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Intellectual Capital Measurement and Company Performance, Any Real Impact?

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ABSTRACT

This study aims to determine the effect of Intellectual Capital measured by VAIC on company performance measured with ROA, ROE and MBV. As many as 19 non-financial companies with 183 observations for the period of 2010-2020 (unbalanced panel) was used for panel data regression model. fixed effect model with robust is the most suitable model for ROA and ROE panel data regression. For MBV random effect model is considered appropriate in this research. According to the results only human capital is the most significant component for ROA and ROE. For MBV, none of the components have significant impact on share performance. Regression result showed that MBV is not suitable to measure company share performance.

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INTRODUCTION

In this millennia physical asset is being replaced by knowledge, idea, and creativity as key drivers to achieve better financial performance (Pedrini, 2007). Company's survival in this disruption age is dependent on how it can create or acquires innovation (Chang & Hsieh, 2011). This innovation or usually called Intellectual Asset can be used to gain competitive advantage and open new market. Intellectual Asset that cannot be tracked in company financial report is called Intellectual Capital (IC) (Bayraktaroglu et al., 2019).

VAIC (Value Added Intellectual Coefficient) is commonly used as method for measuring IC on research (Pulic, 2004). The reason behind this is that VAIC is the easiest method among all other available. The data source to calculate the formula is taken from company's financial report which easily accessible if the company is going public. This method also has a big advantage because most of the time the financial report is already audited by independent accounting firm which make the information reliable (Bayraktaroglu et al., 2019; Soewarno & Tjahjadi, 2020). Some previous research conducted by (Andreeva & Garanina, 2016; Chowdhury et al., 2019; Inkinen, 2015; Nimtrakoon, 2015; Ozkan et al., 2017) concluded that IC and its components are significantly impact profitability.

Most previous IC Research agree with Resource Based Theory (RBT) as a foundation to classify IC as an intellectual asset that can be utilized as main source to create competitive advantage (Bontis et al., 2015; Kohtamäki et al., 2019; Molodchik et al., 2012). Because IC is the main source of

competitive advantage, its components that created it must be rare, valuable and unique. According to Pulic, 2004, VAIC method using three components namely *Human Capital Efficiency* (HCE), *Structural Capital Efficiency* (SCE) and *Capital Employed Efficiency* (CEE) as the core of IC measurement. These three components are the source of IC.

HCE is the contribution of certain individuals involved in the company organization to create more value (Bayraktaroglu et al., 2019). This contribution can be seen in the shape of experience, knowledge, skills, ability to solve problems and any useful thoughts that exist in everyone (Elrehail et al., 2020; Ulum et al., 2014). HC is the main source of every creativity, innovation and knowledge sharing place to improve skills (Bayraktaroglu et al., 2019; Xu & Liu, 2020).

SCE is an infrastructure specifically built by the company to ensure that everyone involved in it can innovate and contribute his thoughts in the company dynamic activity (Anderson & Lawi, 2021; Damuri, 2017; Ngah & Ibrahim, 2009). SCE is considered successful if it can create more productive and innovative atmosphere, accelerate the learning process, and increase employee creativity. Real examples of SCE are all procedures, rules, routines and aspects of corporate culture that are applied as a whole to support productivity (Bayraktaroglu et al., 2019).

CEE is an indicator of how efficiently a company creates added value from its physical & financial capital (Bayraktaroglu et al., 2019; Buallay, 2018; Dženopoljac et al., 2016).The assumption behind CEE is the main principle in doing business, which is required to create maximum added value from each nominal financial asset and from every physical asset under its control (Pulic, 2000a; Shahveisi et al., 2017; Tiwari, 2020). This added value can be seen through dividends and increasing share prices in the market.

The data period for this research is 2010-2020, because Industry 4.0 was introduced in late 2010 and we want to see in period of 10 years how much IC impacted company performance. With the rise of Industry 4.0 which is introduced in 2011, digital technology and innovation become more important and an inseparable in daily operation. With this phenomenon, IC become more important in day-to-day operational activity (Cabrita et al., 2019; Frank et al., 2019). Not just in operational, IC is also subjected to have significant impact on company stock performance because investor speculate its increasing performance in the future (Pedrini, 2007). For research sample, we avoid financial industry because it is highly regulated and can't innovate freely like other industry because its inherent risk on economy (El-Bannany, 2008; Ulum et al., 2014).

The main purpose of this study is to determine the effect of IC on non-financial industry performance. The term performance in this study is referred to inside financial performance which represented by Return on Asset (ROA) and Return on Equity (ROE) and outside performance which represented by share market value fluctuation represented by Market to Book Value (MBV). With this method we aim to gains more evidence on how IC impacted internal organization and investors perception on the share market

RESEARCH METHOD

Hypothesis Development

IC and its relationship with various industries have been studied several times, most of them are focused on specific sectors such as banks (El-Bannany, 2008; Ousama & Fatima, 2015; Ozkan et al., 2017; Ulum et al., 2014), tourism (Bontis et al., 2015; Khalique et al., 2020), pharmacy (Tiwari, 2020; Vishnu & Gupta, 2014), Health (Ahman & Sohn, 2020) and Manufacture (Phusavat et al., 2011; Pucar, 2012; Xu & Li, 2020) in several countries with different politic, economic and social conditions. Most of this research agreed that there is a significant impact and strong relation between IC and company performance as measured using fundamental performance indicators and share prices. Based on previous research and theory the following hypotheses are proposed.

H1 : VAIC Components have significant effect on the company's financial performance (ROA)

H1a : HCE has positive significant effect on ROA
H1b : SCE has positive significant effect on ROA
H1c : CEE has positive significant effect on ROA

H2 : VAIC Components have significant effect on the company's financial performance (ROE)
H2a : HCE has positive significant effect on ROE
H2b : SCE has positive significant effect on ROE
H2c : CEE has positive significant effect on ROE

H3 : VAIC Components have significant effect on the company's financial performance (MBV)
H3a : HCE has positive significant effect on MBV
H3b : SCE has positive significant effect on MBV
H3c : CEE has positive significant effect on MBV

Population and Sample

In this research the population used is non-financial companies listed on the Indonesia Stock Exchange (IDX). Purposive sampling method is used to determine the exact sample with the criteria first criteria is listed on Indonesia Stock Exchange for the year of 2010 to 2020 and published full financial report from 2010 to 2020. From this sample selection there are 19 companies matched as samples. The number of observations obtained are 183 observations. Because some observation is not completed, we used unbalanced panel data regression model for this research (Hun, 2011a).

Operational Definition

In this study, IC was represented using VAIC (Pulic, 2004; Soewarno & Tjahjadi, 2020). VAIC is used because this model is the initial measurement model proposed to measure VAIC efficiency. For conventional VAIC measurements it is calculated using the following formula:

$$VAIC = HCE + SCE + CEE$$

Before calculating HCE, SCE and CEE, it is necessary to first calculate VA (Value Added) with the following formula (Soewarno & Tjahjadi, 2020)

$$VA = OP + HC + D + A$$

Explanation:
OP = Operation Profit; HC = Employee Expense (salary, wage, incentive, and bonus); D = Depreciation; A= Amortization

$$HCE = VA / HC$$

To calculate SCE, it is necessary to first calculate SC (*Structural Capital*). SC has an inverse relationship in the creation of VA (Pulic, 2004) so it is formulated as follows:

$$SC = VA - HC$$
$$SCE = SC / VA$$

For CEE (Capital Employed Efficiency) it is calculated by the following formula:

$$CEE = VA / CE$$

Explanation
CE (*Capital Employed*) = Book value of company net assets.

In this study, company performance is represented by three different ratio calculation that represent financial performance and share price performance in the market. The ratios used as variable are Return on Assets (ROA), Return on Equity (ROE) and Market to Book Value (MBV). The formulas used in calculating these ratios are as follows:

- ROA is the ratio of net income and total assets (Bayraktaroglu et al., 2019)
- ROE Is the ratio between net income and equity (Soewarno & Tjahjadi, 2020)
- MBV is the ratio between market value and book value (Bostanci et al., 2018)

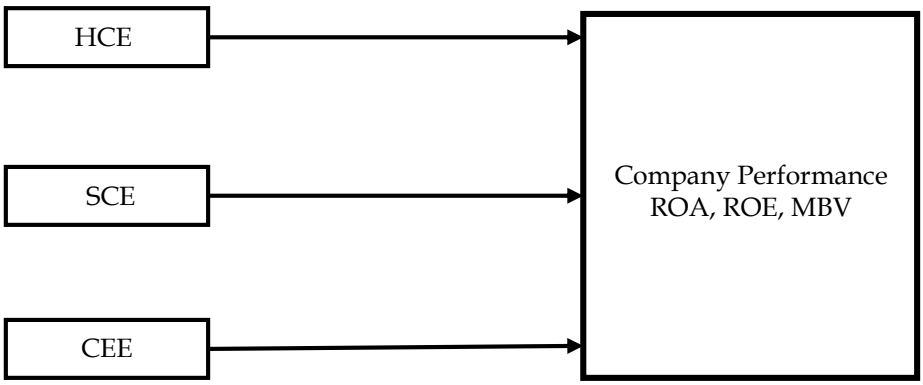

Figure 1. Research Model

Data Analysis

This study used panel data regression to examine the effect of IC measurements with VAIC on financial performance. The statistical tool used is STATA 15. There are three panel data models, namely Common Effect Model (CEM), Fixed Effect Model (FEM) and Random Effect Model (REM). To determine the most suitable panel regression model, each model will be tested with the Chow Test, Hausman Test, and Breusch-Pagan LM Test. (Hun, 2011b; Maulana & Muchtar, 2018; Zulfikar, 2018).

RESULTS AND DISCUSSIONS

Table 1. Descriptive statistic

Variable	Mean	Std. Dev	Min	Company	Max	Company
ROA	0,0965	0,1037	-0,049	PT Indosat Tbk	0,921	PT Merck Tbk
ROE	0,1445	0,2042	-0,208	PT Ricky Putra Globalindo Tbk	2,245	PT Merck Tbk
MBV	3,1366	5,0751	0,039	PT Kalbe Farma Tbk	40,563	PT Indofarma Tbk
HCE	3,0233	2,4275	0,913	PT Indofarma Tbk	14,252	PT Indosat Tbk
SCE	0,5471	0,1942	-0,095	PT Indofarma Tbk	0,930	PT Indosat Tbk
CEE	0,5102	0,1992	0,168	PT Indocement Tunggal Prakasa Tbk	1,320	PT Hanjaya Mandala Sampoerna Tbk

Table 1 shows the descriptive statistics result for all the variables tested. For the dependent variable, the average ROA is 0.096, ROE is 0.144 and MBV is 3.136. The lowest value for ROA is reported by PT Indosat Tbk in 2013 because the company was modernizing the equipment on a large scale and providing many price discounts to maintain customer loyalty during the modernization period and the highest is owned by PT Merck Tbk in 2018 due to an increase in net profit caused by the sale of some business segments.

For ROE, the lowest value is owned by PT Ricky Putra Globalindo Tbk in 2020 which experienced a decrease in profit due to a decrease in sales because of the large-scale Social Restrictions policy, while the highest value is owned by PT Merck Tbk in 2018 due to an increase in net profit caused by the sale of some business segments. For MBV, the lowest value is owned by PT Kalbe Farma Tbk in 2011 while the highest is owned by PT Indofarma Tbk in 2018. Based on the

annual report, PT Indofarma Tbk experienced a higher share price increase during 2018 reaching 300%. Overall, pharmaceutical companies dominate the maximum value for the independent variables tested for both financial performance and stock performance.

For VAIC component, the average HCE is 3.023, the SCE is 0.54 and the CEE is 0.510. The lowest score for HCE is owned by PT Indofarma Tbk in 2013 and the highest is owned by PT Indosat Tbk in 2011. For SCE the lowest score is owned by PT Indofarma Tbk in 2013 while the highest score is owned by PT Indosat Tbk in 2011. For CEE the lowest value is owned by PT Indocement Tunggal Prakasa Tbk in 2018 while the highest is owned by PT Hanjaya Mandala Sampoerna Tbk in 2014.

Table 2. Panel data model test

VAIC	ROA	ROE	MBV
	Prob	Prob	Prob
Chow Test	0,0000	0,0000	0,0000
LM Test	0,0000	0,0002	0,0000
Hausman Test	0,0000	0,0001	0,9267
Chosen Model	FEM	FEM	REM

According to Table 2, the appropriate data panel regression model for ROA and ROE is FEM. For MBV the appropriate data panel regression model is REM.

Table 3. VAIC Model Regression

VAIC	ROA		ROE		MBV	
	Coefficient	P-Value	Coefficient	P-Value	Coefficient	P-Value
HCE	0,014	0,015*	0,027	0,001*	0,223	0,513
SCE	0,223	0,051	0,057	0,785	-3,133	0,471
CEE	0,032	0,603	0,206	0,309	0,921	0,696
Constant	-0,085		-0,074		3,656	
F Prob	0,000		0,000		0,874	
Adj R^2	0,142		0,057		0,026	

From the results of the regression test using VAIC in table 3, it was found that the regression model with the dependent variables ROA and ROE showed a significant F test value (<5%) which indicated that the regression model could be used to predict the effect of the VAIC component on performance as proxied by ROA and ROE. Of all the components of VAIC, only HCE has a significant positive effect on company performance as proxied by ROA and ROE. As for MBV none of VAIC components has significant impact on MBV.

CONCLUSION

Based on the regression results, only H1a and H2a are supported. Human Capital is the only component that has significant impact on performance. Most of the accepted hypotheses relate to the human resource component, these results indicate that human resources become an important role that should be seriously managed by the company (Elrehail et al., 2020; Maditinos et al., 2011; Mariz-Perez et al., 2012; Ousama & Fatima, 2015). HCE is the only components of VAIC that have a significant impact on financial performance. These findings indicate that human resources are a component that plays an important role in shaping IC.

For the dependent variable MBV, it can be seen from the regression results that VAIC components don not have significant impact. This is contrary to the research of Soewarno & Tjahjadi, (2020), Nimtrakoon, (2015) and Wang, (2011), This phenomenon is closely related to the character of capital market players in Indonesia who tend to prefer to rely on technical analysis based on price trends and news rather than company fundamentals itself (Bayu et al., 2014; Sappar, 2015). In addition, the motivation of capital market participants who want to get capital gains in a short time causes them to dislike financial statement analysis because they are considered unable to provide information quickly to respond to price changes (Alamsyah & Sarra, 2019). In terms of regression results VAIC models is not suitable to be used as models to explain the stock value captured by the market as proxied by MBV.

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