vol.2, No. 3(s), pp. 1303-1307 ISSN 1805-3602

Economic value added of intellectual capital on the market value of listed companies in Tehran Stock Exchange

H. Hemmati[1], A. Mohammadi[2], N. Rezaeyan[3]

[1]Higher Education Center of Raja, Qazvin, Iran; [2]Accounting Department, Zanjan Branch, Islamic Azad University, Zanjan, Iran; [3]Zanjan Research Center, Iran

Abstract

The present research studies the effects of the economic value added (EVA) and the intellectual capital on value of the listed companies' value in Tehran Stock Exchange. The research was based on an applicable goal and it is descriptive and post-event in terms of nature. The sample of the research consists of 89 companies listed in Tehran Stock Exchange and the research period was from 2004 to 2011. In order to examine the research hypothesis, a multivariate regression is utilized using panel data. The results indicate spontaneous use of intellectual capital variable and the remaining profit according to the accepted principles of accounting increase description power of the market value fluctuations of the corporate remarkably.

Keywords: intellectual capital, economic value added, volatility of market value

Introduction

The intellectual capital of an organization is assets, subjective and intangible resources that the organization creates value by turning them to new processes of products and services. The term" Intellectual Capital" was first introduced by John Kenneth Galbraith in 1969 Feiwal, (1975). Before him, Peter Drucker used term of "Knowledge workers (e.g. Feiwal, (1975). Peter Drucker (1993), a famous scientist of Science Management states:" We are entering a knowledge world in which economic resources, natural resources and more work forces and .... Are not the main resources but also the main economic resource will be the knowledge. Knowledge is regarded as one of the main significant components of the intangible assets. If most assets of the organizations were tangible in the past, the large of the organizational assets are intangible today (e.g. Sullivan, 2000). The intellectual capital in a wider and acceptable view containing three human, structural and customer axes. Among the concepts of the intellectual capital, the human capital is more important because the human capital is source of innovation and strategic reconstruction of corporates resulting from improvement of the human skills. The structural capital is all non-human knowledge in the organization consisting of database, organizational charts, strategies, procedures, processes and everything whose value for the company is more than its material value. The customer capital includes both present value of the organizational relation with customers and future potential value of such relations. That's why the customer capital is set in the concealed knowledge in channels of the marketing and customer's relations. Hence, such cases as trademarks, market share, customer information, relationships with customers, access points with clients and commercial contracts (e.g. Bontis *et al.*, 2000).

Literature review

Jui Chi Van (2008) in a research as "Evaluation of the relationship between the intellectual capital and the market value of a corporate in electronic industry of USA" by sampling 893 corporates and Olson regression model concluded that there is a positive relationship between intellectual capital and the market value of a corporate (e.g. Jui, 2008). Anvari Rostami and Seraj (2005) as "Evaluation of the intellectual Capital and study of relationship between the Intellectual capital and stock market value" have studied a relationship between the intellectual capital and stock market value of the listed corporates in Tehran Stock Exchange. In this research, 5 proposed relations in the article of Anvari Rostami, PhD. and Mohammadreza Rostami have

Corresponding author: H. Hemmati, Higher Education Center of Raja, Qazvin, Iran. E-mail: H.Hemmati@yahoo.com

been utilized. The intellectual capital of the sampling companies has been calculated based on these five relations. The results of the research represent a significant and direct relation between intellectual capital and stock market value. Moreover, the results of the research represent clearly that among all five used relations, the calculated intellectual capital through discrepancy of the market value and office values of the corporates have strong relationship separately with stock market value of corporates in industries and among all corporates of the research. Rezaei *et al* (2010) have analyzed effect of the intellectual capital in creating EVA and the market. The results and findings of the research show there is a significant and positive relation between the intellectual capital and EVA of the corporate (Rezaei, 2010). Hemmati (2012) in a research as "Performance Comparison of the Selected Portfolio based on the Accounting Models of the Intellectual Capital using Analysis Model with Traditional and Modern Models of the Network" study the selected portfolio based on features of corporates (growth, value, growth-value), type of company stock (defensive, offensive and apathy) and their efficiencies have been compared with each other in order to recognize which one can lead to more efficiency. In this research, matrixes of portfolio network have been selected from the listed companies in Tehran Stock Exchange through 5 years from 2006 to 2010. Performance of the selected portfolio has been calculated based on Triner and Sharp scale. In order to examine the research hypothesis, Pearson correlation test was used based on data integration and caparison R^2 index was used. The results of the research hypothesis testing shows that there is more correlation between portfolio including Palik model of the intellectual capital and market based on both performance criteria of Sharp and Triner and selection of Triner portfolio based on it can consider more efficiency for the investor in comparison with a traditional and modern model of the network.

Materials and Methods

The research was based on an applicable goal and it is descriptive and post-event in terms of nature. In order to analyze data and extract descriptive statistics, SPSS software was used and for extracting the inferential statistics, Eviews software was utilized.

Population and Sampling

The population of this research contains all corporates listed from 2003 to 2011 in Tehran Stock Exchange. Due to high value of the remained corporates in order to apply and implement research and complexity of the models implementation in the research using Cochran model, number of samples are determined which has been performed as follows:

n: Sampling
N: Population
Percentage of success
Percentage of failure
d: Deviation

$$n = \frac{\frac{z^2 * p * q}{d^2}}{1 + \frac{1}{N}\left(\frac{z^2 * p * q}{(d^2)} - 1\right)} \quad (1)$$

Finally, after applying stratified sampling (Cochran), 89 samples out of 432 corporates of Tehran Stock Exchange in the research period by end of 2011 were selected.

Research hypothesis testing

The First Hypothesis

There is no discrepancy between the calculated remaining profit using EVA and accounting profit according to the listed principles of the accounting in explanation of market value fluctuation.

To test hypothesis 1, model 1 will be used. The result of model (1) estimation is as follows:

$$\text{Model 1}: P_t a_0 + a_1 BV_t + a_2 X_t^a + \varepsilon_t \quad (2)$$

Results

Since Table 1 of the determination coefficient of the first model shows, total 50/0 in the remaining profit and 57/0 in the VAE from the changes in dependent variable can be explained by probability level of F-statistics is equal to (000/0) indicates that the mentioned regression model is correct with 99% certainty and all the regression is significant. By comparing the determination coefficient, there is a difference between potential of the calculated remaining profit using the economic value added and accounting profit based on the listed principles of accounting in explaining market value fluctuations. According to Table 1, the determination coefficient of the Model 1 shows that totally 50/0 in the remaining profit and 57/0 in the EVA of the changes in the dependent variable can be explained by dependent and significant variables in the model which represents high potential of the model in explanation of the dependent variable.

Table 1. The final estimation of Regression model of combined data using Generalized least Squares method

Model component	Level of Significance	Statistics t	β Coefficient	VIF	Level of Significance	Statistics t	β Coefficient	VIF
Intercept	0	7.85977	7943.97		0	75.07621	8180.24	
Office value of each share	0.025	2.13441	4.8105	1	0	7.299055	4.2005	1
Remaining earnings per share				1	0	10.97401	4.6405	
Economic VEA of each share	0.038	2.06959	0.02301					1
Determination coefficient	0	10.6563	0.71241		0	265.716	0.71614	
Determination coefficient			0.5727				0.50722	
Modified determination coefficient			0.5527				0.50719	
F-statistics			0.8238				23427.1	
Level of Significance			0				0	
Durbin-Watson			2.0059				1.98808	

The Second Hypothesis

Potential of the calculated remaining profit according to the listed principles of the accounting to explain market value fluctuation of a corporate is remarkably more in case the intellectual capital is added to it. To test such hypothesis, Model 2 consists of the variable of the intellectual capital in Model 1.

Model 2: $$P_t=\alpha_0+\alpha_1 BV_t+\alpha_2 EPSr_t+\alpha_3 RPE_t+\alpha_4 SP_t+\alpha_5 RG_t+\alpha_6 RDP_t+\alpha_7 ME_t+\alpha_8 OS_t+\varepsilon_t \quad (3)$$

Considering Table 2, value of the determination coefficient of the Model 2 shows that totally about 89/0 % in the remaining profit, the intellectual capital variable is added to it at any time. Since probability level of F-statistics is equal to (ooo/0) indicates that the mentioned regression model is correct with 99% certainty and all the regression is significant. By comparing the modified determination coefficient of the model 1 of the economic value added and model 2 value added, when an intellectual capital is added to it, it can be concluded that when an intellectual capital is added to the remaining profit, potential of the calculated remaining profit is remarkably more according to the listed principles of accounting to explain market value fluctuations of a corporate.

The Third Hypothesis

If the intellectual capital variable is added , potential of the calculated remaining profit by the economic value added for explanation of the market value fluctuation will be remarkably increasing. The result of the model 3 consists of the intellectual capital of variables in the model 1.

Model 3: $$P_t=\alpha_0+\alpha_1 BV_t+\alpha_2 EPS_t^{\alpha}+\alpha_3 RPE_t+\alpha_4 SP_t+\alpha_5 RG_t+\alpha_6 RDP_t+\alpha_7 ME_t+\alpha_8 OS_t+\varepsilon_t \quad (4)$$

Considering Table 3, value of the determination coefficient of the Model 2 shows that totally about 0.94 % in the remaining profit, the intellectual capital variable can be added to it at any time. The results from the dependent and independent variables can be explained in this model which shows high power of the model in explaining behavior of the dependent variable. Since probability level of F-statistics is equal to (000/0) indicates that the mentioned regression model is correct with 99% certainty and all the regression is significant.

Table 2. The final estimation of Regression model of combined data using Generalized least Squares method

Components of Model	VIF	Level of Significance	Statistics t	Coefficient β
Intercept		0	439.6576	8.306914
Office value of each share	1.075	0.0086	2.63438	1.07E-08
Remaining earnings per share	1.019	0.4207	-0.80568	-3.43E-09
Operating income per capital	1.828	0.0999	1.647707	3.26E-07
Market costs per share	1.239	0	4.570332	0.002635
Operational growth of income	1.297	0	-5.58119	-0.0103
Research and development expenditure	2.516	0.8011	-0.25199	-5.77E-09
Administrative costs per employee per capita	1.027	0.0399	-2.05872	-5.09E-12
Degree of organizational stability	1.075	0	4.21807	0.022985
The first order autocorrelation	1.019	0.8022	0.25055	0.007556
Determination coefficient				0.895377
Modified determination coefficient				0.8851
F-statistics				91.02385
Level of Significance				0
Durbin-Watson				2.072897

Table 3. The final estimation of Regression model of combined data using Generalized least Squares method

Components of Model	VIF	Level of Significance	Statistics t	Coefficient β
Intercept		0	286.1263	8.21882
Office value of each share	1.075	0.0142	2.458892	1.02-08
Remaining earnings per share	1.019	0	4.416231	8.5206
Operating income per capita	1.828	0.2767	1.088632	2.1907
Market costs per share	1.239	0	4.668388	0.002322
Operational growth of income	1.297	0	-5.22205	-0.01016
Research and development expenditure	2.516	0.8174	0.230955	5.20E-09
Administrative costs per employee per capita	1.027	0.0518	-1.94846	-4.55E-12
Degree of organizational stability	1.075	0	4.382055	0.022423
The first order autocorrelation	1.019	0.6327	0.478229	0.01477
Determination coefficient				0.940719
Modified determination coefficient				0.931292
F-statistics				99.79375
Level of Significance				0
Durbin-Watson				2.089977

By comparing the modified determination coefficient of the model 1 of the economic value added and model 2 value added, it can be concluded that when an intellectual capital is added to the remaining profit, potential of the calculated remaining profit is remarkably more according to the listed principles of accounting to explain market value fluctuations of a corporate. Results from the test prove that the second hypothesis is not rejected.

Conclusion

The concepts of the intellectual capital of the research are going through its initial phases and it has turned to a necessity in business arena. The intellectual capital is one of the largest sources of value creation for corporates and market value of the corporate focuses more on the intellectual capital more than the past. The present study examined the effects of the economic

value of intellectual capital on the market value of listed companies in Tehran Stock Exchange. Moreover, the spontaneous application of the intellectual capital and the remaining profit based on the listed accounting principles, economic value added increases power of description remarkably in market value fluctuations of the corporate. By comparison determination coefficient in Table 4, there is a potential of the calculated remaining profit using economic value added and accounting profit according to the listed accounting in the fluctuations of the market value of corporate. Namely, 0.50 to 0.57 resulting from our first hypothesis is refused.

Table 4. Determination coefficient of Model 2 related to the second and third hypotheses

Variable Name	Model 1 R2	Model 2 R2	Model3 R2
The remaining earnings per share	0.507221	0.895377	-
EVA per share	0.572738	-	0.940719

Comparison of the modified determination coefficient of model 1 in the remaining profit and model 2 in the remaining profit when the intellectual capital is added to it, it can be concluded that the potential of the calculated remaining profit according to listed accounting to explain fluctuations of the stock value of a corporate is remarkably more, namely 0.50 to 0.89, so that the result from the test proves failure of rejection of the second hypothesis. Moreover, by comparison the modified determination coefficient of the model 1in EVA and model 2 in EVA, when the intellectual capital is added to it, it is possible to conclude that the potential of the remaining profit by EVA in order to explain Stock Market fluctuations of a corporate will be remarkably more. Namely, 0.57 to 0.94, thus, the third hypothesis is not rejected. The results of testing hypothesis are representative of rejection of the second and third hypotheses and finally the first hypothesis.

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