

Value added intellectual coefficient (VAIC): an empirical study**Mehrnaz Paknezhad and Ahmad Ahmadkhani****Sama Technical Vocational Training College, Islamic Azad University, Zanjan Branch, Zanjan, Iran***ARTICLE INFO***Article history:*

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ABSTRACT

There is no doubt that conventional accounting does not provide actual value of a firm since they only take into account the tangible assets. Intellectual capital provides a new concept for considering actual value of the assets, which helps calculate intangible values of the firm. In this paper, we use value added intellectual coefficient (VAIC) to measure the performance of a firm. The study investigates the relationship between intellectual capital and return on assets and value added for three consecutive years between 2008 and 2010. The results indicate that there is no meaningful relationship between intellectual capital and return on assets for fiscal years of 2008 and 2009 but there is a meaningful relationship between these two items for the fiscal year of 2010 when $\alpha = 0.05$. Our findings also indicate that there is no meaningful relationship between intellectual capital and value added for the years of 2008 and 2010 but there is a meaningful relationship between the items for the fiscal year of 2009. The results somewhat confirm the recently published results in the literature, which argues the use of VAIC for assessing the direct impact of IC on other financial factors.

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1. Introduction

During the mid 80th, many analysts decided to focus on intangible assets for evaluating business units. The idea was that financial assets do not necessarily represent the actual existing potentials of a business plan. The existence of intellectual capital (IC) is the main core of many high tech industries. Business units could increase their efficiencies as well as productivities by effectively using their IC. It is normally difficult to measure the exact value of IC in many business units and this is in serious conflict with knowledge economy where the basis of knowledge of established on knowledge (Boekestein, 2009). Therefore, firms are able to reach competitive advantage through maintaining intellectual assets and we need to find out on how to assess IC and the impact of IC on other measures such as productivity and value added.

For many years, there have been tremendous efforts on studying the role of Intellectual capital on having more successful business units. A knowledge-based business unit is the primary key for

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having successful organizations. However, it is necessary to use dynamic method on assessing intangible assets (Delgado-verde et al., 2011). According to Martin (2008), successful business units normally absorb skilled human resources who could contribute to firms through team-work activities. Intellectual properties are among knowledge-based items, which could substantially contribute to business models. In other words, IC is an exclusive part of a business unit, which could include various items such as good will, reputation, brand, etc. (Huggins, 2007; Boekestein, 2009). According to Isaac and Herremans (2009), IC is an intellectual property, which allows firms have continuous improvement proportion to changes on the environment.

One of the controversial discussions is on how to calculate the difference between book value and market value in the past few years. Balance sheet normally demonstrates the difference between total assets and total liabilities as the total equities and this can be interpreted, very easily. Nevertheless, financial market does not normally assign value based on what we observe on balance sheet and in some cases, market appreciate the shares of a company solely based on intangible assets, which would not be traced in official transcript such as financial statement or balance sheet (Soler, 2007; Lee et al., 2010). In other words, tangible assets do not necessarily represent actual value of the firms and the focus is concentrated more on intangible assets (Cordazzo, 2007). Creativity and innovation, change on culture, market leadership and other important elements cannot be described, very easily and they are the reflection of continuous improvement or market investment (Burgman & Roos, 2007; Dumay & Cuganesan, 2011).

Wang (2008) demonstrated that there were many advantages on changing intangible assets into intellectual capital. An increase in competitive advantage in the market based on knowledge, technique, organization, customer relationship management and professional skills and experience could establish sustainable assets for modern economy. In current environment, most companies look for learning and controlling their intellectual capitals using different techniques. Therefore, measuring the performance of IC plays an essential role for the success of various firms.

Tan et al. (2007) also specified that IC is one of the most important components for having successful organizations. According to Boekestein (2009) acquisitions reveal the intellectual capital of pharmaceutical companies. Huang (2010) studied contingency factors influencing the availability of internal intellectual capital information. Ting and Lean (2009) studied Intellectual capital performance of financial institution in Malaysia and revealed that IC significantly impacts the performance of the firms in this country.

Stähle et al. (2011) analyzed the validity of the value added intellectual coefficient (VAIC) method as an indicator of intellectual capital. Their investigation demonstrated, first, that VAIC indicates the efficiency of the company's labor and capital investments, and it does not influence intellectual capital. Besides, the technique uses overlapping variables and has other serious validity issues. They also explained that VAIC correlates with a company's stock market value. The main arguments behind the lack of consistency in earlier VAIC end up having the confusion of capitalized and cash flow entities in the calculation of structural capital and in the misuse of intellectual capital concepts.

In this paper, we examine similar work to Stähle et al. (2011) for measuring the impact of IC on return on assets, value added and performance using VAIC technique. This paper is organized as follows. We first explain the proposed study in section 2, present details of our finding in section 3 and finally concluding remarks are given in section 4 to summarize the contribution of the paper.

2. The proposed study

The proposed study of this paper examines the VAIC model for some private colleagues in Iran called Sama. There are three variables including intellectual capital (IC), improvement on performance measurement and value added. The study is performed in three consecutive years from 2008 to 2010. The return on assets is calculated as follows,

$$ROA = \frac{\text{Net earning}}{\text{Total assets}} \quad (1)$$

Value added is another component of our research, which is calculated by adding five items of income, interest, rent, depreciation and energy. We use the method explained in Stähle et al. (2011) to calculate VAIC and interested readers could read the reference for details of the VAIC computations.

3. Results

In this section, we present details of our computations. The first hypothesis is associated with the relationship between CI and two other factors of performance improvement and value added. The results are performed for each years of 2008, 2009 and 2010, separately.

3.1. Relationship between IC, ROA and Value added based on correlation factors

The first part of this survey is devoted to study the relationship between IC and two financial factors, ROA and value added, using correlation factors for three consecutive years.

3.1.1 Relationship between IC, ROA and Value added in year 2008

Table 1 shows details of our finding for these items.

Table 1

Relationship between IC, ROA and Value added for fiscal year of 2008

Title	Correlation	P-value
Relationship between IC and ROA	0.719	0.088
Relationship between IC and Value added	0.384	0.212

As we can observe from the results of Table 1, there is a correlation value between IC and ROA as well as IC and Value added but P-value is not meaningful when $\alpha = 0.05$. Therefore, we can conclude that there is not a significant relationship between IC and other financial factors of ROA and Value added.

3.1.2. Relationship between IC, ROA and Value added in year 2009

Table 2 shows details of our finding for these items.

Table 2

Relationship between IC, ROA and Value added for fiscal year of 2009

Title	Correlation	P-value
Relationship between IC and ROA	0.737	0.082
Relationship between IC and Value added	0.897	0.032

As we can observe from the results of Table 2, there is a correlation value between IC and ROA as well as IC and Value added but P-value is not meaningful when $\alpha = 0.05$. Therefore, we can conclude that there is not a significant relationship between IC and other financial factors of ROA and Value added.

3.1.3. Relationship between IC, ROA and Value added in year 2010

Table 3 shows details of our finding for these items. As we can observe from the results of Table 2, there is a correlation value between IC and ROA as well as IC and Value added but P-value is not meaningful when $\alpha = 0.05$. Therefore, we can conclude that there is not a significant relationship between IC and ROA but there is a meaningful relationship between IC and Value added.

Table 3

Relationship between IC, ROA and Value added for fiscal year of 2010

Title	Correlation	P-value
Relationship between IC and ROA	0.737	0.082
Relationship between IC and Value added	0.897	0.032

In summary, we do not see any consistent positive relationship between IC and two other financial factors to make a conclusion that IC significantly improve financial figures. These results are consistent with recent results of Stähle et al. (2011).

3.2. Regression analysis

In this section, we present regression analysis to study the relationship between IC and other financial factors studied earlier.

3.2.1 Regression analysis between IC and financial factors for year 2008

Table 4 shows details of our regression analysis for IC and ROA.

Table 4

Regression analysis between IC and ROA for fiscal year of 2008

	ESS	Degree of freedom	F	P-value
Regression	6.963	1	0.133	0.719
RSS	887.578	17		

As we can observe, regression analysis does not represent meaningful results for the relationship between IC and ROA fiscal year of 2008. Table 5 shows details of our regression analysis for IC and Value added.

Table 5

Regression analysis between IC and Value added for fiscal year of 2008

	ESS	Degree of freedom	F	P-value
Regression	40.131	1	0.798	0.384
RSS	854.410	17		

As we can observe, regression analysis does not represent meaningful results for the relationship between IC and Value added fiscal year of 2008. The results are consistent with what we had using correlation ratio.

3.2.2 Regression analysis between IC and financial factors for year 2009

Table 6 shows details of our regression analysis for IC and ROA.

Table 6

Regression analysis between IC and ROA for fiscal year of 2009

	ESS	Degree of freedom	F	P-value
Regression	2.46	1	0.116	0.737
RSS	360.295	18		

As we can observe, regression analysis does not represent meaningful results for the relationship between IC and ROA fiscal year of 2009. Table 7 shows details of our regression analysis for IC and Value added. As we can observe, regression analysis does not represent meaningful results for the relationship between IC and Value added fiscal year of 2009.

Table 7

Regression analysis between IC and Value added for fiscal year of 2009

	ESS	Degree of freedom	F	P-value
Regression	0.366	1	0.017	0.897
RSS	362.389	18		

3.2.3 Regression analysis between IC and financial factors for year 2010

Table 8 shows details of our regression analysis for IC and ROA.

Table 8

Regression analysis between IC and ROA for fiscal year of 2010

	ESS	Degree of freedom	F	P-value
Regression	14.147	1	8.301	0.010
RSS	28.972	17		

As we can observe, regression analysis represents meaningful results for the relationship between IC and ROA fiscal year of 2010. Note that correlation ratio also provided enough evidence for this relationship. Table 9 shows details of our regression analysis for IC and Value added. As we can observe, regression analysis does not represent meaningful results for the relationship between IC and Value added fiscal year of 2010.

Table 9

Regression analysis between IC and Value added for fiscal year of 2010

	ESS	Degree of freedom	F	P-value
Regression	3.644	1	1.569	0.227
RSS	39.475	17		

In summary, we have not found strong evidences to claim that there is a meaningful relationship between IC and other financial factors. The results confirm other findings recently reported by Ståhle et al. (2011) where the authors criticized the VAIC results, significantly.

4. Conclusion

In this paper, we have presented an empirical study to use value added intellectual coefficient (VAIC) for measuring the performance of a firm. We have studied the relationship between intellectual capital and two other financial factors including return on assets and value added for three consecutive years between 2008 and 2010. The results indicated that there was no meaningful relationship between intellectual capital and return on assets for fiscal years of 2008 and 2009 but there was a meaningful relationship between these two items for the fiscal year of 2010. Our findings also indicated that there was no meaningful relationship between intellectual capital and value added for the years of 2008 and 2010 but there was a meaningful relationship between the items for the fiscal year of 2009. The results somewhat confirmed the recently published results in the literature, which argued the use of VAIC for assessing the direct impact of IC on other financial factors.

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