MEASURING INTELLECTUAL CAPITAL USING JUSTIFIED PULIC MODEL AND ITS EFFECT ON THE FINANCIAL PERFORMANCE OF LISTED COMPANIES IN TEHRAN STOCK EXCHANGE

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Abstract:

We all know that what gets measured gets done. However, the organizations which pursuing the knowledge management don't have any process for measuring the organizational knowledge or intellectual capitals of assets. The traditional financial reporting cannot measure the actual value of the company (or company) and will suffice the measurement of short-term balance sheet and tangible assets. In fact, the intellectual capital provides a new complete model for observing the actual value of the organizations and through its using; the future value of company can be also measured. Due to the willingness to assess and consider the real value of intangible assets, the intellectual capital has increased more than ever to company, shareholders (investors) and other stakeholder groups. In this study, according to the justified Pulic model (e-VAIC™), the intellectual capital value of listed companies in Tehran Stock Exchange during 10 years period from 2005 to 2015 got measured and then, the relationship between components of intellectual capital and companies' performance was evaluated. In the current study, the statistics method was used and data analysis was conducted with multifold regression and correlation coefficient. The sampling was continuously for a period of 10 years which the company size and financial leverage were considered as control variable. The results indicate that there is a meaningful positive relationship

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between intellectual capital and financial performance of listed companies in Tehran Stock Exchange. According to the results, using this model for achieving higher profit can be intensely recommended for utilizing companies, shareholders, investors and other beneficiaries.

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1. Introduction

The growth and development of utilizing technologies may be the most obvious case of human progression. After the Industrial Revolution, the economy relies on land and labor force gradually replaced its location to the industrial economy, an economy which had dependence toward the capital factor in order to obtain and use technology and then it had dependence to land and labor force, and now in the third millennium, an attitude is ahead of nations and organizations' ways which is called knowledge-based economy or service and informational economy that of course is promising the arrival of informational and communicational development.

Notifying the intellectual capitals and knowledge as the most major factor of new economy is daily increasing. In this economy, the role of human force and intelligence are increasingly notified day by day. Now, most of the researchers consider the intellectual capitals. Also, in industry, the number of companies which have obtained significance successes by utilizing the knowledge and notifying the intellectual assets are in increasing.

One of the most important issues in traditional accounting systems is their disability in sensing and measuring and also the clear consideration of companies' intellectual capitals. Most of these systems have neglected from the role and increasing importance of intellectual asset rights and knowledge of organizations in the new era and disable of measuring the actual value of intangible assets in their calculations (Chan, 2009, p. 12).

For intellectual capital, different definitions were presented and the key differences in definitions and models are regarded to the various measurements of intellectual capital and the priority which any one devotes to the measurement of internal and external social and human capitals. Some of these models are willing to emphasize on the customer capital even though some to the human capital in organization and some others provide a holistic attitude regarding to the available models in measuring the knowledge assets along with their comparative study.

Among the measurement models of intellectual capital, Pulic value-added coefficient model which is one of the subset models of assets return has the most function for measuring intellectual capital among the researchers. In this model, intellectual capital includes three elements of physical, human and structural capitals. As it was mentioned, Pulic model considers three elements of intellectual capital, but researchers have introduced another main element for intellectual capital and is customer (or communicational) capital (Stewart, 1997; Bontis, 1998); which Stewart has introduced it as available knowledge in marketing channels and customers' relationships and its measurement was not considered in the Pulic (2004) model, but the deficiency is made up for in this study using justified Pulic model, and is measured and its effect will be identified.

2. Research literature
2.1. Different definitions of intellectual capital
The various definitions are presented in the regard of intellectual capital which some will be referred at follows:

- The intellectual capital is the knowledge flow in companies (Direx & Kell, 1989, 35).
- The intellectual capital is a knowledge which can be transformed into the value (Edvinsson, 1991, 3).
- The intellectual capital includes of all processes and assets that are not normally and traditionally shown in the balance sheet and also those types of intangible assets (e.g. Trademarks or commercial names and monopoly) which modern accounting methods consider them (Roos, 1997, 413-426).
- The intellectual capital is the difference between market value and the replacement cost of its asset (Sid Raman, 2002, 128-148).

2.2. The elements of intellectual capital

A. Human capital
The human capital shows the knowledge inventory and availability of people in an organization. Bontis describes the human capital as the collective capability of an organization to extract the best solutions from its people's knowledge (Bontis, 1998, 63-76).

B. Structural (organizational) capital
The structural capital includes all non-human reserves of knowledge which contain the data bases, organizational charts, operational instructions of processes, strategies and operational programs of organization (Roos, 1997, 413-426). Roos et al believe that

structural capital is consisted of whatever remains in organization after staffs go back to their homes at night.

C. Communicational (customer) capital

The main subject of customer capital is the available knowledge in marketing channels and relationships with customers. The customer capital shows the potential ability of an organization due to its external intangible factors.

2.3. Measurement models of intellectual capital

Direct Intellectual capital Models (DIC)

These models (or methods) measure the monetary value of intellectual capital with the identification of its various components. Actually, the window of possibility creation will be valuing these components either individually or fractionally of total possible value.

A. Market Capitalization Models (MCM)

These models measure the intellectual capital through the calculation of difference between market capital and shareholders capital.

B. Return on Assets methods (ROA)

In these models, the average income of organization before tax is considered as the basis for calculation. Actually, this average in a temporal period is divided by the average intellectual capital of organization. The result of this fraction achieved the amount of ROA (return capital ratio) of organization. In the following, the ROA amount from fractioned industrial average, and the results of this operation in the next step will be multiplied by the average intellectual capital average of organization so that the annual average income by intellectual capital can be measured.

C. Scorecard Methods (SC)

In these models, different components of intellectual capital are measured and appropriate measures and markers are created. Then, the results are extracted and shown in the form of scorecard or graph. The scorecard methods are similar to the direct intellectual capital methods with this difference that in these methods, no guarantee of financial values of intangible asset will be made.

3. Research history

The following researches about intellectual capital were conducted:

3.1. Foreign researches

The summary of foreign researches is shown in the following table:

Table 1: The summary of foreign researches

Researcher	Year	Subject	Description
Chan et al	2005	The relationship between the intellectual capital of market value and financial performance of listed companies in Taiwan Stock Exchange	The results of test assumptions showed that intellectual capital has a positive effect on market value and financial performance and may be a criterion for future functions
Chung et al	2007	The effect of intellectual capital on the market value and profitability in information technology industry	His results showed that in the whole level of relative industry, intellectual capital and its elements have just positive and meaningful effect with profitability and market value
Chan et al	2005	Survey the relationship between intellectual capital and financial return	Survey the researches indicate that there is a positive relationship between intellectual capital and financial performance of organization
Afroozeh	2009	Survey the effect of intellectual capital on the financial performance in banks of Bangladesh using value-added method of Pulic	The results of this study showed that there is a positive relationship between intellectual capital and return on assets (ROA) and earnings per share (EPS) but there isn't between any relationship between the intellectual capital and return of earning (ROE)
Vishnu and Kapta	2013	Survey the effect of intellectual capital on financial performance in pharmacy companies of India	The results of selected data regression show that there is a positive relationship between intellectual capital components and financial performance

3.2. Domestic Researches:

The summary of domestic researches is shown in the following table:

Table 2: The summary of foreign researches

Researcher	Year	Subject	Description
Kazemnejad et al	2009	The effect of intellectual capital of and financial performance of listed companies in Tehran Stock Exchange	Provides the existence positive and meaningful (significant) relationship between intellectual capital and return of assets and assets circumstance ratio of same year even though the existence of meaningful relationship between intellectual capital and market value ratio to the official ratio was not confirmed
Mojtahedzadeh et al	2010	The relationship of intellectual capital (human, customer and	The results show that when human capital, customer capital and structural capital are surveyed individually have direct relationship

		structural) and insurance industry performance (from managers' viewpoint)	with company's performance
Ismailzadeh moghari et al	2010	Survey the relationship between intellectual capital and performance evaluating indexes of listed companies in Tehran Stock Exchange	The results show that there is a direct relationship between intellectual capital and profit before taxes, operational cash flows and value-added in the studied companies and the correlation between these indexes and intellectual capital is at fairly high level
Siyani et al	2011	Survey the intellectual capital and company performance	They found out that at first regardless of companies' types, a positive relationship is seen between innovation and customer capital with companies' performances. The relationship between customer capital and performance in companies with low technology was higher than companies with high technology and the relationship between innovation capital and financial performance in companies with high technology was lower than companies with low technology

4. Research assumptions

This research has 2 primary assumptions and 2 secondary assumptions.
- First primary assumption: There is a meaningful (or significant) relationship between intellectual capital (justified Pulic model) and return on sales.
- First secondary assumption: There is a meaningful (or significant) relationship between each one of intellectual capital components (justified Pulic model) and return on sales.
- First primary assumption: There is a meaningful (or significant) relationship between intellectual capital (justified Pulic model) and return on assets.
- First secondary assumption: There is a meaningful (or significant) relationship between each one of intellectual capital components (justified Pulic model) and return on assets.

5. Research identification and Information collecting method

This research is an applied research in the terms of purpose, and is a correlation research in the terms of classification based on the method. The methodology of the research is deductive - inductive which in this method, the theoretical basis and research history are collected by library, article and internet; and of deductive reasoning for Supporting or rejecting research assumptions, the appropriate statistical methods were used; and also in order to explaining results, inductive reasoning was used.

6. Statistic society of research

In the current study, according to its subject and function, the statistic society included of all listed companies in Tehran Stock Exchange that the selection reason was ease in information availability. The temporal period of study was from the beginning of 2005 to the end of 2015. The current statistic society had all these criterions:

- The companies must be in the stock exchange before 2005 and their stocks remains in exchange until the end of 2015.
- The operational break of companies should not be more than 3 months from "2005 to 2015".
- The financial year of companies should end to Esfand (February-March) and they don't change their financial year and required information should be available for extracting data.

7. Studied variable and variable measurement method

Variable is a conception that can be replaced between more 2 or several value and figures. The variable can be divided into three categories according to the role that research plays:

- The independent variable;
- Independent monitoring variable;
- Dependent variable.

A. Primary independent variable

It's a variable which is measured, adjusted and selected by the researcher so that its effect or relationship can be determined with other variables. The independence variable in this study is intellectual capital and its measuring method is by justified value-added Pulic coefficient.

The justified Pulic model

As it was mentioned, three capital elements are notified in Pulic model, but researchers have introduced another main element for intellectual capital and is customer (or communicational) capital (Stewart, 1997; Bontis, 1998); which Stewart has introduced it as available knowledge in marketing channels and customers' relationships and its measurement was not considered in the Pulic (2004) model, but the deficiency is made up for in this study using justified Pulic model, and is measured and its effect will be identified.

There are four elements in justified Pulic model:
- ✓ Physical capital (CEE)

- ✓ Human capital (HCE)
- ✓ Customer or communicational capital (RCE)
- ✓ Structural capital (SCE)

$$e - VIAC_i^{TM} = HCE_i + RCE_i + SCE_i + CEE_i$$

P_i = Company profit

I_i = Profit costs

C_i = Payroll costs

D_i = Depreciation costs

DIV = Division profit

T_i = Tax

HC = Payroll costs

CE_i = the book value of total assets – the book value of intangible assets

$$SC = VA_i - HC_i$$

Which they are measured as follows:

This model was introduced by Stahle et al (2011), they found out that the customer capital is neglected to get measured in the primary Pulic model, therefore, they also measured it and measured each one of the intellectual capital elements as follows:

- ✓ Human capital (value-added/ payroll costs):

$$HCE_i = \frac{VA}{HC}$$

- ✓ Structural capital (structural capital/ value-added):

$$SCE_i = \frac{SC}{VA}$$

- ✓ Communicational (or customer) capital (value-added/ sales and market costs and advertisement costs):

$$RCE = \frac{VA}{M\&S}$$

- ✓ Physical capital (Value-added/ capital employed):

$$CEE_i = \frac{VA}{CE}$$

B. Dependent Variable

It's a variable which is observed and measured so that the effect of independence variable on dependent variable can be identified. In correlation study, the existence of

dependent variable is relied on independent variable. Hence, it's called subsidiary or dependent variable. In this study, return on sales (ROS) and return on assets (ROA) of companies are known as the dependent variable that its calculations are as follows:

ROS= Calculated as EBITDA divided by net sales
ROA=Calculated as net income divided by average total assets

C. Independent monitoring variable

It's a variable which such as independent variable has effect on dependent variable. According to the theoretical history and literature, the current study has two independent monitoring variables including of size and financial leverage.

8. Statistical methods

For the statistical analysis of data and test assumptions in the current research, two kinds of statistical methods were used.

- **Descriptive Statistics:** the variable describing direction and data distribution type were determined using central indexes such as mean (average), median and distribution indexes such as standard deviation, skew-ness and kurtosis.

- **Inferential statistics: in two parts:**
  - A. The default test of regression model: includes of statistic society distribution normality test (Kolmogorov-Smirnov test) and self-correlation test of data (Futuristic-Watson test).
  - Main test: includes of multi variable linear regression test, Pearson correlation test. For analyzing and surveying the relationship between variables, the regression (correlation) was used. In order to test the study assumptions, the linear regression method and for the meaningfulness of correlation between the study variables, the P-Value (sig.) test; Pearson correlation test was also used.

A. Pearson correlation coefficient

The Pearson correlation coefficient which is also known under the names of moment correlation coefficient or zero-order correlation coefficient was introduced by Sarkarl Pearson. This coefficient is used for determining the relationship level, kinds and the orientation of a relationship between two interval or relative variables, or an interval and a relative variable. Several equivalent calculation methods can be defined for measuring this coefficient.

- The calculation method using the raw numbers:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n(\sum x^{\Upsilon}) - (\sum x)^{\Upsilon}][n(\sum y^{\Upsilon}) - (\sum y)^{\Upsilon}]}}$$

- The method of calculation through the standardized scores:

$$r = \frac{\sum Z_x Z_y}{n}$$

The Pearson correlation coefficient varies between -1 to +1. If r = 1 indicates that there is a complete direct relationship between two variable; the direct or positive relationship means that if one of the variable decreases, the other will decrease too if r = -1 indicates that there is a complete reverse relationship between two variable; the reverse relationship means that if one of the variable increases, the other will decrease and vise-versa. When the correlation coefficient is zero, it means that there isn't any linear relationship between two variables.

B. F Limer statistics:

The example of model that can be made for describing variables in these types of data is as follows:

$$Y_{it} = \alpha_i + \beta' X_{it} + u_{it}$$

Where β is a k*1 vector of parameters, X_{it} is a k*1 vector of relevant observations to descriptive variables, and t= 1, 2, … and i= 1, 2, … .

The direction of panel and Pulinc being should be identified which in this regard, the Limer test will be used. Before all, the types of data should be determined that here we have two statuses, the data are Pulinc that the statistics of common effects should be estimated using T method; or they are panel which should be estimated using one of these two methods of permanent effects and variable effects (Azat-o-allah Lotfi, 2012).

This study will use the following regression model for information analysis and assumptions testing.

- Performance (ROA; ROS) = α + β1 ICE (e-VAIC™ model) + ε
- Performance (ROA; ROS) = α + β1(HCE)+β2(SCE)+β3(RCE)+β4(CEE)+ ε

9. Assumption testing

The current study assumptions are as follows

- First primary assumption: There is a meaningful (or significant) relationship between intellectual capital (justified Pulic model) and return on sales.
- First secondary assumption: There is a meaningful (or significant) relationship between each one of intellectual capital components (justified Pulic model) and return on sales.
- First primary assumption: There is a meaningful (or significant) relationship between intellectual capital (justified Pulic model) and return on assets.
- First secondary assumption: There is a meaningful (or significant) relationship between each one of intellectual capital components (justified Pulic model) and return on assets.

Defaults analysis

In this section, the required defaults for conducting assumptions will be analyzed.

Variables normality

In order to survey the normality of variables, Jock test was used because data were not normal (the meaningfulness level of Jock Bra test was lower than 0.05).

Table 3: Jock Bra test

Variable	Sales return
Jock Bra statistics	51.42
Meaningfulness (significance) level	0.000000
Compare with 0.05	Lower
Test result	Non-normal

Cox –Box test

In order to normalize the data or in other hands normalize the variables, Cox – Box transformations with the following formula was used where Lambda is constant number and its numeral range varies from -5 to +5 and replacing it in the formula will determine the appropriate type of transformation for normalizing on variables (Bayazidi el al, 2010).

$$T(x_1) = x_1^\lambda \frac{x_1^\lambda - 1}{\lambda}$$

In this study, various amounts of lambda such as 0.25, 0.12, -2, -0.41 and -0.23 in Minitab software for each one of the variables were used. After normalization, the results of Jock Bra test are as follows:

Table 4: Jock Bra test for study variables after applying Cox – Box transformations

Variable	Sales return
Jock Bra statistics	12.72
Meaningfulness (significance) level	0.056
Compare with 0.05	Higher
Test result	Normal

First primary assumption test – the justified Pulic model of intellectual capital and return on sales:

The F Limer test of first primary assumption

Table 5: The results of meaningfulness test of permanent effects in contrast to the least aggregated squares method for first assumption (sales return)

The amount of possibility value (PV)	Freedom degree	The amount of F statistic test
0.27	(7 and 139)	1.24

Therefore, in this section, the first assumption (dependent variable – sales return) as above will be tested using the integrated regression.

Results of first primary assumption - the justified Pulic model of intellectual capital and return on sales

The results of estimating the model with integrated regression method (dependent variable – sales return) show that e-VAIC variable increment (value-added of justified Pulic model of intellectual capital) or its decrement has effect on return on sales because the meaningfulness (or significance) level for the variable with T statistics of 9.97 is 0.000 which is lower than 0.05.

Table 6: The results of estimating model with POOL method with random effects assumption (dependent variable: return of sales)

Variables	Variable coefficients	Standard deviation	T statistics	Sig	Compare with 0.05	Result of model
The value-added of intellectual capital	0.378762	0.037988	9.970532	0.0000	Lower	Effective
Size of company	-0.179188	0.032672	-5.484446	0.0000	Lower	Effective
Financial Leverage	-0.018210	0.006080	-2.995209	0.0029	Lower	Effective
C	8.556617	1.269575	6.739750	0.0000	-	-
futuristic Watson Statistics	1.83	Errors are not in the correlative model				

Coefficient of model determination	0.401	40 percent of return on sales changes are indicated as meaningful by independent variable
Fisher statistic	99.41	
The meaningfulness (significance) level of model	0.0000	The linearity of model is confirmed. In other words, the assumption is not rejected

First secondary assumption test – the justified Pulic model of intellectual capital components and return on sales

The F Limer test of first secondary assumption:

Table 7: The results of meaningfulness test of permanent effects in contrast to the least aggregated squares method for first assumption (sales return)

The amount of possibility value (PV)	Freedom degree	The amount of F statistic test
0.44	(9 and 136)	0.44

Therefore, in this section, the first secondary will be tested using the POOL method.

Results of first secondary assumption - the justified Pulic model of intellectual capital components and return on sales

The results of estimating the model with integrated regression method (dependent variable – sales return) show that SEE (physical capital coefficient) and SCE (structural capital coefficient) and HCE (human capital coefficient) and RCE (customer capital coefficient) variables increments or decrements have effect on return on sales because the meaningfulness (or significance) level for the variable with T statistics is lower than 0.05.

Table 8: The results of estimating model with POOL method
(dependent variable: return of sales)

Variables	Variable coefficients	Standard deviation	T statistics	Sig	Compare with 0.05	Result of model
Physical capital coefficient	22.41790	7.700568	2.911201	0.0042	Lower	Effective
Structural capital coefficient	15.89660	5.480206	2.900731	0.0043	Lower	Effective
Human capital coefficient	0.348680	0.148567	2.346962	0.0204	Lower	effective
Customer capital coefficient	0.229456	0.047568	4.823699	0.0000	Lower	Effective
C	-5.164358	3.638218	-1.419474	0.1580	-	-
Futuristic Watson	2.09	Errors are not in the correlative model				

Statistics		
Coefficient of model determination	0.52	52 percent of return on sales changes are indicated as meaningful by independent variable
Fisher statistic	11.74	
The meaningfulness (significance) level of model	0.0000	The linearity of model is confirmed

Secondary primary assumption test – the justified Pulic model of intellectual capital and return on assets:

The F Limer test of second primary assumption:

Table 9: The results of meaningfulness test of permanent effects in contrast to the least aggregated squares method for second assumption (return on assets)

The amount of possibility value (PV)	Freedom degree	The amount of F statistic test
0.16	(9 and 139)	11.47

Therefore, in this section, the second assumption (dependent variable – assets return) as above will be tested using the integrated regression.

Results of secondary primary assumption - the justified Pulic model of intellectual capital and return on assets

The results of estimating the model with integrated regression method (dependent variable – assets return) show that e-VAIC variable increment (value-added of justified Pulic model of intellectual capital) or its decrement has effect on return on assets because the meaningfulness (or significance) level for the variable with T statistics of 10.07 is 0.000 which id lower than 0.05.

Table 10: The results of estimating model with POOL method with random effects assumption (dependent variable: return of assets)

Variables	Variable coefficients	Standard deviation	T statistics	Sig	Compare with 0.05	Result of model
The value-added of intellectual capital	0.310995	0.030879	10.07150	0.0000	Lower	Effective
Size of company	-0.215720	0.037157	-5.805562	0.0000	Lower	Effective
Financial Leverage	-0.026625	0.006956	-3.827605	0.0002	Lower	Effective
C	8.548907	1.0319775	8.284024	0.0000	-	-
Futuristic Watson Statistics	1.58	Errors are not in the correlative model				
Coefficient of model determination	0.406	41 percent of return on sales changes are indicated as meaningful by independent variable				
Fisher statistic	101.43					

The meaningfulness (significance) level of model	0.0000	The linearity of model is confirmed

Second secondary assumption test – the justified Pulic model of intellectual capital components and return on assets

The F Limer test of second secondary assumption:

Table 11: The results of meaningfulness test of permanent effects in contrast to the least aggregated squares method for first assumption (assets return)

The amount of possibility value (PV)	Freedom degree	The amount of F statistic test
0.56	(9 and 136)	1.90

Therefore, in this section, the second secondary will be tested using the POOL method.

Results of second secondary assumption - the justified Pulic model of intellectual capital components and return on assets:

The results of estimating the model with integrated regression method (dependent variable – assets return) show that SEE (physical capital coefficient) and SCE (structural capital coefficient) and HCE (human capital coefficient) and RCE (customer capital coefficient) variables increments or decrements have effect on return on assets because the meaningfulness (or significance) level for the variable with T statistics is lower than 0.05.

Table 12: The results of estimating model with POOL method
(dependent variable: return of assets)

Variables	Variable coefficients	Standard deviation	T statistics	Sig	Compare with 0.05	Result of model
Physical capital coefficient	63.50307	2.173790	29.21306	0.0000	Lower	Effective
Structural capital coefficient	19.96445	1.547005	12.90523	0.0000	Lower	Effective
Human capital coefficient	0.129288	0.041939	3.082784	0.0025	Lower	effective
Customer capital coefficient	0.035798	0.013428	2.665903	0.0089	Lower	Effective
C	-15.53500	1.027031	-15.12612	0.0000	-	-
Futuristic Watson Statistics	2.13	Errors are not in the correlative model				
Coefficient of model determination	0.94	94 percent of return on sales changes are indicated as meaningful by independent variable				
Fisher statistic	175.20					

The meaningfulness (significance) level of model	0.0000	The linearity of model is confirmed

Table 13: Summary of results

Primary	Secondary	Assumption	Result
1	-	There is a meaningful (or significant) relationship between intellectual capital (justified Pulic model) and return on sales	Non - rejected
	1	There is a meaningful (or significant) relationship between each one of intellectual capital components (justified Pulic model) and return on sales	Non - rejected
2		There is a meaningful (or significant) relationship between intellectual capital (justified Pulic model) and return on assets	Non - rejected
	2	There is a meaningful (or significant) relationship between each one of intellectual capital components (justified Pulic model) and return on assets	Non - rejected

10. Conclusion

The results show that intellectual capital and each one of its components (justified Pulic) have effect on performance. Also, these results show that when the purpose of performance is components such as return of assets and return on sales, the justified Pulic model can better show the available effects. Actually, the justified Pulic model displays better comparison and prediction abilities of performance. The other results indicate that in all companies, the effects of company size and financial leverage on performance were positive and meaningful. The results of F statistics show that the model is meaningful in general status and regarding to Futuristic-Watson statistics, the model lacks of autocorrelation problem.

11. Research recommendations

11.1 Recommendations in the direction of research results
According to the results of current study and other conducted similar studies regarding to the existence of meaningful relationship between intellectual capital and stock companies performance, it's recommended to the financial forms users especially stockholders that consider this category before making any decisions such as investment.

11.2 Subjective recommendations for future researches
- Conducting the current study using the financial intercourse information of companies.

- Survey the current article using the financial information of active companies in OTC market.
- Conducting the comparison between different justified Pulic models for determining the best measurement model.
- Displacing the independent and dependent variables and survey their relationship.
- Doing research in industries with high technology.

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