

Revisiting the Role of Intellectual Capital on Firms' Performance: Indonesian Evidence

F. Nancy, D. Sulistiawan & F.A. Rudiawarni

The University of Surabaya, Surabaya, Indonesia

ABSTRACT: The purpose of this study is to revisit the effect of intellectual capital on firms' performance. This study develops previous researches by measuring firm performance from various dimensions. Further analysis is performed by dividing the sample based on firm size. Using Indonesian data, the results provide evidence that intellectual capital has a positive effect on firm performance. Human capital efficiencies as an element of intellectual capital, also positively affect current and future performance. The authors also find that smaller firms receive more benefits than bigger ones in improving performance by investing more in intellectual capital. Our study contributes to the study of intellectual capital, especially in emerging markets.

Keywords: Intellectual capital, firms' performance, human capital efficiencies.

1 INTRODUCTION

1.1 The success of a business now depends not only on the use of tangible assets but also on the company's ability to apply knowledge as intangible assets. Although these assets do not appear in the financial statements, the assets have far added value compared to physical assets. By managing knowledge appropriately, companies can find ways to survive. The knowledge that is owned or created by human resources owned by the company affect the ability of firms to survive and compete.

It is believed that most company's assets in the 20th century are the company's production equipment itself. However, now, knowledge and productivity of human resources provide a high probability of achieving firms' targets. The report of Ocean Tomo Research discusses the importance of intangible assets in the era of the knowledge economy. Companies begin to shift their attention from labor-intensive principles to the empowerment of knowledge. Workers are one of the intangible assets or intellectual capital to enhance productivity accompanied by technological advances so that the principles of efficiency and effectiveness in the company are also achieved.

In the era of intellectual capital, the level of intangible value in Asian companies has tended to grow even though it has been relatively stable over the past 15 years (2001-2015). However, Indonesia, as part of Asian countries, still relies more on tangibles. Based on the perspective of changes in total intangibles assets from 2012-2016, Indonesia has changed by 50%. However, the level of disclosed value is still small, namely below 25%. Thus, companies in Indonesia are now starting to run a knowledge-based business or knowledge economy to support economic growth through intellectual capital management.

The main objective of a knowledge economy is to create added value. Therefore, the success of a business now depends on the value-added derived from the company's value creation. Value creation is created when the results of value creation are more significant than the resources invested (Jelčić 2007). The aspect of efficiency in creating added value for the company is equally important. Although intellectual capital items usually recognized as an expense, we believe those items can boost the firms' performance.

Intellectual capital is a group of knowledge assets that have a contribution to add value to stakeholders

in a company (Marr, Schiuma & Neely 2004). Based on different point-of-view, Jelčić (2007) stated that intellectual capital is the intangible assets of companies that have a significant influence on company performance and overall business success even though explicitly not in the balance sheet, if any, only in the context of goodwill (Jelčić 2007). The value of firms' assets includes not only physical and financial capital but also intellectual capital.

Every company has knowledge and abilities that can be transformed to create value. By managing intellectual capital, companies can achieve a competitive advantage, increase productivity, and market value (Jelčić 2007). Managing intellectual capital means managing invisible factors, which are the success of the business in the future.

Intellectual capital is divided into two types, namely human capital (HC) and structural capital. Human capital includes all employees composing of individuals and collective knowledge they have gathered, their abilities, attitudes, capacities, behavior, experiences, and emotions (Jelčić 2007). Supposedly, the burden of salaries, training, and various benefits provided by employers are not treated as expenses (expenditure), but rather as an investment because employees have invested their knowledge and abilities for the company.

Structural capital is an infrastructure that supports human resources, which is the result of past human capital activities. Structural capital includes all the intangible factors that remain in the company after employees leave and return home and significantly contribute to business success and performance (Jelčić 2007). So, the company is the owner of structural capital residuals. Although influenced by human capital, structural capital exists objectively and independently of human capital (Chen et al. 2005). For example, patents are created by human capital, but afterward, the patent belongs to the company (Nazari and Herremans 2007). Structural capital comes from organizational processes and values, which reflect the company's external and internal focus, coupled with renewal and development value for the future (Bontis, Chua & Richardson, 2000). A company or organization with substantial structural capital will have a culture that supports each individual to try new things to learn.

The measurement of intellectual capital aims to avoid the failure of managers in making decisions towards the success of a business entity that only relies on financial measurement data. The measurement of intellectual capital to assess the company's intangible assets is well accepted in academia and practice. However, the measurement of intellectual capital is still in the exploratory stage. The involve-

ment of researchers from various scientific disciplines, such as accounting, economics, finance, strategy, human resources, and psychology, has led to the multidimensionality of intellectual capital measurement using various ways to justify the measurement (Nazari and Herremans 2007).

The VAIC model proposed by Pulic (2004) explained that the total value creation efficiency of a company, how human, structural, and physical capital affect the company's performance and value creation. This model is very different from the traditional performance measurement methods. Pulic (2004) uses value-added as an indicator to measure company performance in the context of the knowledge economy. Value added is the difference between output and input. Outputs are net sales revenues, and inputs are all expenses incurred during production or the process of generating sales revenues, without employee expenses because employees are considered as assets that play a role in creating value. In measuring intangibles items, the authors use the methods of Clarke, Seng & Whiting (2011).

VAIC (Value Added Intellectual Coefficient) measures how much new value has been created per monetary unit invested in each resource. The more efficient the capital is used, the more value-added the company has, and the higher the VAIC. According to Dzenopoljac, Yaacoub, Elkanj & Bontis (2017), there are some weaknesses of the VAIC model; the model only uses data from financial statements. The VAIC model only measures the company's operational performance. In addition, the model ignores several vital elements of intellectual capital, such as employee training, human capital (HC) is only based on salaries and other employee-related costs. Besides, there are conceptual inconsistencies with human capital efficiency (HCE) calculations. According to the model, the higher the HC value, the better for the company. However, when calculating HCE, it turns out that a lower HC value is better for HCE because of $HCE = VA/HC$.

The main reason why the VAIC method is still widely used is the simplicity and availability of data. In VAIC's methodological and critical review, Iazzolino and Laise (2013) revealed VAIC, as a measure of performance, is not a rival of traditional methodologies (for example, economic value added (EVA)). These steps can be used to measure various aspects of performance and can complement each other, together with the Balanced Scorecard, Skandia Navigator, or Intangible Asset Monitor.

Investment in intellectual capital is inseparable from the use of physical and financial assets to improve the firm's value. Useful-intellectual capital will boost future performance. Table 1 presents

some previous studies of intellectual capital. The authors complement those researches by predicting the hypothesis; intangibles items affect future performance.

Table 1. Previous Studies: Intellectual capital and firms' performance.

Author(s)	Country	Focus
Firer and Williams (2003)	South Africa	Profitability and market performance
Chen et al. (2005)	Taiwan	Profitability, market performance, productivity
Tan et al. (2007)	Singapore	Profitability and market performance
Zeghal and Maaloul (2010)	Great Britain	Profitability and market performance
Clarke et al. (2011)	Australia	Profitability and productivity
Dzenopoljac et al. (2016)	Serbia	Profitability, earnings, and productivity

2 RESEARCH METHODS

The authors used HCE (Human Capital Efficiency), SCE (Structural Capital Efficiency), CEE (Capital Employed Efficiency), and VAIC (Value Added Intellectual Coefficient) as the independent variables. The formulas used below are based on Clarke et al. (2011). The authors also used research and development expenses as a moderating variable to evaluate the relation between intangible items and performance. Business entities that disclose research and development expense were given a value of 1, and 0 otherwise.

The control variables used were size, leverage, research and development, and industry. Size was measured using the natural logarithm of market capitalization. A large proportion of debt measured leverage reflects that the company is focused on debt holders. The industry was categorized using the dummy variable. The authors used nine industrial sectors, namely agriculture, mining, basic industry and chemicals, miscellaneous industry, consumer goods industry, property, real estate and building construction, infrastructure, utilities and transportation, finance, and trade, services, and investment. The dependent variables are *Return on Assets* (ROA), *Return on Equity* (ROE), *Price to Book Value* (PBV), *Revenue Growth* (RG), *Employee Productivity* (EP). Z multi measurement of performance (P) was used to produce robust results.

$$\begin{aligned}
 P_t = & \alpha + \beta_1 HCE_t + \beta_2 HCE_{t-1} + \beta_3 SCE_t + \beta_4 SCE_{t-1} \\
 & + \beta_5 CEE_t + \beta_6 CEE_{t-1} + \beta_7 RnD \times HCE_{t-1} \\
 & + \beta_8 RnD \times SCE_{t-1} + \beta_9 RnD \times CEE_{t-1} \\
 & + \beta_{10} ControlVariable + \varepsilon_t
 \end{aligned} \quad (1)$$

3 RESULTS AND DISCUSSIONS

There were 1,530 firms-year data from 2014-2016. The authors exclude entities that (1) are not available in Indonesia Stock Exchange, (2) conduct corporate actions, (3) do not publish financial statements that end on December 31, (4) reporting currency is not in Rupiah, (5) have incomplete data to meet the research variable, and (6) have negative equity, negative value-added, and negative structural capital. The final sample consists of 552 firm-year. Descriptive statistics were prepared by the authors but were untabulated.

Table 2. Regression Analysis

Independent Variable	Dependent Variable: ROA					
	All		t		t-1	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
HCE	0.25	<0.01***	0.32	<0.01***		
SCE	8.94	<0.01***	4.45	0.03**		
CEE	1.68	0.23	8.80	<0.01***		
HCE _{t-1}	0.13	0.10*			0.32	<0.01***
SCE _{t-1}	-7.24	<0.01***			-2.51	0.13
CEE _{t-1}	9.55	<0.01***			12.09	<0.01***
RnD x HCE _{t-1}	-0.13	0.31			-0.28	0.16
RnD x SCE _{t-1}	7.84	0.11			9.44	0.08*
RnD x CEE _{t-1}	-4.60	0.12			-6.03	0.07*
Size	0.95	<0.01***	0.99	<0.01***	1.09	<0.01***
Lev	-4.89	<0.01***	-4.97	<0.01***	-5.12	<0.01***
RnD	-4.99	0.10*	-1.20	0.065*	-5.33	0.09*

*, **, ***Significant at level 10%, 5% and 1% respectively

The impact of intellectual capital on performance was examined using a different measure of performance. After testing the data using ROA as the de-

pendent variable, the results are presented in Table 2.

Based on the results in Table 2, it can be seen that almost all elements in the intellectual capital positively affect ROA and future ROA.

Table 3. Regression Analysis for VAIC

Independent Variable	Dependent Variable: ROA					
	All		t		t-1	
	Coef.	Sig.	Coef.	Sig.	Coef.	Sig.
VAIC	0.51	<0.01***	0.56	<0.01***		
VAIC _{t-1}	0.08	0.16			0.43	<0.01***
RnD x VAIC _{t-1}	0.04	0.43			-0.10	0.32
Size	1.07	<0.01***	1.09	<0.01***	1.15	<0.01***
Lev	-4.26	<0.01***	-4.39	<0.01***	-4.52	<0.01***
RnD	-0.99	0.23	-0.84	0.16	-0.52	0.36

*, **, ***Significant at level 10%, 5% and 1% respectively

Table 3 shows that in total, current and future intellectual capital positively affects ROA (current and future), but instead, R&D is not able to directly affect firms' performance.

To improve the robustness of the findings, the authors also used return on equity (ROE), price to book value (PBV), revenue growth (RG), and employee productivity (EP). The results were untabulated.

Human Capital Efficiency (HCE) had a significant positive effect on ROA, RG, and EP. These results support the study of Chen et al. (2005). HCE has a positive effect on EP because human resources in the company are individuals who can transform all their knowledge and skills into the company and provide added value to the company. This positive contribution also caused HCE to have a significant positive effect on the company's revenue growth. Changes in company income with an upward trend causes the company's ROA to increase. The company believes that the contribution of human capital can optimize the rate of return from the company's wealth. Based on the explanation above, it can be concluded that sample firms recognize the importance of human resources. In addition to being supported by an increasingly advanced level of education in Indonesia, employees are given education and training by companies so that employee productivity improves, and employees can become human capital continue to contribute to increasing profitability and company growth.

Structural capital efficiency (SCE) had a positive and significant effect on ROA, ROE, RG, and EP. The results are different from Clarke et al. (2011), who conducted a study on an Australian company. They found that SCE was not significant to all measures of firm performance. Similarly, the research of Chen et al. (2005) showed that SCE has a small, negative, and insignificant effect on ROE and EP. However, Bontis et al. (2000) examined the relationship between structural capital and business performance, and the results are significantly positive in the service industry, but significantly reduced in the non-service industry. In line with the research of Bontis et al. (2000), structural capital acts as supporting infrastructure for human resources so that employee productivity (EP) increases.

Capital Employed Efficiency (CEE) had no significant effect on ROA, ROE, PBV, and RG. Although tangible assets can increase the profitability and business growth of companies in Indonesia, companies are not too dependent on the use of physical and financial capital. No matter how big the company's physical and financial assets, it is not enough to conclude that the company's market performance is good because other factors can affect the company's market performance. Nevertheless, still, the company is aware that tangible assets are also essential to increase.

VAIC is positive and significant to all measurements of company performance (ROA, ROE, RG, and EP). If a company uses intellectual capital more efficiently, it will have an impact on improving company performance (Clarke et al. 2011). VAIC has no significant impact on PBV. This finding indicates that investors do not pay attention to the level of efficiency of the company in using intellectual capital and employed capital. Stockholders are not focused on how companies use the proportion of intangible and tangible assets.

Table 4 and Table 5 below exhibit the regression results when the sample based on their size was split. The result in table 4 shows that human capital and structural capital have a significant influence on firms' performance. Capital employed only has a significant influence on ROA for large-scale firms, but not for small-scale firms. This result shows that a larger firm's size tends to focus more on investing in physical assets in order to increase their performance.

Table 5 exhibits the result for the regression of the VAIC on ROA. The test shows that VAIC as the total Value added of intellectual capital has a significant impact on ROA. The result also depicts that the interaction of R&D and VAIC is significant only for small-scale firms, but it is not for large-scale firms.

This result confirms the result of Table 4 that smaller firms benefit more by investing in intangible assets, especially R&D and intellectual capital, other than physical assets.

Table 4. Regression Analysis for Large and Small Firms – Dependent Variable: ROA

Independent Variables	Large Firms		Small Firms	
	Coef.	Sig.	Coef.	Sig.
HCE	0.3	0.01**	0.41	0.00***
SCE	11.09	0.00***	5.66	.07**
CEE	9.6	0.025**	-0.4	0.44
SCE _{t-1}	0.03	0.4	0.45	0.01**
CEE _{t-1}	-3.56	0.14	-10.89	0.00***
CEE _{t-1}	13.53	0.00**	-1.45	0.31
RnD x HCE _{t-1}	0.2	0.21	4.25	0.1
RnD x SCE _{t-1}	-1.2	0.42	-11.67	0.38
RnD x CEE _{t-1}	-8.33	.002**	-6.87	0.17
Lev	-3.13	0.00***	-4.37	0.00***
RnD	1.61	0.33	-3.91	0.4
Agriculture	-0.5	0.35	-5.97	0.01***
Mining	1.89	0.25	-0.01	0.5
Chemicals	0.51	0.36	0.56	0.4
Miscellaneous	-3.17	0.04**	-0.77	0.29
Consumer goods	0.07	0.48	3.35	0.00***
Property	-0.97	0.19	1.38	0.14
Infrastructure	1.89	0.22	0.51	0.451
Finance	-0.56	0.31	0.59	0.32

*, **, ***Significant at level 10%. 5% and 1% respectively

Table 5. Regression Result for VAIC – dependent variable: ROA

Independent Variables	Large Firms		Small Firms	
	Coef.	Sig.	Coef.	Sig.
VAIC	0.67	0.00***	0.51	0.00***
VAIC _{t-1}	0.10	0.16	0.10	0.25
RnD x VAIC _{t-1}	0.12	0.30	2.06	0.02**
Lev	-1.01	0.27	-4.23	.00***
RnD	-0.67	0.35	-9.07	0.032**
Agriculture	-5.78	0.00***	-5.37	0.02**
Mining	-0.54	0.44	0.68	0.42
Chemicals	-4.58	0.01***	1.72	0.09*
Miscellaneous	-8.50	0.00***	-0.36	0.39
Consumer goods	0.43	0.39	2.89	0.01***
Property	-7.24	0.00***	1.60	0.08*
Infrastructure	-3.42	0.15	0.60	0.44
Finance	-6.88	0.00***	1.44	0.10

*, **, ***Significant at level 10%. 5% and 1% respectively

4 CONCLUSION

This study examined the role of intellectual capital on five dimensions of firms' performance, namely: Return on Assets (ROA), Return on Equity (ROE), revenue growth (RG), employee productivity (EP), and Price to Book Value (PBV). In general, intellectual capital both in total and each element has a positive effect on firms' performance in current and fu-

ture periods, especially the human capital elements. R&D does not have any significant effect on firms' performance. This fact supports the accounting treatment that records R&D expenditures as expenses before they prove their economic benefits in the future. Another finding in this study is that small-scale firms benefit more from investment in intellectual capital compared to large-scale firms, which is the later focused more on tangible assets investment in developing its performance.

There are some challenges for future researches in this area. First, the interaction between earnings management and intellectual property items should be a challenging discussion. Most of the intellectual items are recognized as an expense, while business societies believe those items have a future economic benefit. Second, the measurement of the human capital item is one of the hardest parts in collecting data because the components of human capital items are still incomparable between companies. Third, there are still no regulations for intellectual capital items disclosures for business entities in Indonesia. Evaluating the impact of intellectual capital on performance may be affected by the regulation.

REFERENCES

- Bontis, N., Chua, C.K.W. & Richardson, S. 2000. Intellectual capital and business performance in Malaysian industries. *Journal of intellectual capital* 1(1): 85-100.
- Chen, M.C., Cheng, S.J. & Hwang, Y. 2005. An empirical investigation of the relationship between intellectual capital and firms' market value and financial performance. *Journal of intellectual capital* 6(2): 159-176.
- Clarke, M., Seng, D. & Whiting, R.H. 2011. Intellectual capital and firm performance in Australia. *Journal of Intellectual Capital* 12(4): 505-530.
- Dzenopoljac, V., Yaacoub, C., Elkanj, N., & Bontis, N. 2017. Impact of intellectual capital on corporate performance: evidence from the Arab region. *Journal of Intellectual Capital*, 18(4): 884-903.
- Fire, S., & Mitchell W.S. 2003. Intellectual capital and traditional measures of corporate performance. *Journal of intellectual capital* 4(3): 348-360.
- Iazzolino, G., & Laise, D. 2013. Value added intellectual coefficient (VAIC) A methodological and critical review. *Journal of Intellectual Capital* 14(4): 547-563.
- Jelčić, K. 2007. *Intellectual Capital: Handbook of IC Management in Companies*. Intellectual Capital Center Croatia: Croatia.
- Marr, B., Schiuma, G., & Neely, A. 2004. Intellectual capital—defining key performance indicators for organizational knowledge assets. *Business Process Management Journal*, 10(5): 551-569.
- Nazari, J.A. & Herremans, I.M. 2007. Extended VAIC model: measuring intellectual capital components. *Journal of Intellectual Capital* 8(4): 595-609.
- Pulic, A. 2004. Intellectual capital—does it create or destroy value?. *Measuring business excellence* 8(1): 62-68.

- Tan, P.H., Plowman, D. & Hancock, P. 2007. Intellectual capital and financial returns of companies. *Journal of Intellectual capital* 8(1): 76-95.
- Zeghal, D., & Maaloul, A. 2010. Analysing value added as an indicator of intellectual capital and its consequences on company performance. *Journal of Intellectual capital* 11(1): 39-60.