Relationships among intellectual capital, financial performance and market value: a case study from Indonesia

Noorina Hartati* and Rini Dwiyani Hadiwidjaja

Accounting Department,
Universitas Terbuka,
Jalan Cabe Raya, Pondok Cabe, Pamulang,
Tangerang Selatan 15418,
Banten, Indonesia
Email: orinbblbaut@gmail.com
Email: dwiyani.rini@gmail.com
*Corresponding author

Abstract: This paper re-examines the relationships between intellectual capital, financial performance and market value. The exogenous variables examined include human capital efficiency, structural capital efficiency (SCE) and capital employment efficiency - all used as proxies for intellectual capital (IC). Return on assets (ROA) and market value (MV) are the endogenous variables. The following are the main findings. First, intellectual capital (IC) as represented by human capital and capital efficiency significantly affects financial performance that represented by ROA over the long term, whereas IC as represented by structural capital cannot adapt to changes in the business environments. Second, SCE has failed to moderate the relationship between IC with ROA. Third, IC as represented by human capital, structural capital and capital efficiency significantly affects MV. Finally, SCE is being able to moderate the relationships between IC and MV.

Keywords: financial performance; Indonesia; intellectual capital; market value.


Biographical notes: Noorina Hartati received her Bachelor degree in Accounting from Sebelas Maret University, Surakarta, Indonesia, and Master’s degree in Accounting from Gadjah Mada University, Yogyakarta, Indonesia. Her research areas include finance, intellectual capital and small business.

Rini Dwiyani Hadiwidjaja received her Bachelor degree in Accounting from Perbanas Institute, Jakarta, Indonesia, and Master’s degree in Financial Management from University of North Sumatra, Medan, Indonesia. Her research areas include finance, auditing and small business.

This paper is a revised and expanded version of a paper entitled ‘Relationship between intellectual capital with financial performance and market value: case in Indonesia’, presented at SIBR 2016 Conference on Interdisciplinary Business and Economics Research, 2nd–3rd June 2016, Bangkok.
1 Introduction

As it is an intangible asset that can be converted in time into tangible assets, the notion of intellectual capital has started to draw significant attention from stakeholders (especially from entrepreneurs). As noted by Sawarjuwono and Kadir (2003), globalisation, technological innovation and intense competition have been forcing companies to change the way businesses are run. For instance, companies are progressing from being merely labour-based businesses to knowledge-based ones, i.e., as with science, business too is becoming essentially experience based.

Intellectual capital can exist not only in the form of goodwill or a set of patents as reported in the balance sheet but also in competence of employees, customer relations, the creation of innovation, computer systems and administration. The ability to master technology is also a part of it (Soetedjo and Mursida, 2014). Creativity has now become far more valuable than cash or fixed assets. Knowledge-based businesses increase company productivity by focusing on adding value to their products. Rather than seeking to expand business, for example, through land purchases for the purpose of expanding their plants and office buildings, companies are now beginning to launch vigorous training programs for their employees so as to increase product quality and enhance the company’s ability to respond effectively to changes in the market. Because employees are generally represented by wages and salaries (including other related expenses), it is often forgotten that employees are valuable assets. The 2015 event of ASEAN Free Trade Area (AFTA) has urged companies in the area to upgrade themselves as a way to compete with residence/citizens of other neighbouring countries (Feimianti and Anantadjaya, 2014).

Interest in the issue of intellectual capital began to develop in Indonesia only after the emergence of SFAS No. 19 (Revision 2010) and the adoption of IAS 38 (2009) on intangible assets. The SFAS became effective in January 1, 2011. The objective was to prescribe the accounting protocols for intangible assets that had not been specifically regulated by standards. Intangible assets are defined in paragraph 8 of SFAS 19 (Revision 2010) as an identifiable non-monetary asset without physical form. Three fundamental characteristics determine whether the expenditure of resources and the creation of the liabilities conducted by entities in the acquisition, development, maintenance or enhancement of intangible resources can be classified as an intangible asset - identifiability, control and future economic benefits. Following the AFTA agreement, which has been trying to unite all ASEAN economies into a community, the importance of intellectual capital has been increasing (Verico, 2012 in Feimianti and Anantadjaya, 2014). It is hoped that AFTA will allow the citizens of member nations to freely choose any country within the AFTA membership to work in. This should significantly enhance competition among human resources and the overall business competitiveness. In particular, demand for skilled and competent employees with extensive knowledge should increase (Feimianti and Anantadjaya, 2014).

Research conducted in Indonesia has revealed that human capital invariably affects financial performance positively (Ulum et al., 2008), although it is not necessarily the case with respect to market value (Yusuf et al., 2013). By contrast, it did not do so with respect to financial results, notwithstanding the observation that capital structure has a positive impact on market value. Furthermore, physical capital positively affects both market value and financial performance, whereas structural capital has been found to have little moderating effect on the relationship between human capital and market value.
On the other hand, structural capital negatively moderates the effect of human capital relationship on financial performance. In general, investors and companies emphasising physical and financial capital relating to human capital and structural capital often lack the competitiveness necessary for ensuring a sustainable enterprise (VAIC™) in terms of financial performance.

Because the associated results from previous studies have generally been inconsistent, researchers are getting interested in obtaining empirical evidence concerning the relationship between intellectual capital and financial performance and market value among top companies (LQ45) listed by the Indonesia’s Stock Exchange in the period 2009–2012. This paper seeks to contribute to the understanding of the characteristics of intellectual capital that need attention while striving to improve performance. Conversely, companies can get information about the main components of intellectual capital creating company value. An enhanced understanding should lead to improved competitive advantage through the implementation of better enterprise resource management strategies.

2 Literature review

2.1 Resource-based theory

Resource-based theory (RBT) assumes that companies would excel in a competitive business environment, and their financial performance would improve if they master, how to utilise assets (both tangible and intangible) of strategic importance better (Wernerfelt, 1984). Specifically, the theory assumes that firms will achieve excellence if they have superior resources (Sholikhah et al., 2010). Superior resources are a prerequisite for increasing the value of an enterprise. The resource-based (RB) theory, by contrast, can be seen as an ‘inside-out’ process of strategy formulation. We start by looking at what resources the firm possesses. Next, we assess their potential for value generation and end up by defining a strategy that will allow us to capture the maximum of value in a sustainable way.

2.2 Signalling theory

Signalling theory indicates that the organisation will seek to show the signals in the form of positive information to potential investors through disclosures in their financial statements (Whiting and Miller, 2008). Positive signals aim at getting positive responses from the market. Signalling theory is useful for describing behaviour when two parties (individuals or organisations) have access to different information. Typically, one party, the sender, must choose whether and how to communicate (or signal) that information, and the other party, the receiver, must choose how to interpret the signal. Accordingly, signalling theory holds a prominent position in a variety of management literatures, such as strategic management, entrepreneurship and human resource management.

This study combines the two theories. RBT seeks to utilise and maximise the potential of the resources owned by the company to create competitive advantages that would ultimately improve the company’s financial performance. The signalling of the good financial performance will help draw positive responses from people investing in the company’s stock.
2.3 **Definition of intellectual capital**

Bontis et al. (2000) group intellectual capital into three categories, such as human capital, structural capital and customer capital. The focus on intellectual capital is something that is new, not only in Indonesia but also the global business environment. Using VAIC™ as a proxy, this research tries to measure the effect of intellectual capital on stock returns. The selection of the sample companies of which shares included in the calculation of LQ45 index is intended to identify companies of which shares are active in the exchange.

2.4 **Intellectual capital and financial performance**

According to Yusuf et al. (2013), ROA can be used as proxy for financial performance. ROA is often translated into Indonesian as economic profitability defined as a measure of the company’s ability to generate profits that, in turn, can be projected to assess the company’s ability to generate profits in the future. ROA measures the company’s ability to generate profits by using total assets (wealth) belonging to the group after adjusting for their costs (Hanafi and Halim, 2009).

Using data from 80 companies manufacturing in the period 2008–2010, Chusnah (2014) demonstrated that the influence of IC and its components on company performance yielded a useful way of testing models accounting for the moderating role of strategy. Yusuf et al. (2013) found that human capital has a positive influence on financial performance but not necessarily on market value. Capital structure positively impacts market value but leaves out financial performance. Finally, physical capital positively affects market value as well as financial performance.

According to Sholikhah et al. (2010), intellectual capital too has a significant positive effect on a company’s financial performance as well as company growth but not on market value. Earlier, Ulum (2008) had found that IC (VAIC™) influences both the financial performance and financial future of the company. However, the rate of growth of a company’s IC has little effect on the company’s financial future.

Shamsudin and Yian et al. (2002) have noted that there is a significant positive relationship between ROA and return on equity (ROE) with regard to VAIC and the elements of intellectual capital. VAIC, structural capital efficiency (SCE), human capital efficiency (HCE) and capital employment efficiency (CEE) are all positively and highly correlated, which means that each yields profitability through these enhanced resources.

2.5 **Intellectual capital and market value**

Chen et al. (2005) note that investors are finding a growing niche in the shares of companies known for their intellectual resources because they usually pay higher rates than companies with little intellectual resources. The price paid by investors reflects the company’s value. Sholikhah et al. (2010) found that IC positively impacts both financial performance and company’s growth but has little influence on market value.

According to Feimianti and Anantadjaya (2014), VAIC correlates much better with market value than with accounting value. This indicates that VAIC is a very important factor stimulating the company’s value in the market. In addition, the market to book (M/B) ratio is found to exhibit the highest correlation because it measures the real-time value of the company as compared with its book value.
Relationships among intellectual capital, financial performance and market value

Yuniasih et al. (2010) found that IC has little effect on a company’s market performance. Using data from the period 2004 to 2007, Yusuf (2009) conducted the simultaneous F-test (with respect to the first hypothesis) and found that intellectual capital efficiency, HCE and SCE together have a significant effect on the market performance of companies listed in the Indonesian stock exchange. Chen et al. (2005) from Taiwan found that IC has a positive effect on market value and financial performance. Zéghal et al. (2010) from the UK showed that IC had a positive impact on economic and financial performance, but the relationship between IC and the performance of the market is significant only for high-tech industries.

Kuryanto (2008) measured the effect of IC (VAIC™) on the financial performance of companies in Indonesia on the basis of the ROE, earnings per share (EPS) and ASR figures listed by the Indonesian stock exchange. They concluded that there was no positive influence of IC on company performance; higher values of IC were not associated with higher performances. There is no positive relation between the growth rate of IC of a company and the company’s future performance. The latter varies according to the type of industry.

3 Hypotheses development

3.1 Intellectual capital and financial performance

Investments in the human workforce may increase employee productivity and, hence, financial results (Pfeffer, 1998). As the level of employee human capital is raised, people develop more efficient means of accomplishing task requirements, thereby increasing productivity (Munjuri et al., 2015). Hence, the following hypothesis is made.

\[ H_1: \text{HCE has positive correlation with ROA}. \]

Chen et al. (2005) stated that structural capital has a positive and significant impact on the financial performance of a company. Bontis et al. (2000) concluded that, regardless of industry, the development of structural capital has a positive impact on business performance. This realisation leads to the following hypothesis.

\[ H_2: \text{SCE has positive correlation with ROA}. \]

Among MAKE award companies, CEE was proved to be positively correlated with ROA (Zhicheng, 2016). ROA is an indicator of the performance of an organisation. ROA is the ratio between net income and total assets of the organisation. Because ROA indicates how profitable the organisation is, it can be used to make comparisons among organisations in the same industry (Santoso, 2011). This leads to the following hypothesis.

\[ H_3: \text{CEE has positive correlation with ROA}. \]

Examining companies from Iran, Mehralian et al. (2012) observed that, no significant effects were noted on productivity and market value, and IC significantly impacted profitability positively. Sholikhah et al. (2010) also noted significant impact on financial performance and growth of companies. Because VAIC is composed of HCE, SCE and
N. Hartati and R.D. Hadiwidjaja

CEE, it is reasonable to use it to investigate which components may affect the performance (Zhicheng, 2016). This leads to the following hypothesis.

\[ H_4: \text{VAIC has positive correlation with ROA.} \]

According to Yusuf et al. (2013), SCE can be used as a variable moderating the relationship between intellectual capital and financial performance. Hence,

\[ H_5: \text{HCE has positive correlation with ROA through the SCE.} \]
\[ H_6: \text{CEE has positive correlation with ROA through the SCE.} \]
\[ H_7: \text{VAIC has positive correlation with ROA through the SCE.} \]

3.2 Intellectual capital and market value

The efficiencies of the capital employed and HCE have been found to be among the most influential value drivers of both market value and financial performance, although SCE and relational capital efficiency are less important (Nimtrakoon, 2014). In this context, we can make the following hypothesis based on previous researches and empirical relationships between intellectual capital and market value.

\[ H_8: \text{HCE is positively related to market value.} \]
\[ H_9: \text{SCE is positively related to market value.} \]

Capital employed efficiency and HCE are found to be among the most influential value drivers for both market values (Nimtrakoon, 2014). Hence, the following hypotheses:

\[ H_{10}: \text{CEE is positively related to market value.} \]

According to accounting tradition, the book value of an organisation is exclusively calculated through financial statements. However, in this process, the value of one of the most important assets, IC, of every organisation cannot be calculated from conservative financial statements. This shortcoming usually leads to a divergence between the book values and market values of organisations. In other words, in calculating the value of every organisation, in addition to assets listed on the left side of the balance sheet, ‘market’ takes into account intangible assets of organisation. Usually, the market value of a firm is significantly higher than the company’s book value (Yusuf et al, 2013). It is, therefore, reasonable to assume that the greater the IC, the higher would be the ratio of market-to-book value. But, Yuniasih et al. (2010) state that IC does not have a significant effect on market performance. Because of this inconsistency of previous studies, the authors believe that the following hypothesis is reasonable.

\[ H_{11}: \text{VAIC is positively related to market value.} \]

According to the Yusuf et al. (2013), SCE can be used as a variable moderating the relationship between intellectual capital and financial performance. Hence, the following hypotheses are worth testing.

\[ H_{12}: \text{HCE is positively related to market value through SCE.} \]
\[ H_{13}: \text{CEE is positively related to market value through SCE.} \]
\[ H_{14}: \text{VAIC is positively related to market value through SCE.} \]
4 Research methods

4.1 Research design

As in the case of Yusuf et al. (2013), the Indonesian stock exchange (BEI) had sponsored this study. The empirical study mainly involved testing of the hypotheses described above by examining the relationships among all the studied variables through causal analysis and study using panel data (data pooling) to conduct path analyses.

4.2 Population and sample

The population examined in this research consisted of companies listed and trading in Indonesia’s stock exchange during the years 2009, 2010, 2011 and 2012. It consisted of 45 companies that are selected using calculations based on LQ45 index as listed on the Indonesian stock exchange.

4.3 Method of collecting data

The data collection methods used were essentially indirect, e.g., archived or secondary data derived from the annual financial statements of companies listed on BEI and available at http://www.idx.co.id/ and the Indonesian Capital Market Directory, 2009–2012. Purposive sampling based on samples selected according to certain criteria was used to obtain a representative sample. The following criteria were used:

2. Companies with their financial statements available for each year between 2009 and 2012.
3. Companies with market capitalisation data and the date of publication available over the period 2009–2012.

4.4 Variable identification and measurement

4.4.1 Exogenous variables

Following Shamsudin dan Yian et al. (2013), the exogenous variables in this study were the HCE, SCE and CEE. These variables were used as proxies for intellectual capital (IC). They were measured using the model of value-added intellectual coefficient (VAIC™) developed by Pulic (2000).
4.4.2 Endogenous variables
Following Yusuf et al. (2013), the endogenous variables used were market value and financial performance. Financial performance was used as the proxy for ROA.

4.4.3 Control variables
Finally, following Chusnah et al. (2014), size and leverage were used as the control variables.

4.5 Data analysis methods
The data were analysed using structural equation modelling and path analysis based on the criterion of goodness of fit.

5 Discussion

5.1 Research object description
Table 1 lists the criteria and illustrates the number of samples adopted. The total number of companies was 180, 60 of which were new and 40 had become defunct. There were 20 outliers, so the number of samples finally used was 60.
Relationships among intellectual capital, financial performance and market value

Table 1  Sampling research

<table>
<thead>
<tr>
<th>Total companies</th>
<th>45</th>
<th>LQ</th>
<th>180</th>
</tr>
</thead>
<tbody>
<tr>
<td>New companies</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exiting companies</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outliers</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total samples</td>
<td>60</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Secondary data, 2015

5.2 Descriptive statistics

Descriptive analyses were conducted on both the exogenous (HCE, CEE, VAIC, SIZE Ln, Ln LEV) and endogenous (ROA and LNMV) variables.

Table 2 presents the descriptive statistics of variables used in the study for 45 companies for the 4 years covered. Table 2 lists the mean, standard deviation, $t$-value and minimum and maximum values. Note that the minimum value of the HCE is 0.16. The corresponding maximum value is 57.30, average value 14.5262 and standard deviation of 16.59903. As for SCE, the minimum value was 0.01, the maximum 7.39, the average 0.9503 and standard deviation 1.23802. As for CEE, the minimum value was 0.09, the maximum 49.52, the average 5.8637 and standard deviation 13.37949. Turning to VAIC, the figures were 1.25, 59.41, 20.9842 and 18.12527, respectively. For ROA, they were 0.03, 57.30, 13.5958 and 15.51699, respectively. Finally, they were 16.6, 27.39, 24.807 and 1.819, respectively, for market value. Note that the variances for HCE, SCE and CEE are all very high, whereas those for VAIC, ROA and MV follow a relatively homogeneous distribution.

<table>
<thead>
<tr>
<th>Table 2</th>
<th>Descriptive analysis variables exogenous and endogenous</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Descriptive statistics</td>
</tr>
<tr>
<td></td>
<td>$N$</td>
</tr>
<tr>
<td>HCE</td>
<td>60</td>
</tr>
<tr>
<td>LNMV</td>
<td>60</td>
</tr>
<tr>
<td>ROA</td>
<td>60</td>
</tr>
<tr>
<td>CEE</td>
<td>60</td>
</tr>
<tr>
<td>SCE</td>
<td>60</td>
</tr>
<tr>
<td>VAIC</td>
<td>60</td>
</tr>
<tr>
<td>LNSIZE</td>
<td>60</td>
</tr>
<tr>
<td>LNLEV</td>
<td>60</td>
</tr>
<tr>
<td>Valid $N$ (listwise)</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: Secondary data, 2015
5.3 Suitability of the structural model

Analyses were carried out on the structural equation coefficients by specifying a certain level of significance. The purpose was to test the hypotheses proposed in this study. The results corresponding to the different models are summarized below.

Model 1 Structural equation model of intellectual capital → Financial performance (ROA)

<table>
<thead>
<tr>
<th></th>
<th>SCE</th>
<th>HCE</th>
<th>CEE</th>
<th>VAIC</th>
<th>LNSIZE</th>
<th>LNLEV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(2.46)</td>
<td>(6.28)</td>
<td>(6.20)</td>
<td>(6.19)</td>
<td>(1.13)</td>
<td>(0.80)</td>
</tr>
<tr>
<td></td>
<td>0.49</td>
<td>−2.66</td>
<td>−2.74</td>
<td>2.63</td>
<td>−3.79</td>
<td>2.83</td>
</tr>
</tbody>
</table>

ROA = 1.21*SCE - 16.70*HCE - 17.00*CEE + 16.27*VAIC - 4.30*LNSIZE + 2.27*LNLEV, Errorvar. = 153.29, $R^2 = 0.36$.

Model 1 tested hypotheses 1, 2, 3 and 4. With 0.9 t-value, the influence of SCE on ROA proved to be insignificant to ROA (H2 rejected). By contrast, the influence of HCE on ROA proved to be significant but was found to be in the opposite direction (H1 acceptable but showed the opposite direction). Likewise, as for CEE, the impact was significant and in the opposite direction with expectations (H3 acceptable but in the opposite direction). As for VAIC, most of the results were significantly positive (H4 accepted). As for the use of company size and leverage as control variables, this study followed that of Belkaoui (2003). Size was used to control for the effect of firm size in creating wealth through economies of scale, monopoly power and bargaining power. In the event, size showed an influence in the negative direction. At the same time, leverage was used to control for the effects of the debt in generating profits. In this study, the effect of leverage was found to be in the positive direction. Lisrel test results in terms of the $R^2$ values associated with the reduced form equation obtained for the structural equation in this study were around 0.36, suggesting that this model could only explain 36% of the changes in financial performance variables (ROA).

Model 2 Structural equation model of intellectual capital → ROA through SCE

<table>
<thead>
<tr>
<th></th>
<th>HCE</th>
<th>CEE</th>
<th>VAIC</th>
<th>LNSIZE</th>
<th>LNLEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA</td>
<td>2.45</td>
<td>2.41</td>
<td>−2.42</td>
<td>0.11(0.24)</td>
<td>−0.12(0.24)</td>
</tr>
<tr>
<td></td>
<td>(5.02)</td>
<td>(4.92)</td>
<td>(4.94)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SCE</td>
<td>0.49</td>
<td>0.49</td>
<td>−0.49</td>
<td>0.47</td>
<td>−0.48</td>
</tr>
</tbody>
</table>

Model 2 above tested hypotheses 5, 6 and 7 by examining the relationship between IC and ROA as mediated by SCE. Note that the effect of HCE on ROA is not significant; the t-value is 0.49. Likewise, the effect CEE on ROA is not significant; the t-value is 0.49. Similarly, the influence of VAIC on ROA is not significant; the t-value is −0.49.
Relationships among intellectual capital, financial performance and market value

Model 3  Structural equation model of intellectual capital → Market value

<table>
<thead>
<tr>
<th></th>
<th>HCE</th>
<th>CEE</th>
<th>VAIC</th>
<th>LNSIZE</th>
<th>LNLEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCE</td>
<td>0.33</td>
<td>0.83</td>
<td>0.82</td>
<td>0.15</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>2.41</td>
<td>−2.88</td>
<td>−2.83</td>
<td>2.88</td>
<td>−0.56</td>
</tr>
</tbody>
</table>

The following results were noted: LNMV = 0.79 * SCE − 2.39 * HCE − 2.32 * CEE + 2.36 * VAIC − 0.083 * LNSIZE + 0.15 * LNLEV, Errorvar. = 2.68, \( R^2 = 0.19 \).

Model 3 above was used to test hypotheses 8, 9, 10 and 11. The following findings are worth highlighting:

- The impact of SCE on MV was positive and significant; the \( t \)-value was 2.41 (H9 accepted).
- The impact of HCE on MV was significant but negative; the \( t \)-value was −2.83 (H8 accepted but in the negative direction).
- The impact of CEE on MV was also significant and negative (H10 accepted but in the negative direction).
- VAIC showed consistent results, which is significant to the positive ROA and MV, with \( t \)-value 2.88 (H11 accepted).
- Size as the control variable revealed an influence in the negative direction, whereas leverage showed an influence in the positive direction. The \( R^2 \) values were just above 0.19, which meant this model could only explain 19% of the change in market value (LNMV).

Model 4  Structural equation model of intellectual capital → Market value through SCE

<table>
<thead>
<tr>
<th></th>
<th>HCE</th>
<th>CEE</th>
<th>VAIC</th>
<th>LNSIZE</th>
<th>LNLEV</th>
</tr>
</thead>
<tbody>
<tr>
<td>LNMV</td>
<td></td>
<td>1.60 (0.68)</td>
<td>1.57 (0.67)</td>
<td>−1.57 (0.67)</td>
<td>0.07 (0.06)</td>
</tr>
<tr>
<td></td>
<td>2.34</td>
<td>2.34</td>
<td>−2.34</td>
<td>1.26</td>
<td>−1.65</td>
</tr>
<tr>
<td>SCE</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
<td>−</td>
</tr>
</tbody>
</table>

Model 4 above was used to test hypotheses 11, 12 and 13. Model 4 examines the influence of IC on MV as moderated by SCE. HCE is found to have significant positive correlation to MV through SCE with a \( t \)-value of 2.34 (H11 accepted). CEE also has a significant positive influence on the MV through the mediation of SCE; the \( t \)-value was 2.34 (H12 accepted). Later, VAIC was found to have a significant negative impact on MV under the mediation of SCE; the \( t \)-value was −2.34 (H13 accepted but in the negative direction).

Table 3 shows that HCE significantly impacts ROA and MV in the negative direction; \( t \)-values are −2.66 and −2.88, respectively, and the estimated coefficients are −16.7 and −2.39, respectively. As for SCE, its relationship with ROA is not significant, but that with MV is significant and in the positive direction (in line with expectations). The impacts of CEE are similar, i.e., its relations to ROA and MV are significantly negative (opposite to the expectations). VAIC has shown consistent results that are
significant both in the short term (MV) with a $t$-value of 2.88 and a coefficient estimate of 2.36 and in the longer term (ROA) with a $t$-value of 2.63 and coefficient estimate of 16.27, whereas HCE, SCE and CEE, which are all components of IC, fail to show consistent results in terms of both the short term (MV) and long term (ROA). Thus, it can be concluded that the VAIC is the most suitable indicator for measuring IC.

### Table 3

$t$-Value associated with each hypothesis

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Expect</th>
<th>Coefficient</th>
<th>$t$-Value</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 HCE $\rightarrow$ Financial performance (ROA)</td>
<td>+</td>
<td>-16.70</td>
<td>-2.66***</td>
<td>Significant negative</td>
</tr>
<tr>
<td>2 SCE $\rightarrow$ Financial performance (ROA)</td>
<td>+</td>
<td>1.21</td>
<td>0.49</td>
<td>Not significant positive</td>
</tr>
<tr>
<td>3 CEE $\rightarrow$ Financial performance (ROA)</td>
<td>+</td>
<td>-17.00</td>
<td>-2.74***</td>
<td>Significant negative</td>
</tr>
<tr>
<td>4 VAICTM $\rightarrow$ Financial performance (ROA)</td>
<td>+</td>
<td>16.27</td>
<td>2.63***</td>
<td>Significant positive</td>
</tr>
<tr>
<td>5 HCE $\rightarrow$ Financial performance (ROA) through SCE</td>
<td>+</td>
<td>2.45</td>
<td>0.49</td>
<td>Not significant positive</td>
</tr>
<tr>
<td>6 CEE $\rightarrow$ Financial performance (ROA) through SCE</td>
<td>+</td>
<td>2.41</td>
<td>0.49</td>
<td>Not significant positive</td>
</tr>
<tr>
<td>7 VAICTM $\rightarrow$ Financial performance (ROA) through SCE</td>
<td>+</td>
<td>-2.42</td>
<td>-0.49</td>
<td>Not significant negative</td>
</tr>
<tr>
<td>8 HCE $\rightarrow$ Market value (LNMV)</td>
<td>+</td>
<td>-2.39</td>
<td>-2.88***</td>
<td>Significant negative</td>
</tr>
<tr>
<td>9 SCE $\rightarrow$ Market value (LNMV)</td>
<td>+</td>
<td>0.79</td>
<td>2.41***</td>
<td>Significant positive</td>
</tr>
<tr>
<td>10 CEE $\rightarrow$ Market value (LNMV)</td>
<td>+</td>
<td>-2.32</td>
<td>-2.83***</td>
<td>Significant negative</td>
</tr>
<tr>
<td>11 VAICTM $\rightarrow$ Market value (LNMV)</td>
<td>+</td>
<td>2.36</td>
<td>2.88***</td>
<td>Significant positive</td>
</tr>
<tr>
<td>12 HCE $\rightarrow$ Market value (LNMV) through SCE</td>
<td>+</td>
<td>1.60</td>
<td>2.34**</td>
<td>Significant positive</td>
</tr>
<tr>
<td>13 CEE $\rightarrow$ Market value (LNMV) through SCE</td>
<td>+</td>
<td>1.57</td>
<td>2.34**</td>
<td>Significant positive</td>
</tr>
<tr>
<td>14 VAICTM $\rightarrow$ Market value (LNMV) through SCE</td>
<td>+</td>
<td>-1.57</td>
<td>-2.34**</td>
<td>Significant negative</td>
</tr>
</tbody>
</table>

***1% > 2.35; **5% > 1.96; *1% > 1.65; Source: Secondary data were processed, 2015.
The following observations can be made:

- VAIC is the basis of standard size and consistent.
- All the data used in the calculation of VAIC are based on information that has been audited, so that all the findings can be considered to be objective and verified.
- VAIC is an analytical procedure that is designed to enable management, shareholders and stakeholders to effectively monitor and evaluate the efficiency of the value added to the total resources of the company and the individual components of the primary resource.

The results from this study indicate that the VAIC is a good proxy for IC both over the short term and long term. As with the work of Yusuf (2013), it states that the human capital (HC) proved significant on financial performance but has no significant effect on the market value; structural capital (SC) proved significant for the market value but has no significant effect on financial performance. Capital employed (CE) proved significant for the market value and financial performance. However, these studies do not provide consistent results by separating the IC component, such as HC, SC and CE.

The results of this study support the research by Chusnah (2014). They did this by proving that the IC and IC components are significant to the performance of the strategy as being moderating. This is done using proxy VAIC without separating its components into HCE, SCE and CEE but using a formula of Pulic (1998) that comprises VACA, VAHU and STVA. Likewise, Ulum (2008) uses VAIC to measure IC. These results are consistent with studies of Chen (2005) in Taiwan stating that the IC significantly affects market value and financial performance, then Zeghal (2010) in the UK that states IC significantly affects the economic and financial performance and has a significant effect on the IC market performance in high-tech industries.

Structural capital efficiency has failed to moderate the relationship between IC with ROA because it causes a significant fall - its value fell to negative to such an extent that the value had even become insignificant. HCE proved insignificant to ROA through SCE, with \( t \)-value of 0.49 (H5 rejected). Likewise with CEE, there is no significant relationship between CEE with ROA through SCE with \( t \)-value of 0.49 (H6 rejected). Moreover, VAIC, instead, has become insignificant to ROA through SCE with a \( t \)-value \(-0.49\) (H7 rejected).

But the relationship between IC and MV via SCE is significant. That of HCE and MV via SCE is also significant (positive); \( t \)-value of 2.34 (H12 accepted). The influence of SCE on MV is similarly significant, \( t \)-value equalled 2.34 (H13 accepted). Meanwhile, the impact of VAIC on MV through SCE has been found to be significant negative, Hypothesis H14 may be accepted. However, overall, the results from this study have indicated that VAIC can be used as a proxy for IC because the latter correlates with ROA and MV (Hypotheses 4 and 11 accepted).
6 Conclusion and recommendations

6.1 Conclusion

Based on the results from our hypothesis testing, we can come to the following conclusions. First, intellectual capital is quite influential in determining financial performance (ROA), whereas the structural capital created by the intellectual capital of the company is of importance in adapting the changes in the business environment. Second, intellectual capital positively affects the market value of the enterprise, which suggests that optimally managed intellectual capital can enhance company performance. If the performance is good, the company can attract investors, which, in turn, has a favourable impact on the market value. However, SCE has failed to moderate the relationship between IC and ROA as well as MV because it causes a significant drop in value (even to the negative side).

In conjunction with ROA and MV, VAIC™ developed by Pulic (2000) is the best proxy for measuring IC. VAIC has been found to be able to provide consistent and the positive results with respect to the relationship between ROA and IC (long-term) as well as MV (short term). Overall, it can be said that the IC can improve both financial performance and market value. However, this study has failed to yield consistent results while seeking to separate IC into HCE, SCE and CEE. The results are not good enough, although HCE and CEE have been found to have significant negative influence on ROA and MV. The impact of SCE on MV has proved to be significant positive but not significant with respect to ROA.

6.2 Limitations

A major limitation of this research study is that it was carried out only in Indonesia. This means that it cannot be generalised immediately to all countries.

6.3 Suggestions

1. As for further research, the present researchers recommend adding better estimator indicators for financial performance and market value, e.g., ROE, net working capital to total assets (NWC to TA) and asset turnover as measured by a company’s performance measures such as EPS, market-to-book ratio (M/B ratio) and price-earnings ratio (P/E Ratio) to the market value and including variables moderating to strengthen the relationship between IC with financial performance and market value.

2. Specifically for the Government of Indonesia:

   a. Intellectual capital is of great value in improving competitiveness while implementing the AFTA agreement.
Further research should be conducted in banks because no study has so far been undertaken to examine the influence of intellectual capital on the financial performances of Indonesian banks (Santoso, 2011).

Acknowledgements

The author thanks the Rector of Universitas Terbuka for the financial support provided for the International Conference of the Society of Interdisciplinary Business Research 2016 Bangkok Conference and my colleague, Mrs. Rini Dwiyani Hadiwidjaja, as member of research team for the support in finishing the report.

References


