

# The mediating role of intellectual capital in the relationship between corporate governance and financial performance in the Tehran Stock Exchange

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## Abstract

The purpose of this study is to evaluate the effect of corporate governance mechanisms on the financial performance of firms and the mediating role of intellectual capital in this relationship. The study population consists of the companies listed on the Tehran Stock Exchange. Using systematic elimination, 98 companies were selected as the final sample, covering the period 2009-2014. The results indicate that corporate governance mechanisms have no significant effect on intellectual capital. The only corporate governance indicator to have no effect on financial performance is the percentage of institutional investors. However, the independence of the board directors, the percentage of free float and board size all have a positive impact on financial performance. Other results showed that intellectual capital has a negative effect on financial performance. Moreover, it was revealed that intellectual capital has a negative mediating role only in the relationships of board independence, the percentage of free float and board size with financial performance.

**Keywords:** Corporate governance, Financial performance, Intellectual capital, Tehran Stock Exchange.

**JEL classification:** G30.

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# El rol del capital intelectual como figura mediadora en la relación entre la gobernanza corporativa y el rendimiento financiero en la Bolsa de Teherán

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## Resumen

El objetivo de este artículo es evaluar el efecto de los mecanismos de gobernanza corporativa en el rendimiento financiero de las empresas, así como el papel mediador del capital intelectual en esta relación. La población objeto de estudio es, inicialmente, el conjunto de compañías que cotizan en la Bolsa de Teherán. La muestra final, sin embargo, resulta de un proceso de selección sistemática y se compone de 98 empresas. El periodo objeto de estudio es 2009-2014. Los resultados obtenidos indican que los mecanismos de gobernanza corporativa no tienen efecto alguno en el capital intelectual. Entre los mecanismos de gobernanza corporativa, únicamente el porcentaje de inversores institucionales no tiene un impacto significativo en el rendimiento financiero. Sin embargo, la independencia del consejo de dirección, el porcentaje mínimo de acciones negociadas en el mercado y el tamaño del consejo afectan dicho rendimiento positivamente. Otro resultado interesante es que el capital intelectual tiene un efecto negativo en el rendimiento financiero; además, únicamente tiene un papel mediador negativo en la relación entre la independencia de los consejeros, el porcentaje mínimo de acciones negociadas en el mercado y el tamaño del consejo de dirección con el rendimiento financiero.

## Palabras clave:

Gobernanza corporativa, rendimiento financiero, capital intelectual, Bolsa de Teherán.

## ■ 1. Introduction

With the separation of ownership and management in stock companies, managers run the company as the shareholders' representative. The formation of the agency relationship creates a conflict of interest between the managers and shareholders which is called the agency problem (Florakcis, 2008). This means that the managers are given the opportunity to make decisions which are in their interest but against the interests of the shareholders. In the agency relationship, wealth maximization is the owners' main purpose; therefore, in order to achieve this goal, the work of the representative is monitored and their performance is evaluated. Solving the agency problem goes some way to reassuring the shareholders whose wealth the managers are trying to maximize. In order to ensure that the companies are accountable to people and stakeholders, adequate supervision should be provided (Nikoukar *et al.*, 2014).

Applying surveillance and supervision requires appropriate mechanisms. One of these mechanisms is to design and implement proper corporate governance in the companies. Corporate governance is targeted, above all, at ensuring the company's long-term survival; hence, it aims at supporting the interests of shareholders against the company managers. It also prevents the unwanted transfer of wealth among different groups as well as the violation of the rights of the public and minority shareholders. Reducing agency costs leads to an increase in corporate value; hence, selecting an appropriate corporate governance structure can, by influencing the agency costs, increase corporate value and, thus, further the interests of shareholders and other stakeholders. Therefore, theoretically, it is expected that corporate governance affects companies' financial performance, because effective corporate governance reduces undesirable outcomes caused by the conflict of the interests between the managers and owners, such as misuse of power (Nikoukar *et al.*, 2014). Literature review shows that corporate governance is considered one of the factors affecting companies' financial performance. Among the objectives of corporate governance, increased confidence in corporate activities and management policies are in line with the interests of shareholders and stakeholders in general, thus a significant relationship can be expected between the mechanisms of corporate governance and companies' financial performance (Moradi and Rostami, 2012).

On the other hand, today's world has left behind the industrial economy and has entered a knowledge-based economy. A knowledge-based economy is an economy in which the production and utilization of knowledge plays a major role in the process of wealth creation. One of the distinctive features of such an economy is enormous investment in human capital and information and communication technology. The new knowledge-based economy provides a potentially unlimited re-

source, because human capacity is unlimited in the creation of knowledge, and intangible assets and intellectual capital are complementary to physical assets (Namazi and Ebrahimi, 2009). Nowadays, thanks to the production of knowledge and information as well as wealth creation in the knowledge-based economy, intellectual capital can play an important role in creating value added and boosting GDP. Therefore, in business, the financial performance of companies can be affected by intellectual assets and human capital (Abbasi and Goldi-Sadegh, 2010). In today's knowledge-based environment, intellectual capital is not only an important part of a company's capital, but also provides a sustainable competitive advantage for the organization. Thus, the effectiveness and efficiency of the organization depend on the attention to knowledge and intellectual capital. Accordingly, through understanding the nature of such an important concept, as well as methods to measure and evaluate it, the organization can plan, optimize, control, and constantly monitor its intellectual capital (Ahmadian and Ghorbani, 2013). Intellectual capital plays a key role in the success of firms, and among the components of intellectual capital, human and communication capital play an important role, particularly as companies are starting out (Abdullaha and Sofiana, 2012). In line with the above, the valuation and management of intellectual capital have become crucial for companies. Managers should be aware of the company's intellectual capital in order to manage it effectively, and users should take it into account so that they can predict the company's future and make informed decisions. Therefore, correct identification and valuation of intellectual capital is essential for the managers and users of financial statements, and its importance is increasing day by day.

Accordingly, this study intends to investigate the effect of corporate governance mechanisms on companies' financial performance; then, it will examine the mediating role of intellectual capital in the relationship between corporate governance mechanisms and companies' financial performance. To this end, after introducing the theoretical bases of the study, the related empirical literature will be examined. Then, the methodology of the study will be discussed. After presenting the research findings and results, some recommendations and limitations are outlined.

## ■ 2. Literature review

### 2.1. Corporate governance mechanisms

At the beginning of this new millennium, corporate governance is one of the most common phrases in the lexicon of international trade. The collapse of large companies like Enron and WorldCom in America in recent years has drawn attention to the role of corporate governance in preventing such collapses, and professional

associations, universities, and legislative institutions have shown an extensive interest in this issue (Hassas Yeganeh, 2006). In 2004, the International Federation of Accountants defined corporate governance as “the methods used by boards of directors and executive directors to determine the strategic direction which ensures the achievement of objectives, risk control and responsible use of company resources”. In 1992, the UK Cadbury Committee described corporate governance as: “the system by which companies are directed and controlled”. In a narrow sense, corporate governance can be defined as the relationship between the company and its shareholders, while in a broader sense, it can be considered as the relationship between the company and society. The ultimate objective of corporate governance is to achieve four main goals of accountability, transparency, fairness and respect for the rights of all interest groups in society (Hassas Yeganeh, 2006).

The corporate governance mechanisms of CEO-duality, the independence of the board of directors, the percentage of institutional investors, the percentage of free float, the state ownership and influence, and the board size are considered in this research. Duality refers to a situation where a person in the company holds two posts: CEO and president of the board of directors. The presence of non-executive directors in the board of directors represents the independence of the board of directors. The more independent the board of directors is, the more efficient it will be. Institutional shareholder refers to those shareholders who own more than five percent of investee companies’ shares. The ownership percentage of institutional shareholders in any company is calculated by analysing the corporate governance structure and collecting the ownership percentage of institutional shareholders (Moradi and Rostami, 2012). Morgan Stanley defines free float shares as a proportion of the company’s shares which are tradable in the market but are not held with any management purpose. Finally, board size refers to the number of board members.

## 2.2. Intellectual capital and its dimensions

Intellectual capital includes intellectual materials such as knowledge, information, intellectual property and experience, which create wealth. However, there is not yet any universally-accepted definition for it (Stewart, 1997). Some authors describe intellectual capital as a set of information and applied knowledge for the creation of value in the organization (Edvinsson and Malone, 1997), while others define it as an extensive organizational knowledge which is unique to each company and allows it to continuously adapt to changing and developing conditions (Mouritsen, 1998), or a set of knowledge-based assets/properties which are specific to an organization and which, by adding value for key stakeholders, boost its competitiveness (Marr, 2004).

In general, intellectual capital is divided into three dimensions: human capital, structural (organizational) capital, and communication (customer) capital. Human capital represents the knowledge of the people in an organization. Bontis describes human capital as an organization's collective ability to extract the best solutions from the knowledge of individuals (Bontis, 1998). Structural capital consists of all non-human knowledge resources including databases, organizational charts, operating instructions for the processes, strategies, and the organization's executive programmes (Roos and Roos, 1997). Brooking (1996), in the context of financial markets, refers to customers, their loyalty and distribution channels, which are related to customer capital.

### 2.3. The effect of corporate governance and intellectual capital on financial performance

Proper corporate governance facilitates effective management and control of business units and, hence, helps provide all stakeholders with optimal returns. Research in the field of corporate governance is based on agency theory and focuses on the issue of conflict of interest. Representation theory suggests that the companies with a better corporate governance structure have a higher value and perform better. It also suggests that the companies with concentration of ownership are better managed and monitored, because major shareholders have sufficient motivation and ability to control the manager and increase the company's efficiency (Sami *et al.*, 2009). Dittmar and Marth-Smith (2007) showed in their research that the companies with better corporate governance mechanisms report better performance and higher value. With the arrival of the knowledge-based economy, organizations' knowledge is considered more valuable than other production factors such as land, capital, machinery and so on. Therefore, in this kind of economy, knowledge is the most important production factor and represents organizations' most important competitive advantage (Seetharaman *et al.*, 2002). The intangible aspect of the economy is based on intellectual capital and its main component is knowledge and information. All kinds of organizations need knowledge and information in order to participate in today's markets and improve their performance (Khavandkar and Motaghi, 2009). Additionally, in today's knowledge-based societies and in order for companies to ensure sustained profitability, the intellectual capital employed plays a more important role than the financial return on capital.

## ■ 3. Research background

A study conducted by Ho and Williams (2003) examined 286 companies including 84 companies from South Africa, 94 Swedish companies and 108 UK companies, and found out that there is a significant relationship between board structure and

corporate performance. In their cross-country analysis of corporate governance, Aggarwal *et al.* (2006) concluded that the companies with stronger corporate governance mechanisms have a higher market value. They also concluded that some corporate governance mechanisms such as board structure and audit committees are directly related to the value of the company. Tan *et al.* (2007) focused on the relation between companies' intellectual capital and their financial returns. To that end, they used the Pulik model and, focusing on Asia, obtained information on 150 public companies in the Singapore Stock Exchange between 2000 and 2002. Then, using partial least squares (PLS) statistical analysis, they examined the relationship between, on the one hand, three dimensions of capital including human capital, structural capital, and communication capital, and on the other hand, the financial performance of companies based on return on equity, earnings per share, and total return on common stock. The results showed that, first, there is a significant positive relationship between intellectual capital and companies' current and future financial performance.

Second, it was found that the impact of intellectual capital on companies' financial performance varies by industry. Bramhandkar *et al.* (2007) investigated the effect of intellectual capital on the organizational performance of 139 pharmaceutical companies; the performance of the companies was measured based on return on assets, return on equity, return on investment and risk. The results showed that there is no significant relationship between the components of intellectual capital and the performance of the companies. Maditinos *et al.* (2010) used the Belkoy method to calculate the value-added intellectual capital coefficients. They evaluated the impact of intellectual capital on the market value of 96 companies in Athens.

Regarding the impact of intellectual capital components on financial performance and market value, they found a significant relationship only between human capital and financial performance. Hemmati *et al.* (2013) examined the relationship between intellectual capital and the market value of the companies listed on the Tehran Stock Exchange. The study period was 2005-2009 and the selected sample consisted of 130 companies. Their results suggested that there is a significant positive relationship between intellectual capital and the market value of the companies. Yahyazadehfar *et al.* (2014), using LISREL software, examined the relationship between intellectual capital and the financial performance of the companies listed on the Tehran Stock Exchange during the period 2003-2008.

Their findings showed that return on equity and total return on common stock are directly related with only one of the intellectual capital variables, namely communication capital. Moreover, return on assets and earnings per share are directly related with two intellectual capital variables: communication capital and human capital. In addition, return on investment is directly related with all three intellectual capital vari-

ables: human, communication, and structural capital. Arifin *et al.* (2014), using information on 26 companies in the banking sector between 2008 and 2013, investigated the impact of corporate governance and components of intellectual capital on the financial performance and value of the companies, using the GSCA method. The results showed that corporate governance has a significant impact on the financial performance and value of the companies. Moreover, the impact of the components of intellectual capital on the financial performance and value of the companies was confirmed. Shoorvarzi *et al.* (2015) examined the relationship between corporate governance and firm performance in 151 companies, using fuzzy regression. According to the results of this research, the presence of non-executive members in the board of directors and the presence of institutional owners are significantly related with the performance of the company. Furthermore, no significant relationship was observed between CEO-duality and the performance of the company.

#### ■ 4. Research hypotheses

In light of the above, the main hypotheses of this research are as follows:

1. Corporate governance mechanisms have an impact on the intellectual capital of the companies listed on the Tehran Stock Exchange.
2. Intellectual capital has an impact on the financial performance of the companies listed on the Tehran Stock Exchange.
3. Corporate governance mechanisms have an impact on the financial performance of the companies listed on the Tehran Stock Exchange.
4. Intellectual capital has a mediating role in the relationship between corporate governance mechanisms and the financial performance of the companies listed on the Tehran Stock Exchange.

#### ■ 5. Methodology

In terms of purpose, this study is applied research and in terms of method, it is correlational research. For data collection, library resources, articles, books, theses, the internet, financial statements of the companies and the accompanying notes have been used. The required data have been obtained through the website of the Stock Exchange and Rahavard Novin software.

The study sample consists of all the companies listed on the Tehran Stock Exchange during the years 2009-2014. Systematic elimination sampling is used based on pre-determined criteria. Companies that meet the following criteria have been selected



as the sample: 1) the end of their fiscal year coincides with the end of the calendar year and does not change during the research period; 2) they were first listed on the Tehran Stock Exchange before the beginning of 2009; 3) they are not investment companies, banks, insurance companies or financial intermediation firms; 4) they provide available information required to carry out the research; and 5) they have not ceased trading for more than three months. According to these criteria, of the 473 companies listed on the Tehran Stock Exchange, 142 companies had changed their fiscal year or their information was not available; the end of the fiscal year of 104 companies did not coincide with the end of the calendar year; 53 companies were investment firms, holdings or financial institutions; and 76 companies had stopped trading for more than three months. Finally, 98 companies were selected as the study population for five consecutive years.

The research variables can be classified into three categories of independent, dependent, and mediating variables. The financial performance (FP) of the companies is considered as the dependent variable, which is measured by return on assets (ROA). ROA is calculated from the ratio of operating profit to total assets (Yahyazadehfar *et al.*, 2014). The independent variables of the study are corporate governance mechanisms, which include the independence of board members/directors (DUAL), CEO-duality (NRD), the percentage of institutional investors (INS), the percentage of free float (MFF), and board size (BS). DUAL is obtained by the ratio of the number of non-executive directors to the number of board members. NRD takes the value 1 if the CEO is the chairman of the board and 0 otherwise. INS is determined by the percentage of the shares held by institutional shareholders. MFF is equal to the total released shares of the company minus the number of the shares held by institutional shareholders (Setayesh and Mansouri, 2014). Board size refers to the number of board members (Nazemi *et al.*, 2014).

Intellectual capital (IC) is considered as the mediating variable and value-added intellectual capital coefficient (VAIC) is used as the main model to measure intellectual capital. VAIC is a combination of three conventional indices of communication capital efficiency (CCE), human capital efficiency (HCE and structural capital efficiency (SCE). Communication capital efficiency is an index of communication-based value-added efficiency; human capital efficiency is an index of value-added efficiency based on human capital; and, structural capital efficiency is an index of value-added efficiency based on structural capital (Darabi, 2012).

Finally, in line with the literature, firm size, financial leverage, and growth opportunities were considered as control variables. Firm size (SIZE) is obtained from the natural logarithm of the company's sales. Financial leverage (FL) is the ratio of total debt to total assets. Growth opportunities (GO) refer to profitable investment op-

portunities in the future; it is calculated by Tobin's Q ratio, which is the ratio of the book value of debts and the market value of the company to the book value of total assets (Moradi and Masoudi, 2012).

The models used to test the research hypotheses are as follows:

$$\text{Model (1): } IC_{i,t} = \beta_0 + \beta_1 DUAL_{i,t} + \beta_2 NED_{i,t} + \beta_3 INS_{i,t} + \beta_4 MFF_{i,t} + \beta_5 BS_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 FL_{i,t} + \beta_8 GO_{i,t} + \epsilon_{i,t}$$

$$\text{Model (2): } FP_{i,t} = \beta_0 + \beta_1 IC_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 FL_{i,t} + \beta_4 GO_{i,t} + \epsilon_{i,t}$$

$$\text{Model (3): } FP_{i,t} = \beta_0 + \beta_1 DUAL_{i,t} + \beta_2 DUAL_{i,t} \times IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 FL_{i,t} + \beta_5 GO_{i,t} + \epsilon_{i,t}$$

$$\text{Model (4): } FP_{i,t} = \beta_0 + \beta_1 NED_{i,t} + \beta_2 NED_{i,t} \times IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 FL_{i,t} + \beta_5 GO_{i,t} + \epsilon_{i,t}$$

$$\text{Model (5): } FP_{i,t} = \beta_0 + \beta_1 INS_{i,t} + \beta_2 INS_{i,t} \times IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 FL_{i,t} + \beta_5 GO_{i,t} + \epsilon_{i,t}$$

$$\text{Model (6): } FP_{i,t} = \beta_0 + \beta_1 MFF_{i,t} + \beta_2 MFF_{i,t} \times IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 FL_{i,t} + \beta_5 GO_{i,t} + \epsilon_{i,t}$$

$$\text{Model (7): } FP_{i,t} = \beta_0 + \beta_1 BS_{i,t} + \beta_2 BS_{i,t} \times IC_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 FL_{i,t} + \beta_5 GO_{i,t} + \epsilon_{i,t}$$

The first hypothesis regarding the impact of corporate governance mechanisms on the intellectual capital of the companies is tested using the first model. The second hypothesis regarding the impact of intellectual capital on the financial performance of the companies is tested using the second model. The third hypothesis regarding the impact of corporate governance mechanisms on the financial performance of the companies and the fourth hypothesis regarding the mediating role of intellectual capital in the relationship between corporate governance mechanisms and financial performance of the companies are tested using the third through seventh models.

Data analysis is done using panel data methodology. In order to test the research hypotheses, the F-Limer test is first used to choose between panel data and pooled data. If the calculated F-Limer is smaller than the critical F-Limer, panel data and otherwise integrated data is used. If the data are panel data, the Hausman test is used in order to determine whether a fixed or random effects model is most appropriate. If the *p*-value of the Hausman test is smaller than 5%, random effects are rejected and fixed effects are chosen; but if it is greater than 5%, random effects are chosen. If using random effects, the variance heterogeneity problem is addressed by using generalized least squares to estimate the model. For statistical analysis, Eviews software has been used (Hemmati *et al.*, 2013).

## 6. Results

Table 1 lists the descriptive statistics of the research variables. Table 2 shows the results of the Hausman and F-Limer tests.

● **Table 1. Descriptive analysis of the research variables**

Variable	Observations	Min	Max	Mean	Standard deviation
Independence of board of directors	490	0.00	1.00	0.56	0.26
CEO-duality	490	0.00	1.00	0.03	0.17
Percentage of institutional investors	490	0.00	1.00	0.77	0.21
Percentage of the free float	490	0.00	1.00	0.22	0.21
Board size	490	4.00	7.00	5.10	0.39
Intellectual capital	490	-105.90	490.09	7.54	25.70
Financial performance	490	-0.43	0.56	0.106	0.13
Firm size	490	4.47	8.01	5.95	0.61
Financial leverage	490	0.01	3.06	0.66	0.31
Growth opportunity	490	0.48	7.70	1.53	0.68

● **Table 2. Results of Hausman and F-Limer tests**

Model	Test	Value	p-value	Decision
<b>1</b>	F-Limer	1.544	0.002	Panel data
	Hausman	6.951	0.540	Random effects
<b>2</b>	F-Limer	3.825	0.000	Panel data
	Hausman	39.207	0.000	Fixed effects
<b>3</b>	F-Limer	3.830	0.000	Panel data
	Hausman	37.392	0.000	Fixed effects
<b>4</b>	F-Limer	3.642	0.000	Panel data
	Hausman	31.180	0.000	Fixed effects
<b>5</b>	F-Limer	3.762	0.000	Panel data
	Hausman	42.686	0.000	Fixed effects
<b>6</b>	F-Limer	3.735	0.000	Panel data
	Hausman	30.538	0.000	Fixed effects
<b>7</b>	F-Limer	3.803	0.000	Panel data
	F-Limer	38.629	0.000	Fixed effects

Based on the results shown in Table 2, the  $p$ -value corresponding to the  $F$ -Limer test for all models is smaller than 5%, indicating that the panel data method should be used to estimate the models. Additionally, for the Hausman tests, the  $p$ -value is smaller than 5% in all models except for model (1), indicating that fixed effects estimation is the most suitable. Therefore, in order to test the first hypothesis, panel data–random effects method is used. However, for testing the other hypotheses, panel data–fixed effects method is used. The results of the estimation of models (1) to (7) are shown in Table 3.

**Table 3. Estimation of the research models**

Model	1	2	3	4	5	6	7
Intercept	466.2 (0.846)	-0.008 (-1.059)	0.02 (0.765)	-0.02 (-1.163)	-0.09 (-0.598)	0.02 (0.652)	-0.03 (-0.922)
Independence of board of directors	3.077 (0.822)		0.01** (3/468)				
CEO-duality	-2.331 (-1.156)			-0.05* (-2.400)			
Percentage of institutional investors	-448.3 (-0.826)				-0.03 (-0.829)		
Percentage of the free float	-451.2 (-0.830)					0.03* (2.220)	
Board size	-0.474 (-0.392)						0.006* (2.041)
Intellectual capital		-0.0003* (-2.345)					
Interaction between intellectual capital and board independence			-0.0007** (-5.002)				
Interaction between intellectual capital and CEO-duality				0.002 (1.145)			
Interaction between intellectual capital and the percentage of institutional investors					-0.0005* (-1.487)		
Interaction between intellectual capital and the percentage of the free float						-0.002** (-4.876)	
Interaction between intellectual capital and board size							-0.0001** (-5.664)
Firm size	2.875* (2.264)	0.05* (2.193)	0.06** (9.984)	0.05* (2.196)	0.07** (3.222)	0.06** (9.481)	0.07** (9.477)
Financial leverage	-38.216** (-5.104)	-0.39** (-12.686)	-0.51** (-28.343)	-0.38** (-12.542)	-0.37** (-11.596)	-0.5** (-27.065)	-0.49** (-25.044)
Growth opportunity	0.023* (2.342)	0.04** (5.830)	0.003* (2.051)	0.04** (6.182)	0.04** (5.769)	0.003** (1.996)	0.01** (3.675)
Adjusted R <sup>2</sup>	0.46	0.71	0.74	0.68	0.63	0.75	0.72
Durbin-Watson statistic	1.58	1.88	2.002	1.83	1.92	1.98	2.01
F statistic	14.414**	15.842**	121.48**	15.664**	14.305**	109.8**	101.71**

The number in parentheses represents t statistics  
\* and \*\* represent significance at 0.01 and 0.05 levels

The first hypothesis indicates the significant effect of corporate governance mechanisms on intellectual capital. The estimation of model (1) shows that all corporate governance mechanisms, including the independence of board members/directors, CEO-duality, the percentage of institutional investors, the percentage of the free float, and board size, have a non-significant effect on the companies' intellectual capital. Accordingly, the first research hypothesis is rejected. F-test results also are significant

at the 0.01 level, indicating that model (1) is significant. In addition, the value of the Durbin-Watson statistic is 1.58, which is in the acceptable range of 1.5-2.5 and, hence, it can be said that there is no correlation in the error. Finally, based on the value of the adjusted coefficient of determination, it can be said that 46% of the changes in intellectual capital result from the corporate governance mechanisms.

The second hypothesis suggests the significant impact of intellectual capital on financial performance. According to the results obtained from the estimation of model (2), the impact of intellectual capital on financial performance is negative and statistically significant. Accordingly, the second hypothesis is confirmed. *F*-test results are also significant at the 0.01 level, indicating that the second model is generally significant. Furthermore, the value of the Durbin-Watson statistic is 1.88, which indicates that there is no correlation in the error term. Finally, the variables included in the model (the main one is intellectual capital) explain 71% of the changes in financial performance.

The third research hypothesis suggests the significant effect of corporate governance mechanisms on financial performance. This hypothesis is tested based on the estimation of models (3)-(7). According to the results obtained, it can be concluded that among corporate governance mechanisms, the independence of the board of directors, the percentage of free float and board size have a significant positive impact on financial performance. In contrast, CEO-duality has a significant negative impact on financial performance. Finally, the percentage of institutional investors does not have a significant effect on financial performance. Accordingly, the third hypothesis is accepted if corporate governance mechanisms are considered to be comprised of the independence of the board of directors, the percentage of free float, board size, and CEO-duality. The values of the *F*- and Durbin-Watson statistics meet the required standards.

Likewise, the fourth research hypothesis refers to the mediating effect of intellectual capital in the relationship between corporate governance mechanisms and financial performance. To test this hypothesis, models 3 to 7 are also used. The *p*-value for the variables of the interaction between intellectual capital and board independence, the interaction between intellectual capital and the percentage of free float, and the interaction between intellectual capital and board size is less than 5% in all cases, and their coefficients are negative. Therefore, it can be said that intellectual capital reduces the positive relationship of corporate governance mechanisms, including the independence of the board of directors, the percentage of free float, and board size, with financial performance. In contrast, the *p*-value for the variables of the interaction between intellectual capital and CEO-duality and the interaction between intellectual capital and the percentage of institutional investors is greater than 5%. Hence, it can be said that intellectual capital has no mediating role in the relationship of corporate

governance mechanisms, including CEO-duality and the percentage of institutional investors, with financial performance. Thus, the mediating role of intellectual capital is confirmed only in the relationship of the independence of the board of directors, the percentage of free float, and board size with financial performance.

## ■ 7. Conclusion, recommendations and limitations

This research was an attempt to investigate the effect of corporate governance mechanisms on companies' financial performance; moreover, the paper examined the mediating role of intellectual capital in the relationship between corporate governance mechanisms and companies' financial performance. All companies listed on the Tehran Stock Exchange were considered as the study population. Finally, after systematic elimination sampling, 98 companies were selected as the sample and the required data were collected for the period 2009-2013. Financial performance, as the dependent variable, was measured by return on assets. The independent variables were corporate governance mechanisms and included the independence of the board of directors, CEO-duality, the percentage of institutional investors, the percentage of free float, and board size. Intellectual capital, as the mediating variable, was measured by the value-added intellectual capital coefficient. Finally, firm size, financial leverage, and growth opportunity were considered as control variables. Panel data methods and Eviews software were used for data analysis. The results of the data analysis showed that corporate governance mechanisms have no significant impact on the intellectual capital of the companies listed on the Tehran Stock Exchange. This result was in line with the results of Setayesh *et al.* (2011) but contradicts those of Ho and Williams (2003). The percentage of institutional investors was the only one of the corporate governance mechanisms that had no effect on the financial performance of the companies; the independence of the board of directors, the percentage of free float, and board size all had a significant positive impact, while CEO-duality had a significant negative effect. Hence, these results are in line with the results of Khodadadi and Tucker (2012), Moradi and Rostami (2012), Brown and Caylor (2006), and Dittmar and Marth-Smith (2007). Another interesting result was that intellectual capital has a significant negative impact on the financial performance of the companies listed on the Tehran Stock Exchange. This result is consistent with the finding of Yahyazadefar *et al.* (2014), Hemmati *et al.* (2013), Maditinos *et al.* (2011), Zéghal and Maaloul (2010), and Tan *et al.* (2007). With regard to the mediating role of intellectual capital in the relationship between corporate governance mechanisms and financial performance, it was found that intellectual capital has a negative mediating role only in the relationship of the independence of the board of directors, the percentage of free float, and board size with financial performance. However, its mediating role was not confirmed for CEO-duality and the percentage of institutional investors.

Intellectual capital, as a new management concept, is the centre of managers' attention in the current era. Given the role of intellectual capital in achieving competitive advantage, successful managers are using different strategies to try to create, maintain, and develop it in their organizations. The results of this research showed that corporate governance mechanisms cannot have a significant impact on the strengthening or even weakening of intellectual capital. Therefore, it is recommended that corporate managers do not focus on strategies related to corporate governance in order to develop intellectual capital. It seems that the most important variable influencing intellectual capital is the creation of an organizational culture which is characteristic of knowledge-based organizations. To improve financial performance through the mechanisms of corporate governance, managers are recommended to focus mainly on the independence of the board of directors, the percentage of free float, and board size. Avoiding formal and informal communication between board members to establish the independence of the board of directors, offering company shares to individual investors in order to increase the percentage of free float of the company, and increasing the number of directors on the board are among the strategies which can be proposed to managers to increase the profitability of their companies. However, CEO-duality is not recommended, as this can negatively influence the company's financial performance. The negative impact of intellectual capital on the financial performance of the companies together with its reverse mediating role in the relationship between corporate governance mechanisms and financial performance shows that Iranian companies are not equipped with the systems to promote intellectual capital. In other words, implementation of new management tools and techniques without providing the necessary hardware and software requirements will only result in losses for the companies. Therefore, it is recommended that corporate executives use a gradual, step-by-step approach to design and implement programmes commensurate with the company conditions, to foster the intellectual capital stemming from its employees and observe its positive effects on the financial and non-financial performance of the organization. In order to evaluate intellectual capital, it is recommended that future researchers use the value-added intellectual capital coefficient as well as other models, and examine their relationship with corporate governance and financial performance. In addition, it would be worth investigating the relationship of corporate governance and intellectual capital, not only with financial performance, but also with other non-financial indicators of organizational performance. Finally, future researchers can evaluate the factors affecting the creation and development of intellectual capital in the companies listed on the Tehran Stock Exchange.

In this research, due to the lack of transparency of financial information, access to some of the companies was not possible and, thus, some variables were excluded from the research process. The inefficiency of the Tehran Stock Exchange was another uncontrollable factor which could affect the results of this research. The lack of access

to relevant sources in libraries, universities and other scientific institutions was another limitation of the current research.

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