Middle-East Journal of Scientific Research 18 (7): 1042-1047, 2013
ISSN 1990-9233

DOI: 10.5829/idosi.mejsr.2013.18.7.12460

Intellectual Capital and Increase of Organizational Value

[1]Alireza Yamola, [1]Abbas Sharifi and [2]Iman Zare

[1]Department of Accounting, Islamic Azad University, Qom Branch, Iran
[2]Department of Accounting, Payame Noor University, Iran

Abstract: In knowledge-based economy, intellectual capital is used to create and increase of organizational value and the position of any organization depends on managing these valuable and scarce resources. According to resource-based perspective of company, intellectual capitals are strategic resources that enable companies to create competitive advantage and better financial performance. So, the managers should measure intellectual capital as an important criterion for increasing business performance of organizations, determining the real value f intellectual capitals and even improving their control. In this paper we attempt to investigate the relationship between intellectual capital and increase of organizational value. In this research, firstly intellectual capital value of companies accepted in Tehran stock exchange in a 7 years period between 2006-2012 was calculated using VAIC model. Then, the relationship between intellectual capital and the elements of organizational value of companies was evaluated. In this study, the statistical methods used for data analysis are multiple regression and correlation coefficients. The selected sample includes 84 companies for a period of 7 years and company size, type of industry and investment intensity ratio have been considered as control variables. The findings show significant and positive relationship between intellectual capital and increase of organizational value and the positive effect of control variables on the relationship between intellectual capital and increase of organizational value.

Key words: Organizational value · Intellectual capital

INTRODUCTION

In this respect, intellectual capital theory absorbs the attention of scholars and managers of organizations. On the other hand, one of the important capabilities of organizations that can help them to create advantage and facilitate knowledge and give them the capability of comparison with other organizations is social capital [1]. On one hand, organizations need information and knowledge in any form and type to improve their organizational value and participate in current markets. Thomas Stewart considers intellectual capital a useful knowledge package for organizations [2]. According to *Lif Edvinston* and *Michelle Malon*, intellectual capital consists of human capital, structural capital and costumer capital. Human capital represents the knowledge of organization's employees. Structural capital is supportive infrastructure that directs human capital to be operationalised. Costumer capital, emphasizes all communications and interactions that lead to strength and stability of relations with costumers [3]. On the other hand, organizational value is interested by persons who use financial reports for decision making. From their perspective, earnings of low quality are inappropriate because inappropriate and incomplete allocation of resources implies inefficiency. [4] The previous researches have showed that there is a meaningful relationship between performance indices such as profitability with intellectual capital. This research surveys the relationship between intellectual capital and increase of organizational value [5]. In other words, when intellectual capital increases, organizational value of a company should increase too.

Theoretical Framework and History of Research: During past decade, businesses have understood the importance of intangible assets management and have considered trademark development, stockholders relationships,

Corresponding Author: Abbas Sharifi, Department of Accounting, Islamic Azad University, Qom Branch, Iran.

reputation and organization culture as the most important resources of stable business advantage [6]. In this economy, the ability to create and utilize the value of these intangible assets has created a major qualification for organizations [7]. Kendrick, a well-known American economist, says that in 1925 the ration of intangible capital to tangible capital was 30 to 70. But in 1990 this ratio is 63 to 37. Also Leo suggests that intangible assets constitute 10% to 15% of overall market value of companies and no work has done to measure them [8]. A series of studies carried out in 1999 about the composition of assets of thousands nonfinancial company in time period of 1978-1998 showed that the ratio of intangible assets to tangible assets has been 20 to 80 and in 1998 this ratio was 80 to 20. These significant changes lead to introduction of a series of methods for calculating the asset of companies whose assets are mainly intangible and in particular intellectual and knowledge [9].

Intellectual Capital: There are diverse definitions for intellectual capital in different resources. All of the scholars agree that intellectual capital is an aspect of knowledge that creates competitive advantage and represents intangible value of an organization [10]. But there is no agreement for a specific definition. But there isn't definite composition between theoretical aspect and application of intellectual capital. [5] A key difference between different proposed definitions and models of intellectual capital measurement relates to priority that every one put one measuring internal and external human and social capital. Some of them tend to emphasize on costumer capital, whereas others pay attention to internal human capital [11].

Others provide an holistic perspective about existing models of knowledge assets measurement coupled with their comparison. For instance, according to *Bontis,* intellectual capital is the sum of intangible assets of organization such as a part of human, structural, relational, organizational, internal and external capital. At first, he mentioned three kinds of human, structural and costumer capital and in 2000, he changed his classification as human capital, structural capital, relational capital and intellectual property [12]. Most scholars divide intellectual capital in costumer, human and structural capital.

Human Capital: Represents implicitly acquired knowledge in employers mind. Human capital is defined as a mixture of qualifications, line of thinking and creativity of employees. Employees' qualification is the hardware of intellectual capital and includes knowledge, skills and talents of employees. Knowledge is technical and academic knowledge. Skill is the ability to carry out tasks and assignments that are obtained through exercise and some of them are acquired through education. Line of thinking is the hardware of intellectual capital that includes incentive for work and job satisfaction. Creativity enables employees to use their knowledge and have innovation [13].

Structural Capital: Deals with systems and structures of organization. In fact, it is the procedures and routines of business. We can divide structural capital into culture, organizational structure, organizational learning, operational processes and information systems [13].

Costumer(relational) Capital: According to *Bontis*, costumer capital refers to knowledge that has been put in marketing channels of an organization that have been created by an institute through carrying out its business. In comparison to other three capitals, this capital has direct effect on realization of a company's value and it has become an important factor in businesses [14].

Hypotheses: Major hypotheses:

- Assuming constancy of other factors, there is significant relation between intellectual capital and increase of organizational value.

Minor hypotheses:

- Assuming constancy of other factors, there is significant relation between intellectual capital and applied capital index.
- Assuming constancy of other factors, there is significant relation between intellectual capital and liquidity realization index.
- Assuming constancy of other factors, there is significant relation between intellectual capital and gross profit index.
- Assuming constancy of other factors, there is significant relation between intellectual capital and index of liquidity acquired from operation.
- Assuming constancy of other factors, there is significant relation between intellectual capital and cost of sales management index.
- Assuming constancy of other factors, there is significant relation between intellectual capital and profitable reinvested assets ratio index.

Methodology and Data Analysis: This study is applied in terms of purpose research and is correlation in terms of method. For this goal, intellectual capital index independent variable and organizational value index as dependent variable have been calculated through information extracted from financial statements and data in information banks for sample companies for 7 years time period. Pearson correlation coefficient has been used for yearly analysis of models and regression has been used for analysis of combined data. The basis of inference has been the level of significance and error. When the probability of significance level of test is less than ./.5, zero hypothesis is rejected in 95% level.

Statistical Society and Sample: The statistical universe includes all accepted companies of Tehran Stock Exchange. By taking into account the 7 years period of research(from the beginning of 2006 to the end of 2012), companies have been selected that were member of Tehran Stock Exchange from the beginning of 2001 and their financial period should be Esfand 29th. Sampling was step-by-step and with systematic elimination.

In this research, the companies have been selected that have the following qualifications:

- Their financial year should end on Esfand 29th.
- They should have delivered their financial statements to Exchange without study.
- In the studied time period, they shouldn't have operating loss in their audited income statements of end of financial year and also their residual shouldn't be negative after taxation.

By taking those conditions into account, among all of the companies accepted to Tehran Stock Exchange, financial year of 324 companies ends on Esfand 29th. Finally, 84 companies were elected as statistical universe.

Analytical Model and Method of Variable Measurement

Independent Variable: Intellectual Capital: In this research, pulic model is used for measuring intellectual capital. The main reasons for using this method are its convenience in measuring intellectual capital, its independence and its realness that is used through financial statements and their *attached notes* and as we know, financial statements show what is in reality and is not illusion and considers anything that is in company through financial perspective.

VAIC=HCE+SCE+CEE
VAIC=value added of intellectual capital
HCE: human capital efficiency
SCE: structural capital efficiency
CEE: physical capital efficiency

This model begins with company's ability to create value added. Value added is the difference between input and output. So, VA can be calculated by the following equation:

VA=OP+EC+D+A
OP=operating profit
A+D= Depreciation and Amortization
EC=total employee Expenses

In this research, total employee expenses EC has been extracted from financial statements and total cost (direct wage and production overheads), administrative costs and cost of sale. Also, the total depreciation and amortization costs of tangible and intangible assets have been extracted from comparative table of operating cash flow.

Physical capital efficiency (CEE): includes the ratio of value added to applied physical capital. This index is obtained through the following equation:

CEE=VA/CE (value added/tangible asset)
CE=total assets-intangible assets=tangible assets

Human Capital Efficiency (HCE): The coefficient of human capital efficiency shows that how much value added has been generated for every Rial spent for wage in company. The ratio of VA to HC, represents human capital ability (HC) to value creation in a company.

HCE= value added/ employee expenses
HC=total wages paid to human resources=total wages of company

Structural capital efficiency: the third relation is SCE that shows the ratio of structural capital in value added creation. Structural capital includes all nonhuman knowledge storage in an organization that includes databases, organizational charts, processes and procedures and it gives organization value higher than physical assets. In pulic model, structural capital equals to VA minus HC. The relationship between VA and SC is calculated as follows:

SCE=SC/VA
SC=VA-HU

Dependent Variable

Index of Applied Capital Rate: Applied capital rate = (profit before taxation +interest cost)/(asset-current debt)
Analyzing data of dependent variable Y_1 (Applied capital rate)

Regression estimation of model:
Estimation mean model is presented as follows:

$$\text{Ln } Y_{it} = \beta + \beta_1 X_{1i} + \beta_2 Z_{1it} + \beta_3 Z_{2it} + \beta_4 Z_{3it} + \gamma_1 \text{ automobile} + \gamma_2 \text{ medicine} + \gamma_3 \text{ tire} + \gamma_4 \text{ cement} + \gamma_5 \text{ chemical} + \gamma_6 \text{ food} + \gamma_7 \text{ machinery} + \gamma_8 \text{ electronic} + \gamma_9 \text{ automobile} * X_1 + \gamma_{10} \text{ medicine} * X_2 + \gamma_{11} \text{ tire} * X_3 + \gamma_{12} \text{ cement} * X_4 + \gamma_{13} \text{ chemical} * X_5 + \gamma_{14} \text{ food} * X_6 + \gamma_{15} \text{ machinery} * X_7 + \gamma_{16} \text{ electronic} * X_8 + \varepsilon_{it}$$

In this model, X_{1it} is the main independent variable and Z_{3it}, Z_{2it} and Z_{1it} are control variables.

In this model, the effect of industry shows itself with two parts:

The first part with parameter $\gamma_1'\gamma_2'\gamma_3'\gamma_4'\gamma_5'\gamma_6'\gamma_7'\gamma_8'$.t hat mentioned parameters estimation show their effect in the width of origin of coordinates.

The second part with parameters $\gamma_9'\gamma_{10}'\gamma_{11}'\gamma_{12}'\gamma_{13}'\gamma_{14}'\gamma_{15}'\gamma_{16}'$ that mentioned parameters estimation show their effect in or in other words shows the effect of main variable in every industry.

To investigate the significance of regression model of H_0 and H_1 hypotheses are as follows:

$$\begin{cases} H_0: \beta_1 = \beta_2 = \ldots = \gamma_{16} = 0 \\ H_1: \beta_1 \neq 0 \text{ or } \beta_2 \neq 0 \text{ \& or } \beta_{16} \neq 0 \end{cases}$$

$$\begin{cases} H0: \text{there is no meaningful model} \\ H1: \text{there is no meaningful model} \end{cases}$$

Index of Liquidity Realization:

Index of liquidity realization=cash obtained from operation/net profit
Analyzing data of dependent variable Y_2 (index of liquidity realization)

In this mean model,x_{1it} is the main independent variable and Z_{3it}, Z_{2it} and Z_{1it} are control variables. The effect of industry is dummy variable and is defined as before.

Index of Gross Profit:

Index of gross profit=percent of variations of gross profit/percent of variation in sales revenue

Analyzing data of dependent variable Y_3(index of gross profit)

In this mean model, $_{X1it}$ is the main independent variable and Z_{3it}, Z_{2it} and Z_{1it} are control variables. The effect of industry is dummy variable and is defined as before.

Liquidity Index Obtained from Operations:

Liquidity index obtained from operative action=(net profit-cash obtained from operation)/average of assets

Analyzing data of dependent variable Y_4(index of liquidity obtained from operation)

In this mean model, $_{X1it}$ is the main independent variable and Z_{3it}, Z_{2it} and Z_{1it} are control variables. The effect of industry is dummy variable and is defined as before.

Index of Cost of Sales Management:

Index of cost of sale management=percent of revenue variation-percent of cost of sales management variation

Analyzing data of dependent variable Y_7(index of supply)

In this mean model, $_{X1it}$ is the main independent variable and Z_{3it}, Z_{2it} and Z_{1it} are control variables. The effect of industry is dummy variable and is defined as before.

Profitable Reinvested Assets Ratio Index:

Profitable reinvested assets ratio index=capital expenditures/depreciation

Analyzing data of dependent variable Y_8(index of supply)

In this mean model, $_{X1it}$ is the main independent variable and Z_{3it}, Z_{2it} and Z_{1it} are control variables. The effect of industry is dummy variable and is defined as before.

Control Variables

Firm Size: Firm size influences the relation between intellectual capital and output and financial performance of companies. In this research, the effect of Firm size on relations between variables has been controlled by its effect on regression equation. For measuring firm size, natural logarithm of market value of firm has been applied.

Log=M.V Firm's market value=M.V

Chart 1: results of major hypothesis 1 examination

	Sig	T- Statistic	Durbin Watson (D.W.)	F-Statistic	R2	Standardized Coefficients	Relationship between intellectual capital and dependent variable		Testing for the major Hypothesis
H_1	0.000	10.85	1.789	117.72	0.152	0.390	0.390 0.000 730	Pearson's Coefficient of Correlation (sig) Observations	Sub-main assumption 1
	y = 0/204 + 0/063 β + e_i							Liner Regression Model with Research Variables	
H1	0.000	5.509	1.752	30.348	0.044	0.210	0.210 0.000 730	Pearson's Coefficient of Correlation (sig) Observations	Sub-main assumption 2
	y = 0/562 + 0/077 β + e_i							Liner Regression Model with Research Variables	
H_1	0.000	7.767	1.884	60.332	0.084	0.290	-.087 .051 657	Pearson's Coefficient of Correlation (sig) Observations	Sub-main assumption 3
	y = 0/132 + 0/250 β + e_i							Liner Regression Model with Research Variables	
H1	0.000	8.612	1.868	74.171	0.102	0.319	0.319 .879 730	Pearson's Coefficient of Correlation (sig) Observations	Sub-main assumption 4
	y = 0/083 + 0/021 β + e_i							Liner Regression Model with Research Variables	
H1	0.000	9.640	1.891	92.929	0.124	0.352	0.352 0.000 730	Pearson's Coefficient of Correlation (sig) Observations	Sub-main assumption 5
	y = 0/267 + 0/080 β + e_i							Liner Regression Model with Research Variables	
H_1	0.000	7.579	1.733	57.443	0.081	0.284	0.284 0.000 730	Pearson's Coefficient of Correlation (sig) Observations	Sub-main assumption 6
	y = 4/689 + 0/970 β + e_i							Liner Regression Model with Research Variables	
H_1	$_3\beta$ 0/221- $_2\beta$ 2/962β_1 +1/609= β e_i +$_6\beta$0/029 + $_5\beta$0/604 + $_4\beta$ 3/037+ $_3\beta$ 0/156+						Adjusted R2 337/0		Main assumption

Investment Intensity Ratio: It represents the amount company's investment in fixed assets. So, when the amount of fixed assets to total asset of company shows high percentage, the investment ration of that company is high. This ratio is total fixed assets divided by total assets.

Type of Industry: It is a group of companies whose products are proper alternative for each other. In other words, on the basis of similarities in terms of production process, type of equipment, type of required raw material, etc. that exists between different industrial groups [15-20]. Different industrial groups can be classified from different aspects. There is a virtual variable with zero and one value. One is for industries with high technology and zero is for industries with low technology [21, 22].

Hypothesis Test and Analysis: Major hypothesis 1: there is significant relation between intellectual capital and increase of organizational value.

Minor hypotheses are examined by statistical symbols as follows:

$$\begin{cases} H_0 : \beta_1 = \beta_2 = ... = \beta 8 = 0 \\ H_1 : \beta_i \neq 0 \ \ at\ least\ i = 1,2,3...,8 \end{cases}$$

As significance level of correlation coefficient is less than 5% for minor hypotheses 1-6 and regression model is significant too, we can conclude that intellectual capital has the ability to explain organizational value variations in an acceptable level(33.7%). Also, according to the result of minor hypotheses 1 to 6 and information obtained from Chart 1, we can conclude that there is positive relation between intellectual capital and increase of organizational value.

CONCLUSION

The researcher found out that in mentioned confidence level, there is significant and positive relation between variables of intellectual capital and indices of increase of organizational value. In this regard, intellectual capital has the highest correlation with indices applied capital, sales management cost. The effect off firm size on intellectual capital and increase o f organizational value

was direct and in the same direction. Including control variable industry type shows that it affects the relation between the variables of the research. Including control variable investment intensity ratio shows that it affects the relation between the variables of the research.

REFERENCES

1. Appuhami, R., 2007. The impact of intellectual capital on investors Capital Gain On Shares: An empirical investigation in Thai banking finance & insurance sector. Journal of internet Banking and commerce, April 2007, 12(1),(www.arraydev.com /commerce/ jibe/)
2. Chen Goh, P., 2005. Intellectual capital performance of commercial banks in Malaysia, Journal of intellectual Capital, Vol.6, No.3, 2005 pp.385-396 (www.emeraldinsight.com /1469-1930.htm)
3. Bontis, N., 1998. Intellectual capital: an exploratory study that develops measures and models, Management Decision, 36(2): 63-76.
4. King Hang Chan, 2009. Impact Of Intellectual Capital On Organizational Performance",Emerald, 16(1): 4- 21, (www.Eemeraldisight.Com/0969-6474.Htm)
5. Iman Zare, Mohsen Ojaghi AghjehKandi and Ghasem Ojaghi AghjehKandi, 2012. Qualitative Characteristic of Accounting Information in Reported Values of Goodwill and Intangible Assets (Case Study of the Stock Exchange of Iran), Middle East Journal of Scientific Research, 11(1): 32-38.
6. Mahdi Salehi, Mohmoud Hematfar and Amin Heydari, 2011. A Study of the Relationship Between Institutional Investors and Corporate Value: Empirical Evidence of Iran, Middle-East Journal of Scientific Research, 8(1): 72-76.
7. Sullivan, P., 2000. Value-driven Intellectual Capital: How to convert intangible corporate assets into market value, Wiley.
8. Pulic, A., 2000. MVA and VAICTM Analysis of randomly Selected Companies from FTSE 250. Austrian Intellectual capital Research center, Graz-London.
9. Pew, Tan H., D. Plowman and P. Hancock, 2007. Intellectual capital and financial returns of companies", Journal of intellectual capital, 8(1): 76-95, (www.eemeraldisight.com/1469-1930.htm)
10. Chin, Chen M., S. Ju Cheng and Y. Hwang, 2005. An empirical investigation of the relationship between intellectual capital and firms market value and financial performance" Journal of intellectual Capital, 6(2): 159-176, (www.emeraldinsight.com /1469-1930.htm)
11. Iman Zare, 2011. Study of effectiveness models in optimal portfolio of shares, Middle East Journal of Scientific Research, 10(2): 239-246.
12. Marr, B. and G. Schiuma, 2001 Measuring and managing intellectual capital and knowledge assessing new economy organizations. In Bourne, M.(ed). Handbook of performance Measurement. GEE Publishing Ltd, London.
13. Petty, R. and J. Guthrie, 2000. Intellectual capital literature review: measurement, reporting and management Journal of Intellectual Capital, 1(2): 155-176.
14. Mukesh kumar, Rajesh Singh, Ashish K Singh and Florentin Smarandache, 2011. Some ratio type estimators under measurement errors, World Applied Sciences Journal, 14(2): 272-276.
15. Bontis, N., 2000. Assessing knowledge assets: a review of the models used to measure intellectual capital. Available at: www.business.mcmaster.ca accessed 22 June 2004.
16. Brooking, A., 1997. Management of intellectual capital. Long Range Planning, 30(3): 364-5.
17. Edvinsson, L. and M.S. Malone, 1997. Intellectual capital: Realizing your Company's True Value by Finding Its Hidden Brainpower. Harper Business, New York.
18. Kaplan, R.S. and D.P. Norton, 1996. Using the balanced scorecard as a strategic management system. Harvard Business Review (January February): 75-85.
19. Kujansiveu, P. and A. Lonnqvist, 2005. The value inefficiency of intellectual Capital, update January 23.2006.
20. Lev, B., 2001. Intangibles. Management, Measurement and Reporting, Brookings Institution Press, Washington. D.C.
21. Shah, T., B. Ali, S.A.H. Shah and E. Ahmed, 2011. Equilibrium in Economic Development: A Perspective of Social Capital, World Applied Sciences Journal, 14(12): 1823-1837.
22. Pulic, A., 2002. An accounting tool for ic management"available at : http://www.measuring-ip.at/papers/ham99txt.html