

## Evaluation the relationship between intellectual capital and financial performance of TSE with the emphasize on the components of market value, profitability, and asset turnover

Ghasem Ghasemi<sup>1</sup>, Reza Tehrani<sup>2</sup>

1: Department of Accounting, Islamic Azad University-Sabzevar Branch, Sabzevar, Iran and Ph.D. student in National University of Tajikistan (Corresponding Author)

2: Department of Accounting, Islamic Azad University-Sabzevar Branch, Sabzevar, Iran  
[ghasemighasem14@yahoo.com](mailto:ghasemighasem14@yahoo.com)

**Abstract:** In a knowledge-based organization, where, knowledge forms a large part of the amount and quality of organization's profitability, traditional accounting methods, which are based on tangible assets and information of previous operations of the organization, are incapable of valuing intellectual capital as their most valuable assets. Therefore, the intellectual capital approach is the most comprehensive for organizations who want to know their profitability capacities better. The fundamental importance of this study is the lack of intellectual capital items in the financial statements of the companies as well as a huge gap between book value and market value. In the past, tangible assets had higher importance but today, large part of organizations' assets are intangible assets thus, in today's economy, organizations success depend on the way of managing these assets. Results showed that Iranian stock market is not exempted from this issue and therefore, physical capital (CEE) has the highest coefficient.

[Ghasem Ghasemi, Reza Tehrani. **Evaluation the relationship between intellectual capital and financial performance of TSE with the emphasize on the components of market value, profitability, and asset turnover.** *J Am Sci* 2013;9(4s):135-143]. (ISSN: 1545-1003). <http://www.jofamericanscience.org>. 22

**Keywords:** Intelligent Capital, Financial Performance, Market Value, Profitability, Turnover

### 1. Introduction

We're getting into a knowledge-based society where the main economic sources are not capital, labor, natural resources and so on but, is knowledge. The 21st century is the century of knowledge-based economy.

Prior to knowledge-based economy, the industrial economy was dominant. In industrial economy, the wealth production factors were a series of physical and tangible assets such as land, labor, money, machinery, and so on. In this economy, the use of knowledge as a production factor has a little role but in the knowledge-based economy, knowledge or intellectual capital has more importance than tangible assets in wealth production. In this economy, intellectual assets especially human capital are regarded as most important assets and organization's potential success depends on intellectual capabilities rather tangible assets.

Today, the intangible aspect of the economy is based on intellectual capital and its first and original material is knowledge and information. Organizations, in order to participate in the today's market in any form, require information for and knowledge to improve their performance. Studies indicate that, 60 to 75 percent increase in the value of intellectual capital and intangible assets in share prices of companies. In other words, one can say that, today, intellectual capital management will lead organization to further success in the future of competitive markets.

The simple definition of intellectual capital is the difference between market value and book value of assets of a company.

Intellectual capital consists of that part of companies' capital or assets which is based on knowledge and is owned by the company. Therefore, it is a raw material and economic factor of organization's life. Intellectual capital as knowledge, experience, technical comment and software assets is defined beyond financial and physical assets. According to the definition, intellectual capital can also include knowledge itself (which has been transformed to intellectual property of a company) or the final result of its transfer process. Items such as patents, copyright, and trade mark can be used to evaluate intellectual capital for accounting purposes. Intellectual capital is the storage of the existing knowledge in a particular area of organization and is a tool for understanding the knowledge transformation process over the time.

One of the definitions of intellectual capital is provided by OECD which explains intellectual capital as economic value of two non-tangible groups of assets of a company:

1. Organizational capital (structural)
2. Human capital

Organizational capital is associated with issues such as ownership of software systems, supply and distribution networks.

Human capital is associated with internal and external human resources (suppliers and customers).

Andro Krengi (2000) states that: The only irreplaceable capital that an organization possesses is the knowledge and the ability of its employees.

Burgman et al, (2005) define this type of asset as a property owned by the organization which creates value for it and is not entered in traditional balance sheet as a physical and financial asset.

Vall man (1996) a member of SEC defines intellectual capital as assets that, nowadays, are valued zero in the balance sheets. These assets include:

- The intellectual power of individuals,
- Brand,
- Trademarks, and
- Assets registered in the accounting records by historical cost of assets, but their value has increased over the time. (Mojtahedzadeh, 2009, p2).

## 2. Material and Methods

In terms of purpose, this research is an applied research. In terms of methodology our method is based on correlation.

In this research, we have used library studies including books, articles and foreign and domestic journals to collect research literature and the data required to test the hypotheses.

The statistical population consists of all companies listed in Tehran Stock Exchange. The reason to choose these companies as statistical population was the ease of access to their audited financial statements as well as their stock returns in different periods.

Concerning the 7-year period of study (from 2005 to 2011), we have been selected companies which listed in Tehran Stock Exchange at least in the beginning of 2005 with the end of fiscal year in Esfand, 29. The sampling method was step by step with systematic elimination.

In this study, the companies that have selected that have all of the following conditions:

1. Listed in Tehran Stock Exchange before 2005.
2. Their fiscal year ends at Esfand 29.
3. Their shares must be traded at the beginning and end of their fiscal year.
4. Have presented their financial statements to bourse in order to study at the end of fiscal year.
5. In the studied period, the companies should not have operating losses in the audited profit and loss accounts as well as after considering taxes.

Therefore, among all companies listed in Tehran Stock Exchange, 73 companies have been selected according to aforementioned conditions.

### 2.1. Research variables

#### Independent variable:

In this study, the intellectual capital along with its components including structural, human and physical capital is regarded as independent variables.

#### Dependent variables:

In this study, the dependent variable was the financial performance which indices are based on MB, Tobin q, ROA, P/E, ATO.

#### Control variable:

In order to control firm size on variables, firm size is introduced as control variable.

## 2.2. Research Hypotheses

1. There is a significant relationship between components of intellectual capital and indicators of market value as indicator of company's financial performance.
  - a) There is relationship between components of intellectual capital and the ratio of market capitalization to book value of common stocks (MB).
  - b) There is relationship between components of intellectual capital and Tobin q ratio of market value indicators.
  - c) There is relationship between components of intellectual capital and the ratio of market value of shares to return on shares (P/E).
2. There is significant relationship between components of intellectual capital and profitability ratio (ROA) as an indicator of financial performance.
3. There is significant relationship between components of intellectual capital and asset turnover ratio (ATO) as an indicator of financial performance of company.
4. There is significant relationship between firm size, intellectual capital, and financial performance

The multiple regression models for the hypotheses are as follows

1. a.  $MB_i = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 FSIZE + \epsilon_i$
1. b.  $Tobinq = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 FSIZE + \epsilon_i$
1. c.  $P/E = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 FSIZE + \epsilon_i$
2.  $ROA_i = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 FSIZE + \epsilon_i$
3.  $ATO_i = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \beta_4 FSIZE + \epsilon_i$
4.  $FP_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Fsize + \epsilon_{it}$

## 3. Results

### Testing first hypothesis

First main hypothesis: there is a significant relationship between components of intellectual capital and indicators of market value as indicator of company's financial performance.

The first main hypothesis is divided into three sub-hypotheses:

#### Testing first sub-hypothesis

There is relationship between components of intellectual capital and the ratio of market capitalization to book value of common stocks (MB).

Table 1: Pearson correlation coefficient, significance level and the number of sample of the variable of the ratio of components of intellectual capital and market value to book value

|                                 | Physical capital | Structural capital | Human capital |
|---------------------------------|------------------|--------------------|---------------|
| Pearson correlation coefficient | 0.364            | 0.222              | -0.026        |
| Significance level              | 0.000            | 0.000              | 0.007         |
| Number                          | 508              | 508                | 508           |

The table shows that, the correlation coefficient between the market value to book value and structural capital, SCE, in 5 years, with physical capital, CEE, in 7 years is significant and the direction of relationship in all cases is positive, but has no significant relationship with human capital variable (HCE) of intellectual capital. Therefore, the null hypothesis (H0) is rejected and the H1 hypothesis indicating the presence of correlation is confirmed.

The model for regression analysis is as follows:

$$Ln(MB)_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \varepsilon_{it}$$

Table 2: Analysis of variance of regression between components of intellectual capital and book-to-market value

| Model |                         | Sum of squares | Degree of freedom | Mean of squares | Statistic of F | Significance level |
|-------|-------------------------|----------------|-------------------|-----------------|----------------|--------------------|
| 1     | Regression              | 107.867        | 4                 | 26.967          | 58.813         | 0.000              |
|       | Sum of square of errors | 230.634        | 503               | 0.459           |                |                    |
|       | Total                   | 338.501        | 507               |                 |                |                    |

Table 3: Correlation coefficient and Durbin-Watson test between components of intellectual capital and book to market value

| Model | Correlation coefficient | Determination coefficient | Adjusted determination coefficient | Error of estimation index | Durbin-Watson |
|-------|-------------------------|---------------------------|------------------------------------|---------------------------|---------------|
| 1     | 0.565                   | 0.319                     | 0.313                              | 0.67714                   | 1.620         |

Using following model

$$Ln(MB)_{it} = -2 / 45 - 0 / 008 HCE_{it} + 0 / 87 SCE_{it} + 2 / 01 CEE_{it} + \varepsilon_i$$

We have

Table 4: Coefficients of regression equation between intellectual and book to market value

| Model |           | Non-standardized coefficients |                | Standardized coefficients | Statistic of t | Significance level | Linearity test |                           |
|-------|-----------|-------------------------------|----------------|---------------------------|----------------|--------------------|----------------|---------------------------|
|       |           | B                             | Standard error | Beta                      |                |                    | Tolerance      | Variance inflation factor |
| 1     | Intercept | -2.455                        | 0.259          |                           | -9.466         | 0.000              |                |                           |
|       | HCE       | -0.008                        | 0.002          | -0.142                    | -3.236         | 0.001              | 0.709          | 1.427                     |
|       | SCE       | 0.871                         | 0.203          | 0.205                     | 4.288          | 0.000              | 0.594          | 1.685                     |
|       | CEE       | 2.013                         | 0.186          | 0.207                     | 10.799         | 0.000              | 0.955          | 1.048                     |

Testing second sub-hypothesis: there is relationship between components of intellectual capital and Tobin q ratio of market value indicators.

Table 5: Pearson correlation coefficient, significance level and the number of sample between components of intellectual capital and Tobin q ratio

|                                 | Physical capital | Structural capital | Human capital |
|---------------------------------|------------------|--------------------|---------------|
| Pearson correlation coefficient | 0.364            | 0.222              | -0.026        |
| Significance level              | 0.000            | 0.000              | 0.879         |
| Number                          | 511              | 511                | 511           |

According to the above table, the correlation coefficient of Ln(Tobin q) is significant with structural capital (SCE) in 6 years and is significant with physical capital (CEE) in 7 years and the direction of relationship is positive in all cases but have no relationship with human capital (HCE).

The model for regression analysis is as follows

$$\ln(Q - \text{Tobin})_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \varepsilon_{it}$$

Table 6: Analysis of variance of regression between components of intellectual capital and Tobin q ratio

| Model |                         | Sum of squares | Degree of freedom | Mean of squares | Statistic of F | Significance level |
|-------|-------------------------|----------------|-------------------|-----------------|----------------|--------------------|
| 1     | Regression              | 52.313         | 4                 | 13.078          | 112.171        | 0.000              |
|       | Sum of square of errors | 58.995         | 506               | 0.117           |                |                    |
|       | Total                   | 111.308        | 510               |                 |                |                    |

Using following model

$$\ln(Q - \text{tobin})_{it} = -1/69 - 0/003 HCE_{it} + 0/60 SCE_{it} + 1/56 CEE_{it} + \varepsilon_i$$

We have:

Table 7: Correlation coefficient and Duerbin-Watson test between components of intellectual capital and Tobin q ratio

| Model | Correlation coefficient | Determination coefficient | Adjusted determination coefficient | Error of estimation index | Durbin-Watson |
|-------|-------------------------|---------------------------|------------------------------------|---------------------------|---------------|
| 1     | 0.686                   | 0.470                     | 0.466                              | 0.34146                   | 1.616         |

Table 8: Coefficients of regression equation between intellectual and Tobin q ratio

| Model |           | Non-standardized coefficients |                | Standardized coefficients | Statistic of t | Significance level | Linearity test |                           |
|-------|-----------|-------------------------------|----------------|---------------------------|----------------|--------------------|----------------|---------------------------|
|       |           | B                             | Standard error | Beta                      |                |                    | Tolerance      | Variance inflation factor |
| 1     | Intercept | -1.693                        | 0.130          |                           | -13.011        | 0.000              |                |                           |
|       | HCE       | -0.003                        | 0.001          | -0.142                    | -2.628         | 0.009              | 0.701          | 1.426                     |
|       | SCE       | 0.600                         | 0.102          | 0.205                     | 5.878          | 0.000              | 0.594          | 1.683                     |
|       | CEE       | 1.559                         | 0.093          | 0.207                     | 16.758         | 0.000              | 0.957          | 1.045                     |

Testing third sub-hypothesis: there is relationship between components of intellectual capital and the ratio of market value of shares to return on shares (P/E).

In order to test this hypothesis the correlation coefficient was used.

Table 9: Pearson correlation coefficient, significance level and the number of sample between components of intellectual capital and P/E ratio

|                                 | Physical capital | Structural capital | Human capital |
|---------------------------------|------------------|--------------------|---------------|
| Pearson correlation coefficient | 0.015            | 0.135              | -0.087        |
| Significance level              | 0.741            | 0.002              | 0.051         |
| Number                          | 503              | 503                | 503           |

According to the above table, the correlation coefficient between Ln(P/E) and structural capital (SCE) in 1 year is significant with human capital (HCE) in 1 year and the direction of relationship is negative and thus, there is no significant relationship with CEE. Moreover, concerning that, Sig. is not equal to 0.000, therefore, the  $H_0$  hypothesis is confirmed and  $H_1$  is rejected indicating the rejection of third hypothesis.

The model for variance analysis:

$$\ln(P/E)_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \varepsilon_{it}$$

Table 10: Analysis of variance of regression between components of intellectual capital and P/E ratio

| Model |                         | Sum of squares | Degree of freedom | Mean of squares | Statistic of F | Significance level |
|-------|-------------------------|----------------|-------------------|-----------------|----------------|--------------------|
| 1     | Regression              | 7.311          | 4                 | 1.828           | 4.896          | 0.001              |
|       | Sum of square of errors | 185.907        | 498               | 0.373           |                |                    |
|       | Total                   | 193.218        | 502               |                 |                |                    |

Table 11: Correlation coefficient and Durbin-Watson test between components of intellectual capital and P/E ratio

| Model | Correlation coefficient | Determination coefficient | Adjusted determination coefficient | Error of estimation index | Durbin-Watson |
|-------|-------------------------|---------------------------|------------------------------------|---------------------------|---------------|
| 1     | 0.195                   | 0.038                     | 0.038                              | 0.61099                   | 1.412         |

Using the following model

$$\ln(P/E)_{it} = 1/48 - 0/65SCE_{it} + \varepsilon_i$$

We have

Table 12: Coefficients of regression equation between intellectual and P/E ratio

| Model |           | Non-standardized coefficients |                | Standardized coefficients | Statistic of t | Significance level | Linearity test |                           |
|-------|-----------|-------------------------------|----------------|---------------------------|----------------|--------------------|----------------|---------------------------|
|       |           | B                             | Standard error | Beta                      |                |                    | Tolerance      | Variance inflation factor |
| 1     | Intercept | 1.476                         | 0.238          |                           | 6.209          | 0.000              |                |                           |
|       | HCE       | -0.001                        | 0.002          | -0.021                    | -0.406         | 0.685              | 0.696          | 1.437                     |
|       | SCE       | -0.651                        | 0.188          | 0.198                     | -3.460         | 0.001              | 0.590          | 1.695                     |
|       | CEE       | -0.025                        | 0.168          | 0.007                     | -0.152         | 0.880              | 0.954          | 1.048                     |

After testing secondary hypotheses, we will test the first main hypothesis:

There is significant relationship between components of intellectual capital and indicators of market value as company's financial performance index.

According to above secondary hypotheses and their results, the indices of correlation coefficient, determination coefficient, and significance level, the Pearson correlation coefficient shows that, components of intellectual capital (especially physical and structural capital) have significant relationship with book-to-market and Tobin q ratios so that, the coefficient of determination for the mentioned relationships is equal to 0.319 and 0.470, respectively, indicating an acceptable explanation of the financial performance indicators related to market value by components of intellectual capital. According to these statistical results, the first main hypothesis is confirmed.

### Testing second hypothesis

Second main hypothesis: there is significant relationship between components of intellectual capital and profitability ratio (ROA) as an indicator of financial performance.

Table 13: Pearson correlation coefficient, significance level and the number of sample between components of intellectual capital and profitability ratio

|                                 | Physical capital | Structural capital | Human capital |
|---------------------------------|------------------|--------------------|---------------|
| Pearson correlation coefficient | 0.433            | 0.392              | 0.42          |
| Significance level              | 0.000            | 0.000              | 0.360         |
| Number                          | 507              | 507                | 507           |

Pearson correlation matrix is shown in the above table. Ln(ROA) is significant with the variables of structural capital (SCE) and physical capital (CEE) in 7 years and the direction of relationship in all cases is positive and there is no significant relationship with HCE.

The model for variance analysis:

$$\ln(ROA)_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \varepsilon_{it}$$

Table 14: Analysis of variance of regression between components of intellectual capital and profitability ratio

| Model |                         | Sum of squares | Degree of freedom | Mean of squares | Statistic of F | Significance level |
|-------|-------------------------|----------------|-------------------|-----------------|----------------|--------------------|
| 1     | Regression              | 124.519        | 4                 | 31.130          | 103.978        | 0.000              |
|       | Sum of square of errors | 150.292        | 502               | 0.299           |                |                    |
|       | Total                   | 274.811        | 506               |                 |                |                    |

Table 15: Correlation coefficient and Durbin-Watson test between components of intellectual capital and profitability ratio

| Model | Correlation coefficient | Determination coefficient | Adjusted determination coefficient | Error of estimation index | Durbin-Watson |
|-------|-------------------------|---------------------------|------------------------------------|---------------------------|---------------|
| 1     | 0.318                   | 0.101                     | 0.098                              | 0.69998                   | 1.889         |

Using the following model

$$\ln(ROA)_{it} = -3/87 - 0/008 HCE_{it} + 1/82 SCE_{it} + 2/19 CEE_{it} + \varepsilon_i$$

We have

Table 16: Coefficients of regression equation between intellectual and profitability ratio

| Model |           | Non-standardized coefficients |                | Standardized coefficients | Statistic of t | Significance level | Linearity test |                           |
|-------|-----------|-------------------------------|----------------|---------------------------|----------------|--------------------|----------------|---------------------------|
|       |           | B                             | Standard error | Beta                      |                |                    | Tolerance      | Variance inflation factor |
| 1     | Intercept | -3.874                        | 0.212          |                           | -18.278        | 0.000              |                |                           |
|       | HCE       | -0.008                        | 0.002          | -0.162                    | -4.101         | 0.000              | 0.698          | 1.432                     |
|       | SCE       | 1.821                         | 0.165          | 0.469                     | 11.019         | 0.000              | 0.601          | 1.664                     |
|       | CEE       | 2.191                         | 0.149          | 0.496                     | 14.677         | 0.000              | 0.956          | 1.047                     |

### Testing third hypothesis

Third main hypotheses: there is significant relationship between components of intellectual capital and asset turnover ratio (ATO) as an indicator of financial performance of company.

Pearson correlation matrix is shown in the following table. Asset turnover ratio (ATO) is significant with the variable of structural capital (SCE) in 1 year, is significant with physical capital (CEE) in seven years, and is significant with human capital (HCE) in 2 years. The direction of relationship is positive with CEE and is negative and inverted in other cases.

Table 17: Pearson correlation coefficient, significance level and the number of sample between components of intellectual capital and asset turnover ratio

|                                 | Physical capital | Structural capital | Human capital |
|---------------------------------|------------------|--------------------|---------------|
| Pearson correlation coefficient | 0.342            | -0.071             | -0.151        |
| Significance level              | 0.000            | 0.111              | 0.018         |
| Number                          | 511              | 511                | 511           |

Pearson correlation matrix is shown in the above table. Ln(ROA) is significant with the variables of structural capital (SCE) and physical capital (CEE) in 7 years and the direction of relationship in all cases is positive and there is no significant relationship with HCE.

The model for variance analysis:

$$ATO_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \varepsilon_{it}$$

Table 18: Analysis of variance of regression between components of intellectual capital and asset turnover ratio

| Model |                         | Sum of squares | Degree of freedom | Mean of squares | Statistic of F | Significance level |
|-------|-------------------------|----------------|-------------------|-----------------|----------------|--------------------|
| 1     | Regression              | 8.291          | 4                 | 2.073           | 19.794         | 0.000              |
|       | Sum of square of errors | 52.991         | 506               | 0.105           |                |                    |
|       | Total                   | 61.282         | 510               |                 |                |                    |

Table 19: Correlation coefficient and Durbin-Watson test between components of intellectual capital and asset turnover ratio

| Model | Correlation coefficient | Determination coefficient | Adjusted determination coefficient | Error of estimation index | Durbin-Watson |
|-------|-------------------------|---------------------------|------------------------------------|---------------------------|---------------|
| 1     | 0.368                   | 0.135                     | 0.128                              | 0.323611                  | 1.857         |

Using the following model

$$ATO_{it} = -0.236_{it} + 0.689CEE_{it} + \varepsilon_i$$

We have

Table 20: Coefficients of regression equation between intellectual and asset turnover ratio

| Model |           | Non-standardized coefficients |                | Standardized coefficients | Statistic of t | Significance level | Linearity test |                           |
|-------|-----------|-------------------------------|----------------|---------------------------|----------------|--------------------|----------------|---------------------------|
|       |           | B                             | Standard error | Beta                      |                |                    | Tolerance      | Variance inflation factor |
| 1     | Intercept | 0.927                         | 0.212          |                           | 7.517          | 0.000              |                |                           |
|       | HCE       | -0.001                        | 0.001          | -0.040                    | -0.819         | 0.413              | 0.701          | 1.285                     |
|       | SCE       | 0.128                         | 0.097          | 0.071                     | 1.326          | 0.185              | 0.594          | 1.683                     |
|       | CEE       | 0.689                         | 0.088          | 0.330                     | 7.818          | 0.000              | 0.957          | 1.045                     |

**Testing fourth main hypothesis**

Fourth main hypothesis: there is significant relationship between firm size, intellectual capital, and financial performance.

Table 21: Pearson correlation coefficient and significance level of firm size, components of intellectual capital and financial performance

|                         | MB    | Tobin Q | P/E   | ROA   | ATO    |
|-------------------------|-------|---------|-------|-------|--------|
| Correlation coefficient | 0.365 | 0.373   | 0.059 | 0.315 | -0.157 |
| Significance level      | 0.000 | 0.000   | 0.183 | 0.000 | 0.000  |
| Number                  | 508   | 511     | 503   | 507   | 511    |

Based on the statistical output of the above table the variable of firm size has a significant relationship with indicators of financial performance excluding the asset turnover ratio and it can be concluded that, there is positive and significant relationship between firm size, indicators of financial performance, and other components of the intellectual capital in the multiple regression model.

Using the following model

$$FP_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 CEE_{it} + \beta_4 Fsize + \varepsilon_{it}$$

We have

Table 22: Coefficients of regression equation between components of intellectual capita, firm size and financial performance

| Indicator of financial performance | Estimated regression model   | Correlation coefficient | Determination coefficient | Firm size coefficient $\beta$ | Statistic of T |        | Direction of relationships |                       |
|------------------------------------|--|-------------------------|---------------------------|-------------------------------|----------------|--------|----------------------------|-----------------------|
|                                    |  |                         |                           |                               | Firm size      | Sig.   | Intellectual capital       | Financial performance |
| MB                                 | $Ln(MB)_{it} = -2/45 - 0/008HCE_{it} + 0/87SCE_{it} + 2/01CEE_{it} + 0/40Fsize$      | 0.565                   | 0.470                     | +0.40                         | 8.904          | 0.000  | +                          | +                     |
| Tobin q                            | $Ln(Q-tobin)_{it} = -1/69 - 0/003HCE_{it} + 0/60SCE_{it} + 1/56CEE_{it} + 0/23Fsize$ | 0.686                   | 0.319                     | +0.23                         | 9.247          | 0.000  | +                          | +                     |
| P/E                                | $Ln(P/E)_{it} = 1/48 + 0/14 Fsize_{it} - 0/65 SCE_{it}$                              | 0.195                   | 0.38                      | +0.14                         | 3.153          | 0.0002 | -                          | +                     |
| ROA                                | $Ln(ROA)_{it} = -3/87 - 0/008HCE_{it} + 1/82SCE_{it} + 2/19CEE_{it} + 0/21Fsize$     | 0.318                   | 0.101                     | +0.21                         | 5.243          | 0.000  | +                          | +                     |
| ATO                                | $ATO_{it} = -0/236 - 0/073 Fsize_{it} + 0/689 CEE_{it}$                              | 0.368                   | 0.135                     | -0.073                        | 3.125          | 0.002  | -                          | -                     |

According to the analyses presented above the summary is as follows.

The first main hypothesis: There is a significant relationship between components of intellectual

capital and indicators of market value as indicator of company's financial performance.

The first sub-hypothesis: There is relationship between components of intellectual capital and the

ratio of market capitalization to book value of common stocks (MB).

According to the above results, the correlation coefficient between the components of intellectual capital and market-to-book value in the model is 0.565. Concerning the coefficients of F and T and their significance level there is a positive and significant relationship between them and intellectual capital explains 32% of the changes of market-to-book value.

In addition, considering the efficiency coefficient of physical and structural capital had the highest coefficient (2.01 and 0.87, respectively) in the regression equation, therefore they have more explanatory power than human capital component.

The second sub-hypothesis: There is relationship between components of intellectual capital and Tobin q ratio of market value indicators.

According to the above results, the correlation coefficient between the components of intellectual capital and Tobin q in the model is 0.686. Concerning the coefficients of F and T and their significance level there is a positive and significant relationship between them and intellectual capital explains 47% of the changes of market-to-book value.

In addition, considering the efficiency coefficient of physical and structural capital had the highest coefficient (1.56 and 0.6, respectively) in the regression equation, therefore they have more explanatory power than human capital component.

The third sub-hypothesis:

There is relationship between components of intellectual capital and the ratio of market value of shares to return on shares (P/E).

According to the above results, the correlation coefficient between the components of intellectual capital and P/E in the model is 0.15. Concerning the coefficients of F and T and their significance level there is a positive and significant relationship between them and intellectual capital explains 38% of the changes of market-to-book value.

In addition, considering the efficiency coefficient of physical and structural capital had the lowest coefficient (-0.651 and -0.001, respectively) in the regression equation, therefore they have less explanatory power than human capital component.

The main hypothesis of the first: There is a significant relationship between components of intellectual capital and indicators of market value as indicator of company's financial performance

According to the results of three secondary hypotheses, confirming first and second and rejecting the third, it can be concluded that, the  $H_0$  hypothesis is rejected and  $H_1$  is confirmed indicating that, there is positive relationship between the indicators of market value and intellectual capital.

The second main hypothesis: There is significant relationship between components of intellectual capital and profitability ratio (ROA) as an indicator of financial performance.

According to the above results, the correlation coefficient between the components of intellectual capital and profitability in the model is 0.318. Concerning the coefficients of F and T and their significance level there is a positive and significant relationship between them and intellectual capital explains 10% of the changes of market-to-book value.

In addition, considering the efficiency coefficient of physical and structural capital had the highest coefficient (2.19 and 1.82, respectively) in the regression equation, therefore they have more explanatory power than human capital component.

The third main hypothesis: There is significant relationship between components of intellectual capital and asset turnover ratio (ATO) as an indicator of financial performance of company.

As the results show, the significance level of correlation coefficient and the significance level between components of intellectual capital and asset turnover ratio is more than the acceptable 5%, and regarding that, the regression model for human and structural capital is not significant, the  $H_0$  hypothesis is accepted and the third main hypothesis is rejected. Therefore, it can be concluded that, there is no significant relationship between intellectual capital and asset turnover ratio. Moreover, the coefficient of determination ( $R^2$ ) is equal to 0.135, which indicates there is no balance in explanatory power of components of intellectual capital to explain asset turnover ratio.

The fourth main hypothesis: There is significant relationship between firm size, intellectual capital, and financial performance.

According to the results, models can explain the relationship between components of intellectual capital, financial performance, and firm size. In addition, the significance of correlation between firm size and financial performance indicators and intellectual capital is less than 5%. Therefore, one can say that, firm size can explain the relationship between intellectual capital and financial performance.

#### 4. Discussions

The author, in this work, concluded that, there is significant and positive relationship between variables of intellectual capital and financial performance indicators in the considered level of significance. In this regard, components of intellectual capital have the highest correlation with the indicators of profitability, market value and value added. It is worth mentioning that, in developing

countries, unlike developed countries, local markets are valued by physical capital rather intellectual capital and they are less depend on IC as an strategy. One reasons for this is that, they are still depend on trading and processing of natural resources as a fundamental growth strategy. Iranian stock market, also, is not exempted from this issue and therefore, physical capital (CEE) has the highest coefficient.

#### Corresponding Author:

Ghasem Ghasemi

Department of Accounting, Islamic Azad University-Sabzevar Branch, Sabzevar, Iran and Ph.D. student in National University of Tajikistan (Corresponding Author)

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1/8/2013