

Intellectual Capital and Firm Performance *Evidence from Indonesia*

Budi Yuda Prawira and Rahmat Setiawan

Departement of Management, Faculty of Economics and Business, Universitas Airlangga, Jl. Airlangga 4-6, Surabaya, Indonesia

Keyword: Intellectual Capital, Value Added Capital Employed, Value Added Human Capital, Structural Capital Value Added, Return on Asset, Return on Equity, Market-to-Book Ratio.

Abstract: This study aims to examine the effect of intellectual capital and its components such as value added capital employed, value added human capital, and structural capital value added on firms performance. Intellectual capital was measured using pulic's models, while firms performance measured by return on asset, return on equity, and market- to-book ratio. The samples are 102 firms in the manufacturing industry sector listed in Indonesia Stock Exchange over the time window 2012-2016. Multiple regression analysis have been utilized to test the hypothesis. The result showed that intellectual capital has a significant positive effect on return on asset, return on equity, and market-to-book ratio. In addition, the result show that value added capital employed, a component of intellectual capital was found to be the most influential value drivers for firm performance than value added capital employed and structural capital value added. This findings suggest that having large capital employed and good managing on it, enabling firm to improve financial performance and their maket value.

1 INTRODUCTION

The biggest problem of investors is making an appropriate investment decision. An investor must have accurate information related to the target company as a basis for making investment decisions. So far, firms that listed on the Indonesia Stock Exchange only provide general information through financial statements that published every year. Meanwhile, there is more important information that should be known by investors that become a competitive advantage of the firms as key success of their performance, it is intellectual capital (Ross et al. 1997).

Intellectual capital according to Stewart (1997) is an intangible asset of a company, it can be knowledge, information, experience of human resources and company organization. Mouritsen et al. (2001) said that the difference between the market value and the book value of a company is a result of the development of the company's intellectual capital. The existence of a large difference between the real value of the company and its market value illustrates the market conditions are not good.

Based on data obtained from the IDX Factbook, during period 2012-2016 the average PBV of all firms listed on the Indonesia Stock Exchange is 2.09 times, which means that the average market rate of firms in Indonesia is 2 times greater than the book value. this research specifically examines the manufacturing industry, because the difference between the average of book value and the value of firms in this industry is quite large that is 2.4 times, even in the subsector consumer goods industry average PBV reached 4.58 times. This condition encourages us to find out is intellectual capital as the factor of that differences.

Several previous studies have shown different results related to the influence of intellectual capital on firm's performance. Chen et al. (2005) shows that intellectual capital has a significant positive effect on the value and financial performance of the company. These results are reinforced by research conducted by Onyekwelu et al. (2017), Amin and Aslam (2017). While different results shown by Firrer and Williams (2003) and Diez et al. (2010) that intellectual capital had no effect on firm's performance. Similar results were also shown by Mehralian et al. (2012) that there is no relation between intellectual capital and firm's performance.

Meles et al. (2016), in their research mentions that the capacity and contribution of intellectual capital to the firm's performance in every country and every industry are different, therefore this research try to investigate more related to the influence of intellectual capital to firms performance on manufacturing industry listed in Indonesia Stock Exchange.

2 LITERATURE REVIEW

2.1 Previous Research

Nimtrakoon (2015), examines relationship between intellectual capital, market value and financial performance of firms in 5 countries in ASEAN. Intellectual capital is measured by modifying value added of the intellectual coefficient (MVAIC) and its components measured by capital employed efficiency, human capital efficiency, structural capital efficiency, and relational capital efficiency. Market value is in accordance with the market to book ratio, financial performance as measured by net profit margins and return on assets. Analysis model is multiple linear regression. The results showed that intellectual capital and its four components had a significant positive effect on the value and financial performance of the firm.

Nuryaman (2015), examined the influence of intellectual capital on firm value with financial performance as an intervening variable on 93 manufacturing firms listed on the Indonesia Stock Exchange during period 2012. The results showed that intellectual capital positively influenced value and financial performance of the firm, while value added capital employed, has no effect on return on assets, return on equity, and net profit margin, but has a positive effect on price to book value. Value added human capital has no effect on firm's value and performance, while structural capital value added has a significant positive effect on price to book ratio and return on equity, but has no effect on return on assets and net profit margins. When return on assets were included in the model, the regression coefficient of value added capital employed, structural capital value added, and value added intellectual coefficient decreased from the previous model, so return on assets were functioned as an intervening variable in the causal relationship between intellectual capital and firm value.

Different result was shown by research Firer and Williams (2003), which is examining the effect of intellectual capital on firm performance on 75 public

firms in South Africa in 2001. The results of this study indicate that intellectual capital does not affect the performance of the company. However, human capital efficiency which is a component of intellectual capital has a significant positive effect on return on assets. Similar results was also shown by the study of Diez et al. (2010).

2.2 Intellectual Capital and Firm Performance

Intellectual capital is a collection of hidden assets held by organizations such as brands, trademarks and patents and other assets not seen in financial statements, intellectual capital is the most important resource for organizations to maintain competitive advantage (Ross et al. 1997). Intellectual capital according to Stewart (1997) is an intangible asset of a company, it can be knowledge, information, experience of human resources and company organization. Mouritsen et al. (2001) revealed that intellectual capital is the difference between the market value and the book value of a company in which this value is influenced by the intellectual development of the company.

Pulic (1998) developed an intellectual capital measurement model through the company's ability to efficiently use physical capital (VACA), human resource intellectual skills (VAHU), and structural capital (STVA) describing the capabilities and relationships of the company's infrastructure. Pulic calls this coefficient an intellectual value-added coefficient (VAICTM) that describes the company's overall intellectual capabilities. Firm performance is a benchmark against the company's ability to manage and allocate their resources in a period. Company goals will be achieved if the company has a good performance. The company with good performance reflects the company's condition in good condition. The results of the firm's performance can be used as an evaluation material for the company in the future (Sudana, 2015).

2.3 Relationship between Intellectual Capital and Firm Performance

Value Added Capital Employed (VACA) is related to physical capital (net income and total equity) owned by a company within a certain period (Pulic, 1998). This physical capital can be used as capital to fund the activities of the company in the next period. Firms with high physical capital have the opportunity to expand their business. If the company is able to utilize the physical capital possessed

optimally, then the company will get the high return and will eventually increase the value of the company. Previous research conducted by Chen et al. (2005) shows that VACA has a significant positive effect on firm's performance.

Edvinsson (1997) disclosed that Value Added Human Capital (VAHU) is a combination of individual employees' knowledge, skills, innovation and ability to accomplish their tasks well, indicating that employees with the high competency will give the opportunities for the company to improve their performance. Kamath (2015) reveals that VAHU has a significant positive effect on firm's performance. Structural Capital Value Added (STVA) is a corporate infrastructure that supports employee productivity (Edvinsson, 1997). Firms with adequate infrastructure will support employees to perform their activities, so it may improve the performance and value of the company. This is supported by previous research conducted by Amin and Aslam (2017) which revealed that STVA has a significant positive effect on company performance.

If the company is able to utilize their resources optimally (VACA, VAHU and STVA) it will create a high intellectual capital (VAICTM) for the company. Firms with high intellectual capital have high corporate performance as well. This is a positive signal for investors, so the demand for stocks of firms will increase. Chen et al. (2005), Onyekwelu et al. (2017), Amin and Aslam (2017) show that intellectual capital has a significant positive effect on firm's performance. Based on the explanation hypothesis can be formulated as follows:

- H₁ : VAICTM has a significant positive effect on firm performance
- H₂ : VACA has a significant positive effect on firm performance
- H₃ : VAHU has a significant positive effect on firm performance
- H₄ : STVA has a significant positive effect on firm performance

3 METHODS

3.1 Sample

This study used a sample of 102 manufacturing firms listed on Indonesia stock exchange and consistently published financial statements in Rupiah during period 2012-2016.

3.2 Measurement of Variables

3.2.1 Independent Variable

Here is the measurement of intellectual capital using the VAICTM model developed by Pulic (1998):

- a. Calculate Value Added (VA). $VA = \text{Output} - \text{Input}$, which is $\text{output} = \text{total sales} + \text{other revenues}$, and $\text{input} = \text{sales expenses} + \text{other costs except personal expenses}$.
- b. Calculate Value Added Capital Employed (VACA). $VACA = VA/CE$, which is $CE = \text{net income} + \text{total equity}$.
- c. Calculate Value Added Human Capital (VAHU). $VAHU = VA/HC$, which is $HC = \text{personal expenses}$
- d. Calculate Structural Capital Value Added (STVA). $STVA = SC/VA$, which is $SC = VA - HC$.
- e. Calculate Value Added Intellectual Coefficient (VAICTM). $VAIC^{TM} = VACA + VAHU + STVA$

3.2.2 Dependent Variable

Profitability ratio is proxied with Return On Assets (ROA) measured through net income divided by total assets and Return On Equity (ROE) measured by net income divided by total equity. While market value ratio is proxied with market to book ratio (M/B) as measured by market price per share divided by book value per share (Sudana, 2015:25-27).

3.3 Analysis Model

In this research data is processed and analyzed by using multiple linear regression model. Here is the models in this study:

$$Y_{it} = \beta_{0,1} + \beta_{1,1} VAIC^{TM}_{it} + \beta_{2,1} SIZE_{it} + \beta_{3,1} LEV_{it} + e_{it}$$

$$Y_{it} = \beta_{0,1} + \beta_{1,1} VACA_{it} + \beta_{2,1} VAHU_{it} + \beta_{3,1} STVA_{it} + \beta_{4,1} SIZE_{it} + \beta_{5,1} LEV_{it} + e_{it}$$

4 RESULTS

Descriptive statistics of variables in this research is shown in Table 1.

Table 1: Descriptive statics.

| | N | Min | Max | Mean | Std. Dev |
|--------------------|-----|-------|-------|--------|----------|
| ROA | 510 | -.67 | .49 | .042 | .0891 |
| ROE | 510 | -7.68 | 9.42 | .350 | 1.249 |
| MB | 510 | .29 | 8.08 | 1.415 | 1.155 |
| VACA | 510 | -14.4 | 7.42 | .328 | 1.044 |
| VAHU | 510 | -11.8 | 13.66 | 1.989 | 2.366 |
| STVA | 510 | -8.70 | 11.25 | .537 | 1.362 |
| VAIC TM | 510 | -13.5 | 14.87 | 2.824 | 3.025 |
| SIZE | 510 | 18.4 | 32.47 | 26.428 | 2.213 |
| LEV | 510 | .09 | .99 | 1.238 | 1.967 |

Based on Table 1, during the period 2012 - 2016 manufacturing firms in Indonesia have difficulty in making profit, this is shown by low mean scores of ROA (0,042) and ROE (0,3506). MB has the mean scores of 1.4155 indicating that average market value about 1.4155 times greater than their book value. Meanwhile, the mean scores of intellectual capital (VAICTM) is 2.8244 indicating a company created Rp. 2.8244 for every Rp. 1.00 utilized during period 2012-2016.

4.2 Relationship between VAICTM and Firm Performance

Based on Table 2, Value Added Intellectual Coefficient (VAICTM) has a significant positive effect on firm's performance (ROA, ROE, MB) which means firs hypothesis (H1) is accepted. This is proofed by the positive value of the regression coefficient ROA, ROE and MB each of 0.013, 0.120 and 0.056 with a significance level of 0.000 < 0.05. This shows that firms capable of managing capital employed, human capital, and structural capital optimally will improve the performance of the company. firms with good performance will generate high profits that increase the value of the company. This is a positive signal for investors that are marked by increasing demand of the company's shares.

Table 2: Summary of regression results.

| Variable | ROA | ROE | M/B |
|--------------------|-----------------|------------------|-----------------|
| VAIC TM | .013* (.000) | .120* (.000) | .056* (.000) |
| SIZE | .007* (.000) | .060** (.014) | .113* (.000) |

| | | | |
|-----|-----------------|-----------------|-----------------|
| LEV | -.002 (.262) | -.047 (.081) | -.024 (.332) |
|-----|-----------------|-----------------|-----------------|

Notes : significance at *1%, **5%

4.3 Relationship between VACA and Firm Performance

Based on Table 3, Value Added Capital Employed (VACA) has a significant positive effect on firm's performance (ROA and ROE) which means second hypothesis (H2) is accepted. This is proofed by the positive value of the regression coefficient ROA and ROE each of 0.010 and 0.587 with a significance level of 0.012 < 0.05 and 0.000 < 0.05. This shows that firms with adequate physical capital will be able to support the firm's performance to generate profit. This result is in line with the research of Chen et al. (2005) shows that VACA has a significant positive effect on firm's performance. While the performance of the company proxied with market-to-book ratio in this case is not influenced by VACA (sig 0.417 > 0.05). This means that during the 2012-2016 observation period the market assesses a company not only from physical capital, but also considers human capital as well as structural capital owned by the company.

4.4 Relationship between VAHU and Firm Performance

Based on Table 3, Value Added Human Capital (VAHU) has a significant positive effect on firm's performance (ROA, ROE, M/B), which means the third hypothesis (H3) is accepted. This is proofed by the positive value of the regression coefficient ROA, ROE, and M/B each of is 0.021, 0.042, and 0.090 with a significance level of 0.000 < 0.05 and .039 < 0.05. This shows that firms with competent human resources will improve the firm's performance. In addition, the market will also provide more value to the company with superior human resources. This results support Kamath's research (2015), that VAHU has a significant positive effect on firm's performance.

Table 3: Summary of regression results.

| Variable | ROA | ROE | MB |
|----------|------------------|-----------------|-----------------|
| VACA | .010** (.012) | .587* (.000) | .090* (.000) |

| | | | |
|------|--------|--------|--------|
| VAHU | .021* | .042** | -.039 |
| | (.000) | (.039) | (.417) |
| STVA | .004 | .023 | .015 |
| | (.084) | (.351) | (.671) |
| SIZE | .006* | .038 | .112* |
| | (.000) | (.080) | (.000) |
| LEV | -.002 | -.05** | -.026 |
| | (.164) | (.037) | (.298) |

Notes : significance at *1%, **5%,

4.5 Relationship between STVA and Firm Performance

Based on Table 3, Structural Capital Value Added (STVA) has a significant positive effect on firm's performance (ROA), which means the fourth hypothesis (H4) is accepted. This is proofed by the positive value of the regression coefficient ROA 0.004 with a significance level of $0.084 > 0.1$. This result shows that firms with adequate infrastructure will support employees to perform their activities, so it may improve the performance and value of the company. This is supported by previous research conducted by Amin and Aslam (2017) which revealed that STVA has a significant positive effect on company performance. However, the results of this study also show that the market does not give more value to the company with adequate structural capital, but the market will provide more value for the company. This is supported by previous research conducted by Amin and Aslam (2017) which revealed that STVA has a significant positive effect on company performance. However, the results of this study also show that the market does not give more value to the company with adequate structural capital, but the market will provide more value for the company if the company is able to utilize their infrastructure well.

5 CONCLUSIONS

Firms that are able to utilize their resources optimally (VACA, VAHU and STVA) will create a high intellectual capital (VAICTM). Firms with high intellectual capital also have high firm performance. This is proofed in the results of this study which shows that intellectual capital has a significant positive effect on firm's performance. In addition,

the results of this study found that the component of intellectual capital that is VACA gives the highest contribution on firm's performance than VAHU and STVA. This shows that firms with large of capital employed and good managing on it, enabling firms to improve financial performance and their market value. This result is in line with Nimtrakoon (2015), which shows that VACA was found to be the most influential value drivers for firm performance.

The sample of this study is limited to the manufacturing industries listed on the Indonesia Stock Exchange. Meanwhile, there are still many other industries in Indonesia that need to be researched about the capacity of their intellectual capital on firm performance. So that the results of research with similar topics are expected to be used as a reference for stakeholders in decision making.

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