



Research Article

ISSN : 0975-7384  
CODEN(USA) : JCPRC5

**The influence of the triple components of intellectual capital on the economic performance of pharmaceutical companies listed in Tehran stock exchange**

**Mohammad Hossein Chizari<sup>1,2</sup>, Mahmoud Moeinadin<sup>2\*</sup>  
and Mohammad Mirmohammadi Sadrabadi<sup>2</sup>**

<sup>1</sup>Department of Accounting, College of Humanities, Yazd Science and Research Branch, Islamic Azad University, Yazd, Iran

<sup>2</sup>Department of Accounting, Yazd Branch, Islamic Azad University, Yazd, Iran

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**ABSTRACT**

*The present study investigates influence of the intellectual capital on the economic performance of pharmaceutical companies accepted in Tehran stock market for. In order to investigate the intellectual capital, the method of Polk's value added intellectual coefficient (VAIC) and also the cash value added (CVA) are used. Using multifarious regression panel- based method, the study examines the influence of each element of the intellectual added capital coefficient on the economic performance of 26 active companies in pharmaceutical industries accepted in Tehran stock market in years from 2008 to 2012. The results of the study show that the value added intellectual coefficient influence significantly on the economic performance of the pharmaceutical companies accepted in Tehran stock market is statically significant and among the intellectual capitals, the used or physical capital has the greatest influence on the economic performance.*

**Key words:** the intellectual capital, the value added intellectual coefficient, performance, the economic value added, the cash value added.

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**INTRODUCTION**

Previous studies showed that companies grew more in the market value than the book value. In fact, the traditional financial reports cannot calculate the actual value of the company and only show the short-term financial balance and concrete properties, it can greatly be helpful in understanding the concept of marketing. It should be noticed that the observable properties can be copied easily or enter a retail market. Therefore, they cannot be considered as the strategic properties of a company. On the contrary, the intellectual properties are usually established internally and are hidden in the employee's skills and experiences. These properties are exclusive and united and cannot be copied or forged. Due to this reason, they are considered valuable for these companies and can make the future competitive Profit (Poor Zamani *etal.* 2012). Estimation of the performative indexes of companies is of great importance in the financial resolution of the company and is considered the most important factor in decision making by the knowledgeable investors. There are many different variables to classify and estimate the performance of companies and various methods for each of these variables but the choice of the appropriate variable among the present variables and a method conforming to that variable is the issue which venture further studies in the world financial literature.

With the course of communities from the industrial age to the information age the importance of intellectual capital is increased. The importance of such factors can be derived from the information technology revolution, the growing importance of knowledge and knowledge-based economy and the impact of innovation and creativity as a crucial element of competition is (Guthrie, 2001). At the present time the stock price id so much dependent on the understanding of the future that is not identifiable and measurable in the current financial accounting. Companies are

well aware that the intellectual capital is their only competitive advantage; but the financial reporting lack the information related to intellectual capital resources. A review of the literature on intellectual capital confirms interest in measuring and reporting its valuation. Companies for strategic survival should consider the competitive advantage and since markets, products, technology, competition and regulation in society are changing fast in and continuous improvement of knowledge and innovation, they will be able to maintain a sustainable competitive advantage (Nonaka, 1995). So today, managers consider knowledge and ability to create and using knowledge as the most important sustainable competitive advantage. Because knowledge is regarded as an asset, and efforts to implement knowledge management and intellectual property, has been associated with great success in guiding organizations. In the present era the development of knowledge-based economy, intangible assets of companies and their intellectual capital are the keys to achieving sustainable competitive advantage (Teece, 2000). Because knowledge is regarded as an asset, and efforts to implement knowledge management and intellectual property, has been associated with great success in guiding organizations. In the current business structure efficiency of intellectual capital used is much more important than the financial return on capital used. This means that in contrast to the intellectual capital, the importance of financial assets in determining sustainable profitability is significantly decreased. Due to the increasing relative importance of intellectual capital (an important part of the company's total assets) in a sustainable long-term profitability, most companies are trying to find answers for this question that whether statistically, intellectual capital, has no effect on firms listed in Tehran Stock Exchange? And whether the use of models based on intellectual capital can help the shareholders and investors in their future decision making? And whether the use of this model leads to a higher net profit for the company?

## **2. Theoretical principles and develop of hypotheses**

Many theorists and researchers in describing the features of the new economic environment believe that the economy has got a global and inclusive shape, and is formed from intangible assets, and intangible complex incomes which are mixed together in a particular way. In this environment productivity and competitive advantage of firms depends on production capacity, processing and application of knowledge has been sustainable in global range.

### **2-1. Intellectual capital**

What all authors agree on is that intellectual capital is a form of knowledge which creates competitive advantage and displays the intangible value of a company. In initial impression, intellectual capital may be defined as the set of all knowledge which has been possessed by the employees and the company and creates a competitive advantage or in other words they have defined the intellectual capital as intellectual circuits such as knowledge, information, and analysis of intellectual property, which through them companies can benefit of in order to create a fortune (Bontis, 2000). Bontis in 2000 has defined intellectual capital as a concept that classifies intangible resources and their interrelation; so, managers need to be able to measure the effect of knowledge management efforts on the performance of their organization. In this study, the three components of intellectual capital, including human capital, structure and communication is used.

#### **2-1-1. Human Capital**

Human Capital represents knowledge of the individuals of an organization. Bontis describes human capital as a collective capability to extract the best solutions from the knowledge of men (Bontis, 1998). Ross and colleagues (1997) also argue that employees create their intellectual capital through competence, attitude and their agility in thinking. Mental agility enables the individual to change the practices and thinking about innovative solutions for issues. Broking (1997) also believes that the assets of an organization include the skills, expertise, ability to problem-solving and leadership styles (Bontis, 1999).

#### **2-1-2. Capital structure (organizational)**

Capital structure includes all reserves non-human knowledge including databases, organizational charts, and processes and operating procedures, strategies, organizational action plans (Ross et al., 1997). Chen and colleagues believe that the capital structure refers to the current business structure and procedures of the organization. In their view, capital structure can more clearly classify as organizational culture, organizational learning, operational processes and information systems. Human capital and structural capital with interacting with one another can help organizations to shape costume capitals and use and develop them harmoniously (Chen, 2004).

#### **2-1-3. Relational capital (customer)**

Although the term 'customer funds were raised primarily by Hubert, new definitions, have developed its concept to relational capital, includes all relationships of the organization with customers, competitors, suppliers, trade associations or government establishes (Bontis, 1999). Chen et al classify customer capital in the form of marketing capability, the severity of market and customer loyalty. Without r relational capital the market value or the performance a business or organization cannot be realized; therefore, relational capital growth depends on human capital and structural capital (Chen, 2004).

## 2-2. Performance criteria and its types

Numerous studies has long been conducted to achieve a sufficient criterion for assessing performance of corporate and directors of the company in order to ensure alignment with the interests of potential investors and as a basis for making economic decisions of potential investors and creditors. The results obtained from these studies provide four approaches in terms of performance criteria which include financial approach, the economic approach, integrated approach (market) and fiscal management approach. In this study, the economic perspective is examined. To achieve the main objective of this research and by taking this approach, the main hypotheses can be proposed as follows:

H1: the value added intellectual coefficient (VAIC) influences the economic performance (with the variable EVA) for the pharmaceutical companies accepted in Tehran stock market

H2: the value added intellectual coefficient (VAIC) influences the economic performance of pharmaceutical companies accepted in Tehran stock market (CVA variable)

### 2-2-1. The economic approach

According to this approach in which the economic concepts are used, and the emphasis on the profitable power of companies properties and considering the return on output and return on cost for the investment used in is estimated. The economic added value, the adjusted economic value added and the market value added are involved in this group. The economic value added can be considered as management system based on value includes variables that focus on the financial performative measurement, the estimation of strategic methods, suggested designs, identification of the non-profitable production line and more focus on the working capital. By presenting a basis for award and interpretation of the relation between the company's performance and its respective investments, this system focuses on the two key factors, value and cost.

The economic variables are more profitable than the accounting ones. In order to omit the inappropriate effects resulted from the conservative principles for the profit figures and accounting properties, , in 1982 Stuart suggested to near the return on accounting output to the return on the real economic , the decrease of inability and the management motivation in profit management, the improvement of the response ability of the market unit against investors, returning part of the invested properties from both profit and loss to the balance sheet and making rich the economic value added as a variable to estimate the performance of parts of adjustments on the used accounting and investment profit. Some of the most important kinds of these adjustments are marketing and advertisement costs, the cost of employees training, the endowment of the decreased value of properties, the endowment of the decreased value of investments and the endowment of the delayed cost. This method is known as the economic value added. Therefore, it can be mentioned that:

H11: Any element for the intellectual value added capital which includes the value added capital employed coefficient (VACA),the value added human capital coefficient (VAHU) and the value added structural capital coefficient (STVA) influences the economic performance of the pharmaceutical companies accepted in Tehran stock market (Economic value added, EVA).

H21: Any element of the intellectual value added which includes VACA, VAHU and STVA influences the economic performance of the pharmaceutical companies accepted in Tehran stock market (CVA)

### 2-3. Review of research background

Tan et al. (2007), in their study using the Pulic model with a focus on Asia and obtaining information on the 150 companies of Singapore Exchange between 2000 and 2002, using PLS test (for data analysis) examined the relationship between the three sectors (human capital, structural capital and relational capital) with financial efficiency (performance) of companies, based on return on equity, earnings per share and return on total common stock. The results indicate that firstly there is a significant positive relationship between company's intellectual capital and the current and future financial performance of the companies and secondly, the impact of intellectual capital on the financial performance of companies in various industries is different (Tan et al., 2007).Nazari (2010), investigates and explains the relationship between the elements of intellectual capital and financial success of companies in which 775 companies between 1996 and 2006 are studied. The results suggest that human capital has a significant positive relationship with the structural capital; in addition, there is also a positive relationship between human capital and company performance. In this research to calculate the components of intellectual capital, pulic method is used; and also to measure the performance the ROA, ROE methods and the changes in sales are used (Nazari, 2010).Zegal (2010) studied value Added Intellectual Capital and financial and economic performance, and market value of 300 English companies in three groups of technology, traditional and service industries. For measuring intellectual capital of Value Added Intellectual Coefficient Pulic model was used, results of the tests

show that the performance of intellectual capital has a significant positive relationship with economic performance and financial performance, but in the case of market value in the technology industry it is just an important relationship (Zegal and Maaloul, 2010). In a study of Maditinos *et al* (2011), which is titled the impact of intellectual capital on the market value of the company and its financial performance, public method was used for measuring intellectual capital. One of the assumptions is that companies that have a higher intellectual capital, have higher rates of market value on book value; finally the experimental results failed to support this hypothesis and this hypothesis is rejected (Meditinos *et al.*, 2011). Chang and Hsieh (2011) examined the relationship between intellectual capital components and three functions of operational, financial and stock market in Taiwan electronics industry to measure intellectual capital, value added Intellectual coefficient model is modified. The results show that the relationship between operational performance and the used capital is positive and has no relationship with human capital and structural capital (Chang and Hsieh, 2011). Clark and colleagues (2011) examined the relationship between intellectual capital and company performance in Australia where a sample of Australian companies between 2004 and 2008 are examined. The results show there is a direct relationship between intellectual capital and financial performance of Australian companies. Also a positive relationship between intellectual capital (human capital and structural) was also found in the previous year and the current year's financial performance (Clark *et al.*, 2011). Cheng *et al* (2010) in a study titled "resource investment, competition and intellectual capital and firm performance aimed to investigate effects of intellectual capital, human capital, customer, process innovation on corporate performance." an was conducted in health industry and for a four-year period, experimental results indicates an important relationship between intellectual capital and company performance and the results showed companies can improve their performance by human capital value added (Cheng *et al.*, 2010).

### 3. Research method

This study an applied research and it is non-experimental correlational research method. Also in terms of data it is after event type. The research population consists of companies in the pharmaceutical industry listed on the Tehran Stock Exchange. The reason for choosing these companies as the statistical community is the easy access to their audited financial statements as well as access to information on the corporate stock in different times. Regarding the 5-year period of the study (from the beginning of 2009 to the end of 2013) firms have been chosen, that have been a member of the Tehran Stock Exchange at least since the beginning of 2009 and have handed their fiscal year-end financial statements to the exchange for research period. The stocks of said companies should be traded at the beginning and end of their financial year. Their information should be available on the official site of the Tehran Stock Exchange. The sample size consists of all the all companies of statistical population with above specification. Since a major confusion and lack of resolve on activities, performance and reports of the company leads to a Long-term stop of companies logo by securities and exchange company and this leads to a lack of access to company information and affects the decision of shareholders, therefore, the characteristics of the population and the number of 3 companies were eliminated in order to create uniformity. Finally, with regard to the above requirements, the sample will be 25 companies listed in Tehran Stock Exchange and active in the pharmaceutical industry. In this study, data collection methods of research literature are Library method including books and various articles and domestic and foreign publications. Also the data collected in this study, is obtained from banks and valid software including the "Rahavardnovin 3" and the audited financial statements of listed companies in Tehran Stock Exchange and extracted from "Kadal" site, also from the official website for price announcement ([www.tsetmc.ir](http://www.tsetmc.ir)), which gives the researcher audited information and needed data in this study. Also to sort and classify data, excel 2010, and for data analysis "Eviews" software were used.

### 4. Findings of the study

First the effect of added value of intellectual capital coefficient on economic performance pharmaceutical companies listed in Tehran Stock Exchange is tested. And after the main hypothesis testing a separate sub-hypothesis examines the relationship between the components of intellectual capital coefficient of added value including: value added capital coefficient (VACA), human capital coefficient (VAHU), and structural capital coefficient (STVA) with the economic performance of pharmaceutical companies listed on the Stock Exchange. To test research hypothesis correlation method between variables and regression equations through panel data were used.

#### 4-1. The analysis of first main assumption (H1)

This assumption tries to investigate the influence of the intellectual value added coefficient on the economic performance of the companies accepted in Tehran stock market while EVA criterion is considered. This assumption is examined by using the following model:

$$EVA_{it} = \alpha_i + \alpha_1 VACA_{it} + \alpha_2 VAHU_{it} + \alpha_3 STVA_{it} + \alpha_4 MV_{it} + \varepsilon_{i,t}$$

The results found for the first main assumption are presented in table.1.

Table 1. The analysis of the first main assumption

Adjusted determination coefficient	0.969067				
Statistics F	150.678				
Probability (P)	0				
Drbin-Watsons D	1.98715				
Descriptive variable	Coefficient	Standard Deviation	t	Probability	Confidence Level
VAIC	2946.191	245.2532	12.01285	0	99%
MV	0.101508	0.014697	6.906576	0	99%
C	29702.29	11196.29	2.652877	0.0093	99%

Considering the statistics F and the probability, it can be concluded that confidence level of 99% shows that the regression equivalent is statically significant. Regarding to the results found for the test of variable-related probability model, the variable for the intellectual value added coefficient has the probability level less than 0.01. Therefore, this variable is statistically significant while the confidence level is 99%. Moreover, the measurement variable (MV) of the company which is considered as the control variable has the probability level less than 0.01. Thus, this variable is statistically significant while the confidence level equals to 99%. Considering the fact that the variable of the value added intellectual coefficient (VAIC), as the main variable of the model, is significant, it can be claimed that there is a significant relation between the value added intellectual coefficient and the economic value added (EVA) for pharmaceutical companies accepted in Tehran stock market; accordingly, regarding the results found for the model, the first assumption of the study is confirmed.

#### 4-1-1. The analysis of secondary assumption (H11)

This assumption tries to investigate the relation between the elements of the value added intellectual capital including VACA, VAHU, STVA and the economic performance (considering EVA criterion) for the pharmaceutical companies accepted in Tehran stock market and it is examined by the use of the following model:

$$EVA_{it} = \alpha_i + \alpha_1 VACA_{it} + \alpha_2 VAHU_{it} + \alpha_3 STVA_{it} + \alpha_4 MV_{it} + \varepsilon_{i,t}$$

The results related to the secondary assumption come in table. 2. Considering the frequency and its respective probability, it can be concluded that the regression equivalent is significant while the confidence level is 99%.

Table 2: the analysis of the secondary assumption

Adjusted determination coefficient	0.941962				
Statistics F	73.1956				
Probability (P)	0				
Drbin-Watsons D	2.077533				
Descriptive variable	Coefficient	Standard Deviation	t	Probability	Confidence Level
VAHU	2386.136	965.9704	2.470196	0.0152	99%
VACA	119685.8	17160.59	6.974458	0	99%
STVA	-3372.02	288882.47	-0.11675	0.9073	Not significant
MV	0.101854	0.015327	6.645258	0	99%
C	-3127.72	30080.03	-0.10398	0.9174	Not significant

Regarding the results found for the test of variable-related probability model, VAHU and VACA have the probability level less than 0.05 and 0.01, respectively. Thus, these variables are significant while the confidence level is 95% and 99%, respectively. But the variable of STVA has the probability level more than 0.05. Therefore, this variable is not significant when confidence level is 95%. The measurement variable (MV) of the company, the control variable, has the probability level less than 0.01 as well. Accordingly, this variable is significant in the model when the confidence level is 99%. So, considering the significance of the relation between the VAHU and VACA from among the elements of the capital, it can be claimed that the relationship between VAHU, VACA and the economic value added (EVA) for of the companies accepted in Tehran stock market is significant.

#### 4-2. The analysis of second main assumption (H2)

This assumption tries to investigate the relation between the value added intellectual capital (VAIC) and the economic value added (regarding CVA ) for the pharmaceutical companies accepted in Tehran stock market and it is examined by the use of the following model:

$$CVA_{it} = \alpha_i + \alpha_1 VAIC_{it} + \alpha_2 MV_{it} + \varepsilon_{i,t}$$

The results for the four main assumption come in table. 3. Considering Statistics and its respective probability, it can be concluded that the regression equivalent is statistically significant when the confidence level is 99%.

Table 3. The analysis of the second main assumption

Adjusted Determination Coefficient	0.812034				
Statistics F	21.64058				
Probability (P)	0				
Drbin-Watsons D	1.997327				
Descriptive Variable	Coefficient	Standard Deviation	t	Probability	Confidence Level
VAIC	-9099.94	2609.31	-3.48749	0.0007	99%
MV	119905	24780.01	4.838779	0	99%
C	-	346709.9	-3.52783	0.0006	99%

The determined coefficient which is adjusted for the model shows the relation existed between independent variables and dependent one (the value added cost). Regarding the results of the test for the variable- related probability model, the variable for the value added intellectual coefficient (VAIC) has the probability level less than 0.01. Thus, this variable with the confidence level equaling to 99% is significant in the model. Also, the variable of the measurement variable (MV), the control variable, has the probability level less than 0.01 and this variable is significant when the confidence level is 99%. Accordingly, when coefficient variable for the value added intellectual capital (VAIC), the main variable is significant, it can be claimed that there is a significant relation between the value added intellectual capital (VAIC) and the economic performance of the pharmaceutical companies accepted in Tehran stock market (CVA). Therefore, regarding the results of the model, the second assumption of the study is confirmed.

#### 4-2-1. The analysis of secondary assumption (H21)

This assumption tries to investigate the influence of the elements of the value intellectual added capital coefficient including VACA and VAHU, STVA on the economic performance (considering CVA criterion) for the pharmaceutical companies accepted in Tehran stock market. It is examined by the use of the following model:

$$CVA_{it} = \alpha_i + \alpha_1 VACA_{it} + \alpha_2 VAHU_{it} + \alpha_3 STVA_{it} + \alpha_4 MV_{it} + \varepsilon_{i,t}$$

The results found to examine the secondary assumption come in table. 4. Regarding statistics and its respective probability, it can be concluded that the regression equivalent is significant when the confidence level is 99%.

Table 4. The analysis of the secondary assumption

Adjusted Determination Coefficient	0.969067				
Statistics F	150.678				
Probability (P)	0				
Drbin-Watsons D	1.98715				
Descriptive Variable	Coefficient	Standard Deviation	t	Probability	Confidence Level
VAHU	9174.459	4937.244	1.858214	0.0661	Not significant
VACA	286679.5	88527.89	3.238296	0.0016	99%
STVA	-398338	102659.9	-3.88017	0.0002	99%
MV	0.176945	0.054374	3.254213	0.0016	99%
C	306523.9	34542.12	8.873917	0	99%

Regarding the test for the variable- related probability test, VACA or STVA has the probability level less than 0.01. Hence, these variables are significant when the confidence level is 99% but the variable for VAHU has the probability level more than 0.05. As the result, this variable is not significant in the model when the confidence level is 95%. The measurement variable for the company, also as the control variable, has the probability level less than 0.01. Therefore, this variable is significant at the confidence level of 99%. Thus, regarding the significant effectiveness of VACA and STVA among the elements of the capital, it can be claimed that there is a significant relation between VACA and STVA and the economic performance of the pharmaceutical companies accepted in Tehran stock market. Also, the VAHU and the economic performance variables for the pharmaceutical companies accepted in Tehran stock market are not significantly related (CVA).

#### Discussion, Conclusion and Suggestions

The result of the study show that the elements of the intellectual capital, EVA and CVA are significantly and positively related but the structural capital effectiveness in EVA is not significant. Moreover, the human capital effectiveness in EVA influences significantly and positively but it is not significant for the CVA. Generally, these results indicate the positive influence of the variables of the intellectual capital on the economic performance standards. That is, strengthening the elements of the intellectual capital and especially the effectiveness of the used or physical capital (VACA) can strengthen the economic performance. These results are not in line with the results found by Tan and et al. (2007), Rods and Mihalik (2007), Jigal and Malul (2010), Nazari (2010), Maditines et al.

(2011), Clark et al. (2011), Sepehr Doost (2006), Madhushi and NeshadAmiri (2009), Namazi and Ibrahim (2009), Shams and Khalili (2011), Hadavi (2011), Hemati and Mehrabi (2011), TalebiNiya et al. (2012), and Poor Zamani et al. (2012) but the results of this study is in line with those results found by Chang and Hasiyeh (2011), MOjtahed Zadeh et al.(2010).

These results indicate that existence of a generally positive effect of the variable components of intellectual capital on indicators of economic performance, meaning strengthening the intellectual capital components and value added capital coefficient (VACA) can be used to enhance financial Performance. It is recommended to the companies studied that in order to improve the organization's intellectual capital and consequently increasing the financial performance, a system of support and encouragement for superior minds of employees be established for improving intellectual capital of the organization's physical assets. It is recommended to all organizations and companies that by creating a separate unit within the company or through human resource management, measurement, management and development of intellectual capital as a key resource, in a competitive advantage in the knowledge-based economy help to increase learning, create value and improve the overall performance of the company. And by investing more in this non-financial asset, add more value to the company. Also it is recommended that the standard-setting organizations to consider the role of intellectual capital in improving financial performance, take action on identifying and developing indicators for intellectual capital reporting in a series of reports on the financial statements, this will improve the transparency of financial information and help the decision makers and investors.

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