

# Intellectual Capital Disclosure, Information Asymmetry, Cost of Capital, and Firm Value: Empirical Studies on Indonesian Manufacturers

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## Abstract

Signaling theory suggests that when high-quality entities signal their potentials such as intellectual capital to the market, its participants (e.g., investors) re-evaluate their worth and make informed decisions therefrom. This paper examines the consequences of intellectual capital disclosures with respect to firm value, information asymmetry, and cost of capital. Voluntary intellectual capital disclosure (ICD, measured in index) affects firm value (FV, measured in Tobin's Q) through reducing both information asymmetry (IA, measured in bid-ask spread) and cost of capital (COC, measured in weighted average cost of capital). 67 Indonesian manufacturers were purposively selected whose financial reports published in Indonesian Stock Exchange official website and Bloomberg provide the data for the research. A research model is estimated to the data through a partial least square analysis. Results provides substantial evidence on the positive effect of ICD on FV and negative effect on IA; negative effect of IA on FV; negative effect of COC on FV; and positive effect of IA on COC. On a separate analysis, IA is shown to significantly mediate the relationship between ICD and FV.

**Keywords:** Intellectual capital disclosure, information asymmetry, cost of capital, firm value.

## 1. Introduction

There is a leapfrog increase in the market capitalization of global companies over the years. Price-waterhouseCoopers (2017) reports that, between 2009 and 2017 alone, the capital market consistently puts a higher value on shareholder equity (i.e., market value) than the value appearing on corporate balance sheet (i.e., the book value). The difference between market and book value is the portion of intangible assets often undisclosed under the traditional financial reporting (Brennan & Connell, 2000; Hulten & Hao, 2008; Iranmahd, Moeinaddin, Shahmoradi & Heyrani, 2014; Rieg & Vanini, 2015; Ferchichi & Paturel, 2013; Boujelbene & Affes, 2013; Anifowose, Abdrashud & Annuar, 2016; Dashti, Aleemi & Tariq, 2016; Brand Finance Institute, 2017). Indonesia is among many nations reported to have approximately half of its firms' intangible assets remain undisclosed (Brand Finance Institute, 2015). Given that intellectual capital determines a firm's future wealth creation, its [voluntary] disclosure in the annual report communicate the firm's superior value to the capital market (Whiting & Miller, 2008; Haji & Anifowose, 2017).

Previous studies have only partially investigated the consequences of intellectual capital disclosure (ICD hereafter). For instance, scholars examined the effect of ICD on firm value (FV hereafter) (e.g., Orens et al., 2009; Ferchihi & Paturel, 2013), infor-

mation asymmetry (IA hereafter) (Anifowose et al., 2016; Cormier, Aerts, Ledoux & Magnan, 2009), and cost of capital (COC hereafter) (Boujelbene & Affes, 2013; Anifowose et al., 2016). An integrated research framework comprising of these four focal issues have yet received a proper attention in the literature. Specifically, past studies have yet to examine the effect of ICD on FV with IA and COC as the key mediating processes. This study aims to close this gap by investigating the impact of firms' disclosure on their intangible information in reducing the information asymmetry and lowering the cost of capital, resulting ultimately in an increased firm value. With respect to the era of knowledge-based economy, it provides a valuable insight into the importance of intangible assets to firm valuation, a topic of investigation lacking in studies in both the accounting and finance literature (Boujelbene & Affes, 2013).

## 2. Literature Review

Abeysekera and Guthrie (2002) define ICD as a disclosure made by an organization about its intellectual capital aimed to meet users' need for information not commonly found in the traditional reporting framework. Intellectual capital disclosure comprises of three major components namely human capital, structural capital and relational capital (Cabrita & Vaz, 2006; Benevene & Cortini, 2010;

Boujelbene & Affes, 2013). ICD is valuable to the extent that it affects investors' behaviors in their decision-making (Alfraih, 2017; Dashti et al., 2016; Williams, 2001; Anifowose et al., 2016; Salehi, Rostami & Hesari, 2014; Ferchichi & Paturel, 2013).

Signaling theory proposes that when a firm signals its potentials to the market, investors will re-evaluate and [hence] make a more favorable decision on its value (Whiting & Miller, 2008). The era of knowledge-based economy acknowledges firms' intellectual capital as the essential foundation for firms' future success (Williams, 2001), which is used to create and apply knowledge within the firms, thereby enhancing their value (Cabrita & Vaz, 2006). Extensively, intellectual capital disclosure forms a relative chunk of voluntary disclosures that places the firm in proper perspective for investors and other stakeholders (Asare, Onumah & Simpson, 2013). Thus, a major premise is that organizations disclose intellectual capital to improve transparency, legitimize status and enhance reputation (Oliveira, Rodrigues & Craig, 2006). The transparency leads to the increase of firm value since it appeals market to have a better image of an organization through the intellectual capital information released (Leuz & Verrecchia, 2000). In the financial market, intellectual capital is one of the most important information that explains the increasing firm value. When disclosed, it increases investors' and creditors' interests therefore their confidence in investment decisions (Ferchichi & Paturel, 2013; Williams, 2001). The literature provides ample evidence on the positive association between ICD and firm value (see for example, Orens et al., (2009); Mansour, Somaia & Soad, (2014); Iranmahd et al., (2014); Ferchichi & Paturel (2013); Dashti et al., (2016)).

Unfortunately, most firms do not provide meaningful information about their intellectual capital, which therefore lead to information asymmetry (Gamerschlag, 2013). Furthermore, a firm's poor intellectual capital implies that there is a need for shareholders to acquire new financing or divert cash flows from current investments or debt repayment (Williams, 2001). In this light, ICD hence reduces the information asymmetry (IA), defined as the situation in which one party has more information (usually the firms) over the other party (usually the stakeholders) (Dadbeh, Abednazari & Mogharebi, 2013), or when there is an equality of information (Shiri & Ebrahimi, 2012) between the management and shareholders of organization due to separation of ownership (Brown & Ryngaert, 1991). Previous studies (e.g., Anifowose et al., 2016); Cormier et al., 2009) have documented that ICD has a significant negative impact on IA.

When investors have limited access to the information (i.e., high IA), they would consider the benefits and costs to acquire more information about a given firm to support their investment decisions. Investors who found that the cost of collecting more data outweighs its benefits may seek and collect more information from alternative sources (Ferreira, Branco & Moreira, 2012). The information "attached" in ICD signals investors and creditors about the firm's future wealth creation capabilities, thereby reducing the perceived risks associated with the firm. Consequently, their requirements on the invested funds are minimal therefore causing a decline in the firm's cost of capital (COC) (Williams, 2001). It follows then that high ICD reduces both IA and COC, and that IA increases proportionately with COC.

Information asymmetry that arises between firms and investors would influence many decisions made in the business (Myers, 1977). In this state, managers tend to have a better and realistic prediction about the organizations as a whole but it does not apply to investors (Fosu, Danso, Ahmad & Coffie, 2016). Investors who are not well-informed about the activities of a firm cannot produce a thorough assessment of its future wealth creation capabilities (Li, Pike & Haniffa, 2007). This leads to an undervaluation of the firm by the market (Fosu et al., 2016) because investors are unable to make a more precise valuation of its worth (Li et al., 2007). Past studies (e.g., Fosu et al., 2016); Dadbeh et al., 2013); Shiri & Ebrahimi, 2012) inform our understanding that information asymmetry has a negative significant impact on the firm value. This means that, when lower information asymmetry exists, it is more likely that the firm value will increase, and vice versa.

An organization's investment is considered valuable only when the predictable capital return is higher than the capital cost. The logic behind this was because an organization should earn maximum profits to satisfy its shareholders, leading to the increase of firm value. The appropriate level of cost of capital has been one of the most critical issues many financial experts strive to identify (Sattar, 2015; Mohamad & Saad, 2012). Effective capital budgeting would be an essential element of business strategy to generate shareholder value and therefore enhance profitability and firm value at the same time (Sattar, 2015). Several scholars (e.g., Sattar, 2015; Sumaryati & Trisriarini, 2017; Mohamad & Saad, 2012) found the effect of weighted average cost of capital (WACC) to be significantly negative on the firm value. It has a meaning that when the organizations' cost of capital is decline, the firm value will increase.

The aforementioned literature on the relationships among ICD, IA, COC, and FV has led to the following hypotheses:

- H<sub>1</sub>: Intellectual capital disclosure positively influence firm value.
- H<sub>2</sub>: Intellectual capital disclosure negatively influence information asymmetry.
- H<sub>3</sub>: Information asymmetry negatively influence firm value.
- H<sub>4</sub>: Intellectual capital disclosure negatively influence cost of capital.
- H<sub>5</sub>: Cost of capital negatively influence firm value.
- H<sub>6</sub>: Information asymmetry positively influence cost of capital.

### 3. Methods

#### 3.1 Population and Sample

The manufactur sector is chosen for the research context, which provided an opportunity to investigate the effects of intellectual capital disclosure, information asymmetry, and cost of capital on firm value. The sample frame consisted of three sub-sector of manufactur, namely namely basic industry and chemicals sectors, miscellaneous industry sectors, and consumer goods sectors listed on the Indonesian stock exchange. Samples are selected purposively, the technique in which included in the non-probability method of sampling. The criteria with which these samples are selected are as follows:

- Companies from basic industry and chemicals sector, miscellaneous industry sector, and consumer goods sector listed in the Indonesia Stock Exchange.
- The initial public offering (IPO) dated before 2012.
- The currency expressed in financial statements must be in Indonesia Rupiah.
- Complete financial statement and annual report during years 2012-2016.

Based on 154 companies as the population, only 67 companies of which met the purposive sampling criteria. This study uses secondary data (which is obtained from anual report and Bloomberg) related to the variables or constructs under examination. The data were analyzed through the partial least square (PLS) method. The analysis followed the two-step approach recommended by Gerbing and Anderson (1988) in which both the measurement and structural fit of the model were verified, respectively. The measurement portion of the model was analyzed through convergent and discriminant validity to establish measurement fit with the data (Hair, Hult, Ringle &

Sarstedt, 2014). On the other hand, the structural fit of the model was confirmed through path analysis involving a bootstrap procedure to test the hypotheses for this research. Several results on the model's predictive accuracy (i.e., through coefficient of determination R<sup>2</sup>) and relevance (i.e., through blindfolding Q<sup>2</sup>) were also reported.

### 3.2 Variable Measurement

#### 3.2.1 Intellectual capital disclosure (ICD)

The analysis of intellectual capital disclosure employees equal-weighted index, in which a scoring system that assigns a point of each intellectual capital information sub-category pertaining to any of three categories being considered (Ferreira et al., 2012). The calculation of intellectual capital disclosure index is as follow (Yan, 2017):

$$ICDI = \frac{\sum D}{N} \times 100\%$$

Where:

ICDI = Intellectual capital disclosure index

D = Scored 1 if disclosed; 0 if otherwise

N = Number of total categories in intellectual capital disclosure checklist

#### 3.2.2 Information Asymmetry (IA)

Well-informed stakeholders who have better access to the information are more capable in affecting the supply and demand of the share's price leading to the so-called spread in bid-ask spread (Salehi et al., 2014). To calculate bid-ask spread is as follows (Lu & Chueh, 2015):

$$Bid-Ask Spread = \left\{ \sum \frac{AP-BP}{(AP+BP) \div 2} \right\} \div n$$

Where:

Spread = bid-ask spread

AP = ask price

BP = bid price

N = number of trading days during a year

#### 3.2.3 Cost of capital (COC)

According to Mohamad and Saad (2012), the overall cost of capital is also knows as the weighted average cost of capital or WACC where it has been widely used to predict and assess the cost of capital of an organization. Normally, to the cost of debt must be adjusted to reflect the tax deductibility of interest expenses. To calculate the weighted average cost of capital is as follows (Modigliani & Miller, 1958):

$$WACC = \left[ \frac{D}{V} \times (1 - Tc) \times CoD \right] + \left[ \frac{E}{V} \times CoE \right]$$

Where:

- D = the market value of debt (number of bond outstanding x current market price of the bond)
- E = is the market value of equity (number of shares outstanding x current market price of one share)
- V = the market value of the firm (market value of debt + market value of equity)
- Tc = corporate tax rate
- CoD = cost of debt
- CoE = cost of equity

### 3.2.4 Firm value (FV)

To calculate the firm value, Tobin's Q measurement was used. Tobin's Q computed as the book value of total assets minus the book value of equity added with the market value of equity in the numerator and the book value of total assets in the denominator (Orens et al., 2009). The calculation of Tobin's Q (Cormier et al., 2009; Ferchichi & Patrel, 2013; Dadbeh et al., 2013; Al-Matari, Al-Swidi & Fadzil, 2014; Shiri & Ebrahimi, 2012) is as follow:

$$Tobin's\ Q = \frac{MVE + Debt}{TA}$$

Where:

MVE = Market Value Equity (stock prices x outstanding shares)

Debt = The book value of debt

TA = Total assets

## 4. Results

### 4.1 Evidence of Measurement Fit

The measurement model comprises of four single-item constructs, which was evaluated on the basis of their internal consistency reliability, convergent validity, and discriminant validity (Hair et al., 2014). The data were all ratio measures of each construct, whose validity and reliability were summarized in Table 1.

**Table 1.** Results Summary for Measurement Model

Indicators	Loadings	Composite Reliability	AVE
Bid-Ask Spread	1	1	1
ICDI	1	1	1
Tobins Q	1	1	1
WACC	1	1	1

Note. AVE = Average Variance Extracted

Since all constructs are unidimensional, the results of measurement model evaluation through SmartPLS 3.2.7 returned a perfect constructs' variance explained by their measures (i.e., the value of 1). Similarly, the composite reliability values of all the single-item constructs are 1, but cannot be largely

interpreted that they signal perfect reliabilities (see Hair et al., 2014, p. 110). Results from the PLS algorithm also showed values of 1 for each constructs' square-root of AVE, which were well above a given construct's correlation with any other construct in the model thus establish discriminant validity between constructs (see Table 2).

**Table 2.** Fornell-Larcker Criterion for Assessing Discriminant Validity

	COC	FV	IA	ICD
COC	<i>Single-item construct</i>			
FV	-0.146	<i>Single-item construct</i>		
IA	0.124	-0.310	<i>Single-item construct</i>	
ICD	-0.110	0.443	-0.390	<i>Single-item construct</i>

### 4.2 Evidence of Structural Fit

The assessment of the structural model largely builds around the results of bootstrapping and blind-folding procedures. An assessment of collinearity presence in the model was first examined. Table 3 shows that all variance inflation factor (VIF) below the cutoff point of 5 (Hair et al., 2014), thereby concluding that there is no issue of collinearity among the predictor constructs in the structural model.

**Table 3.** Collinearity Assessment

	COC	FV	IA	ICD
COC		1.020		
FV				
IA	1.179	1.188		
ICD	1.179	1.184	1.000	

The structural model (results summarized in Table 4, PLS model shown in Figure 1) exhibits the R2 values of COC (0.02), FV (0.226), and IA (0.152), which show that the effect of ICD on COC, IA, and FV can be considered as weak to moderate. The structural model also exhibits good predictive relevance, as shown by the values of Q2 that are well above the zero cutoff point.

The path coefficient values inform our understanding that ICD is the strongest determinant FV, followed by IA. Also in the model we can see that IA is the primary driver of COC, and that ICD strongly determines IA. In the relationships among constructs we learn that all relationships in the structural model are significant except for ICD → COC, with the acceptable significance level at ten percent error probability for COC → FV.

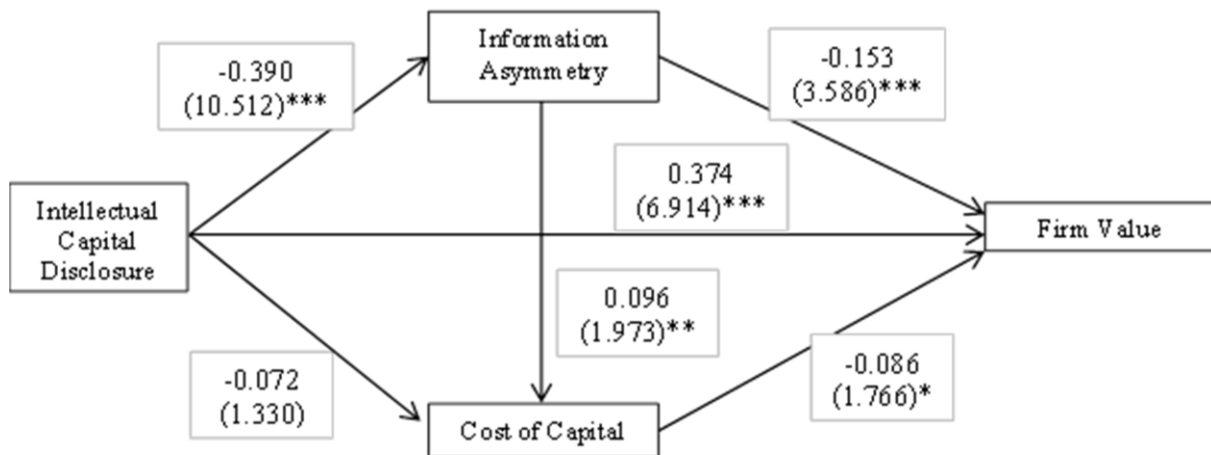


Figure 1. PLS Structural Model

Table 4. Results Summary for Structural Model

Construct	Model Prediction	
	Accuracy	Relevance
COC	0.020	0.004
FV	0.226	0.210
IA	0.152	0.143

Significance Test Results				
	Path Coefficient	t Value	p Value	Hypothesis
ICD → FV	0.374	6.914***	0.000	H1 substantiated
ICD → IA	-0.390	10.152***	0.000	H2 substantiated
IA → FV	-0.153	3.586***	0.000	H3 substantiated
ICD → COC	-0.072	1.330	0.185	H4 rejected
COC → FV	-0.086	1.766*	0.078	H5 partially substantiated
IA → COC	0.096	1.973**	0.049	H6 substantiated

Note. The *t* and *p* values were obtained through bootstrapping procedure (individual sign change, and two-sided test at 95% confidence interval). The measures of cross-validated redundancy of Q2 were obtained from the blindfolding procedure with the omission distance of 7.

\**p* < .10, \*\**p* < 0.05, \*\*\**p* < 0.001 (two-sided test).

Table 5. Mediation Assessment

	Indirect effects		Direct effects		Total effects	
	Path coefficient	t Value	Path coefficient	t Value	Path coefficient	t Value
ICD → IA → COC	-0.037	1.778	-0.072	1.330	-0.110	1.861
ICD → IA → COC → FV	0.003	1.118	0.374	6.914	0.443	9.228
ICD → COC → FV	0.006	0.786	0.374	6.914	0.443	9.228
ICD → IA → FV	0.060	3.568***	0.374	6.914	0.443	9.228

### 4.3 Additional Assessment: Mediation Effect

Results from the bootstrapping procedure showed specific and joint-mediation effects of two key mediators IA and COC in the relationship between ICD and FV. Table 5 shows that only IA that can significantly explain the effect of ICD on FV (*t* = 3.568, *p* = 0.000). We also learn that in the relationship between ICD and COC, IA can only explain the effect of ICD on

COC at the 90 percent confidence level. Results from joint-mediation analysis additionally showed that IA and COC cannot jointly mediate the effect of ICD on FV.

## 5. Discussion

The effect of ICD on FV was substantiated, which means that as organizations disclose more of its intellectual capital information, the firm value would therefore increase. This is in line with the research of

Orens et al., (2009); Mansour et al., (2014); Ferchichi and Paturel (2013); Dashti et al., (2016); Alfraih et al., (2017); Sudibyo and Basuki (2017); Subaida, Nurkholis and Mardiaty (2017). As signaling theory proposes that voluntary disclosure such as intellectual capital information allow investors and other relevant stakeholders to produce a better assessment about the organization's values and their ability to generate future wealth. By disclosing intellectual capital information tend to improve transparency, legitimize status and enhance reputation (Oliveira et al., 2006). The transparency would therefore lead to the increase of firm value since it appeals market to have a better image of an organization through the intellectual capital information released (Leuz & Verrecchia, 2000).

The effect of ICD on IA was substantiated, implying that the higher intellectual capital information disclosed by organization would lead to the lower information asymmetry. This is in line with the research of Anifowose et al., (2016); Cormier et al., (2009); Nucholisah and Yadiati (2017); Orens et al., (2009). The reduction of information asymmetry could be lowered only when the organizations commit to disclose the highest level of the information organizations have access to (Verrecchia, 2001). Voluntary intellectual capital disclosures tend to reduce information asymmetry between organizations and those external users of the information (Bruggen, Vergauwen & Dao, 2009).

The effect of IA on FV was substantiated therefore we can conclude that as information asymmetry decreases, the firm value increases. This is in line with the research of Fosu et al., (2016). Investors who are not well-informed about the activities of organizations cannot produce a thorough assessment of the organizations' future wealth creation capabilities (Li et al., 2007). Investors do not have the whole 'true' image about the organizations, a tendency causing their equity to be undervalued by the market (Fosu et al., 2016). Consequently, investors cannot afford to make a more precise valuation of the firm (Li et al., 2007). Consequently, decreasing information asymmetry between the management as the insiders and the investors as the outsiders will in turn "enrich" the market price disclosed by organizations (Rieg & Vanini, 2015).

The effect of ICD on COC was rejected. Statistically, ICD have no impact on COC, however the sign of the relationship is negative. This is in line with the research of Sasongko, Admadianto, Trisnawati and Wiyadi (2016); Setiawati and Agustina (2016). Firms who attempt to make public the information of intellectual capital will not effect the amount of cost

of capital bearing by the firms. The reason was due to information such as intellectual capital is not considerably relevant and sufficient enough to Indonesian investors' eyes (Sasongko et al., 2016). Furthermore, stakeholders normally would require organizations to disclose information related to the business, therefore helping them in making decision. This hence requires that the main reason for which organizations prepare annual reports is to provide the information to satisfy the requirements by various stakeholders (Mouritsen, Larsden & Bukh, 2001). However, not all the required information to make informed decision is included in the annual report (Sasongko et al., 2016), thereby making it difficult for investors to produce a thorough assessment thereof.

The effect of COC on FV was substantiated, which means that the lower the cost of capital, the higher the firm value. This is in line with the research of Sattar (2015). Effective and accurate financing decision making lead to the maximization of shareholders' value through maximizing the firm value (Mohamad & Saad, 2012; Agarwal, Taffler, Bellotti & Nash, 2015). Therefore, the financial experts are trying their best to identify and obtain the optimal capital structure to the point where the cost of capital (WACC) are minimized therefore increasing the firm value (Brigham & Gapenski, 1996; Agarwal et al., 2015; Singhal, 2014).

The effect of IA on COC was substantiated, which is in line with the research of Liu and Niu (2012); Nurjanati and Rodoni (2015); Murni (2004); Sasongko et al., (2016); He, Lepone & Leung (2013); Armstrong, Core, Taylor and Verrecchia (2011). As there is unbalanced information (i.e., information asymmetry arises), investors have a doubt regarding the firm's performance in which leading to the unattractiveness (reducing its liquidity) of firm's shares resulting in the the small trading volume (Sasongko et al., 2016). In other words, when high information asymmetry exists, investors would demand a high cost of capital for the added transaction costs (Botosan, 1997) as well as estimation of risks (Shiri & Ebrahimi, 2012). They believe that the reduction in information asymmetry would reduce an organization's cost of capital (Bruggen et al., 2009; Botosan, 1997). According to economic theory, information asymmetry leads to an increase in organizations cost of capital because it leads to adverse selection between buyers and sellers (Alfraih, 2017), which tends to reduce the liquidity of an organization's securities (Glosten & Milgrom, 1985).

IA was found to be mediating the effect of ICD on FV. The signaling element such as intellectual

capital disclosure could mount up organizations' values by enhancing their image, creating and improving an understanding of organization's performance, thereby magnetizing potential investors through reduced information asymmetry (Singh & Mitchell, 2008; Rodgers, 2007; Vergauwen & Alem, 2005).

## 6. Conclusion

This research examines the direct effect of ICD on FV and the indirect effect through which IA and COC act as key mediating processes. The research context is Indonesian manufacturers listed on Indonesian Stock Exchange with the data period of 2012-2016. The finding supports hypothesis H1, H2, H3, H5 and H6 respectively: ICD has significant, positive effect on FV; ICD has significant, negative effect on IA; IA has significant negative effect on FV; COC has significant negative effect on FV; IA has significant positive effect on COC. However, the effect of ICD on COC is found statistically not significant but has the negative sign. As for the indirect effect, only IA found mediating the effect of ICD on FV.

Based on the result drawn up from the research, there are some managerial implications that could be a use for companies and related stakeholders specially in today's era of knowledge-based economy. Management of the company should pay more concerned on disclosing voluntary information such as intellectual capital information, as ICD is value relevant to the investors, in which such information have an effect on the activities in capital market and to boost and obtain more of investors's confidence in decision making of their investment therefore influence investor's investment decision. This research highlight the importance of supplying additional non-financial information with intellectual capital information since it plays a significant role in affecting the market valuation of the organization. Such disclosure would also reduce imbalance information between more informed and less informed stakeholders.

The limitation of this research deals only with the quantity of intellectual capital information disclosed. An interesting avenue is for future research to investigate both the quality and quantity of the disclosure of intellectual capital information. Besides, the sample of this research is chosen purposively and it is only manufacturing firms in Indonesia. Future research could investigate the impact of intellectual capital disclosure with the samples of companies specifically classified into high-intensive and low-intensive intellectual capital firms.

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