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Building firm value and financial performance through intellectual capital: the indonesia stock exchange's experience

Muhammad Madyan
Faculty of Economics and Business, Airlangga University

Iksan Abdi Nugraha
Faculty of Economics and Business, Airlangga University

Wisudanto Wisudanto
Faculty of Economic and Business, Airlangga University

Rahmat Setiawan
Faculty of Economics and Business, Airlangga University

Novian Abdi Firdausi
Faculty of Economics and Business, Airlangga University

Abstract

This study aims to assess the effect of intellectual capital and its components on firm value and financial performance. Using sample firms on each sectors in the Indonesian Stock Exchange within 2014-2018 time period, intellectual capital is measured through VAIC™ and its components which are capital employed efficiency (CEE), human capital efficiency (HCE), and structural capital efficiency (SCE). While firm value and financial performance is measured through market-to-book value (MBV) and return on equity (ROE) respectively. Results of the study indicate that VAIC™ alone has a significant positive effect on MBV and ROE. CEE and HCE also have a positive significant effect on both MBV and ROE, but SCE has an insignificant but mixed effect with negative effect on MBV and positive effect on ROE. This result may be attributed to bad business cycle and major financial restatements within study period. Control variables such as firm size and leverage both have a positive effects with firm size has a significant effect while leverage is insignificant to firm value and financial performance.

1. Introduction

One of the steps that can be taken by a firm to maximize firm value is by owning intellectual capital, disclosing intellectual capital, and performing good financial management. Intellectual capital represents the existing knowledge within an organization at a particular time (Subaida et al, 2018). Intangibles are usually not reported in traditional managerial and financial reporting, firms are also not obliged to report these intricate details, including intellectual capital. However, intellectual capital disclosure provides valuable information for investors, reducing the firm's future prospect uncertainty and facilitating firm valuation (Bukh, 2003). On the other side, firms made financial reports as simple and informative as possible to provide easier analysis, giving broader viewpoints and promoting quick investing decisions.

Barney (2000) postulated that intellectual capital could be utilized to gain a competitive advantage and improving financial performance as more freely available capital in the intangible economy affects the entire world, especially for firms located in developing countries. Intellectual capital also has the advantage of creating value when faced with constant change (Stahle & Hong, 2002). Previous studies assessed the effects of intellectual capital in several countries, such as China (Xu & Wang, 2018), Nigeria (Anifowose et al, 2018), Brazil (Camfield et al, 2018), Malaysia (Poh et al, 2018; Noradiva et al, 2016), and Baltic states (Berzkalne & Zelgalve, 2014). All of the studies' results inferred that intellectual capital affects financial performance and firm value.

Furthermore, The Intellectual Capital Rank 2019, a part of the Global Sustainable Competitiveness Index formulated by SolAbility (a non-commercial third party Swiss-Korean joint venture), Indonesia was ranked 61st out of 180 countries with the overall score of 41.1, from the highest available score of 72.9 and the lowest 8.7. A higher score in this ranking infers the likelihood of a country to develop or sustain its economy, thus achieving a higher probability of economic growth than other countries.

Chen et al (2005) implied the virtue in assessing the role of intellectual capital in emerging economies as different technological progress in emerging economies may have different implications for intellectual capital in creating firm value and enhancing financial performance. In the case of the Indonesia Stock Exchange, several prior studies from Ardila & Christiana (2019), Mulyasari & Murwaningsari (2019), Subaida et al (2018), Utami (2018), Khairiyansyah & Vebtasvili (2018), and Irawanto et al (2017) also studied intellectual capital in Indonesia Stock Exchange but having mixed results and scopes, while some studies also only assessed a sector or industry.

Aside from macroeconomic factors, intrinsic firm factors such as intangible assets, mainly intellectual capital, are not utilized enough to fulfill the informational need of stakeholders. So this study was motivated by the intrigue to reassess the effect of intellectual capital and its components on firm value and financial performance. This study contributes to the literature of financial management and intellectual capital through assessing both intellectual capital variable and each of its components, while also using samples in every sector to achieve better explanations as intellectual capitals still offer opportunities to venture further into, especially in Indonesia.

2. Literature Review

2.1. Intellectual Capital

Intellectual capital and knowledge assets are difficult to discern and quantify, the results will be reflected in the greater value of firm productivity, efficiency, and aggregate profitability. Intellectual capital includes a set of hidden values of capital, assets, or resources that tend to add real value to an organization, hence allowing its continuity and better organizational performance (Clarke et al, 2011). Clarke et al (2011) showed that intellectual capital buffs employee productivity and firm value, which measured by return on assets and

return on equity. Saleh et al (2009) found that an increase in intellectual capital is directly proportional to an increase in firm performance. Camfield et al (2018) also gave a premise that intellectual capital could be represented with brands, trademarks, patents, and knowledge.

One of the most widely used methods and measurements on intellectual capital is the Value Added Intellectual Coefficient (VAIC™) which was devised by Pulic (2004, 2000). VAIC™ aims to calculate the ability of a firm to produce added values based on its resources and efficiency (Berzkalne & Zelgalve, 2014; Stahle et al, 2011). VAIC™ is easy to calculate, standardized, and consistent basis of measure. It enables an effective comparative analysis across firms and countries, could also be used to measure the impact of intellectual capital performance (Noradiva et al, 2016; Firer & Williams, 2003).

Hypothesis 1. Intellectual capital has a positive effect on financial performance.
Hypothesis 2. Intellectual capital has a positive effect on firm value.

2.2. Main Components of Intellectual Capital

Pulic (2000, 2004) explained the measurement inside the VAIC™ is the summation of three components, which are human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE).

SCE emphasizes the importance of the firm's structure which encloses production procedures, managerial instruments, information systems, and administrative policy to innovate and develop products and services. In the long-term, it may increase the firm's competitive performance in conquering new markets (Jordão & Almeida, 2017). In other words, SCE is the structures and processes utilized by employees to be productive, effective, and innovative (Boujelbene & Affes, 2013).

Intellectual capital has a goal in assessing human capital's importance, taking into account their characteristics, capabilities, and competencies in problem-solving and making decisions (Jordão & Almeida, 2017). HCE also portrays the knowledge, professional skills, experiences, educations, innovativeness, and inherent employee capabilities within an organization (Agostini et al, 2017; Boujelbene & Affes, 2013).

Pulic (2000) stated that firms' market value is created by intellectual capital and capital employed. CEE calculates the ratio of new value creation by one unit of investment in the capital employed (Berzkalne & Zelgalve, 2014), thus becoming one of the major interpreters in firms' financial performance (Chu et al, 2011). CEE also depicts a firm's net worth, representing the physical and financial capital strength of a firm (Pal & Soriya, 2012).

Hypothesis 3. HCE, SCE, and CEE have positive effects on financial performance
Hypothesis 4. HCE, SCE, and CEE have positive effects on firm value

3. Methodology

The sample in this study was chosen through purposive sampling method on listed firms in the Indonesian Stock Exchange spanning from 2014 to 2018 through several criteria. The first is consistently listed within the study period, the second is periodically expose annual financial reports with Rupiah as currency, the third is consistently having positive equity, and the fourth is consistently having profits. The third and fourth criteria are based on the logic that positive cash flow may be allocated into different or even in the less prominent kinds of investments, firms that have negative cash flow will prioritize their leverage solvency and may put some intellectual capital flow to be on hold, as implied in Anifowose et al (2018).

<div align="center">**Table 1. Variables Summary**</div>

Variables	Definitions and Measurements
Dependent Variables	
Financial Performance (FP)	Revealing how much profit a company generates with the money shareholders have invested (Pal and Soriya, 2012). Measured using Return on Equity (ROE) (Amri & Abdoli, 2012; Pal & Soriya, 2012; Phusavat et al, 2011; and Calisir et al, 2010). $$ROE = \frac{Net\ Income}{Total\ Equity} \qquad (1)$$
Firm Value (FV)	Firm value could be seen both from the firm's book and market values (Chen et al, 2005; Koller et al., 2010). Measured using Market-to-book Value (MBV) Pal & Soriya (2012) and Kharal et al (2014). $$MBV = \frac{Outstanding\ shares\ \times\ share\ price}{Book\ value\ of\ stockholders'\ equity} \qquad (2)$$
Independent Variables	
Value Added Intellectual Capital (VAIC™)	Based on Pulic (2000), VAIC™ is a composite sum of three separate indicators of Value Added (VA) efficiency of capital employed (CEE), human capital (HCE), and structural capital (SCE) (Firer and Williams, 2003). $$VAIC™ = CEE + HCE + SCE \qquad (3)$$
VAIC™ components	Value Added (VA) calculated using the subtractive method from Riahi-Belkaoui (2003), expressing the output and value-added creation of involved parties in the production team. $$VA = S - B - DP \qquad (4)$$ Where S: Sales revenue, B: Bought-in materials and services, DP: Depreciation.
	CEE calculated by dividing VA with capital employed (CE) $$CEE = \frac{VA}{CE} \qquad (5)$$ CE represents the book value of firm net assets, calculated with the book value of net total assets. $$CE = Total\ Assets - Intangible\ Assets \qquad (6)$$
	HCE calculated by dividing VA with human capital (HC) expenditures, in this term, is wage and employee expenses. $$HCE = \frac{VA}{HC} \qquad (7)$$
	SCE calculated by dividing VA with structural capital (SC) $$SCE = \frac{VA}{SC} \qquad (8)$$ SC indicates the utilization of knowledge that belongs to the organization as a whole. $$SC = VA - HC \qquad (9)$$

Firer & Williams (2003), Pal & Soriya (2012), and Mulyasari & Murwaningsari (2019) recommendations to exclude firms that have had negative value on human and structural capital in VAIC™ calculations resulting in 14 firms in every nine sectors in Indonesia Stock Exchange are adequate to be analyzed. The small number of selected samples was due to the agriculture sector only has 20 firms as of December 2018, and only 14 firms fulfill the study criteria. On

the rest eight sectors, sample firms were picked randomly, amounting to 126 firms and 630 observations, the firm population data was taken from IDX Annual Statistics from 2014 to 2018.

Table 2. Sample Distribution

Sector	Firm Population	Sample Coverage
Agriculture	20	70%
Mining	47	30%
Basic Industry and Chemicals	69	20%
Miscellaneous Industry	46	30%
Consumer Goods Industry	48	30%
Property, Real Estate and Building Construction	73	19%
Infrastructure, Utilities, and Transportation	70	20%
Finance	91	15%
Trade, Service, and Investment	153	9%
Total	617	20%

Calisir et al (2010) and Firer & Williams (2003) study introduced control variables such as firm size and leverage to reduce any biases of the financing and size of the firms on the outcome of the estimate. It is apparent with Berzkalne & Zelgalve (2014) conclusion of not controlling the amount and the period of firm's liability may have a major effect, inflating the value of firm value and VAIC hence puzzling the regression result. To summarize, the first control variable is firm size (SIZE) which measured by the natural logarithm of book value divided by total assets. The second is leverage (LEV) which is calculated by the debt-to-total asset ratio. Regression models are summarized as follows:

$$FV = \alpha + \beta_1 VAIC + \beta_2 SIZE + \beta_3 LEV + \varepsilon \tag{10}$$
$$FP = \alpha + \beta_1 VAIC + \beta_2 SIZE + \beta_3 LEV + \varepsilon \tag{11}$$
$$FV = \alpha + \beta_1 CEE + \beta_2 HCE + \beta_3 SCE + \beta_4 SIZE + \beta_5 LEV + \varepsilon \tag{12}$$
$$FP = \alpha + \beta_1 CEE + \beta_2 HCE + \beta_3 SCE + \beta_4 SIZE + \beta_5 LEV + \varepsilon \tag{13}$$

4. Results and Discussions

Table 3. Descriptive Statistics

Variable	Minimum	Maximum	Mean	Std. Deviation
FV	0.123	16.128	2.297	2.203
FP	-0.814	0.908	0.117	0.131
VAIC	0.736	18.963	6.068	3.716
CEE	-0.054	2.033	0.195	0.217
HCE	0.164	17.766	5.164	3.557
SCE	0.061	1.374	0.709	0.195
SIZE	24.223	34.084	30.007	1.942
LEV	0.021	0.937	0.514	0.22
Valid N		630		

The mean of firm value implied that firms in Indonesia Stock Exchange are over appreciated two times more than its' book value, but only several firms have had enjoyed this, proven with the high standard deviation and the min-max value. Looking through the components of VAIC™, the human capital efficiency is the best value-added aspect, inferring

that several firms are efficient enough to employ minimal human capital expense in return to its huge market operation and value-added output.

According to Anifowose et al (2018), using panel data regression may result in a better and robust model in explaining intellectual capital, and so as a prerequisite, the Hausman test is used to find the best estimation. Prior to this, the result from Levin, Lin, and Chu test on all models rejected the hypothesis of having unit root. The result in Table 6 summarized that fixed effect is the best estimation for all study models.

Overall, Table 4 and Table 5 show all of the Spearman rank-order correlations value between explanatory variables are under 0.8, proving no problems on multicollinearity on explaining intellectual capital correlations (Pal & Soriya, 2012; Anifowose et al, 2018). VAIC is correlated positively to MBV and ROE, suggesting that intellectual capital and its components (SCE, HCE, and CEE) as a whole, are able to boost firm value and financial performance.

Table 4. Correlation Matrix on Firm Value

	MBV	VAIC	CEE	HCE	SCE	SIZE	LEV
MBV	1.000						
VAIC	0.145*	1.000					
CEE	0.31*	0.316*	1.000				
HCE	0.152*	0.352*	0.246*	1.000			
SCE	0.108*	0.375*	0.257*	0.424*	1.000		
SIZE	0.507*	-0.042	-0.086	-0.032	-0.048	1.000	
LEV	-0.03	-0.23*	-0.4*	-0.202*	-0.22*	-0.008	1.000

* denotes significance at 5%.

Table 5. Correlation Matrix on Financial Performance

	ROE	VAIC	CEE	HCE	SCE	SIZE	LEV
ROE	1.000						
VAIC	0.346*	1.000					
CEE	0.315*	0.317*	1.000				
HCE	0.331*	0.359*	0.265*	1.000			
SCE	0.329*	0.355*	0.286*	0.473*	1.000		
SIZE	0.341*	-0.042	-0.098	-0.04	-0.005	1.000	
LEV	-0.034	-0.23*	-0.397*	-0.201*	-0.219*	-0.007	1.000

* denotes significance at 5%

In addition, firm size is not significantly correlated with VAIC and its components but correlated with the dependent variables. On the contrary, leverage is correlated with VAIC and its components while not significantly correlated to dependent variables, both leverage and firm size are also not correlated with each other. These interactions prove the importance of control variables in assisting study model assessments.

Structural capital efficiency (SCE) does not have a significant effect on firm performance and value, while the other components (HCE and CEE) have significant effects. Meaning that firms were not constrained with the efficiency of structural capitals to boost financial performance and firm value. The R^2 values imply that assessing intellectual capital through VAIC™ as a standalone variable was not enough to have the predictive power on both firm value and financial performance, but VAIC™ broken down through its components have almost fifty percent predictive power on both estimations. In summary, assessing intellectual capital should not omit the specific components forming the main variable (VAIC™), because there exists a high probability that one of the components do not contribute enough to VAIC™

and being covered by other components, supporting Chen et al (2005) that using aggregated value is not preferable to assess intellectual capital.

Table 6. Fixed Effect Regression Results

	FV		FP	
Constant	-14.251**	-15.292**	-0.799**	-0.847**
	(0.000)	(0.000)	(0.000)	(0.000)
VAIC	0.179**		0.014**	
	(0.003)		(0.000)	
CEE		2.042**		0.102**
		(0.000)		(0.000)
HCE		0.117**		0.012**
		(0.002)		(0.000)
SCE		-1.213		0.045
		(0.714)		(0.518)
SIZE	0.544**	0.561**	0.029**	0.027**
	(0.000)	(0.000)	(0.000)	(0.000)
LEV	0.039	0.458	0.044	0.066
	(0.266)	(0.286)	(0.094)	(0.249)
Hausman Test χ^2	11.259*	21.573*	12.879*	22.652*
Adjusted R^2	0.24	0.47	0.3	0.48

* and ** denotes significance at 5% and 1% respectively.

VAIC variable has a positive effect on firm value and financial performance as empirically tested in Table 6, confirming the first and second study hypothesis. This result distinguishes Indonesia Stock Market as a stock market in which intellectual capital (calculated with VAIC™) is able to boost individual firms' MBV, even though the VAIC coefficient is weaker than control variables. One of the main problems in assessing intellectual capital effect is the low awareness of both investors and firm managers, added with the ineptitude in reading and interpreting intellectual capital (Subaida et al, 2018; Mulyasari & Murwaningsari, 2019). Generally, it could be inferred that the Indonesia Stock Market is improving over time in appreciating the existence of intellectual capital. The study result helps to fill the gap on financial perspectives in Indonesia, with the newer empirical result, confirming VAIC has a positive effect on ROE.

Looking through VAIC™ three components, which are CEE, HCE, and SCE, both CEE and HCE have a significant and positive effect on both MBV and ROE, this result confirms prior studies such as Anifowose et al (2018), Maditinos et al (2011), and Chen et al (2005). Barasa et al. (2019) also posited that firms in developing countries are likely to realize efficiency gains by developing workers in human capital programs and employing foreign technologies for production to increase firm revenue and performance.

The insignificant effect of SCE implies that firms may not be constrained in employing capital, mainly structural capital, to sustain firm value in the stock market. Efficiency wise, Indonesian firms were presumably have not considered the efficiency of structural capital yet, several firms are identified as having had policy changes in the structural capital budget, resulting in mixed deviations as some were making improvement in SCE ratio in a year or two and then deteriorate as time period goes, and vice versa. This is one of the aspects in driving SCE to have an insignificant effect.

Several firms have had difficult business cycle within the study period, and a major revision in Indonesian accounting standard (PSAK) in 2015 made lots of financial statements getting restated, the consequence is the major change in value and the adaptation time lag in applying financial statement reform, but this reform also resulted in a much more detailed financial statement and increasing the level of financial disclosure to stakeholders. Control variables firm size has a significant positive result with both firm value and financial performance. Adversely, leverage has an insignificant effect on both firm value and financial performance.

5. Conclusion

Study result bolsters the confidence that intellectual capital and its components can be utilized to increase firm valuation in terms of its financial performance and firm value, intellectual capital depicts the needed efficiency and evaluation to generate profits intangibly, as intangibles are usually tricky to be measured. Using Indonesia Stock Exchange as an exhibit to assess intellectual capital may open a new perspective to the developing countries' economy. Intellectual capital components such as capital employed efficiency (CEE) and human capital efficiency (HCE) have proven to positively affect firm value and financial performance significantly, yet structural capital efficiency has an insignificant effect. This result infers that structural capital efficiency has not been taken into consideration and/or captured conceptually by stakeholders.

It is recommended that intellectual capital valuation is incorporated in the traditional financial valuation, broadening stakeholders' horizons in how firms can increase profits effectively, thus resulted in boosting investors' confidence. Intellectual capital may also be disclosed with more sophisticated and intricate details, just like how sustainability reports are formed and usually reported as a standalone report, split but integral from the main annual report, with several additions on intellectual capital viewpoint using the same base value from firm's financial reports. Especially in emerging countries like Indonesia where the regulatory bodies are supportive of innovations in investments.

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