BOARD STRUCTURE AND DISCLOSUREOF INTELLECTUAL CAPITAL:ANEMPIRICAL STUDYIN AN EMERGING MARKET

by Siti Maria

BOARD STRUCTURE AND DISCLOSURE OF INTELLECTUAL CAPITAL: AN EMPIRICAL STUDY IN AN EMERGING MARKET

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Abstract

Capital market regulators have concentrated on company transparency, including and also intellectual capital disclosure (ICD) throughout the previous decade. Jensen and Meckling (1976) stated that high disclosure can reduce agency costs and the uncertainty faced by investors. This research aims to explore the ways the board structure, comprising board size, independence, female board members and CEO dichotomy, affects intellectual capital disclosure within Indonesia. A sample comprising 323 non-commercial companies in 7 industries listed publicly from 2008 to 2017 on Indonesia Stock Exchanges (IDX) was analyzed using ordinary least squares (OLS) regression. This study found a positive and significant impact of board size which implied that a higher total number of members of the board of directors results in a higher extent of ICD. The larger the number of outside board members, the better. This makes the board more independent and allows it to provide a higher level of corporate governance to shareholders. The findings revealed the level of ICD significantly and negatively affected CEO duality statistically. The complete findings indicated robust implications of board structure for ICD. This study may be utilized to facilitate higher intellectual capital awareness and foster ICD execution by IDX capital market administrators.

1. INTRODUCTION

In the past decade, capital market regulators in Indonesia have focused on disclosure by companies including intellectual capital disclosure (ICD). Disclosure of company information plays an important role for investors to assess risks and opportunities appropriately. The existence of elements of uncertainty regarding the quality of the company, in terms of assets or cash flow risks and marketable securities, makes investors request additional information to reduce the possibility of errors in making investment decisions.

The annual reports' information disclosure comprises mandatory and voluntary disclosure, with the former being a requisite of applicable accounting regulations and standards, while the latter is employed for company administrators to offer accounting and further information important for annual report users in making decisions. Mandatory disclosure or voluntary disclosure is the best way to publish information related to the condition of the company for shareholders at a certain time. However, many investors think that companies in Indonesia only focus on mandatory disclosure rather than voluntary disclosure. Therefore, companies need to be encouraged to increase voluntary disclosure.

Jensen and Meckling (1976) stated that high disclosure can reduce agency costs and the uncertainty faced by investors. Good corporate governance can provide investors with guarantees of protection against the uncertainty inherent in the investment. The structure and processes in corporate governance can improve the quality, supervision, and performance of the investment in intellectual capital (Keenan & Aggestam, 2001). In other words, corporate governance is responsible for and ensures that intellectual capital runs well so that it can create corporate value. Adequate corporate governance offers proper inducement for chasing objectives for the company and shareholders' interests by boards and management and promotes efficient supervision, therefore, enhancing better organizational voluntary disclosure quality.

Moreover, the advantage of companies implementing adequate organizational governance comprises a growth in investor confidence level for financing such a company, and an influence on company information disclosure to financial statements users, therefore, lessening information asymmetry. The various legislations introduced by capital market authorities comprise Financial Authority Services Regulation No. 29/POJK.04/2016 regarding yearly report of public corporations or issuers. Subsequently, Financial Authority Services Regulation No. 43 became official to supervise corporate governance and information disclosure for public corporations or issuers fulfilling the criteria of having smaller and medium-scale properties. However, many companies' increases in intellectual capital are not in line with the level of ICD.

This research investigates the impact on ICD by the board structure, comprising board size, female board members, board independence, and CEO dichotomy, within Indonesia. The study was performed in this emerging country and provides an interesting context for the investigation. Much of the previous research on ICD focus on the investigations in developed countries (Vergauwen & Van Alem, 2005; Brüggen, Vergauwen, & Dao, 2009; Ben-Amar, Chang, & McIlkenny, 2017; Cerbioni & Parbonetti, 2007; Lim, Matolcsy, & Chow, 2007; Li, Pike, & Haniffa, 2008; Nalikka, 2009; Tejedo-Romero, Rodrigues, & Craig, 2017; Nadeem, 2020). In fact, characteristics of capital markets in emerging countries differ from those in developed countries. Narayan, Mishra, and Narayan (2011) showed that capital markets in developed countries have well-established stock markets, and most have developed through the processes of globalization and financial liberalization. Therefore, to get a better description of the state of the financial system, it is necessary to consider the characteristics of the country (Bayraktar, 2014). Additionally, this study focuses on the board structure because it affects a variety of aspects of the business, including internal control (Koutoupis & Pappa, 2018; Al-Adeem & Alsogair, 2019; company performance (Dao & Nguyen Tra, 2020; Abdel-Azim & Soliman, 2020; Saerang, Tulung, & Ogi, 2018), and stock market performance (Berbou & Sadqi, 2020).

A sample comprising 323 firms publicly recorded on the Indonesia Stock Exchange (IDX) covering 2,634 company-year observations or 7 industrial sectors from 2008 to 2017 revealed that board size positively impacted ICD. Furthermore, CEO duality was discovered to be significantly and negatively associated with ICD level statistically. The findings have been confirmed by consistent robustness tests, comprising substitute of ICD measures having endogeneity issues, different subsamples and diverse ICD groupings.

The research enhances studies on this topic in three major ways. Firstly, previous studies have shown a different focus on determinants of ICD. Li et al. (2008), Keenan and Aggestam (2001), Haniffa and Cooke (2002), Cheng and Courtenay (2006), Lim et al. (2007), Cerbioni and Parbonetti (2007), García-Meca and Sánchez-Ballesta (2010), Muttakin, Khan, and Belal (2015) evaluated the association between ICD and corporate governance and found that company boards have the responsibility to use intellectual capital to increase corporate value. Furthermore, Nalikka (2009), Lucas-Pérez, Mínguez-Vera, Baixauli-Soler, Martín-Ugedo, and Sánchez-Marín (2015), Tejedo-Romero et al. (2017), Ben-Amar et al. (2017) investigated the connection female board members had with ICD. Recently, Nadeem (2020) has examined the way boardroom gender diversity (BGD) influenced ICD. Therefore, an attempt is made to fill the lacuna in discovering the particular impact of the board structure on ICD. This might have an important effect for capital market authorities and firms in regulation of ICD.

Secondly, this study focuses on investigating board structure's impact on ICD in Indonesia as the biggest stock market in Southeast Asia (Hadjaat, Yudaruddin, & Riadi, 2021). Most studies that focused on ICD in Indonesia only comprised data from several firms (in limited samples and years). For instance, Naimah and Mukti (2019) using 45 sampled companies in LQ45 index within 2013–2014, investigated ways audit working group and company's qualities affected ICD. Widiatmoko, Indarti, and Pamungkas (2020) focused on using 16 companies during 2015–2018, to test

the influences of the corporate governance index on ICD. Meanwhile, Hamidah and Arisukma (2020) used 35 companies listed during 2013–2017 period. This study provides a significantly larger sample size and period analysis of ICD in Indonesia.

Thirdly, the research findings promote particular knowledge of board structure attributes and ICD procedure to support earlier study discoveries focused on emerging nations too (Abeysekera, 2010; Barako, Hancock, & Izan, 2006; Haniffa & Cooke, 2002; Muttakin et al., 2015).

Subsequent parts of this research are outlined below. The potential impact on ICD by board structure, comprising board size, female board members, board independence and CEO dichotomy, is addressed in Section 2, while Section 3 describes the methodology. Section 4 explores econometric technique and data, while Section 5 covers empirical findings comprising robustness analysis. Lastly, Section 6 concludes, recommends limitations and ways forward.

2. LITERATURE REVIEW

2.1. Board size

Board size has an influence on ICD. Hidalgo, García-Meca, and Martínez (2011) suggested that the increase to 15 board members' number beneficially affects ICD, however where the increase exceeds 15 the effect will be detrimental to the supervision, control and retrieval processes, decisions regarding intellectual capital disclosure. Therefore, a maximum number of 15 members is recommended for effectiveness.

Some previous studies revealed that board size positively and significantly influenced ICD, including the research performed by Abeysekera (2010), Hidalgo et al. (2011), Lim et al. (2007), Rositha, Firdausi, and Darmawan (2019), Nadeem (2020), Hatane, Kuanda, Cornelius, and Tarigan (2020), Hesniati, (2021). Meanwhile, Cheng and Courtenay (2006) discovered that board size positively but insignificantly impacted voluntary disclosure, but Cerbioni and Parbonetti (2007) indicated negative and substantial findings related to board size and disclosure of intellectual capital.

Therefore, the first hypothesis is as follows:
H1: Board size positively impacts intellectual capital disclosure.

2.2. Board independence

Board independence can provide good disclosure for the company. Haniffa and Cooke (2002) explained regarding firm disclosure that a noteworthy variable to investigate is board composition due to the indirect reflection of independent director's roles, meaning that higher disclosure is likely anticipated where in comparison to perceived supervisory duties, supervisory responsibilities are exercised. Similarly, the supremacy, especially numbers, may offer higher power to require disclosure by management.

Previous studies found a positive association between board independence and the extent of ICD (Cheng & Courtenay, 2006; Cerbioni & Parbonetti, 2007; Lim et al., 2007; García-Meca & Sánchez-Ballesta, 2010; Li et al., 2008; Kamath, 2019).

Recently, Muttakin et al. (2015) focusing on companies in Bangladesh discovered a substantial impact on ICD by board independence. However, other studies found different results, including studies by Hidalgo et al. (2011), Ho and Wong (2001), Taliyang and Jusop (2011) with documentation signifying insignificant and positive results. Meanwhile, Barako et al. (2006) discovered a negative and important connection between ICD levels and board independence.

Our second hypothesis is as follows:
H2: Board independence positively impacts intellectual capital disclosure.

2.3. Female board members

Previous studies prove that gender diversity enhances voluntary disclosure levels. Women on board show greater persistence in monitoring so that gender diversity is claimed to lead to better manager supervision and increase voluntary disclosure (Barako & Brown, 2008; Adams & Ferreira, 2009; Srinidhi, Gul & Tsui, 2011; Lucas-Pérez et al., 2015; Ben-Amar et al., 2017; Tejedo-Romero et al., 2017). Most recently, Nadeem (2020) found a positive effect on ICD by female board members in China. However, the opposite result was found by Herli, Tjahjadi, and Hafidhah (2021) and Nalikka (2009) in the investigation of Helsinki Stock Exchange's listed firms comprising 108 companies, indicating that female board members do not significantly influence voluntary disclosure level.

We formulate the third hypothesis as follows:
H3: Women on board positively impact intellectual capital disclosure.

2.4. CEO dichotomy

CEO dichotomy is a substantial issue in dividing decision management from control and possesses the potential to increase information asymmetry (Fama & Jensen, 1983; Jensen, 1993). The CEO duality is able to erode independence of the board and interfere with supervision and governance functions, therefore, causing concentration of decision-making power and reducing voluntary disclosure of information (Forker, 1992; Jensen, 1993; Dahya, Lonie, & Power, 1996; Gul & Leung, 2004; Lakhal, 2005). Empirical investigations by Gul and Leung (2004), Cerbioni and Parbonetti (2007) and Nadeem (2020) found a negative and significant relationship between ICD and CEO dichotomy. However, Li et al. (2008), Hidalgo et al. (2011), Martins, Morais, Isidro, and Laureano (2018) discovered no substantial connection.

Therefore, the fourth hypothesis is as follows:
H4: CEO dichotomy negatively impacts intellectual capital disclosure.

3. RESEARCH METHODOLOGY

3.1. Sample and data

The sample comprises firms listed publicly on IDX. To classify the sample of firms into the industries, we used seven industry (non-finance) classifications from the Indonesia Stock Exchange as a guide: 15 agriculture industry companies, 33 mining industry companies, 55 basic industry & chemicals

industry companies, 34 miscellaneous industry companies, 25 consumer goods industry companies, 48 property real estate & building construction industry companies, and 113 trade services & investment industry companies. Yearly reports were employed as a data source for each sample company. This research covers the years 2008 to 2017, allowing for an examination of Indonesia's ICD reporting patterns. As of December 31, 2017, 422 firms were recorded on Indonesia Stock Exchange. Just 323 firms, however, met the requirements.

3.2. Variables

Three variables, comprising dependent, independent, and control variables, were used. The dependent variable is intellectual capital disclosure (ICD). Human capital category (HCC), internal capital category (ICC) and external capital category (ECC) are the three types of intellectual capital disclosure. The disclosure index built on the basis of an adapted technique by Vergauwen and Van Alem (2005) and Muttakin et al. (2015) was used to measure the intellectual capital disclosure.

Intellectual capital disclosure calculations were based on the content analysis, as stated by Muttakin et al. (2015), Abeysekera (2010), and Cerbioni and Parbonetti (2007). An unweighted dichotomous procedure was used in the study of intellectual capital disclosure. Following the content review process, score is 1 if the annual report includes the item disclosure; score is 0 if the annual report does not include the item disclosure. The disclosure score index is built as follows:

$$ICD_j = \frac{\sum_{t=1}^{n_j} X_{i,j}}{m} \qquad (1)$$

where, n_j is a firm's overall actual disclosure ranking, and m is the number of related disclosure items (32 items).

The board structure, which includes board size (BSIZE), board independence (BIND), women on boards (BWOM), and CEO duality (DUAL), is the dependent variable in this analysis. Leverage (LEVEG), firm age (AGEF), board meetings (BMEET), type of auditor (BIG4), ownership concentration (CONS), profitability (ROA), and firm size (FS) are all control variables (Tejedo-Romero et al., 2017; Cerbioni & Parbonetti, 2007; Brüggen et al., 2009; Martins et al., 2018; Masum, Latiff, & Osman, 2020; Nadeem, 2020). Because of the high level of financial risk faced by the company, companies with a higher leverage ratio (LEVEG) would reveal more information, particularly information about intellectual capital. Companies with a longer history (AGEF) reveal more details. Companies with a high level of meeting activity (BMEET) enjoy disseminating information to the general public. When it comes to the ownership concentration (CONS) dimension, dispersed ownership is more important in terms of getting access to the details they need to share less. When financial statements demonstrate strong financial results, companies are more likely to reveal more details (ROA). Large corporations are more inclined to release more information (FS). Table 1 lists the independent and control variables that represent the constructs.

Table 1. Independent and control variables

Variables	Symbol	Definition and measure	Expected sign	Data source
Independent				
Board size	*BSIZE*	Overall amount of board of directors' members (%).	+	Nadeem (2020)
Board independence	*BIND*	The proportion of independent directors to the overall amount of directors (%).	+	Nadeem (2020)
Women on boards	*BWOM*	The proportion of female board members to the overall amount of directors (%).	+	Tejedo-Romero et al. (2017)
CEO duality	*DUAL*	This is a dummy variable, which is equal to either 1 or 0, takes into consideration duality or absence of duality.	-	Nadeem (2020)
Control				
Leverage	*LEVEG*	Total debt/total equity (%).	+	
Age of firm	*AGEF*	The age of a company as of the day it was founded.	+	
Board meeting	*BMEET*	The total number of board meetings that occur per year.	+	Brüggen et al. (2009), Martins et al. (2018), Tejedo-Romero et al. (2017), and Nadeem (2020)
Ownership concentration	*CONS*	5% of the shares are owned by one or more people.	+	
Type of auditor	*BIG4*	Dummy variable with the value 1 if the client is a Big 4 auditor and 0 if the client is not.	+	
Profitability	*ROA*	Net profit/total asset (%).	+	
Firms size	*FS*	Ln total assets.	+	

Source: Authors' summary.

3.3. Research model

The association between the board structure variables and ICD level was investigated using a regression analysis technique in this research. Linear regression is a technique for analyzing quantitative data that connects two or more quantitative variables in a research model in order to determine possible causal relationships between board structure and ICD. Following Muttakin et al.

(2015), ordinary least squares (OLS) with robust standard errors method was used in this analysis. In the process of estimation withregression test necessitate best linear unbiased estimator (BLUE). Therefore, heteroscedasticity and autocorr OLS, however, certain assumptions in the elation (HAC) robust standard errors involving panel data are employed for tackling heteroscedasticity and autocorrelation concerns (Wooldridge, 2013). Finally, distinct sectors are represented by year dummies

and industry dummies in this study. This is used to deal with the problem of ‖unobservable effects‖. Moreover, to deal with the endogeneity problem in the regression an alternative estimation of the generalized method of moments (GMM) is utilized for the robustness test (Nadeem, 2020). Therefore, empirical validation of the formulated research hypotheses will be carried out by performing multiple linear regression based on the following regression model:

$$ICD_{i,t} = \alpha_{i,t} + \beta_1 BSIZE_{i,t} + \beta_2 BIND_{i,t} + \beta_3 BWOM_{i,t} + \beta_4 DUAL_{i,t} + \beta_5 LEVEG_{i,t} + \beta_6 AGEF_{i,t} + \beta_7 BMEET_{i,t} + \beta_8 CONS_{i,t} + \beta_9 BIG4_{i,t} + \beta_{10} ROA_{i,t} + \beta_{11} FS_{i,t} + s_{i,t} \tag{2}$$

where, α is constanta, $\beta_1 - \beta_2$ are coefficients of variables, s is the error term.

4. RESULTS

For the entire study, Table 2 displays descriptive statistics on employed variables in the research. Our sample's average intellectual capital disclosure is 0.5196, with a standard deviation of 0.1641. The entire true disclosure of the total disclosure items is more than half of the average intellectual capital disclosure for the study according to these findings (32 items). Except for the leverage variable, the total of the variables exceeds the standard deviation, showing that the variables are fairly represented.

Table 2. Descriptive statistics for all variables ($N = 2634$)

Variables	Mean	Std. dev	Min	Max
ICD	0.5196	0.1641	0.0625	1.1875
BSIZE	4.2976	1.7546	2	13
BIND	0.3987	0.1208	0.1	0.8333
BWOM	0.4096	0.6657	0	5
DUAL	0.2839	0.4510	0	1
LEVEG	1.6614	6.0520	-38.525	216.25
AGEF	31.689	17.534	3	117
BMEET	6.9605	6.3774	1	53
CONS	51.896	21.038	10.09	97.67
BIG4	0.3090	0.4621	0	1
ROA	0.4118	1.8849	-6.230	50.678
FS	23.240	5.0853	10.946	32.214

Dichotomous variables	Yes (%)		No (%)	
DUAL	28.40		71.60	
BIG4	69.10		30.90	

Source: STATA database. Authors' calculations.

Table 3 shows the extent of the relationship among the explanatory variables employed in testing multivariate regression. The correlation matrix reveals an absence of strong correlation of all explanatory variables to indicate multicollinearity is not a concern. Based on Kennedy (2008), a correlation higher than 0.70 means that multicollinearity is not a problem within the data. Therefore, no multicollinearity problem exists in this circumstance.

Table 3. Correlation matrix

Variables	BSIZE	BIND	BWOM	DUAL	BMEET	FS	LEVEG	ROA	AGEF	CONS	BIG4
BSIZE	1.0000										
BIND	-0.1267	1.0000									
BWOM	0.0777	0.0851	1.0000								
DUAL	0.0007	0.0511	0.0235	1.0000							
BMEET	-0.0022	-0.0930	0.0411	0.0121	1.0000						
FS	-0.2300	0.0332	0.0851	-0.0248	0.1007	1.0000					
LEVEG	0.0090	-0.0191	-0.0036	0.0177	-0.0165	0.0199	1.0000				
ROA	-0.0096	0.1656	0.1094	0.0962	-0.0189	-0.0751	-0.0167	1.0000			
AGEF	0.1829	-0.0659	0.0828	0.0425	0.1311	-0.1029	-0.0115	-0.0082	1.0000		
CONS	0.0699	-0.0198	-0.0058	-0.0009	0.0400	-0.1318	-0.0688	-0.0468	0.1345	1.0000	
BIG4	0.2588	-0.0701	-0.0894	0.0525	-0.0196	-0.3162	0.0046	0.0273	0.1072	0.0865	1.0000

Source: STATA database. Authors' calculations.

Table 4 reports the relationship between intellectual capital disclosure and the explanatory variables. In Table 4, the analysis involves all variables, such as main independent, control variables, years, and industry dummies. This study shows that the R-squared is 0.1065. This means that the independent variable can influence the dependent variable (intellectual capital disclosure) by 10.65%, while the remaining 89.35% is explained by other variables not included in this study model.

The outcomes presented in Table 3 also show the influence of board structure on intellectual capital disclosure. In columns 1–4, the coefficient of board size (BSIZE) is positive ($\beta = 0.0067$; $\beta = 0.0074$; $\beta = 0.0044$; $\beta = 0.0053$) and significant (at 0.01), thus supporting H1. This study finds a negative and significant coefficient of board independence (BIND) and CEO duality (DUAL) which implies that a higher percentage of board independence (BIND) and CEO duality (DUAL) results in a lower level of intellectual capital disclosure, thus supporting H3 and H4.

5. DISCUSSION

The entire Table 4 reports findings for the association between intellectual capital disclosure and the explanatory variables. This study assessed the specification using OLS with HAC robust standard, while in the part of specifications we include control variables, industry dummy and year dummy. This study tested the effect of board structure hypothesized variables. This study discovered a positive and significant *BSIZE* coefficient, implying that a larger overall number of board members results in a greater degree of ICD, therefore validating *H1*. The greater the number of members of the board of commissioners with diverse educational background and experience, the more effectively the burden may be distributed. This, in turn, can increase the quality of decision-making, represent stakeholders' interests, and reduce the CEO's dominance. As a result, the ICD is pushed upward by the board size. The empirical finding is consistent with Abeysekera (2010), Hidalgo et al. (2011), Lim et al. (2007), Rositha et al. (2019), Nadeem (2020), Hatane et al. (2020), Hesniati (2021) providing support to the argument that total members of the board size have a beneficial effect on intellectual capital disclosure.

Table 4. Board structure and ICD

Explanatory variables	ICD (dependent variable)			
	(1)	(2)	(3)	(4)
BSIZE	0.0067*** (0.0018)	0.0074*** (0.0017)	0.0044** (0.0019)	0.0053*** (0.0018)
BIND	-0.0978*** (0.0256)	-0.0924*** (0.0249)	-0.0780*** (0.0261)	-0.0722*** (0.0255)
BWOM	0.0044 (0.0044)	0.0018 (0.0044)	0.0040 (0.0046)	0.0014 (0.0045)
DUAL	-0.0152** (0.0069)	-0.0148** (0.0069)	-0.0017** (0.0079)	-0.0017** (0.0069)
LEVEG			0.0001 (0.0004)	0.0001 (0.0004)
AGEF			0.0003** (0.0001)	0.0003** (0.0001)
BMEET			0.0024*** (0.0005)	0.0022*** (0.0005)
CONS			0.0009*** (0.0001)	0.0008*** (0.0001)
BIG4			0.0223*** (0.0074)	0.0213*** (0.0073)
ROA			0.0002 (0.0013)	-0.0001 (0.0013)
FS			0.0005 (0.0006)	0.0004 (0.0004)
Constant	0.5319*** (0.0142)	0.4759*** 0.01811	0.4389*** (0.0258)	0.3753*** (0.0281)
F-statistic	10.51***	13.68***	12.29***	14.30***
R-squared	0.0141	0.0783	0.0457	0.1065
Obs.	2634.00	2634.00	2634.00	2634.00
Year dummy	No	Yes	No	Yes
Industry dummy	No	Yes	No	Yes

*Notes: *sig. at 10%, **sig. at 5%, and ***sig. at 1%.*

The greater the number of independent board members, the better the company's ability to provide better corporate governance to shareholders. The level of ICD in the sample companies is statistically significant and inversely associated with board independence. As a result, it is incompatible with *H2*. This finding is in line with the findings of Barako et al. (2006), who found a negative and important association between board independence and the degree of ICD. The reason for this result is that in Indonesia, directors who are said to be ―independent‖ are not truly independent and often fail to disclose because they still have a family with companies or political connections to state-owned companies. Moreover, this is achievable due to Indonesia's lax corporate governance practices. There is no necessity for firms to publish their corporate governance conditions and structures, particularly those related to the board of commissioners' responsibilities and independence. Additionally, while the Indonesian Stock Exchange regulates the number of independent commissioners, there is no process in place for shareholders to choose independent commissioners, implying that even though the board of commissioners exists, their appointment is unknown. Such circumstances continue to develop options for several parties to engage in political collusion, one of which is the appointment of independent commissioners who retain familial ties to the company's directors. This will significantly undermine the application of corporate governance, as the presence of insider transactions and fraud will deteriorate corporate governance, which will have an effect on the disclosure of information required by transparency as a corporate governance principle.

This investigation further evaluated the impact of female board members on ICD extent and found a positive but insignificant result. In other words, this implies that women on boards have no influence on ICD levels of sample firms. Therefore, *H3* is not supported. A possible reason for such finding could be that women relatively discard risk more than men do, so women have a lower percentage on boards compared with men. Moreover, these findings suggest that the inclusion of a woman on the company's board of directors has not resulted in variations in perception and comprehension of board decisions. Women are said to have a cognitive style that focuses on harmony, and the capacity to promote knowledge transmission does not exist in Indonesian organizations. This also suggests that women continue to encounter a variety of obstacles when it comes to sharing information.

Finally, the CEO duality variable (*DUAL*) is significant at the 5% level. The negative coefficient shows that bigger firms reveal higher IC information, therefore supporting *H4*. The findings affirm empirical proof regarding voluntary disclosure (Gul & Leung, 2004; Cerbioni & Parbonetti, 2007; Nadeem, 2020). Furthermore, these results indicate that the CEO duality is able to erode independence of board and interfere with supervision and governance functions, therefore causing concentration of decision-making power and reducing voluntary disclosure of information. Turning to the control variables, we found that board meeting (*BMEET*), age of firm (*AGEF*), ownership concentration (*CONS*) and type of auditor (*BIG4*) substantially and positively impact disclosure of intellectual capital. This result is in line with expectations and is also aligned with the results of

earlier investigations by Tejedo-Romero et al. (2017), Martins et al. (2018) and Nadeem (2020).

This section tested the main findings' robustness using three methods. First, according to Nadeem (2020), two probably endogeneity sources exist in this research comprising self-selection 15 judice and omitted variables. Therefore, studies by Arellano and Bond (1991) and Blundell and Bond (1998) were applied to handle the endogeneity concern, while an alternative estimation of the GMM is utilized. We found consistent results especially for board independence variable as is presented in Table 5.

Table 5. Board structure and ICD (GMM method)

Explanatory variables	ICD (dependent variable)
IC (-1)	-0.1752***
	(0.0210)
BSIZE	-0.0020
	(0.0025)
BIND	-0.0457*
	(0.0250)
BWOM	-0.0095*
	(0.0091)
DUAL	-0.0015
	(0.0099)
Constant	No
Control	Yes
AR(1)	0.0000
AR(2)	0.3437
Sargan test	507.20

Notes: *sig. at 10%, **sig. at 5%, and ***sig. at 1%.

Second, this research employed ICD levels for the listed diverse intellectual capital groups comprising ICC, ECC, and HCC in accordance with Muttakin et al. (2015) as reported in Table 6. These robustness tests, as predicted, confirm our key findings to indicate a substantial association between board size, board independence, female board members, CEO dichotomy and ICD.

Table 6. Board structure on different types of ICD

Explanatory variables	ICC (1)	ECC (2)	HCC (3)
BSIZE	0.0071***	0.0050**	0.0044*
	(0.0023)	(0.0023)	(0.0024)
BIND	-0.0722**	0.0023	-0.1290***
	(0.0347)	(0.0340)	(0.0323)
BWOM	-0.0146**	-0.0122**	0.0189***
	(0.0066)	(0.0061)	(0.0052)
DUAL	-0.0228**	-0.0318***	-0.0237***
	(0.0095)	(0.0088)	(0.0086)
Constant	Yes	Yes	Yes
F-statistic	9.93***	8.38***	11.66***
19 quared	0.0859	0.0629	0.0872
Control variables	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes
Industry dummy	Yes	Yes	Yes
Obs.	2634	2634	2634

Note: *sig. at 10%, **sig. at 5%, and ***sig. at 1%.

Finally, in accordance with Nadeem (2020), we divided our sample into two categories, low and high ICD firms, to check the primary findings' robustness as Table 7 shows. Furthermore, the study findings indicate a consistent association between ICD and board structure concerning results baseline in low ICD companies.

Table 7. Board structure on different types of ICD

Explanatory variables	ICD (dependent variable)	
	High ICD (1)	Low ICD (2)
BSIZE	0.0047**	0.0057***
	(0.0021)	(0.0016)
BIND	-0.0438	-0.0252
	(0.0281)	(0.0243)
BWOM	-0.0027	0.0161***
	(0.0056)	(0.0040)
DUAL	-0.0066	-0.0111**
	(0.0072)	(0.0067)
Constant	Yes	Yes
F-statistic	10.18***	8.40***
R-squared	0.1669	0.1269
Control	Yes	Yes
Year dummy	Yes	Yes
Industry dummy	Yes	Yes
Obs.	1306	1328

Note: *sig. at 10%, **sig. at 5%, and ***sig. at 1%.

6. CONCLUSION

The analysis of voluntary information disclosure is relatively recent, and there are many explanations why businesses reveal information voluntarily, 22 luding the disclosure of intellectual resources. The purpose of this study is to look into the impact of board structure, including board size, board independence, female board members, and the CEO dichotomy, on ICD in Indonesia. A sample comprising 323 non-finance companies in 7 industries listed publicly from 2008 to 2017 on the Indonesia Stock Exchanges was analyzed. The results of the study found that the board structure plays a role in influencing the ICD. First, the influence of board structure hypothesized factors was investigated in this study. The BSIZE (board size) coefficient was shown to be positive and significant in this study, suggesting that a larger total number of board members resulted in a higher degree of ICD, therefore confirming H1. These findings support agency theory by demonstrating that it may improve decision-making quality, reflect stakeholders' interests, and mitigate the CEO's power. Second, the level of ICD of sample companies is statistically significant and inversely associated with board independence. As a result, it is incompatible with H2. The reason for this result is that in Indonesia, directors who are said to be ―independent‖ are not truly independent and often fail to disclose because they still have a family with companies or political connections to state-owned companies. This will considerably impair corporate governance's application, as the prevalence of insider transactions and fraud will deteriorate corporate governance, impairing the disclosure of information required by transparency as a corporate governance principle. Third, female board members discovered a positive but insignificant effect on the extent of ICD. In other words, evidence demonstrates that women on boards of directors had no effect on the ICD levels of sample firms. As a result, H3 is not supported. Women may discard risk more 1 han males, resulting in a smaller percentage of women on boards. Moreover, the presence of a woman on the board of directors has not altered perceptions or comprehension of board decisions. Women are thought to have

a harmonious cognitive style, and Indonesian organizations lack the potential to foster information transmission. This shows that women still face challenges in sharing knowledge. Fourth, CEO duality was revealed as being significantly and negatively connected with ICD levels statistically. These findings indicate that the CEO duality may undermine the board's independence and interfere with monitoring and governance tasks, resulting in decision-making power concentration and less voluntary sharing of information. Overall, the results survived consistent robustness tests, comprising alternative ICD measures involving endogeneity concerns, different groups and diverse subsamples.

The research outcome proposes certain particular policy consequences. First, the total results indicate that board size possibly impacted ICD levels positively and CEO duality was revealed to be significantly and negatively connected with ICD levels statistically. These findings suggest that the board structure in Indonesia has beneficial implications for capital market regulators. In this sense, this finding endorses agency theory that increasing the number of board sizes not only increases information disclosure but also reduces agency problems. For regulators, this study supports the importance of decision-making quality, representing stakeholders' interests, and reducing the CEO's control as a result of high board size and CEO duality. Second, being capital market regulator, IDX may employ the findings of this research to facilitate higher intellectual capital awareness and promote Indonesia's ICD implementation. Due to the limited data reports and differences in the characteristics of the financial and non-financial industries, the financial industry is not included in the focus of the research. As a result, future studies may look into ICD in the financial industry. Second, changes in the International Accounting Standard Committee (IASC) and International Financial Reporting Standard (IFRS) occurred throughout the research period, affecting disclosures and the structure of some assets and liabilities. This has an evident impact on the financial statements for the periods under consideration. As a result, a future study may take into account changes in the IASC and IFRS while evaluating ICD.

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