oriented organizations have become more important than pragmatic organizations. Experts believe that the 80s is quality movement decade, 90s is reengineering decade-business process improvement and costs decrease-and the current decade is knowledge management decade.

In knowledge-based economy, products and organizations live and die on the basis of knowledge and the most successful organizations are those which use these intangible assets better and faster. Actually, knowledge increasing importance does not add only another variable to production process but changes the play rules knowledge widely and fundamentally. Nowadays, the organizations production power is based on knowledge. Studies show that in contrast to efficiency decrease of traditional resources, knowledge is really a resource for business performance increase. Now, the question is which tool causes knowledge to create organizational value.

We need to define and specify the intellectual capital to answer that question. Intellectual capital is the result of science and knowledge. Actually, intellectual capital is a reformed knowledge which creates enterprise value. Thus, in knowledge-based economy, organizations try to have an optimum creation, management, development and utilization of intellectual capitals for organizational value-creation and business process improvement.

The managers of private units or companies as well as other organizations managers have understood intellectual capital importance in today's knowledge-based economy and consider it as an influential element in creating competitive advantages, achieving sustainable profitability and increasing owners' wealth. Practically, private units allocate a special place to intellectual capitals to improve their performance. Thus, many researches have been done in developed countries about intellectual capital different aspects by the time of introducing intellectual capital concept.

This research investigates the relationship between intellectual capital and some financial ratios of the listed companies in Stock Exchange considering the importance of intellectual capital in today's business world.

Financial ratios are classified in five groups of liquidity, profitability, leverage or investment, activity and market ratios. However, among those ratios, we studied four groups in profitability and market ratios including Return on Assets, Return on Equity and Price to each share earnings and each share price ratio to earning.

Significance of the study and previous research:

Today, intellectual capital development and management obligation have been changed into a serious requirement nationwide and in business. Specially, new economic situations have caused the countries to create frameworks and introduce economical new actions and develop current human capacities and indicate an intensive competition in achieving resources and competitive markets in this regard so that the universal competition arena emphasizes on intellectual capital elements and international organizations proceed to design universal frameworks for intellectual capital management.

According to this, intellectual capital evaluation both in macro and micro levels has become an undeniable obligation for being accepted and competing in international markets and as a precondition for investment. However, in spite of significant increase in companies' intangible assets and intellectual capital, most of traditional accounting systems are not able to measure the companies' intellectual capital and indicate it in financial statements while the intellectual capital role and importance utilized for companies sustainable profitability is more than utilized financial capitals. Due to these reasons, it is necessary to do some research studies about intellectual capital and its various aspects such as intellectual capital concept, its various evaluation and reporting methods and the degree of the relationship between intellectual capital and other concepts such as accounting, management and economy.

Regarding the study done in this area, Darabi *et al.* (2012) investigated the association between the intellectual capital of firms and their earnings quality. The Research was conducted with 158 accepted companies and 948 firm-year observations from Iran stock market. Empirical studies were conducted based on hypothesis by Value Added Intellectual Coefficient as measures of intellectual capital and taking absolute value of Discretionary Accruals as measures of earnings quality. The results of statistical test show that intellectual capital and its human capital component have a significant positive impact on earnings quality and lead us to conclude that intellectual capital has a positive role in financial practices and reporting.

In another study, Dadashinasab *et al.* (2012) investigated empirically the relation between the value creation efficiency and firms' financial performance. This research employed by using drawn from companies that were listed in Tehran Stock Exchange (TSE), from Automotive Industry and spare parts sector. In addition public's Value Added Intellectual Coefficient (VAICe) as the efficiency measure of capital was employed. Regarding to intellectual capital, the researchers constructed regression models to examine the relationship between firm value creation efficiency and firms' financial performance. The findings of this current study demonstrated that firms' intellectual capital had a positive impact on financial performance and the components of VAIC (VACA, VAHU and STVA) were positively and significantly influenced on ROA, ROE and GR.

Research question: With regard to the above-mentioned issues, the following research question was raised for further research:

Is there any significant relationship between intellectual capital and four financial ratios including Return on Assets, Return of Equity, net profit margin ratio to sales and each share price ratio to earning among the listed companies in Tehran Stock Exchange?

Research hypotheses: By considering this research question, the following research hypotheses were suggested:

- There is no significant relationship between intellectual capital and rate of return on assets for the listed companies in Tehran Stock Exchange.
- There is no significant relationship between intellectual capital and rate of return on equity for the listed companies in Tehran Stock Exchange.
- There is no significant relationship between intellectual capital and ratio of net profit margin ratio to sales for the listed companies in Tehran Stock Exchange.
- There is no significant relationship between intellectual capital and ratio of price to each share earnings for the listed companies in Tehran Stock Exchange.

METHODOLOGY

Research method is descriptive one and of correlative type. From objective view, it is a kind of applied research. Also, the reasoning method is deductive-inductive. It is deductive because of utilizing library, study and the internet for the research theoretical framework and background and inductive because data collection has been done through primary data to accept or refuse hypothesis and the obtained results have been generalized to the whole of population including the listed LLCs in Tehran Stock Exchange.

Participants: As we need to use Stock price on the last day of the company's financial year in determining market value in order to calculate intellectual capital and in most of the listed companies in Tehran Stock Exchange, end of February is considered as the end of financial year, therefore matching their financial year to this date was regarded as a condition for the members of Participants. On the other hand, some listed companies in Stock had not presented the research required data to Stock during study period and so the required data for research was another limitation for population members.

According to above clarification, the research participants includes all the listed companies in Tehran

Stock Exchange which their shares were dealt during 2008 to 2012 and had the three following conditions:

- The end of their financial year is end of February
- They are not among banks industry, credit and other financial institutions, financial mediating and investments
- The research required data had been presented to Stock in the period of 2008 to 2012

Research variables: Table 1 shows the variables considered for the purpose of this study.

Sampling: First, the number of samples was obtained by using the following relation:

$$n = \frac{NZ_{\frac{\alpha}{2}}^2 \times P(1 - P)}{(N - 1)\varepsilon^2 Z_{\frac{\alpha}{2}}^2 \times P(1 - P)}$$

In which:

- n = Sample size
- N = Population size
- Z = Standard variable of Normal distribution
- P = Success ratio
- ε = Evaluation error

Substituting in that relation we have:

$$n = [116 \times (1.96)^2 \times 0.5 \times 0.5] / [(116 - 1) (0.07)^2 + (1.96)^2 \times 0.5 \times 0.5] = 73$$

In this substitution, the success ratio was equal to 0.5 and evaluation error equal was considered to be to 0.07. According to the obtained results, 73 companies were selected using random sampling and proportional to each industry frequency among the population and were studied as sample.

Data collection method: The related local and foreign books, thesis and magazines to the research topic have been used in writing the research literature. The related information to net profit margin and return on assets, the rate of return on equity and so the required data for calculating intellectual capital and the ratio of each share price to earnings is collected by using information of sample company's financial statements and also referring to Stock Exchange database.

Table 1: Research independent and dependent variables in terms of the research hypotheses

Hypothesis	Independent variable	Dependent variable
First hypothesis: There is a significant relationship between intellectual capital and ratio of each share price to each share earning	Intellectual capital	Ratio of each share price to each share earning
Second hypothesis: There is a significant relationship between intellectual capital and rate of return on assets	Intellectual capital	Rate of return on assets
Third hypothesis: There is a significant relationship between intellectual capital and rate of return on equity	Intellectual capital	Rate of return on equity
Fourth hypothesis: There is a significant relationship between intellectual capital and ratio of net profit to sales	Intellectual capital	Ratio of net profit to sales

Statistical methods and hypothesis testing: In some researches, it is not possible to obtain interval data or if it is possible it does not have necessary specifications. In these cases it is possible to replace the raw number with rank, although the rank data does not give us the information of raw data. Therefore, Spearman Test can be used in this regard.

Null hypothesis supposes that there is no correlation. Rank correlation coefficient is indicated with r_s . Rank correlation coefficient is calculated in the following form for paired data (x_i, y_i) and $i = 1, 2, \dots, k$: First, we give a rank to all x variables according to their values and the same process for y, then we calculate the difference between each pair rank which are shown in d_i . In the next step, the second exponent of d is calculated and finally rank correlation coefficient is calculated by this formula (Azar and Mohmeni, 2002):

$$r_s = 1 - \frac{6 \sum_{i=1}^k d_i^2}{n(n^2 - 1)}$$

For testing null hypothesis, a hypothesis which claims x and y variables are not correlated to each other and were sorted randomly because there is no need to a specific hypothesis among samples. For the large sample values ($n > 10$) r_s distribution could be approximated using normal distribution that in this case the test statistics is calculated by this formula:

$$Z = r_s \sqrt{n-1}$$

For collecting data, as being normal is one of the fundamental postulates of regression model, the normality of the research variables should be taken into account at first place. Therefore, Kolmogorov-Smirnov test was used in this regard.

Data analysis: After collecting the research data necessary for this study, the data were classified by Excel and then applied to SPSS in order to be analyzed. Then, the necessary tests were done according to the research needs. Finally, hypothesis testing results were investigated and interpreted.

RESULTS AND DISCUSSION

After analyzing data, the hypotheses were tested as follows:

The first main hypothesis: There is a significant relationship between intellectual capital and ratio of net profit margin to sales for the listed companies in Tehran Stock Exchange.

H01: There is no significant relationship between intellectual capital and ratio of net profit margin to sales for the listed companies in Tehran Stock Exchange in 2008.

Table 2: Data related to intellectual capital and ratio of net profit margin to sales relationship in 2008

Spearman P	Number	Sig.
0.512	72	0.000

Table 3: Data related to intellectual capital and ratio of net profit margin to sales relationship in 2009

Spearman P	Number	Sig.
0.442	72	0.000

Table 4: Data related to intellectual capital and ratio of net profit margin to sales relationship in 2010

Spearman P	Number	Sig.
0.540	72	0.000

Table 5: Data related to intellectual capital and ratio of net profit margin to sales relationship in 2011

Spearman P	Number	Sig.
0.583	72	0.000

According to the Table 2, it could be seen that Spearman test has become significant at the level of 1, so H_0 hypothesis is rejected. Thus, there is a relationship between intellectual capital and ratio of net profit margin to sales in 2008.

H02: There is not any significant relationship between intellectual capital and ratio of net profit margin to sales for the listed companies in Tehran Stock Exchange in 2009.

According to the Table 3, it could be seen that Spearman test has become significant at the level of 1. Therefore, H_0 hypothesis is rejected. Thus, there is a significant relationship between intellectual capital and ratio of net profit margin to sales in 2009.

H03 : There is not any significant relationship between intellectual capital and ratio of net profit margin to sales for the listed companies in Tehran Stock Exchange in 2010.

As it is clear from Table 4, Spearman test is significant ($p < 0.05$). Therefore, H_0 hypothesis is rejected. Thus, there is a significant relationship between intellectual capital and ratio of net profit margin to sales in 2010.

H04: There is no significant relationship between capital and ratio of net profit margin to sales for the listed companies in Tehran Stock Exchange in 2011.

According to the Table 5, it is clear that Spearman test is significant ($p < 0.05$). Therefore, H_0 hypothesis is rejected. Thus, there is a significant relationship between intellectual capital and ratio of net profit margin to sales in 2011.

H05: There is no significant relationship between intellectual capital and ratio of net profit margin to sales for the listed companies in Tehran Stock Exchange in 2012.

Table 6: Data related to intellectual capital and ratio of net profit margin to sales relationship in 2012

Spearman P	Number	Sig.
0.504	72	0.000

Table 7: Data related to intellectual capital and ratio of price to each share earning relationship in 2008

Spearman P	Number	Sig.
0.034	72	0.777

Table 8: Data related to intellectual capital and ratio of price to each share earning relationship in 2009

Spearman P	Number	Sig.
0.123	72	0.303

Table 9: Data related to intellectual capital and ratio of price to each share earning relationship in 2010

Spearman P	Number	Sig.
0.177	72	0.137

Table 10: Data related to intellectual capital and ratio of price to each share earning relationship in 2011

Spearman P	Number	Sig.
0.064	72	0.593

Table 11: Data related to intellectual capital and ratio of price to each share earning relationship in 2012

Spearman P	Number	Sig.
0.013	72	0.912

Table 12: Data related to intellectual capital and return on assets relationship in 2008

Spearman P	Number	Sig.
0.558	72	0.001

As it is clear from Table 6, Spearman test is significant at the level of 1. Therefore, H0 hypothesis is rejected. Thus, there is a significant relationship between intellectual capital and ratio of net profit margin to sales in 2012.

The second main hypothesis: There is a significant relationship between intellectual capital and the ratio of price to each share earnings for the listed companies in Tehran Stock Exchange.

H01 : There is no significant relationship between intellectual capital and ratio of price to each share earnings for the listed companies in Tehran Stock Exchange in 2008.

According to the Table 7, Spearman test indicated the significance of the variable ($p < 0.05$). Therefore, H0 hypothesis is confirmed. In other words, there is no relationship between intellectual capital and ratio of price to each share earnings in 2008.

H02 : There is no significant relationship between intellectual capital and ratio of price to each share earnings for the listed companies in Tehran Stock Exchange in 2009.

According to the Table 8, it could be seen that Spearman test is not significant ($p > 0.05$). Therefore, H0

hypothesis is confirmed. In fact, there is no relationship between intellectual capital and ratio of price to each share earnings in 2009.

H03 : There is no significant relationship between intellectual capital and ratio of price to each share earnings for the listed companies in Tehran Stock Exchange in 2010.

According to the Table 9, Spearman test showed that the variable is not significant. Therefore, H0 hypothesis is confirmed. In other words, there is no relationship between intellectual capital and ratio of price to each share earnings in 2010.

H04 : There is no significant relationship between Intellectual capital and ratio of price to each share earnings for the listed companies in Tehran Stock Exchange in 2011.

According to the Table 10, it could be seen that Spearman test is not significant ($p > 0.05$). In fact, H0 hypothesis is confirmed. Thus, there is no relationship between intellectual capital and ratio of price to each share earnings in 2011.

H05 : There is no significant relationship between intellectual capital and ratio of price to each share earnings for the listed companies in Tehran Stock Exchange in 2012.

According to the Table 11, it could be seen that Spearman test has not become significant at 0.05, leading to confirming null hypothesis. Thus, there is no relationship between intellectual capital and ratio of price to each share earnings in 2012.

The third main hypothesis: There is a significant relationship between intellectual capital and return on assets for the listed companies in Tehran Stock Exchange.

H01 : There is no significant relationship between intellectual capital and return on assets for the listed companies in Tehran Stock Exchange in 2008.

According to the Table 12, it could be seen that Spearman test has become significant ($p < 0.05$). Therefore, H0 hypothesis is rejected. Thus, there is a relationship between intellectual capital and return on assets in 2008.

H01 : There is no significant relationship between Intellectual capital and return on assets for the listed companies in Tehran Stock Exchange in 2009.

Table 13: Data related to intellectual capital and return on assets relationship in 2009

Spearman P	Number	Sig.
0.510	72	0.001

Table 14: Data related to intellectual capital and return on assets relationship in 2010

Spearman P	Number	Sig.
0.581	72	0.001

Table 15: Data related to intellectual capital and return on assets relationship in 2011

Spearman P	Number	Sig.
0.607	72	0.001

Table 16: Data related to intellectual capital and return on assets relationship in 2012

Spearman P	Number	Sig.
0.501	72	0.001

Table 17: Data related to intellectual capital and return on equity relationship in 2008

Spearman P	Number	Sig.
0.843	72	0.001

Table 18: Data related to intellectual capital and return on equity relationship in 2009

Spearman P	Number	Sig.
0.860	72	0.001

Table 19: Data related to intellectual capital and return on equity relationship in 2010

Spearman P	Number	Sig.
0.847	72	0.001

Table 20: Data related to intellectual capital and return on equity relationship in 2011

Spearman P	Number	Sig.
0.873	72	0.001

According to the Table 13, it could be seen that Spearman test has become significant in the level of 1, so H0 hypothesis is refused and H1 hypothesis is confirmed. Thus, there is a relationship between intellectual capital and return on assets in 2009.

H02 : There is no significant relationship between intellectual capital and return on assets for the Listed companies in Tehran Stock Exchange in 2010.

According to the Table 14, Spearman test showed that the variable is significant ($p < 0.05$). Therefore, H0 hypothesis is rejected. Thus, there is a relationship between intellectual capital and return on assets in 2010.

H03 : There is no significant relationship between Intellectual capital and return on assets for the listed companies in Tehran Stock Exchange in 2011.

As it is clear from Table 15, it could be seen that Spearman test is significant at the level of 0.05. In other

words, H0 hypothesis is rejected. Thus, there is a relationship between intellectual capital and return on assets in 2011.

H04 : There is no significant relationship between intellectual capital and return on assets for the listed companies in Tehran Stock Exchange in 2012.

According to the Table 16, Spearman test showed that the variable is significant at the level of 0.05, leading to the rejection of H0 hypothesis. Thus, we can conclude that there is a relationship between intellectual capital and return on assets in 2012.

The fourth main hypothesis: There is a significant relationship between intellectual capital and return on equity for the listed companies in Tehran Stock Exchange.

H01 : There is no significant relationship between intellectual capital and return on equity for the listed companies in Tehran Stock Exchange in 2008.

According to the Table 17, it could be seen that Spearman test has become significant in the level of 0.05. Thus, it can be concluded that there is a relationship between intellectual capital and return on equity in 2008.

H02 : There is no significant relationship between intellectual capital and return on equity for the listed companies in Tehran Stock Exchange in 2009.

According to the Table 18, Spearman test showed that the result is significant ($p < 0.05$). Therefore, H0 hypothesis is refused. In other words, there is a relationship between intellectual capital and return on equity in 2009.

H03 : There is no significant relationship between intellectual capital and return on equity for the listed companies in Tehran Stock Exchange in 2010.

According to the Table 19, Spearman test showed that the results are significant at the level of 0.05. Therefore, H0 hypothesis is rejected. In other words, there is a relationship between intellectual capital and return on equity in 2010.

H04 : There is no significant relationship between intellectual capital and return on equity for the listed companies in Tehran Stock Exchange in 2011.

According to the Table 20, the results are significant at the level of 0.05. Thus, there is a

Table 21: Data related to intellectual capital and return on equity relationship in 2012

Spearman P	Number	Sig.
0.821	72	0.001

relationship between intellectual capital and return on equity in 2011.

H05 : There is no significant relationship between intellectual capital and return on equity for the listed companies in Tehran Stock Exchange in 2012.

As it is clear from Table 21, it could be seen that the results are significant ($p < 0.05$). Thus, there is a relationship between intellectual capital and return on equity in 2012.

CONCLUSION AND RECOMMENDATIONS

The results of this study indicated that three hypothesis out of four main hypothesis were confirmed. In other words, a relationship were established between the ratio of net profit margin with intellectual capital and between and the rate of return on assets with intellectual capital and between the rate of return on equity with intellectual capital, but no relationship was established between intellectual capital and the ratio of price to each share earnings. Furthermore, the results showed that intellectual capital has the strongest relationship with return on equity.

It is not unexpected to obtain such results with considering intellectual capital concept and approach in today's knowledge-based economy which is moving toward integration and globalization.

Recommendations:

- It is recommended to the potential and de facto investors to evaluate the organization position about intellectual capitals management and utilization in order to evaluate financial situation, investigate financial performance and predict to make appropriate and logical decisions in addition to basic financial statements.
- It is recommended for Stock Exchange, Ministry of Economy and Finance, scientific assemblies and all qualified references to draft a comprehensive and applied standard about mandating the commercial units to do intellectual capital reporting, establish professional seminars and workshops before decision makers, experts, scholars and industrial firms managers to increase different level administrators' knowledge regarding intellectual capital importance and position in knowledge-based economy.

- It is recommended for Stock Exchange to oblige commercial units on some selected sectors to provide it with intellectual capitals data by providing and notifying a regulation temporarily until drafting a comprehensive standard.
- It is recommended for banks and credit institutions to put knowledgebase units, which have a special attention to intellectual capital and its utilization in business process, in their crediting program priority.
- It is recommended for brokerage firms to draft appropriate indexes and proportional to national economy situation and capacities try to classify the listed company in Stock Exchange from intellectual capital viewpoint.
- We suggest Stock Exchange, the Audit and all decision-maker and economical administrators by creating a codified system and considering the university and research centers study leading to their evaluations, policies and executive process in addition to prioritizing them to other researches.
- It is recommended for university and research centers, while attention to research priorities, to create a centralized database having the comprehensive accessibility in order to exchange study results and versatile access to the companies' transparent and accurate information which are active in economy.

Suggestion to the future researchers: According to this study, it is recommended for the future researchers to investigate about the following issues in order to clarify the issue more and enriching more the literature related to intellectual capita:

- Calculating the companies intellectual capital through other financial methods and specially Calculated Intangible Value (CIV) method and investigating its relationship to variable such as profit before tax, operative cash flow and added value.
- Studying this research topic according to different industries in order to provide more comparisons.
- Utilizing other intellectual capital evaluation quantitative and qualitative methods and investigating their relationship to other performance evaluation indicators for the listed companies in Stock Exchange.
- Studying the relationship between intellectual capital and accounting variables and financial ratios.
- Investigating the problems of accounting and management systems in order to intellectual capital evaluation and management and introducing a

designed model for accounting and management information systems in this regard.

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