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MARKET VALUATION OF INTELLECTUAL CAPITAL OF INDONESIAN LISTED FIRMS

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Abstract

This study aims to investigate the impact of intellectual capital (IC) on the market value of Indonesian public listed firms. Further, this study also analyzes the relationship of each of the individual IC elements with the sample firms' market values. The research sample covers all of the Indonesia Stock Exchange (IDX) public listed firms, excluding banking and financial firms. This study observes a total of 829 firm years from 2013 to 2015. The authors employ multiple regression analysis, with market values measured by Tobin's Q) as the dependent variable and intellectual capital efficiency (ICE) and its elements as the independent variable. The findings show that, on average, the ICE of Indonesian listed firms has a weak positive relationship with their market values. Additionally, further analyses find that Human Capital Efficiency (HCE) has the strongest relationship with market value compared to Structural Capital Efficiency (SCE) and Relational Capital Efficiency (RCE). This implies that ICE may improve the Indonesian firms' market value by improving the level of HCE.

INTRODUCTION

Entering the knowledge era, physical assets acquired over time during the industrial age are becoming onerous. The traditional heavy-asset corporations are starting to appear slow-moving, old fashioned, and inflexible, particularly to investors. As a result, companies and other stakeholders increasingly put emphasis on intangible assets (Wind, Beck, and Libert. 2016). The implications of the importance of intangible assets are also highlighted from the research conducted by OceanTomo (2015) who finds that from S&P 500 companies, intangible assets account for 84% of the total asset composition that has been increasing significantly by 68% since 1995. The result of the study implies that firms are trying to continuously innovate by relying on the skills, new technologies, and knowledge of their employees

rather than their physical assets such as machinery. Hence, by realizing all the values of intangible assets, it is expected that companies will have the ability to achieve their value creation components in the business process (Cañibano, Garcia, and Sanchez, 2000).

One of the missing values of intangible assets is intellectual capital (IC). According to Abdullah, Sofian, Bajuri (2015), IC is referred to as a strategic intangible asset that is essential for sustainable company performance. Moreover, IC is very relevant in this age since most products and services in the market today are based on the development of knowledge-based intellectual creations. Hence, the management of knowledge-based assets and its integration into the business process is a fundamental activity of this era. It is then important for a firm to manage its knowledge-based assets from its involvement in a firm's product and services to determine the end result of knowledge transformation process of a firm (Márta, 2014). Thus, other than helping a company achieve its value creation component in the business process, intellectual capital is an important concept for firms as it is related to the current shift in economy.

While current financial reporting standards regulate the recognition of intangible assets such as goodwill and intellectual property—patents, trademarks and copyrights (Deloitte. 2017; International Financial Reporting Standards. 2008), there is no standard regarding the direct recognition of IC in the financial statement, making it unable to reflect every value creation process in a firm. Consequently, firms face difficulty in valuing their IC despite its importance. Cañibano, Garcia, and Sanchez (2000) discuss the consequences of such an issue in which, with a relative lack of IC and other intangible assets in the financial statement, the current financial reports have failed in conveying the value of the firm for shareholders and many other users.

Nevertheless, during the past two decades, it has been generally accepted that IC is able to improve a firm's valuation as investors highly regard firms with high IC (Chen, Cheng, and Hwang. 2005). Empirical studies have also shared the same opinion that IC improves investors' evaluation while reflecting a firm's market competitive value and financial performance (e.g., Zéghal and Maaloul, 2010; Tan, Plowman, and Hancock, 2007; OECD, 2008). Hence, by improving IC in a firm, it is expected that a firm's market value may also improve. Essentially, the importance of IC is highlighted in various studies. Chen, Cheng, and Hwang (2005) and Wang (2008) find that firms with better intellectual capital efficiency (ICE) have higher profitability and revenue growth. Meanwhile, Tseng & Goo (2005) find a significant correlation between IC and market value. Furthermore, Tan, Plowman, and Hancock (2007) provide evidence that the rate of IC growth positively relates with a company's current performance.

Despite the existence of a relationship between IC and firms' value in various countries and economic situations, to the authors' knowledge, there is no research that explores such a relationship in Indonesia. Several empirical studies regarding IC in Indonesia have been conducted. Sihotang and Winata (2008) find a positive trend of IC growth in 2002 to 2004, while Razafindrambinina and Anggreni (2011) show that IC contributes to financial performance with the exception of revenue growth in the consumer goods sector. Meanwhile, Santoso (2011) investigates the influence of IC

usage on the financial performance of banks in Indonesia and finds that the relationship is stronger in the state-owned and private commercial banks than those in the regional development and syariah banks.

Although research into IC is wide-ranging internationally and several empirical studies on IC have already been conducted in Indonesia, less focus has been given to the importance of IC towards all public listed firms in Indonesia. Additionally, the beneficial elements of IC towards market value indicates the rising importance of IC. Hence, this study intends to contribute to the existing literature through an investigation of the relationship between IC efficiency (ICE) and market value of public listed firms in Indonesia.

Using a total sample of 829 firm years from 2013 to 2015, this study provide evidence that, on average, the ICE of Indonesian listed firms has a weak positive relationship with their market values. Breaking down ICE into its three components, further analyses find that human capital efficiency (HCE) has the strongest relationship with market value compared to structural capital efficiency (SCE) and relational capital efficiency (RCE). This implies that ICE is able to improve Indonesian firms' market value by improving their level of HCE.

The remainder of the paper is structured as follows: the next section discusses the theoretical framework and hypothesis development, then it is followed by the research design, findings and discussion, and concluding remarks.

LITERATURE REVIEW

There have been a number of studies examining the impact of IC on market value. Chen, Cheng, and Hwang (2005) use a sample of Taiwanese listed company and employ Value Added of Intellectual Coefficient (VAIC) as a method of measuring IC. They find out that company IC has a positive impact on firm market value and financial performance, such as profitability and revenue growth. Similar findings are also revealed by Wang (2008) who has studied S&P 500 electronic firms. Correspondingly, Tseng and Goo (2005) using three components, which are IC, resource-based view and finance, also discover a significant correlation between IC and market value.

Focusing on Asian firms in the Singaporean market, Tan, Plowman, and Hancock (2007) assess the influence of IC on financial performance. They find that IC is a robust predictor for current and future firm market value. Additionally, they also show that the rate of IC growth is also positively related to a firm's current performance. A study conducted by Nimtrakoon (2015) on 213 technology firms listed on five ASEAN stock exchanges also reports similar results - the author has found a positive relationship between IC and firm market value and financial performance measures (margin and ROA).

Zéghal and Maaloul (2010) report that IC has a positive influence on economic and financial performance. However, different from previous findings, the significant relationship is only visible for high-tech industries. This result is expected, as technology companies, among other companies operating in other industries, usually possess numerous intangible capitals due to the process of designing and developing advanced and innovative products. This implies that the type of industry could be considered as a factor affecting the impact of IC on firm valuation.

However, despite all the positive findings which claim that market value is positively related with IC, Firer and Williams (2003) fail to identify a relationship between VAIC as a measure of IC and profitability as well as productivity in South African firms' market value. Meanwhile, Maditinos, Chatzoudes, Tsairidis, and Theriou (2011) fail to provide evidence of a significant relationship between IC and market and book value ratios. Instead, the authors only find the significant relationship between IC and financial performance in a company. Chan (2009) finds that there is no conclusive evidence between the relationship of IC and three basic measures of performance— ROA, SIZE, DEBT using the VAIC method. The author has used evidence from Hang Seng Index from the Hongkong stock exchange from year 2001 to 2005. Instead, the author finds that psychical capital is highly valued in the market.

This study hypothesizes that the existence of IC in a firm reflects the accumulation of knowledge process by a firm, including personal knowledge possessed by employees, tacit knowledge and established network through interaction (Hsu & Wang, 2012), that can be leveraged to enhance its competitive advantage (Martín-de-Castro, Delgado-Verde, López-Sáez, and Navas-López, 2011). Hence, the more efficient a firm manages its IC, the more likely it levers its competitive advantage that in turn is perceived by the investor as a high value firm.

MATERIALS AND METHODS

Sampling

This study draws a sample from the population of all firms listed in Indonesia from January 2013 to January 2015. A closer inspection reveals that the total population of all public listed firms in Indonesia as of May 1, 2017 reached 525 companies in 2015; 509 companies in 2014; and 486 in 2013. After collecting the financial statements and annual reports, not all companies are usable for the research. Out of the total varied population of all public listed companies from 2015 to 2017, the samples are narrowed down using criteria sets to exclude (i) banking and financial institutions because the nature of the financial statement is substantially different than those of other firms; (ii) delisted firms from 2013 onwards; (iii) firms with financial statements in foreign denominations; (iv) firms that do not have data required to process ICE. For example, the mining sector sometimes does not have selling expenses or marketing expenses that are required to calculate RCE.

Then, in order to get the final sample a filter of three sigma rules is applied, in which the top and bottom 3% of each of the variables analyzed in the study are eliminated. This procedure is conducted to ensure that there are no outliers included in the data, thereby generating more verifiable and dependable results. The derivation of the final sample is presented in Table 1.

Table 1
Final Sample Derivation

All public listed companies from 2013 to 2015	1520
Exclude: Financial institutions	210

Exclude: Companies that are not included in the public listed companies between 2014 and 2015	40
Exclude: Companies that use foreign currency as their financial statement denomination	105
Exclude: Companies that do not have complete data required to process ICE (ex: mining firms sometimes do not have selling expense— required to calculate RCE)	105
Exclude: Companies that do not have financial statements and annual report data in the IDX	120
Total population from 2013 to 2015 including outliers	900
Exclude: Outlier data	71
Total Population from 2013 to 2015 (in firm years)	829

Data Collection and Analysis Method

The ICE and its component (HCE, SCE, RCE) data were gathered from the annual reports collected from the official websites of the companies or from the IDX official website. To calculate Tobin's q as a proxy of a firm's market value, the authors collected data from the IDX website.

To evaluate the importance of IC towards market value, Tobin's q is regressed by independent and some other control variables considered relevant in the literature regarding market value. Based on the theoretical framework there is one proxy for dependent variable (Tobin's q) and one proxy for dependent variable (ICE). In separate studies by Zéghal and Maaloul (2010), Nimtrakoon (2015), and Hejazi, Ghanbari, and Alipour (2016) to determine the controlling variables of market valuation, all studies include elements of size and leverage. Following those studies, this study also employs firm size and leverage as control variables.

While prior studies using VAIC as the measure of IC, this study uses ICE for several reasons. Firstly, ICE captures relational capital, which is not included in VAIC. Therefore, ICE is a more complete measure of IC usage compared to VAIC. Secondly, ICE measures use information from financial statements, which allows for industry comparisons (Nimtrakoon, 2015, and Urbanek, 2016).

Following Nimtrakoon (2015), the main independent variable, ICE, is measured as

$$ICE = HCE + SCE + RCE$$

As mentioned previously, ICE is the total of its three components that are measured as follows:

$$VA = OUT - IN$$

$$HCE = VA / HC$$

$$SCE = SC / VA$$

$$RCE = RC / VA$$

Where VA is the value added of a particular firm; OUT the total revenues; IN the total expenses excluding employee costs. HCE is Human Capital Efficiency; HC is Human Capital, measured by total employee expenditures; SCE is Structural Capital Efficiency; SC is Structural Capital, measured by VA–HC; RC is Relational Capital, measured by marketing expenses; RCE is

Relational Capital Efficiency measured by RC divided by value added; ICE is Intellectual Capital Efficiency.

Following Jones, Miller, and Yeager, (2011), this study measures a firm’s market value by Tobin’s q that is estimated as follows:

$$Tobin's\ q = \frac{MVE + BVL}{BVA}$$

Where MVE is the market value of equity; BVL is the book value of liabilities; and BVA is the book value of assets

To test the hypotheses, two regression equations are developed, as expressed below:

$$Tobin's\ q = \beta_0 + \beta_1\ ICE + \beta_2\ SIZE + \beta_3\ LEV + \varepsilon \dots eq.1$$

Where Tobin’s q is firm’s market value; ICE is Intellectual Capital Efficiency; SIZE is firm size measured by natural log of asset; LEV is firm leverage measured by debt to asset ratio; BVE is firm’s book value of equity, measured by natural log of equity; and ε is the regression estimation error.

Another regression equation is developed to test the impact of individual ICE components on a firm’s market q value, as expressed below:

$$Tobin's\ q = \beta_0 + \beta_1\ HCE + \beta_2\ SCE + \beta_3\ RCE + \beta_4\ SIZE + \beta_5\ LEV + \varepsilon$$

Where, HCE is Human Capital Efficiency; RCE is Relational Capital Efficiency; SCE is Structural Capital Efficiency; other variables follow the description of eq.1.

RESULTS AND DISCUSSIONS

Descriptive Statistics and Univariate Analysis

This section presents the distribution of the research data as well as the univariate analysis to show the correlation of all possible variable pairs. Table 2 presents the descriptive statistics of the data.

Table 2
Descriptive Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Tobin's q	0.02	5.98	1.32	0.97	829
ICE	-9.59	25.27	7.32	4.88	829
HCE	-10.38	24.28	6.31	4.70	829
SCE	-2.30	3.57	0.75	0.31	829
RCE	-0.93	2.54	0.26	0.32	829
Size	24.15	32.74	28.53	1.59	829
Lev	0.01	0.99	0.48	0.23	829

As explained in the *Sampling* section, outliers are defined as the observation that has values greater or lower than 3 standard deviations from the variable means. The treatment applied to the outliers is deletion. The data presented in Table 2 has gone through outlier checks and treatment. Therefore, the data of all variables are seen as normally distributed.

The univariate analysis is conducted, and the result is presented in the Pearson correlation matrix (Table 3).

Table 3
Correlations Matrix

	Tobin's q	ICE	Size	Lev	HCE	SCE
Tobin's q	1.000	.182				
ICE	.182***	1.000				
Size	.058**	.172**	1.000			
Lev	.015	.041	.184**	1.000		
HCE	.186***	.997**	.173**	.030	1.000	
SCE	.046*	.410**	.161**	.115**	.370**	1.000
RCE	.007	.178**	-.078**	.062	.127**	0.178*

Note: * significant at $\alpha = 10\%$, ** significant at $\alpha = 5\%$, *** significant at $\alpha = 1\%$

The univariate analysis shows that ICE and its components have positive correlation coefficients with Tobin's q. The results indicate that the usage of IC as a whole as well as individually is positively and significantly related to firm market value implying that the more efficient the usage of IC within the firms, the higher their market value, and vice versa.

Next are the results of the OLS regression equations presented in Table 4 below. The second column of the table is the analysis result of eq.1, while the third column presents the analysis result of the second regression equation. Column 2 and 3 contains the regression coefficients of each independent variable.

Table 4
Regression Analysis Results

Variable	Tobin's q	Tobin's q
Constant	.583	.685
ICE	.035***	-
HCE	-	.041***
SCE	-	-.112
RCE	-	-.067
Size	.017	.016
Lev	.012	.042
Adj.R-square	0.031	0.128
F-stat	6.227***	5.339***

Note: *** significant at $\alpha = 1\%$

Table 3 shows that both research models are valid; however, the explanatory power of the models can be classified as low (3.15% and 12.8%, respectively). The overall usage of IC, as measured by ICE, positively and

significantly influences firm market value. In the second analysis, only HCE is positively and significantly related to firm value. Other IC components appear to be insignificant.

Although the coefficient of ICE is quite small (0.035), the regression analysis result shows that ICE has a significant positive relationship with firm market value (Tobin's q), which is in line with prior studies (Tseng and James, 2005; Tan et al., 2007 and Chen et al., 2005). This confirms that a firm's IC as a whole is a vital resource that drives market performance for all public listed firms in Indonesia. Furthermore, it can also be determined that the market has a high appraisal value towards firms that are able to efficiently utilize their intangible assets, especially IC, for value added creation. Henceforth, this finding implies that if a firm is able to manage its ICE, it is able to create value added, and reveal the hidden value of firms in the market. In turn, the market responds by putting higher values for the share of the firms, relatively to the book value of the firms.

However, size and leverage are not significant in determining market value. Although the result is not as expected, it is in line with Hejazi, Ghanbari, and Alipour's study (2016) which does not find a significant relationship between size and leverage as control variables on Tobin's.

Next is the discussion of the second regression analysis. The result shows that investors value HCE positively in market value. Investors put higher market value for the firm that manages its human capital more efficiently. As discussed in Chang, Chen & Lai (2008) human capital could be defined as the reference to explicit and tacit knowledge possessed by employees and their ability to generate such knowledge in order to realize the mission of the company. The empirical result of this study implies that the market does acknowledge the high importance of employees' explicit and tacit knowledge as the source of added value creation within Indonesian firms.

The results, however, do not provide support for the impact of RCE and SCE on firm market value. The result is not as expected since RCE is referred to as customer capital or the company's sources of ongoing established relationship by interaction between the company and the individual that may benefit the former in the future (Kostova & Roth, 2003). However, the established relationship is external to the firms, or could be perceived as uncontrollable by the management. Therefore, the market is not sure of its sustained impact on the firm's added value creation. It is shown by the negative and insignificant coefficient of RCE in Table 4.

The hypothesis test for SCE is also not able to reject the null hypothesis. A negative and insignificant coefficient of SCE implies that there is no influence of how firms manage their structural capital on market pricing decision. According to Bontis (1998), structural capital refers to the knowledge embedded within the routines of an organization that influence the life of the organization. Structural capital is possessed and managed by the firm, thus making it easier to be controlled by the company. However, Johnson (1999) claims that structural capital allows for the creation of wealth through the transformation of the work of human capital. This leads to the explanation of the significance of HCE and the insignificance of SCE. The investors of the Indonesian market might include their valuation of SCE on HCE. However, further test is required to establish a valid conclusion.

CONCLUSIONS

This study examines the role of Intellectual Capital Efficiency (ICE) on firm added value creation that in turn influences firm market valuation. Using a sample of 829 firm years in the IDX from 2013 to 2015, this study provides support to ICE being positively and significantly related to market value among Indonesia listed firms. This study explains that although information on ICE cannot be directly obtained by investors, it is strongly perceived as valuable intangible assets by the market. The ICE reflects the efficiency of IC management. The result implies that firms which manage their IC in more efficient ways will be valued higher in the market.

This study also finds that of the three components of ICE, only HCE is relevant for the investors in the IDX. The Indonesian market relates IC closely to human capital - the existing and tacit knowledge of a firm's employees. The more efficient firms manage their employees' knowledge, the higher their market value. The RCE is not found to be relevant, as it is perceived as an uncontrollable capital for the firms. Meanwhile, the insignificance of SCE might be caused by investors' perception which is distorted by HCE as argued by Johnson (1999).

This study suggests that the industry might play an important role in the level of perception of ICE and its components. For future research, therefore, it is suggested that industry sectors be included as a moderating variable. Another suggestion is to conduct a partial industry analysis of the relationship between IC and firm market value.

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