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Research Article

AN OVERVIEW ON EFFECT OF INTELLECTUAL CAPITAL ON BENEFIT OF QUALITY AMONG THE COMPANIES ACCEPTED IN TEHRAN STOCK EXCHANGE IN CHEMICAL INDUSTRY PRODUCTS

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ABSTRACT
Relevance and usefulness of the information that companies provided, have been mentioned as the challenges in reporting within companies, so that usefulness of traditional reporting in business unit has changed mainly through the changes in nature of business environment to competitive economy and change in different resources for creation of value, under which it has been proven that the competition in new economy with an emphasis on knowledge-based assets such as human knowledge has been mentioned as the innovation of technology and information. In this research, effect of intellectual capital on quality of financial information has been examined as one of the major dimensions of intellectual capital, because financial information is accounted as a basis for users' economic decision making that influences benefits of organization, whereby detection of factors affecting quality of financial information is of great importance; as a result the main question of this research is whether a significant relationship exists between intellectual capital and quality of financial information?. The statistical population consists of all the companies accepted in Tehran stock exchange in chemical industry products. Sample size is the same as the size of statistical population because all the companies accepted in Tehran stock exchange in chemical industry products were considered as the sample. Data collection method includes referral to documents and financial statements of the companies in sample group in website of Tehran stock exchange.

Keywords: *Intellectual Capital;* Benefit *of Quality*; *Chemical Industry Products*

INTRODUCTION
Financial report is a basis for economic decisions that influence benefits of organization and owners; nonetheless, numerous studies have been conducted about the factors affecting quality of financial information. Therefore, with regard to significance of representation of high-quality financial information, the present research has examined effect of intellectual capital on quality of financial information, because intellectual capital has been recognized as an important factor for creation of value and acquisition of competitive advantage in today's knowledge-based economy (Bontis and Serenko, 2000). In recent decades, a particular attention has been paid to intellectual capital as the knowledge-based capital. However significance of intellectual capital keeps increasing regarding today's competitive market, most of organizations face numerous problems due to ignoring effect of their intellectual capital. It should know that intellectual capital has remained latent in these companies due to its nature and features (Alcaniz *et al.*, 2011). The studies conducted to date have shown that production of superior products is not the only source for economic value but also the cause for distinctive intellectual capital. With regard to significance of intellectual capital, numerous studies have been conducted to examine effect of intellectual capital on different dimensions of performance (Beatty *et al.*, 2010). The present research seeks to know whether intellectual capital can affect financial performance of units including quality of benefit or not.

Theoretical Framework
Nowadays, intellectual capital in sake of intrinsic nature has been considered as a competitive advantage representing a part of economic performance for the organizations and an indicator of development and growth of countries. Collection of functional data pertaining to intellectual capital is one of the most important steps in intellectual capital management. In recent years, theorists' and researchers' attention to

intellectual capital has provided the opportunity for development of models, indicators and new and creative indicators and measures. These models, indicators and measures in addition to have common points with traditional measures are accounted the models, indicators and measures which are based on future capacities for business success. As mentioned, a series of models, indicators and measures which are used with the aim of general measurement for intellectual capital are the most important aspects of intellectual capital management. These frameworks have been developed under a range of accounting, economy, human resources accounting and intellectual ownership (Mahmoudi, 2009). At 20th century, economy has been based on industry when any company and country with more tangible physical and material assets has been producing more wealth. Yet, in the 21th century, economy is based on knowledge (Mahmoud and Bayazidi, 2011). Intellectual capital goes beyond physical and tangible assets and human capital refers to the most important asset existing in an organization, thus it is expected higher financial performance in the companies which enjoy higher human and intellectual capital (Rakhshani, 2008). In general, these models can be classified to two groups in sake of nature:

1-the first group: this includes the models which have been designed through descriptive approach in measurement of intellectual capital.

2-the second group: this includes the models which have been introduced in a systematic way with the main purpose of homogenization of measurement process and intellectual capital reporting. On the other hand, with regard to growth in significance of intellectual capital in development of countries in recent years, a variety of models and indicators have been introduced to measure intellectual capital and knowledge throughout the countries by international organizations and entities. These models grounded on a macro-strategy measures level of intellectual capital based on growth and development of national indicators of this capital. Besides aforementioned factors, some service companies with the main purpose of building management frameworks have succeeded in inventing some tools at this area (Aghaei and Shakeri, 2010).

MATERIALS AND METHODS

Research Method

The applied research method has been used in this research. The statistical population consists of all the companies accepted in Tehran stock exchange in chemical industry products. Sample size is the same as the size of statistical population because all the companies accepted in Tehran stock exchange in chemical industry products were considered as the sample.

The First Major Hypothesis

Null hypothesis: there is not a significant difference between mean of major variables of research in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of major variables of research in the industries under study.

To test the first major hypothesis, the secondary hypotheses below are tested:

Secondary Hypothesis

The First Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of quality of benefit-Penman index in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of quality of benefit-Penman index in the industries under study.

The Second Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of quality of benefit-Barton index in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of quality of benefit- Barton index in the industries under study.

The Third Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of efficiency of the capital used in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of efficiency of the capital used in the industries under study.

The Fourth Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of efficiency of human capital in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of efficiency of human capital in the industries under study.

The Fifth Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of efficiency of structural capital in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of efficiency of structural capital in the industries under study.

Hypotheses Testing

In this section, the research hypotheses are examined:

The First Major Hypothesis

Null hypothesis: there is not a significant difference between mean of major variables of research in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of major variables of research in the industries under study.

The First Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of quality of benefit-Penman index in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of quality of benefit-Penman index in the industries under study.

Firstly equality of variance of variable in the groups is considered to examine this hypothesis. For this purpose, variance ratio test has been used and then two-sample t-test has been used.

Table 1: Table of variance ratio test

Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.8932973	.1832777	1.922233	.5300468	1.256548
1	85	1.230683	.2941137	2.711595	.6458054	1.81556
combined	195	1.040363	.1646728	2.299531	.7155839	1.365142

```
    ratio = sd(0) / sd(1)                                     f =   0.5025
Ho: ratio = 1                                 degrees of freedom =  109, 84

    Ha: ratio < 1               Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 0.0004         2*Pr(F < f) = 0.0008          Pr(F > f) = 0.9996
```

Since the obtained probability is under 0.05, null hypothesis is rejected deducing that there is a significant difference between groups concerning the variance of variable.

Table 2: Two-sample t-test

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.8932973	.1832777	1.922233	.5300468	1.256548
1	85	1.230683	.2941137	2.711595	.6458054	1.81556
combined	195	1.040363	.1646728	2.299531	.7155839	1.365142
diff		-.3373855	.3465453		-1.022316	.3475452

```
    diff = mean(0) - mean(1)                                      t =  -0.9736
Ho: diff = 0                     Satterthwaite's degrees of freedom =  145.049

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.1659         Pr(|T| > |t|) = 0.3319          Pr(T > t) = 0.8341
```

With regard to the obtained probability which is greater than 0.05, it can observe that there is no significant difference between mean of quality of benefit-Penman index in the industries under study.

The Second Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of quality of benefit-Barton index in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of quality of benefit- Barton index in the industries under study.

Firstly equality of variance of variable in the groups is considered to examine this hypothesis. For this purpose, variance ratio test has been used and then two-sample t-test has been used.

Table 3: Table of variance ratio test

Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.2499225	.01908	.2001122	.2121066	.2877383
1	85	.3635948	.0564582	.5205191	.2513215	.4758682
combined	195	.299472	.0270808	.3781631	.2460613	.3528826

```
    ratio = sd(0) / sd(1)                                         f =   0.1478
Ho: ratio = 1                                 degrees of freedom =  109, 84

    Ha: ratio < 1                Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 0.0000         2*Pr(F < f) = 0.0000          Pr(F > f) = 1.0000
```

Since the obtained probability is under 0.05, null hypothesis is rejected deducing that there is a significant difference between groups concerning the variance of variable.

Table 4: Two-sample t-test

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.2499225	.01908	.2001122	.2121066	.2877383
1	85	.3635948	.0564582	.5205191	.2513215	.4758682
combined	195	.299472	.0270808	.3781631	.2460613	.3528826
diff		-.1136723	.0595951		-.2318618	.0045171

```
    diff = mean(0) - mean(1)                                      t =  -1.9074
Ho: diff = 0                     Satterthwaite's degrees of freedom =  103.245

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0296         Pr(|T| > |t|) = 0.0592          Pr(T > t) = 0.9704
```

With regard to the obtained probability which is greater than 0.05, it can observe that there is no significant difference between mean of quality of benefit- Barton index in the industries under study.

The Third Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of efficiency of the capital used in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of efficiency of the capital used in the industries under study.

Firstly equality of variance of variable in the groups is considered to examine this hypothesis. For this purpose, variance ratio test has been used and then two-sample t-test has been used.

Table 5: Table of variance ratio test

Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.3353211	.018447	.1934739	.2987597	.3718825
1	85	.268516	.0190978	.1760726	.230538	.3064939
combined	195	.3062009	.0135036	.188568	.2795682	.3328337

```
    ratio = sd(0) / sd(1)                                         f =   1.2074
Ho: ratio = 1                              degrees of freedom =  109, 84

    Ha: ratio < 1               Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 0.8166         2*Pr(F > f) = 0.3668          Pr(F > f) = 0.1834
```

Since the obtained probability is greater than 0.05, null hypothesis is not rejected deducing that there is not a significant difference between groups concerning the variance of variable.

Table 6: Two-sample t-test

Two-sample t test with equal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.3353211	.018447	.1934739	.2987597	.3718825
1	85	.268516	.0190978	.1760726	.230538	.3064939
combined	195	.3062009	.0135036	.188568	.2795682	.3328337
diff		.0668052	.0268756		.0137975	.1198128

diff = mean(0) - mean(1) t = 2.4857
Ho: diff = 0 degrees of freedom = 193

Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.9931 Pr(|T| > |t|) = 0.0138 Pr(T > t) = 0.0069

With regard to the obtained probability which is under 0.05, it can observe that there is a significant difference between mean of efficiency of the capital used in the industries under study.

The Fourth Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of efficiency of human capital in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of efficiency of human capital in the industries under study.

Firstly equality of variance of variable in the groups is considered to examine this hypothesis. For this purpose, variance ratio test has been used and then two-sample t-test has been used.

Table 7: Table of variance ratio test

Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	12.71113	.7635481	8.00816	11.1978	14.22445
1	85	37.97838	6.686071	61.64253	24.6824	51.27437
combined	195	23.72506	3.07104	42.88474	17.66815	29.78197

ratio = sd(0) / sd(1) f = 0.0169
Ho: ratio = 1 degrees of freedom = 109, 84

Ha: ratio < 1 Ha: ratio != 1 Ha: ratio > 1
Pr(F < f) = 0.0000 2*Pr(F < f) = 0.0000 Pr(F > f) = 1.0000

Since the obtained probability is under 0.05, null hypothesis is rejected deducing that there is a significant difference between groups concerning the variance of variable.

Table 8: Two-sample t-test

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	12.71113	.7635481	8.00816	11.1978	14.22445
1	85	37.97838	6.686071	61.64253	24.6824	51.27437
combined	195	23.72506	3.07104	42.88474	17.66815	29.78197
diff		-25.26726	6.729528		-38.64469	-11.88983

```
    diff = mean(0) - mean(1)                                      t =  -3.7547
Ho: diff = 0                     Satterthwaite's degrees of freedom =   86.194

    Ha: diff < 0                 Ha: diff != 0                 Ha: diff > 0
 Pr(T < t) = 0.0002         Pr(|T| > |t|) = 0.0003          Pr(T > t) = 0.9998
```

With regard to the obtained probability which is under 0.05, it can observe that there is a significant difference between mean of efficiency of human capital used in the industries under study.

The Fifth Secondary Hypothesis

Null hypothesis: there is not a significant difference between mean of efficiency of structural capital in the industries under study.

Alternative Hypothesis: there is a significant difference between mean of efficiency of structural capital in the industries under study.

Firstly equality of variance of variable in the groups is considered to examine this hypothesis. For this purpose, variance ratio test has been used and then two-sample t-test has been used.

Table 9: Table of variance ratio test

Variance ratio test

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.8967624	.004702	.049315	.8874432	.9060816
1	85	.8686493	.0368878	.3400888	.7952938	.9420047
combined	195	.884508	.0162735	.2272477	.8524122	.9166037

```
    ratio = sd(0) / sd(1)                                         f =   0.0210
Ho: ratio = 1                              degrees of freedom =  109, 84

    Ha: ratio < 1                Ha: ratio != 1                 Ha: ratio > 1
  Pr(F < f) = 0.0000         2*Pr(F < f) = 0.0000          Pr(F > f) = 1.0000
```

Since the obtained probability is under 0.05, null hypothesis is rejected deducing that there is a significant difference between groups concerning the variance of variable.

Table 10: Two-sample t-test

Two-sample t test with unequal variances

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
0	110	.8967624	.004702	.049315	.8874432	.9060816
1	85	.8686493	.0368878	.3400888	.7952938	.9420047
combined	195	.884508	.0162735	.2272477	.8524122	.9166037
diff		.0281131	.0371863		-.0458018	.1020281

diff = mean(0) - mean(1) t = 0.7560
Ho: diff = 0 Satterthwaite's degrees of freedom = 86.7342

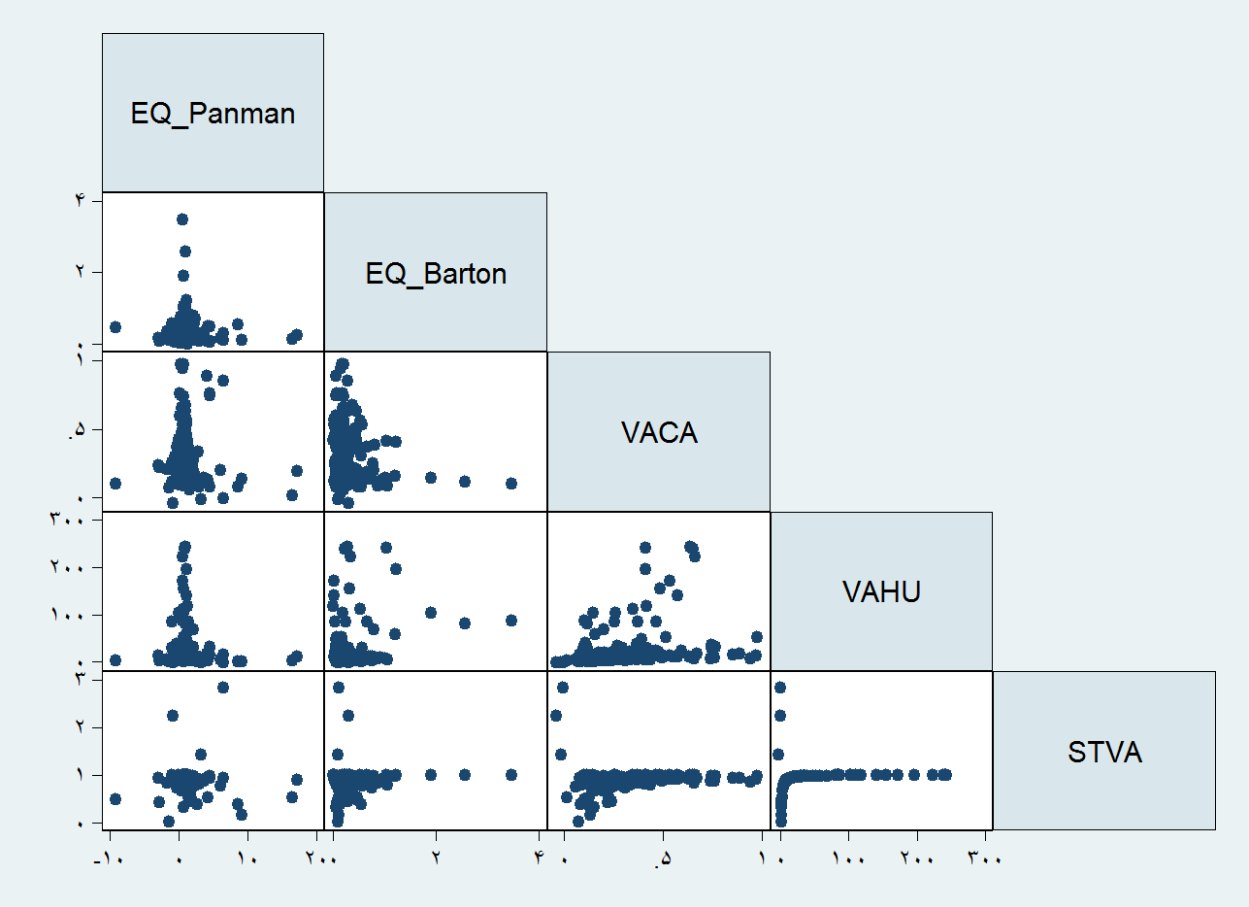
Ha: diff < 0 Ha: diff != 0 Ha: diff > 0
Pr(T < t) = 0.7742 Pr(|T| > |t|) = 0.4517 Pr(T > t) = 0.2258

With regard to the obtained probability which is greater than 0.05, it can observe that there is a significant difference between mean of efficiency of structural capital used in the industries under study.
In following, the correlation between research variables has been examined and the research hypotheses have been examined via regression analysis of combined data.

Table 11: Correlation between research variables

Variable	quality of benefit-Penman index	quality of benefit-Barton index	Efficiency of used capital	Efficiency of human capital	Efficiency of structural capital
quality of benefit-Penman index	1.00				
quality of benefit-Barton index	0.01-	1.00			
Efficiency of used capital	0.05-	0.18-	1.00		
Efficiency of human capital	0.04-	0.25	0.29	1.00	
Efficiency of structural capital	0.01-	0.03	0.07	0.18	1.00

Pearson correlation coefficient indicates extent of linear relationship between research variables. It is observed that there is a poor correlation between variables of efficiency of human capital and quality of benefit-Penman index. Scatter plot is depicted to examine the cause for this.



With regard to the status for data dispersion, it can perceive that there is a non-linear relationship between some of variables, that such non-linear relationship can raise problem in the regressions under study for which it should consider suitable techniques to resolve it. In following, the research hypotheses using regression analysis are examined. In multivariate regression analysis, the relationship between one dependant variable and several independent variables is examined. Despite correlation, here effect of one variable on another variable is measured. Correlation coefficient examines whether a linear relationship exists between two variables or not. In regression analysis, a variable is considered as a function of several other variables. The basis for regression analysis has been grounded on multivariate distributions and conditional distributions that propose the regression equation as a conditional mean. With regard to regression equation, the changes in dependant variable are classified to two groups: changes which are influenced of independent variable called with random and controllable changes and changes which arise from random and uncontrollable factors.

Total Sum of Squares, Explained Sum of Squares and Residual Sum of Squares

Total sum of squares represent sum of squares for changes of Y due to $\overline{Y}$.

$$TSS = \sum (Y_i - \bar{Y})^2$$

Explained Sum of Squares indicates those changes of Y that are explained via regression equation.

$$ESS = \sum (\hat{Y}_i - \bar{Y})^2$$

Residual Sum of Squares indicates those changes of Y which arise from other factors, equaled to sum of squares of errors.

$$RSS = \sum (Y_i - \hat{Y}_i)^2$$

Determination Coefficient (R^2)

After estimation of regression equation, the first question is in this way: to which extent estimation size of $\hat{Y}_i$is close to Y_i. In other words, to which extent regression equation can be a good equation explaining the changes in dependant variable. Here, determination coefficient is used as the criterion which indicates ratio of the explained changes to total changes. Further, determination coefficient equals to the square of correlation coefficient between Y_i and $\hat{Y}_i$.

The Average Estimation Error or Standard Deviation of Regression

The average estimation error or standard deviation of regression represents the extent of dispersion in the observations around the regression line. When the regression line gets close to real observations, there will be less error, whereby standard deviation will be smaller. In general, standard deviation of regression equations indicates average error in regression equation.

$$\hat{\sigma}^2 = \frac{\sum (Y_i - \hat{Y}_i)^2}{n-k-1} = \frac{\sum {e_i}^2}{n-k-1} = \frac{RSS}{n-k-1}$$

Standard deviation of estimation indicates the extent to which a deviation exists in real Ys from estimated $\hat{Y}$s.

Analysis of Panel Data

Panel data include a series of data which encompass a period of time and several sections. In the present research, sections are called to companies under study that on the whole 56 companies were considered among which 17 companies were not used due to no access to the information on several variables and/or difference in financial year, as a result 39 companies in two industries were examined. The period of time for the data under study has been mentioned during 2009-2013. Panel data can reflect more information as they reflect time changes and the changes in any section. Most of points which are ignored in the time series analyses are clarified in panel data analysis, particularly heterogeneities that are neglected in time series analyses can be examined in data panel analysis. Therefore, in panel data analysis, special characteristics of any company which have been fixed during time but changing from one company to another company are taken into consideration. There are two general methods for analysis of panel data:

-fixed effects

-random effects

In each of the hypotheses via Hausman test, feasibility of use of the random effects model is measured and a suitable model is used. Ultimately, to assure from results of statistical tests under conditions undergoing difference of the variances of the residuals, the obtained results are examined via Robust Standard Errors and the probable changes are elaborated.

Discussion and Conclusion

The present research has been conducted to identify and examine effect of intellectual added value, efficiency of the used capital, efficiency of human capital, efficiency of structural capital on quality of benefit based on Penman index and Barton index. For this purpose, the considered variables are calculated via the information extracted from the financial statements of the companies under study. The necessary information was extracted from financial statements of the companies under study including statement of balance sheet and loss and profit. In this research, the statistical population consists of pharmaceutical companies (22 companies) and chemical companies (17 companies) accepted in Tehran stock exchange; the present research has been conducted during 2009-2013 and the variables have been selected from the financial statements during this period of time. On the whole, 195 observations pertaining to the entire companies during 5 years have been examined and collected. With regard to the limitations and necessary conditions for the sampling, 39 companies among the pharmaceutical and chemical companies have been selected and 17 companies were put aside due to deficiency in their data.

The present research is a correlation in sake of nature and content, engaging in analyzing correlation via the data extracted from financial statements of the companies accepted in Tehran stock exchange. This research will be conducted under the framework for inductive reasoning that exploration of correlation between variables is the reason for use of correlation method. Correlation research is categorized as descriptive research. In the present research, firstly the correlation between variables of research were tested and then the multiple regression model were estimated under a correlation between variables of research. On the other hand, the present research is prospective research, that is, it has been conducted based on analysis of previous information. Further, this research is a library and analytical research. This research is considered as an applied research in sake of aim and a descriptive correlation in sake of method.

Suggestions from Results and Findings of Research

-nowadays, intangible assets such as innovations, trademark and extent of education develop market value of company. Recognition and utilization of intellectual capital in the companies help for increasing performance of companies throughout the world.

Human capitals as a part of intellectual capitals play a potential role in building market value. Intellectual capital has been defined as a series of factors such as knowledge, skill, abilities and attitudes of staffs that can result in persuasion of customers in purchase from company and acquisition of financial benefit as an important factor in organizational performance. This capital has been accounted as a useful tool with a potential role in increasing the quality of services provided for customers, resulting in acquisition of competitive advantage in market and acquisition of higher exchange for the organization. On the other hand, human capital requires for a backup structural capital so as to reach to an optimal intellectual performance. If a suitable investment does not make in structural capital in advance, human capitals will not undertake their responsibilities properly. Sine a significant relationship between value of intellectual capital and quality of benefit has been confirmed in the present research, it is suggested to the managers to seek improvement in the conditions for knowledge, skill, experience, innovation in the organization regarding the factors contributing in intellectual capital. Further, it is suggested to the managers to institutionalize the aforementioned factors in the existing organizational culture.

-since the relationship between efficiency of the used capital, efficiency of human capital and efficiency of structural capital and quality of benefit has been significant in the present research, it is suggested to the managers to seek those strategies for increasing the value added of ratio of total assets through suitable planning.

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