Investigate the Relationship between Intellectual Capital of Board and Financial Performance of Accepted Companies in Tehran Stock Exchange

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ABSTRACT

In recent decade development of information and rapid advancement of technology has created great change in all aspects of human life and activities and has caused moving towards the knowledge-based economy and has led to change dominant paradigm on the industrial economy. So it can be seen today knowledge and Information-based economy that the basis and foundation on which is based on the intangible assets and intellectual capital. In such environment, intellectual capital of organizations has been considered more than past as a competitive advantage. This study aimed to investigate the effects of intellectual capital of the board of directors on firm's Value and financial performance of listed companies in Tehran Stock Exchange and the main purpose of this study is to investigate the effects of the variables on each other in the field of the knowledge-based sectors. Hypotheses are based on three variables: Number of directors with Ph.D. degree, Tobin's Q and Return on Equity and in sample of 60 listed companies in Tehran Stock Exchange and using data for the years 1388-1390, were analyzed using correlation and regression. The results of this analysis indicate that:The number of scientists on the board has a positive impact on the firm's Value and financial performance in knowledge-based sectors.

KEYWORDS: corporate governance, intellectual capital, firm value, financialPerformance, knowledge-based companies.

1. INTRODUCTION

In order to have a stable and continuous presence in the world of business and competition, organizations should focus their activities on the axis of knowledge. Although knowledge is a necessity when it comes to the survival of organizations, and the key to the success of organizations depends on how well it is attained and how deeply it is absorbed in all levels, competition is the first principle of survival and knowledge is the prerequisite of entering the competition arena (Halim, 2010). Until mid-twentieth century it was chiefly believed that the main reason behind the backwardness of developing countries is the deficiency of financial and physical capital, but today it has been proved that the injection of such capital cannot accelerate the process of development in these countries. Only the countries that have strong official structures and efficient and specialized human resources could properly apply financial and physical resources in the process of further development and progress. In today's global economy, the generation and increasing of wealth mainly comes from subtle assets, especially intellectual ones; meanwhile, the economic growth of most successful organizations suggest that increasing wealth depends more on subtle assets than physical ones (Shojaei et al, 2010). In respect to what just mentioned above, intellectual capital is the key factor in promoting the efficiency and organizational value. The most important issue concerning intellectual capital is how this asset is conceptualized, understood, evaluated, and measured (Shojaei and Baghbanian, 2009). According to Iran's 20-Year Outlook, the country must rank first in the region in respect to commerce and economy, therefore in his words for the Iranian New Year, the Supreme Leader of Iran introduced the approaches by which Iran could acquire such a rank in the region as being dependent on emphasizing on and promoting a knowledge-oriented economy. Corporate intellectual capital has well established its position and role in the constitution of competitive profits, financial performance and creating organizational value in the global economy literature. Numerous experimental studies in different fields of commerce show that wise and experienced personnel and managers affect the value and performance of a company in a positive way. All these studies have actually focused on the intellectual capital of an organization's human resources and ignored the intellectual capital of its board of directors. In a similar manner, even the most comprehensive studies on corporate governance have only explained different structures and processes of it but they have not mentioned anything about the intellectual capital criteria or the knowledge of the board of directors. Therefore, there will remain a critical gap in the concept of good corporate governance that basically limits the understanding of the effect of the corporate governance on a corporation's performance and value (Calita, 2011). The results of experimental researches in other countries show that a proper approach in corporate governance will lead to a corporation's higher value and performance. However, only a few researches have

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been done on intellectual capital and especially its relation with firm value and performance in Iran. In respect to the fact that privatization and government downsizing processes have become one of the top economic topics of the day in Iran, a review of the effects of intellectual capital mechanisms on the corporations' value and performance in Iran's capital market is of great importance (Nikbakht et al, 2010).

Chapter 2 introduces the theoretical framework of the research. In chapter 3, the research methodology is explained, and in chapter 4, the research findings are reviewed. Finally, in the last chapter we have conclusion and suggestions.

2. RESEARCH LITERATURE

In this chapter, some researches done in the same field were mentioned:

In his research, Joui (2008) studied the relation between the intellectual capital and the market value of 893 companies in US electronic industry using Olson Regression Model. The results of his research showed that there was a significant and positive relation between the intellectual capital and the market value of companies. In his research, Hung (2007) also studied the relation between the intellectual capital and the performance of 150 active companies in SGX using the regression model. The results of his research showed that there was a positive correlation between both the intellectual capital and the companies' performance, and the intellectual capital and the future performance of companies. Bin Ismail (2005) carried out a research titled "A Review of the Effect of Intellectual Capital on the Performance of Telecom Co." in Malaysia. The statistical population of this research were general and deputy managers working in different sections of 14 branches of Telecom Co. The independent variables of the research included human capital, structural capital, relational capital, intellectual capital, knowledge management, and intellectual capital management. The only dependent variable of the research was performance improvement. the results of this research showed that relational, human, structural, and intellectual capital and its management correlated positively to the performance, while the relation between knowledge management and performance was an indirect one. With a better management and a higher intellectual capital, Malaysia's Telecom Company will perform better in the future. In their research, Belko et al (2006) assessed the relationship between corporate governance indices and the market value of 219 companies in Russia. They used Tobin's q Ratio to measure the market value of their chosen companies. The results showed that a company's value could be predicted based on its governance. Ditmar and Smith (2005) studied 2 criteria of corporate governance and their relation with companies' market value. They found out that in poorly governed companies, every one-dollar change in cash caused a 42% to 88% change in the market value, while in well governed companies this amount doubles. In his research, Bloc (2002) sought an answer to this question: Is corporate governance a measure in predicting a company's value? He defined one corporate governance index for each company and all companies in KRX (Korea Exchange) ranging from 0 to 100. The index was defined according to 5 important elements of corporate governance including shareholders equity, the structure of the board of directors, the board of directors' procedures, transparentization, and ownership equity. The results of his research showed that the companies with a more efficient governance system and higher governance indices had a better performance (less capital and sales costs), but they were not necessarily predicted to be more profitable in the future. Also in these companies, the value of investors was higher, and the shareholders received similar returns. Bavari et al (2003) studied the effect of corporate governance on European companies' dividend yield, value and performance. Controller shareholder, the percentage of the dormant members of the board of directors, and the transparency of the information were used to measure corporate governance. Also, to measure dependent variables, Tobin's q, net profit margin, and return on assets were used. The results of the research confirmed a positive relation between the corporate governance mechanisms and the firm value. However, contrary to what was expected, there was a negative relation between corporate governance standards and performance ratios. In their research, Nandelstadt and Rosenberg (2003) studied the effect of corporate governance mechanisms on the firm value. To measure the corporate governance they used the number of directors board's sessions, the number of non-executive directors, and the number of institutional shareholders. The results of their research showed that the companies with a high level of corporate governance had a higher value (Tobin's q). Aman et al (2011) studied 64 characteristics of corporate governance in 6 groups of directors' board accountability, financial information disclosure and domestic control, shareholders equity, rewards, market control, and corporate behavior in 22 developed countries from 2003 to 2007 and concluded that there was a strong positive relation between corporate governance characteristics and the firm value. Using value added intellectual coefficient method, Chen et al (2005) studied the companies admitted to Taiwan Stock Exchange Corporation in 1992-2002 interval, and concluded that the intellectual capital of companies had a positive and significant effect on their market value and financial performance, and that research and development costs could affect a company's profitability and value. Tan et al (2007) also studied the relation between the intellectual capital and the financial performance of 150 admitted companies to SGX (Singapore Exchange) in 2000-2002 interval using value added intellectual coefficient method. The results of their research suggested that there was a positive correlation between the intellectual capital and the performance of a company and a significant correlation between the

intellectual capital and the future performance of the same company. HanokuBathoula (2008) studied the characteristics of directors' board and the performance of 207 companies admitted to NZX (New Zealand Exchange) from 2004 to 2007 using their available financial data. The findings of his research showed that from among different characteristics of the board of directors, only the rate of return on assets and proprietary ratio had a significant and positive relation with a company's performance, while the relation of the number of directors' board members with the same company's performance was a significant and negative one. Shiou (2006) studied the relation between the intellectual capital and the financial performance of 80 Taiwanese companies in 2003. The findings of his research suggested that the value added intellectual coefficient had a positive correlation with profitability and market value and a negative correlation with productivity. RiahiBolouki (2003) studied the relation between the intellectual capital and the performance of American multinational companies in the interval of 1992 to 1996. He used the number of requests for brand preservation as the measure of intellectual capital and the ratio of value added to all the assets as the measure of performance, and concluded that there was a positive and significant relation between the performance and the intellectual capital of the American multinational companies studied. Fier and Williams (2003) studied the relation between the value added intellectual, human, and structural capitals and profitability, productivity, and the market value of the companies admitted to JSX (Johannesburg Stock Exchange) of South Africa. The statistical sample of their research was 75 companies admitted to JSX in 2001. Using correlation analysis and linear regression methods, they concluded that the intellectual capital was the most important factor that determined the performance of companies in South Africa.

All the above-mentioned researches have focused on the intellectual capital of human resources and ignored the intellectual capital of a company's board of directors. In a similar manner, even the most comprehensive studies on corporate governance have only explained different structures and processes of it but they have not mentioned anything about the intellectual capital criteria or the knowledge of the board of directors. As a result, there has remained a critical gap in the concept of good corporate governance that basically limits the understanding of the effect of the corporate governance on a corporation's performance and value. Therefore, this research focused on the study of the gap between 2 major research literature proceedings that are research on the intellectual capital and corporate governance, and developed the criteria of the directors board's intellectual capital to be used in the future researches. From the experimental point of view, this research identified the considerable role of the directors board's intellectual capital, and this way it took a part in a long-term strategy concerning the effect of corporate governance on the firm value and performance and also the reaction of investors in respect to the changes in the structure of the board of directors.

3. METHODOLOGY

This research is a practical study in respect to its goals. A practical research is a research that uses theories, rules, principles, and techniques to resolve actual and executive issues. The current research is a descriptive study concerning its methodology. Since this research studied the relation between the intellectual capital of the board of directors and the firm value and performance, it could be defined as a correlative descriptive research. So, multivariate regression method was used to test the hypotheses of the research, and regression model default tests to ensure the reliability of the results. Research literature was reviewed through library studies. Dependent and independent variables' data was collected from financial lists and descriptive notes of sample companies registered in Rahavard Software, AryaSahm Software of Tehran Stock Exchange, and Research, Development, and Islamic Studies website of Tehran Stock Exchange, and the DVDs containing financial data of the companies admitted to the exchange in the 3-year interval of 2009 to 2011. The data concerning the characteristics of the directors board was extracted from summary reports of Ordinary General Assembly's decisions issued by Tehran Stock Exchange and also the annual report of the directors board's performance presented to the Shareholders Ordinary General Assembly. Research variables were calculated using the data already inserted into MS Excel datasheets after collection, and SPSS was used for statistical calculations. Data was analyzed descriptively and inferentially. The statistical population of this research was all the companies admitted to Tehran Stock Exchange. The reason behind choosing this statistical population was that the financial data of the admitted companies to the exchange was accessible, and that such data was homogeneous in respect to the specific rules and regulations of Tehran Stock Exchange. This way, the data could be analyzed more easily. The research sample included 60 companies (180 observations) that were chosen using filtering technique based on the 4 criteria below:

1. Full detailed data of the annual financial statements of the companies admitted to Tehran Stock Exchange is accessible for the 3-year interval of 2009 to 2011.

2. Each company to be studied shall be admitted to Tehran Stock Exchange 2 years before the start of the research interval.

3. Companies under study must remain in the exchange until the end of March 21, 2011.

4. To increase or keep the ability to compare the financial data acquired, keep the homogeneity of reports' dates, and eliminate seasonal effects, all the companies' financial year must end at March 20, 2011.

3.1. Research Variables

3.1.1. Independent Variables

- Directors with PhD degree: The number of directors in the directors board who have PhD degree.
- Knowledge: is a qualitative variable capable of assuming two values: 1 for the companies present in the knowledge-oriented industries and 0 for other companies.
- The head of directors board with PhD degree: If the head of the directors board has a PhD degree, we will give the value of 1 to this variable, and if not, 0.

3.1.2. Dependent Variables

- Tobin's q: It is measured by adding all the assets then subtracting the total from shareholders equity book value, and then adding the shareholders equity market value to the results which is then divided by the total assets.
- Industry adjusted Tobin's q: measured by subtracting industry median Tobin's q from a company's Tobin's q.
- The rate of return on shareholders equity: is one of the financial indices that is attained by diving net profits by the total shareholders equity.
- Earnings per share: shows the earnings for each share and is calculated by subtracting a company's taxes from its profits or losses and then dividing the result by the number of shares (Calita, 2011).

3.1.3. Control Variables

- Company size: attained through the natural logarithm of sales revenue.
- Company leverage: calculated by dividing the total debts by the total assets.

3.2. Research Hypotheses

According to the relation between the research variables, 2 hypotheses are presented as below:

Hypothesis 1: The value of a company has a positive relation with the number of experts in the board of directors in knowledge-oriented industries. The following models are used to test this hypothesis.

1)$TOBINSQ_t = \beta_0 + \beta_1 PHDNUM_t + \beta_2 KNOWLEDGE_t + \beta_3 PHDNUM \times KNOWLEDGE_t + \beta_4 PHDCHAIR_t + \beta_5 PHDCHAIR \times KNOWLEDGE_t + \beta_6 SIZE_t + \beta_7 LEVERAGE_t + \varepsilon$

2)$ADJUSTEDTOBINSQ_t = \beta_0 + \beta_1 PHDNUM_t + \beta_2 KNOWLEDGE_t + \beta_3 PHDNUM \times KNOWLEDGE_t + \beta_4 PHDCHAIR_t + \beta_5 PHDCHAIR \times KNOWLEDGE_t + \beta_6 SIZE_t + \beta_7 LEVERAGE_t + \varepsilon$

Hypothesis 2: The performance of a company has a positive relation with the number of experts in the board of directors in knowledge-oriented industries. The following models are used to test this hypothesis.

3)$ROE_t = \beta_0 + \beta_1 PHDNUM_t + \beta_2 KNOWLEDGE_t + \beta_3 PHDNUM \times KNOWLEDGEt + \beta_4 PHDCHAIR_t + \beta_5 PHDCHAIR \times KNOWLEDGE_t + \beta_6 SIZE_t + \beta_7 LEVERAGE_t + \varepsilon$

4)$EPS_t = \beta_0 + \beta_1 PHDNUM_t + \beta_2 KNOWLEDGE_t + \beta_3 PHDNUM \times KNOWLEDGE_t + \beta_4 PHDCHAIR_t + \beta_5 PHDCHAIR \times KNOWLEDGE_t + \beta_6 SIZE_t + \beta_7 LEVERAGE_t + \varepsilon$

4. RESEARCH RESULTS

4.1. Testing the Assumptions of the Regression Model

Assumptions of the regression model must be tested before using the model (HassasYeganeh et al, 2009). So, Durbin-Watson, multicollienarity, and errors normality tests were performed. The results of these tests were as follows:

4.1.1. Durbin-Watson Test

One of the assumptions of regression is the independence of errors. In case this assumption is not verified, and errors are correlated to each other, regression (model) cannot be used. Durbin-Watson Test was used to test this assumption. According to Table 1, the statistic of this test for hypotheses 1 and 2 was a value between 1.5 and 2.5. Therefore, it could be concluded that the errors were independent, and regression model could be used to test the hypotheses.

Table 1: The results of regression errors autocorrelation test for hypothesis 1 & 2

Durbin-Watson	Regression Model
1.925	1
1.935	2
1.998	3
2.160	4

4.1.2. Multicollienarity Test

The rate of linear relation between the independent variables of the regression model was measured using 2 indices of variance inflation tolerance. According to the fact that tolerance is a ratio, its value varies between 0 and 1. Any value close to 1 means that a small part of an independent variable dispersion could be explained by referring to other independent variables, while any value close to 0 means that a variable is almost a linear combination of other independent variables, and data are multicollienar, so using regression would be problematic. Variance inflation factor is the inverse of tolerance, and the higher is its value, the higher would be the regression coefficients variance which makes regression an inappropriate choice for prediction. Table 2 shows the results of regression model independent variables multicollienarity test for hypotheses 1 and 2.

Table 2: The results of regression model independent variables multicollinearity test for hypotheses 1 and 2

Regression Model	Variables	Multi Collinearity	
		Tolerance	VIF
1	Director with PhD Degree	0.851	1.849
	Knowledge	0.756	1.800
	Chairmanwith PhD Degree	0.768	1.717
2	Director with PhD Degree	0.351	1.849
	Knowledge	0.756	1.800
	Chairmanwith PhD Degree	0.868	1.717

Regression Model	Variables	Multi Collinearity	
		Tolerance	VIF
3	Director with PhD Degree	0.751	1.849
	Knowledge	0.756	1.800
	Chairmanwith PhD Degree	0.768	1.717
4	Director with PhD Degree	0.851	1.849
	Knowledge	0.756	1.800
	Chairmanwith PhD Degree	0868	1.717

According to Table 2, the value of tolerance for all the independent variables is close to 1, therefore, data are not multicollinear, and there is nothing wrong with using the regression.

3.1.4. Normality Test of Errors

One of the regression assumptions that must be tested is that errors are normally distributed and their average and standard deviation is 0 and 1, respectively. It's obvious that until this assumption is not verified, regression model cannot be used. Table 3 shows the results of normality test of regression errors for hypotheses 1 and 2.

Table 3: The results of normality test of regression errors for hypotheses 1 & 2

	Min	Max	Mean	SD	Number
Standard Error of Model 1	-1.912	11.141	0.00	0.969	180
Standard Error of Model 2	-2.751	11.100	0.00	0.969	180
Standard Error of Model 3	-2.200	6.553	0.00	0.969	180
Standard Error of Model 4	-3.042	4.404	0.00	0.969	180

According to Table 3, the standard error of models 1, 2, 3, and 4 is normally distributed with an average of 0 and a standard deviation of 0.969 (close to 1). Therefore, there is nothing wrong with using the regression.

4.2. Regression Significance Test

Using Fisher Statistic, this test is used to determine the significance of a regression model. In order to confirm the significance of the regression model, the calculated statistic must be higher than Fisher Statistic. To conclude that, sig statistic could be used and should be less than the error level (α=5%). Table 4 shows the results of regression model significance test for the research hypotheses.

Table 4: The results of regression model significance test for hypotheses 1 & 2.

Regression Model	Sum of squares	Degrees of freedom	Mean squares	F statistic	Significance level
1	304322.4	11	27665.670	6.833	0.000
2	263240.1	11	23930.922	5.659	0.000

Regression Model	Sum of squares	Degrees of freedom	Mean squares	F statistic	Significance level
1	136332.2	11	12393.834	6.819	0.000
2	1.18E+08	11	1077711.08	13.546	0.000

According to Table 4 and the fact that the sig value for hypotheses 1 and 2 is 0 and less than 5%, the significance of the regression model could be confirmed for hypotheses 1 and 2.

4.3. Coefficients Significance Test

Besides determining the significance of the coefficients, this test also specifies the direction of the coefficients' effects on dependent variables. t statistic was used to determine the significance of coefficients instead of which sig column could also be used. After the significance of the coefficients was confirmed, the calculated coefficients in beta column were used to determine the same effect of independent variable on dependent variable in respect to size and direction. Table 5 shows the results of regression coefficients significance test for the research hypotheses.

Table 5: The results of regression coefficients significance test for hypotheses 1 & 2.

Significance level	T statistic	Standard coefficients	Nonstandard coefficients		Variables	Regression Model
		β	Standard Error	Factor Variable		
0.018	-2.391	-	51.017	-121.002	Intercept	1
0.004	3.201	0.022	5.543	-1.112	Number of Director with PhD	
0.018	2.852	0.116	13.960	1.877	knowledge	
0.002	3.119	0.434	8.100	5.263	Number of PhD* knowledge	
0.017	3.219	0.023	19.973	4.379	Chairman with PhD	
0.010	3.113	.015	31.838	3.612	Chairman with PhD* knowledge	
0.001	3.288	0.236	7.588	24.945	Measure	
0.021	-2.609	-0.125	21.318	-34.312	Leverage	
Significance level	T statistic	Standardcoefficients	Nonstandardcoefficients		Variables	Regression Model
		β	Standard Error	Factor Variable		
0.035	-2.127	-	52.141	-110.926	Intercept	2
0.002	3.213	0.024	5.655	1.206	Number of Director with PhD	
0.002	3.284	0.114	14.267	1.316	knowledge	
0.005	2.848	0.408	8.278	3.577	Number of PhD* knowledge	
0.008	2.197	0.021	20.413	-4.020	Chairman with PhD	
0.001	3.124	0.017	32.539	4.046	Chairman with PhD* knowledge	
0.004	2.929	0.216	7.755	22.713	Measure	
0.014	-2.810	-0.118	21.788	-32.266	Leverage	

It's quite clear in the sig column in the above table that the sig statistic for the variable of directors with PhD degree for model 1, 2, 3, and 4 is 0.004, 0.002, 0.022, and 0.000, respectively. According to the fact that the error level assumed for this research was 5%, both hypotheses were affirmed.

5. Conclusion and Suggestions

Former researches in this field have accurately and comprehensively analyzed the structure, rules, and regulations of corporate governance, but none of them have ever mentioned something about the intellectual capital or the knowledge of the board of directors, so, there has been a considerably limited understanding of what role corporate governance plays in organizational value creation. The results of this research showed that the directors boards with more specialized members take more efficient decisions concerning research and development, and consequently, the could observe the decisions taken by less specialized directors boards more efficiently. It is expected that directors with a scientific history have more insight in decision making compared to other directors. Highly specialized directors boards choose long-term projects that maximize the current value of their firm. Expert members of a board of directors are considered to be valuable assets who drive better performance in knowledge-oriented industries. More generally, the intellectual capital of a board of directors is an important aspect of corporate governance and a source to create organizational value. The results of this research could be generally summed up in 3 categories: First, this research bridged the gap between the researches on corporate intellectual capital and researches on corporate governance, and developed the criteria of directors boards' intellectual capital so that they could be used in future researches. This research also showed that the directors' knowledge has more effect on the firm value compared to other proper criteria of corporate governance used in former researches. Second, the current research provides more ground to develop the

researches on the effect of corporate governance on the firm value and the reaction of the investors to the changes in the structure of the board of directors. Third, this research highlights the importance of controlling implicit factors such as the effects of a specific industry in corporate governance researches.

According to the research results concerning the effect of directors board's intellectual capital on the firm value and performance, it is recommended that the authorities of companies and organizations take account of the following:

1. Members of the directors board inexperienced in finance and accounting are less capable of spotting the problems in financial reporting. Having an experienced member in finance could make other members vigilant and sensible. Therefore, in order to control the management and take part in decision making, it is recommended that the board of directors acquires different skills in, say, accounting, banking and law so that it could take effective steps in increasing the firm value.

2. According to the fact that privatization and government downsizing have become one of the top economic topics of the day in Iran, enacting and executing a corporate governance act in which special attention is paid to the corporate governance code and especially the board of directors as soon as possible seems necessary.

3. Knowledge-oriented companies shall use the financial performance criteria as a basis to reward the directors and personnel for their services and increase their motivation.

4. It is recommended that banks and credit institutes prioritize establishing knowledge-oriented businesses in their credit-giving plans where they pay special attention to intellectual capital and applying it in business processes.

Based on the results of the current research and to put more trust in its subject, some suggestions are made below for the future researches. Upon finishing this research, many questions about the intellectual capital and corporate governance rose in our minds that could serve as the research questions or hypotheses of future researches. Some of these questions or ideas were as below:

1. What is the relation between the corporate governance index and the knowledge-oriented companies' value?

2. What is the relation between the characteristics of directors board and the value of non-knowledge oriented companies admitted to Tehran Stock Exchange?

3. Studying the relation between the intellectual capital and companies' market response

4. What is the effect of the structure of directors board on the performance of knowledge-oriented companies admitted to Tehran Stock Exchange?

5. Implementing the current research for each of the industries present in Tehran Stock Exchange

6. Implementing the current research in different time intervals

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