

Study of the Effect of Intellectual Capitals on the Relationship Between Ownership Structure and Firm Value in High-Tech Companies of Tehran Stock Exchange

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Abstract: The purpose of this study is to examine the effect of intellectual capital on the relationship between ownership structure and firm value among listed companies in Tehran Stock Exchange. For this purpose, 163 companies were chosen as statistical sample out of statistical population of listed companies in Tehran Stock Exchange during 2008-2013 and data of them were analyzed. To achieve the goal of this study, one hypothesis was tested. Multiple regression method was used as statistical technique to test hypothesis through EVIEWS Software. The obtained results of statistical analysis of hypothesis (intellectual capital has a significant effect on the relationship between ownership structure and firm value) indicate that this hypothesis has been tested through various methods and finally it has been accepted at confidence level of 95%.

Key words: Intellectual capital, ownership structure, firm value, technique, relationship

INTRODUCTION

Intellectual and financial capitals have been symbols of power since the beginning of industrial revolution while they are losing their power in current world. Alvin Toffler has described the evolution process of power in his book "power shift". Force and violent is the most unfair symbol of power used for punishment. Therefore, it is the weakest level of power. Vice versa, wealth is the smartest tool for power indicating average level of power. Today a new form of power is considered in which the highest level of power is expressed by knowledge. Knowledge has gained the power of physical and financial capital (Pulic, 2004). The current environment of companies is a growing and highly competitive environment for their activities. Companies have to compete with various factors at national and international levels and expand their activities through new investments in order to be remained in market. Value creation was related to industrial ability and investment in tangible and financial assets during industrial era while economic patterns have changed from industrial forms to scientific and knowledge-based patterns in current world in which, value creation is related to accepting creativity as a business process. Intellectual capitals are intangible assets that create value for business enterprises as the main factor in creating competitive advantage for

companies. The effect of ownership structure on firm value is originated from conflict between interests of shareholders. Knowledge-based economy is an economy in which knowledge generation and exploitation has the most important role in wealth creation. One of the privileges of knowledge-based economy is large investment in human capital, knowledge, information and communications technology. Itami believes that many of businesses have reached to the conclusion that value is not obtained based on tangible resources in current world but intangible resources can create value and profit (Bontis, 2002).

Intellectual capital is applied in knowledge-based economy to create knowledge and increase organizational value. It can be stated that success key in world economy is dominance on intellectual capital along with ownership concentration. The obtained advantages from these intangible assets are prior to advantages of tangible assets. The main purpose of this study is to examine the effect of intellectual capital and ownership concentration on value of listed companies in Tehran Stock Exchange and this is an important goal indicating to managers, investors and other decision makers that different ownership type and concentration should be considered in financial decisions and investments because of its role in management supervision and control and reducing representative costs.

Definition of intellectual capital: Intellectual capital is defined as a group of knowledge-based assets of an organization considered as the features of that organization considerably leading to improvement of competitive situation of organization through increasing value of key beneficiaries of organization. According to other definition, intellectual capital is a collection of knowledge-based assets attributed to an organization that are effective in improvement of competitive situation of organization through increasing value of beneficiaries (Sudarsanam *et al.*, 2006). The concept of capital if one of the richest frames in sociological, economic and managerial considerations in contemporary era. This matter has been changed during current decades so that new theories have been emerged in field of organizational, intellectual, human and cultural capital. Asset is a valuable matter from the public view. Marxist view and Karl Marx symbol of this view consider capital as a part of extra value produced by labor forces but gained by investor. According to this theory, investment process is a mutual relation between investor and labor leading to profit for investor and exploitation of labor. Despite the existing theories about capital and different attitudes in this field, the concept of capital as “expected yield” has kept its nature. Intellectual capital comprises all processes and assets that are not usually described in balance sheet of organizations so that this capital includes all intangible assets considered by modern accounting. Intellectual capital, knowledge management and intangible assets are the most important factors in value determination of organizations and future strategies of business and technology during long-term planning. Despite the high importance of intellectual capital strategy, abstract and dynamic nature of this concept has made a problem for researchers to define it. Hence, some researchers believe that the concept of intellectual capitals has imperial aspect, conducted study can introduce two general concept of knowledge as the source and capital is they are based on the thoughts of industrial era (Madhoushi and Asgharnejad, 2009).

Reasons for importance of intellectual capital: First, intellectual capital is the only asset of each company that is not depreciated. Many of other assets (building, factory, equipment, machines and similar assets) start to depreciation from the day bought by the company while intellectual capital should be grown if the company tends to be successful. The duty of manger is to make knowledge productive and change intellectual capital to marketable values. Second, knowledge-based task will not be reduced but it will be increased.

Third, those employees who have intellectual capital are diligent because best employees would find job opportunities in organizations. It does not mean that these employees work free but they are able to choose their work place; hence they are somehow voluntary involved in company.

Fourth, many of managers do not pay attention enough to intellectual capital. Fifth, those employees who have intellectual capital are not usually at the center of attention. Sixth, there is an inappropriate attitude toward current investments in field of intellectual capital. Seventh, intellectual capital is a key factor in improvement of organizational performance and competition. Eighth, intellectual capital has a key role in strategic human resources management.

Ownership structure: Economists got interested in effects of separation between ownership and control of stock companies from the late decade of 1930. Different goals of investors (who are financial providers) mangers and members of board of directors (who lead and control the company) created an issue known as representation problems. The carried out studies in field of corporate governance have studies those mechanisms used by investors to control company and decrease representation problems. These mechanisms are divided into two internal and external mechanisms. Ownership structure is related to internal mechanisms. Ownership structures of companies are different. Company ownership might be centralized or dispersed. There might be minor or major shareholders with different percent of ownership in composition of company ownership. The number of major shareholders might be different in each company. The nature of shareholders of companies might be based on different patterns such as legal shareholders, managerial ownership, private, institutional and governmental shareholders. Hence, type of ownership structure and composition of shareholders in a company is a tool to control company and apply considered policies in them.

The obtained results from conducted studies in field of the effect of ownership structure on firm value have been different. Value of a company is related to various factors. One of these factors is ownership of company that can effect on value of that company. In fact, ownership structure of the company can be effective in decrease or increase in interest conflict between shareholders and mangers, consistency or inconsistency between their interest or profits, supervision level on tasks of managers and increase or decrease in firm

value. Nobody can claim that dispersed ownership is not successful to achieve the goal of maximizing profit or value of company. Any made decision by shareholders to change ownership structure of company from centralized to dispersed ownership should be based on the awareness of results and effects of these decisions on reduction in control on professional management. Increase cost and decreased profit due to these decisions should be compensated by lower cost of capital acquisition or other strength points. According to Demsetz, concentration of ownership and interest rate should not be related to each other. Moreover, the cost of increased ownership of management is provided through different sources in Demsetz theory. To increase ownership ratio, management should invest a considerable part of its wealth in a company that is under the management of it. It means that management should ignore some resources for investment taking more risk. The company or investors should give extra reward to management because of additional risk tolerance in order to encourage manager to increase his or her ownership. The mentioned reward would lead to increase in cost of company. Meanwhile, limited wealth of management to invest in firm would lead to limitation in firm size preventing form access to economic production level. According to the theory of Demsetz, there is substitution relationship between representation cost, capital cost and production cost. According to this relationship, shareholder as a whole (including management) would determine public structure of ownership and management ownership within maximizing process of firm value.

Firm value: The marginal result of financial and production programs, activities and decisions are reflected in profitability of a company. Majority of required data for assessment of executive operation of company are directly extracted from profit and loss statement while this statement is a summary of financial and production activities of company. However, executive operation should be related to assets that create results of operations. Moreover, operating results should indicate perception of external people of executive operations and revenue of firm. Some beneficial information about efficiency of management performance and financial state of the company can be obtained through comparing profit and loss statement during several consecutive quarters but majority of beneficiaries of the company in terms of investment in a company, granting credit or activity revenue would pay attention to profit level and profitability of that company.

Effects of ownership structure on firm performance (value)

Ownership structure can improve firm performance based on three reasons:

- Centralized ownership would create integration between interests of manager and owner; hence, this matter would decrease representative problem
- Shleifer and Vishny (1997) proved that even if owners are not involved in management, they still are able to monitor and control managers
- Companies with centralized ownership have long-term investment plan

Negative effects of ownership structure on firm performance (value): Controlling shareholders and managers might perform some activities to reach their personal interest while these activities can interfere with optimal policies of company. These activities including high salaries for themselves, employing family members and use of credit and assets of the firm to access to personal interests would have harmful effects on the firm (Shleifer and Vishny, 1997).

Centralized ownership might have no visible effect on the firm due too indigenious effects between ownership structure and performance. In such condition, those firms with efficient ownership can remain in economy scene while the other firms will be excluded from the cycle in long term.

There is a type of extreme risk aversion in firms with centralized family ownership due to centralization of family and inherited wealth in business so that this issue would prevent from some strategies such as development and merging.

Research background: Chen (2005) studied the role of intellectual capital on value creation for trade organizations. This study was conducted on 367 semiconductor companies in Taiwan during 2000-2008. To examine different components of intellectual capital, financial scales and a reformed coefficient of value added were applied in this study. The obtained results indicated that intellectual capital had negative effect on financial and market performance of studied companies.

Demetrous studied the effect of intellectual capital on market value and financial performance of listed companies in Egypt Stock Exchange during 2006-2008. The obtained results of this study indicated that there was a significant relationship between efficiency of human capital and financial performance. They also found that there was a positive relationship between intellectual capital and market value.

Chen (2005) conducted a study to examine if the ownership can directly or indirectly (through IC) effect on firm value. Statistical population of this study included 623 public companies in Taiwan during 2000-2009. Financial data were obtained from database of Economic Journal of Taiwan. Firms' value was calculated using Tobin's Q index. The obtained results indicated that the relationship between ownership and firm value was generally related to features of industry and the applied nature of intellectual capital in industries. In addition, centralization of ownership had a positive significant effect on firm value.

Shiu (2007) studied the relationship between ownership structure and outside directors with profitability of company in different industries in Korea during 1999-2005. The studied sample included 516 production companies. The findings of this study indicated that centralized ownership had a positive significant effect of profitability of companies. The other results of the study proved that there was a positive significant relationship between ratio of outside directors and profitability of company.

Moradzade Fard conducted a study to examine the effect of intellectual capital on profitability of companies. They calculated efficiency of intellectual capitals of companies using Value Added Intellectual Capital developed by Pulic and then evaluated its effect on profitability of companies (net profit, return on equity, return on assets and earnings per share) using panel-data regression. About 4-year information (2007-2010) of 87 companies of Tehran Stock Exchange (out of 348 companies) was obtained from financial statements of companies used to calculate human capital, structural capital and physical capital. The obtained results indicated that there was a positive relationship between intellectual capital and profitability of companies.

Mashauekh and Abdollahi (2011) studied the relationship between centralized ownership, company performance and dividend policy among listed companies in Tehran Stock Exchange. Statistical population this study included 64 companies during 2001-2009. The selected approach was combined panel data and time-series to test hypotheses. Merged least square regression method (panel data) was used in this study. Ownership centralization was assessed using percentage of ownership of major shareholders (above 5%); performance was evaluated using share of criteria ROI, ROE and Tobin's Q and dividend policy was assessed using dividend ratio (DPS/EPS). The obtained results indicated that there was a significant relationship between ownership centralization and two criteria of

performance including ROE and Tobin's Q at confidence level of 95%. It means the more the centralization of ownership, the more control on managers is and the more company performance is improved.

Setayesh and Kazemnejad (2009) studied that effect of intellectual capital on performance of listed companies in Tehran Stock Exchange. Statistical sample of this study included 123 listed companies in Tehran Stock Exchange during 2001-2006. They concluded that intellectual capital has a positive and significant effect on rate of Return on Assets (ROA) and turnover ratio of assets but this effect was not significant in terms of the ratio of market value to book value. According to the obtained results of tests, intellectual capital had a positive and significant effect on future performance of company.

Hypothesis: The following hypothesis has been designed in order to achieve the goal of study.

Hypothesis: Intellectual capital has a significant effect on the relationship between ownership structure and firm value.

MATERIALS AND METHODS

Statistical population, studied period: Statistical sample has been chosen among listed companies in Tehran Stock Exchange based on following options:

- Investment companies, banks and insurance companies were excluded from sample
- Period of study included a 6 years period from 2008-2013
- The 163 companies were chosen for this period

Variables of study and measurement method

Independent variable

Intellectual capital: Intellectual capital as independent variable is measured based on the method of market value to book value that is one of the general methods to measure intangible assets and intellectual capital. This value is calculated based on the difference between market value and book value. The following formula can be applied to calculate intellectual capital (Anvari and Rostami, 2005):

$$IC = \sum_t \frac{MV_t - BV_t}{1 + I_{inf t}}$$

Where:

IC = Intellectual capital

Mv_t = Market value of company during t period

Bv_t = Book value of company during t period

I_{inf t} = Inflation rate during t period

Table 1: Descriptive statistics of variables

Variables	Symbol of variable	Number	Mean	Med	SD	Min.	Max.
Intellectual capital	IC	978	0/6250	0/700	0/2769	0/09	1/20
Firm value	Value	978	0/1730	0/2013	0/8935	1/008	16/61
Ownership structure	INSID	978	0/37058	0/024	7/101	0/99	22/19
Firm size	NLA	978	5/792	5/734	0/6066	4/27	8/01
Financial leverage	LEV	978	0/7343	0/6798	0/3654	0/04	3/06
Firm age	Age	978	0/2137	0/1939	0/3868	0/72	1/65

Dependent variable

Ownership structure: Ownership structures of companies are different. Company ownership might be centralized or dispersed. There might be minor or major shareholders with different percent of ownership in composition of company ownership. The number of major shareholders might be different in each company. The nature of shareholders of companies might be based on different patterns such as legal shareholders, managerial ownership, private, institutional and governmental shareholders. Hence, type of ownership structure and composition of shareholders in a company is a tool to control company and apply considered policies in them.

Firm value: Firm value has been considered as one of the dependent variable in this study. Tobin’s Q ratio has been used as value criterion. Tobin’s Q: this ratio has been applied as value criterion. This ration is obtained from the market value of assets divided by alternative cost of them. The simplified model of Q has been used been this study:

$$Q = \frac{Mve + Bvd}{Bva}$$

Where:

- Q = Firm value
- Mve = Market value of equity
- Bvd = Book value of depts
- Bva = Book value of assets

Control variables: Control variables of this study are as follows: firm size, ratio of book value to market value and financial Leverage that are explained in this part.

Firm size (size): that is equal to natural log of market value of company for 4 months after the end of financial year that is end of July each year (Ghorbani *et al.*, 2013; Hashemi and Moghadam, 2013).

Firm age: log of numbers of establishment years of company financial Leverage (LEV): ratio of book value of long-term depts. To book value of total assets at the end of each year (Ghorbani *et al.*, 2013; Hashemi and Moghadam, 2013).

Statistical model: The following regression model has been used in this study to test hypothesis:

$$(Value \text{ and } INSID) = \beta_0 + \beta_1 IC_{i,t} + \beta_2 NLA_{i,t} + \beta_3 LER_{i,t} + \beta_4 AG_{i,t} + \epsilon_{i,t}$$

Table 2: Results of stationary (reliability) test of variables

Variables	Levin Lin Chu test	
	Test values	Sig.
Intellectual capital	38/55	0/000
Firm value	50/16	0/000
Ownership structure	32/14	0/000
Firm size	58/98	0/000
Financial Leverage	70/55	0/000
Firm age	30/63	0/000

RESULTS AND DISCUSSION

Hypothesis testing and Analysis of findings: To test hypothesis of study, first variables were measured through EXCEL software and then hypothesis was tested through EVIEWS software. Descriptive statistics and results of statistical analysis of hypothesis have been presented in following tables.

Table of descriptive statistics includes mean, standard deviation, minimum and maximum of independent, dependent and control variable. In this table, the main central index is mean that indicates equilibrium point and center of distribution; hence, it is a good index to depict center of data (Table 1).

Results of hypothesis testing

Reliability (stationary) of variables: The obtained results reliability test of variables has been presented in Table 2. Accordingly, significance level of unit root test of Levin for all variables was obtained to 0/05 indicating stationary variables. Therefore, there have not been structural changes in studied companies and use of these variables in the model would not lead to spurious regression. According to the obtained results, summary of study can be observed in Table 3.

Results of hypothesis testing: According to the obtained results of test, it can be stated that there is a positive significant relationship between intellectual capital, ownership structure and value of listed companies in Tehran Stock Exchange. This matter indicates that F test has been used to examine linearity and significance of regression model. H₀ of F test is related to significance and linearity of regression model. According to the obtained results from F test for hypothesis model, F-prob has been equal to 0 that is lower than the considered importance level of α; therefore, H₀ of F test is rejected at confidence level of 95%; the model has been significant and there is a linear relationship between independent and

Table 3: Summary of results of hypothesis testing

Independent variable	Dependent variable	Sig level of F-Limer	Test result	Relation type	Durbin-Watson value	Coefficient of determination (R ²)	Coefficients of independent variable based on t test
Intellectual capital	Firm value and ownership structure	0/000	Accepted	Significant	1/933	0/52	0/548

dependent variables. In general, the model is presentable. Coefficients of model have been estimated based on the least square error. To examine significance of estimated coefficients, t-test was used. H₀ of t-test was related to this coefficients equality to zero. According to the obtained results of t-test for hypothesis model, the relevant value to fixed coefficient and relevant coefficient to independent variable is lower than critical level of α (sig level $\alpha = 0/05$); therefore, H₀ of t-test is rejected at confidence level of 95% (error level of 5%); hence coefficients have been significant and are not equal to zero. The coefficient of determination (R²) has been equal to 0/52 indicating that independent variable can explain 52% of changes in dependent variable. The high value of this coefficient indicates high ability of model to explain changes in dependent variable through independent variable. Therefore, this model has been fitted for data and is statistically powerful. According to the hypothesis results, there was a positive significant relationship between independent variable (intellectual capital) and dependent variables (ownership structure and firm value).

CONCLUSION

The obtained results of this study have been coordinated with results of following conducted studies: Rostami and Seraji including variables of intellectual; capital and market value of company stock, Setayesh and Kazemnejad (2009) including intellectual capital and financial performance of company (earned value of company), Yung Chu comprising variables of intellectual capital and performance of advance industries, Demetrous comprising variables of intellectual capital, market value and financial performance of company and study by Chen (2005) including intellectual capital and value of commercial organizations. The significant relationship between studied variables has been accepted in all of the mentioned studies; hence, this significance is matched with the obtained results of present study.

RECOMMENDATIONS

- Study the requirements of promoting competitiveness of firms in the business environment of country using intellectual capital
- Study of the role of government and firms in classification of intellectual and human capital in companies and industries
- Design an indigenous index to measure intellectual capitals

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