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The interrelationship of intellectual capital disclosure, IPO underpricing and board characteristics: ASEAN evidence.

Sirinuch Nimtrakoon
School of Accountancy, University of the Thai Chamber of Commerce, Bangkok, Thailand.
Corresponding author: sirinuch_nim@utcc.ac.th

Michael Tayles
Business School, Hull University, Hull, U.K.

Abstract

This research investigates the relationships between board characteristics, intellectual capital (IC) disclosure and the level of IPO underpricing in the context of ASEAN countries. Content analysis of IPO prospectuses was employed for 192 ASEAN companies which underwent IPO listing between 2014 and 2017 a period straddling the creation of the ASEAN Economic Community (AEC). The influence of board characteristics on underpricing is shown to be in the appropriate direction but not statistically significant. Of the four board characteristics investigated, three have statistically significant direct influence on the extent of IC disclosure. The research demonstrates the importance of IC disclosure within ASEAN, on which we have relatively limited prior knowledge, however the results demonstrate a relatively low level of IC disclosure in the ASEAN with insufficient impact to mitigate the information asymmetry gap and impact the level of underpricing. Regulators may need to promote greater IC disclosure before the level of underpricing can be influenced.

Keywords: Intellectual capital disclosure, Board structure, IPO underpricing, ASEAN

1. Introduction

It has become apparent over the last few decades that many organizations have tended to contribute to their firms' value mainly through intangible resources or intellectual capital (IC), rather than their tangible assets. However, the concept of IC is hardly captured in traditional financial accounting statements (Alcaniz, Gomez-Bezares & Ugarte, 2015; Lev & Zarowin, 1999). This implies that traditional financial statements may be inappropriate to convey information which reflects a realistic value of a firm. It is therefore argued that companies provide less relevant information to their stakeholders or potential stakeholders (Guthrie, Petty & Ricceri, 2006) and for these businesses, there is an increasing gap between their market value and book value (Lev, 2001).

This deficiency of traditional financial reporting in the reflection of the firms' value created by IC can generate an agency problem between well-informed and less well-informed stakeholders. The relationship between company boards of directors and investors is stereotypical of the principle-agent relationship, where different levels of information are held by each party with the potential for information asymmetry. The presence of information asymmetry between company directors and investors has been acknowledged by various corporate disclosure scholars, particularly in the case of IC. The insiders who possess more information on IC can earn benefits that are unavailable to investors outside the organizations (Scott, 2000). To make the capital market more efficient and reduce the information asymmetry, companies can therefore decide to voluntarily disclose IC information. The disclosure of IC information is an essential signal to investors about a company's competence to survive in a severely competitive environment (Abeysekera, 2008; Weqar, Zubair & Haque, 2021).

IC disclosure has particular relevance when related to initial public offerings (IPOs). In the case of IPOs, it is common for a firm to offer shares to investors at a price lower than that which emerges on the first trading day, called underpricing. IPO underpricing is a phenomenon when the offer price is lower than the closing price on the first trading day and can be considered as an initial gain for the investor in a share immediately after issuance. It is effectively a process through which existing shareholders transfer wealth to new investors and the success of an IPO can be influenced by this underpricing. The extent of the underpricing, affects the success of the issue, has an impact on the total amount of funding raised by an IPO and as a consequence impacts the firm's cost of capital (Too & Wan Yusoff, 2015), hence it is of interest and concern. Firms confident of their superior performance may use underpricing to entice investors to take up shares. That is, it may be taken as a sign of the quality of their shares. On the other hand, the offer price may have been judged too low, which has an obvious drawback that the firm is not receiving in investment an amount commensurate with their current value and this naturally impacts adversely their cost of capital (Singh & Van der Zahn, 2007).

Within the research stream of IC disclosure and reporting, many researchers predominantly employed annual reports as the main source of data; however, this has been shown to have drawbacks (Dumay & Cai, 2014). It has been pointed out that IPO prospectuses are superior to annual reports in disclosing IC information because, compared to annual reports, prospectuses provide more information about strategy, future options for development and their potential risks, the sort of insights which are not usually available in annual reports (Cordazzo, 2007). Prospectuses are designed to affect forthcoming investment decisions; they tend to be timelier and more relevant to the investors (Garanina & Dumay, 2017).

From a corporate governance perspective, board structure variables have been widely studied as the determinants of IC disclosure. It is expected that characteristics of the management board of a company can mitigate any information asymmetry by increasing the level of IC disclosure. For example, the extent of managerial ownership prior to the IPO may influence the amount of voluntary IC disclosure (Bukh, Nielsen, Gormsen & Mouritsen, 2005) and retained ownership after an IPO also affects IC disclosure (Alcaniz *et al*., 2015). Board size and board independence have also been found to have significant association with the extent of IC disclosure in an IPO prospectus (Cordazzo & Vergauwen, 2012; Rashid, Ibrahim, Othman & See, 2012). However, very little research has extended this and investigated the relationship between board variables and the extent of IPO underpricing (Yatim, 2011; Darmadi & Gunawan, 2013), and even less the relationship between board structure, IPO underpricing and IC disclosure. This paper will deal with the interplay of these issues within Association of Southeast Asian Nations (ASEAN).

Regarding the IC disclosure research stream, it was observed that the most studied contexts are continental Europe and Australasia while IC disclosure research in other regions such as Asian countries is rarely studied. This therefore provides an opportunity to examine IC disclosure in emerging economies and the current study focuses on IC disclosure in some ASEAN countries between 2014 and 2017. To fill the research gap identified above, the research objectives are first to investigate the level of underpricing of IPOs and IC disclosure in ASEAN countries and relate these to board structure characteristics. Then to incorporate IC disclosure into the relationship between board structure characteristics and underpricing.

The research contributes to our knowledge in several ways. First, it sheds light on IC disclosure and underpricing in emerging countries by focusing on

four ASEAN founders. Although some of this research has been conducted in individual countries in Southeast Asia, none has targeted and contrasted ASEAN as comprehensively. Regarding the emergence of the ASEAN economic community (AEC) at the end of 2015, the paper offers insight into the extent of IC disclosure and underpricing in the ASEAN before and after the initiation of the AEC. Third, much of IC disclosure research used annual reports as a main data source, resulting in criticism that the data were inappropriate for this particular research (Dumay & Cai, 2014), consequently, this research continues the recent trend of using IPO prospectuses. Fourth, most IC disclosure research using IPO prospectuses is predominantly involved in identifying determinant factors (Bukh *et al*., 2005; Singh & Van der Zahn, 2008; Cordazzo & Vergauwen, 2012; Rashid *et al*., 2012; Alcaniz *et al*, 2015). The current research extends our body of knowledge by addressing both the determinants and the value relevance of IC disclosure in the context of underpricing. Thus it is one of the first papers that investigates the impact of board structure on IPO underpricing and subsequently the potential mediating role of IC disclosure on this relationship, that is, an examination of the direct and indirect effect of board structure on the level of IPO underpricing.

The remainder of the paper is organized as follows. The next section deals with a literature review and the development of hypotheses. Then, the research methodology is discussed elaborating the research setting, data collection, variable measurement, and analysis. The results are then presented and discussed, followed by an interpretation of the findings and conclusion referring to limitations and proposals for further work.

2. Literature review and development of hypotheses

IC has provided firms with the capabilities to generate sustainable competitive advantage and contribute to greater corporate performance (Nimtrakoon, 2015). As a result, the measurement and management of IC has received much attention from researchers and practitioners, particularly in the last 20 years. There are various definitions and classifications of IC. One of the pioneers defined IC as intangible assets including particularly technology, customer information, brand name, reputation and corporate culture that a firm utilizes to gain competitive power (Itami, 1987). Others viewed IC as knowledge, information, intellectual property and experience that can be used to create wealth (Stewart, 1997) and Tayles, Pike and Sofian (2006) aligned it with what managers refer to as Knowledge Management.

Traditionally, researchers separated IC into three different categories, including human capital, structural capital (organizational capital), and relational capital (customer capital or social capital) (Bontis, 1999; Edvinsson & Malone, 1997; Roos, Roos, Edvinsson & Dragonetti, 1997; Sveiby, 1997). More recently Bukh *et al*. (2005) developed an IC disclosure index based on a study of the literature and the content of IC in corporate reports. The index (Bukh *et al*., 2005) which has been utilized quite widely in reporting IC disclosure, structured IC into six categories, human resource capital, customer capital, IT capital, process capital, R&D capital and strategic capital, widened the scope under which IC disclosure was detected. Their IC disclosure index across these six categories has been widely adopted and adapted by much contemporary IC disclosure research (Cordazzo, 2007; Singh & Van der Zahn, 2008; Too & Wan Yusoff, 2015; Garanina & Dumay, 2017).

Regarding underpricing theories, firms operating in different corporate governance environments tend to exhibit different degrees of underpricing because of different regulations, the interpretation of them or the different characteristics of the company boards making the issues (Yatim, 2011). There has been relatively little attention paid to the relationship between corporate governance characteristics and underpricing, especially in the context of Asian economies (Darmadi & Gunawan, 2013). We shall first discuss the impact of board characteristics on underpricing and subsequently their impact on IC disclosure. We shall then consider the relationship between IC disclosure and underpricing and finally the mediation effect of IC disclosure on the relationship between board characteristics and underpricing.

2.1 Board characteristics and IPO underpricing

The specific board characteristics that are being investigated in this study are size, independence, reputation and retained ownership and these will be discussed below in the development of the hypotheses.

2.1.1 Board size

There is no universally agreed optimum number of board directors for a company and empirical studies have examined the effects of board size on both the process of interaction of the board and the ability to control management (Jensen, 1993). It is claimed that board size may have a positive relationship with the value of a firm. Specifically, larger boards have potential to contribute more experience, skill and knowledge, gain more access to information, networks and know-how, as well as offer superior innovation for business development. Empirical evidence of Ghazali (2020) confirmed that larger board size provides superior exchange of ideas and formulation of strategic policies, resulting in better organizational performance. Conversely, board size may have a negative

association with firm's value as smaller boards can behave with greater consistency, be more easily monitored with lower coordination costs and hence be more effective (Yatim, 2011). Empirical evidence has produced various findings regarding the association between board size and the level of underpricing. Darmadi and Gunawan (2013) found a negative link between board size and underpricing in Indonesia. In contrast, Yatim (2011) reported no significant relationship between board size and underpricing in Malaysia and Ali, Yang, Sarwar, and Ali (2019) demonstrated insignificant association between board size and cost of equity based on the evidence from Pakistan. Based on these mixed findings the hypothesis is formed as follows:

H1a. There is a significant association between board size and the level of underpricing.

2.1.2 Board independence

Board independence concerns the proportion of independent non-executive directors on the board. An independent directors' role is to contribute originality but also to protect shareholders' interests in managerial decision-making. Hence, the existence of a high proportion of independent directors may address any disconnection between control and management of decisions (Fama & Jensen, 1983). Based on signaling theory, IPO firms with a greater proportion of independent board directors tend to convey more non-financial information in order to signal the 'quality' of the firm to investors; thus, the level of underpricing is expected to be lower. However, not all empirical research has found this relationship to hold. Disclosing contradictory evidence, Darmadi and Gunawan (2013) reported a positive relationship between board independence and the level of underpricing in Indonesian firms; Ali *et.al*. (2019) identified positive but insignificant association between the number of independent non-executive

directors and the cost of equity based on the cement sector in Pakistan; Fariha, Hossain, and Ghosh (2022) revealed that board independence had a positive relationship with stock return based on research in Bangladesh. Based on these mixed empirical findings the hypothesis is constructed as follows:

H1b. There is a significant association between board independence and the level of underpricing.

2.1.3 Board reputation

High-quality directors are in demand for their skills, experience, social connections and corporate networks and can be identified from the number of other directorships they hold. The experience of firms' directors can exert a positive influence on the achievement of the companies they serve, resulting in an increase in size and success of the IPO and a decrease in underpricing. Research by Yatim (2011) indicates results contradictory to this logic, he found that board reputation has a positive relationship with the extent of Malaysian IPO underpricing, so it deserves further attention. As a result the hypothesis is shown below:

H1c. There is a significant association between board reputation and the level of underpricing.

2.1.4 Retained ownership

The extent of retained ownership of shares from an IPO has the potential to deliver mixed signals of future potential and hence the pricing of shares including underpricing. On one hand, the presence of some extent of retained managerial ownership in the company may ensure an alignment between management and shareholder, resulting in better performance (Bukh *et al*., 2005: Cordazzo, 2007). On the other hand, if a high percentage of shares is expected to

be sold to the market, it may be seen to imply an anticipated negative performance in the future (Alcaniz *et al*., 2015). This leads to the hypothesis below:

H1d. There is a significant association between retained ownership and the level of underpricing.

2.2 Board characteristics and IC disclosure

The level of IC disclosure can be affected by a variety of factors such as firm-specific and board characteristics (Bukh *et al*., 2005). The link between four board characteristics and IC disclosure are explored to form the hypotheses.

2.2.1 Board size

Based on resource dependence theory, a larger board can offer more knowledge, greater management supervision and gain access to a broader range of resources (Alfraih, 2018). Consequently, board size usually provides 'conforming pressure' to make disclosures. Following this logic, a rise in the number of directors on a board is perceived to improve the foundation of a boards' management (Yan, 2017). That is, any increase in board size could improve a board's monitoring capabilities. To support the above statement, empirical evidence has illustrated that a higher number of board members has a greater influence on IC efficiency and disclosure (Tejedo-Romero, Araujo & Emmendoerfer, 2017; Alfraih, 2018; Aslam & Haron, 2020; Vitolla, Raimo, Marrone & Rubino, 2020; Nicolo, Aversano, Sannino & Polcini, 2021). In contrast, based on agency theory board size may present problems with board communication, decision making and thus a consequent decrease in information disclosure (Rashid *et al*., 2012). For example, empirical evidence from India demonstrated that board size has a negative influence on the extent of IC

disclosure in IT firms (Kamat, 2020). The mixed findings encountered lead to the following hypothesis:

H2a. There is a significant association between board size and the extent of disclosure.

2.2.2 Board independence

Independent directors aim to mitigate any information asymmetry between principal and agent by promoting information disclosure (Cordazzo & Vergauwen, 2012). As a result, firms influenced by independent directors are more likely to disclose information more useful to external investors. Empirical evidence to date has revealed a significant influence of board independence on the extent of IC disclosure in annual reports (Muttakin, Khan & Belal, 2015; Alfraih, 2018) and in IPO prospectuses (Rashid *et al*., 2012). The number of non-executive directors is shown to explain positively the extent and quality of IC efficiency in Islamic banks (Aslam & Haron, 2020). Similarly, board independence is found to positively affect both the extent and type of IC disclosure by Indian IT companies (Kamat, 2020) and Italian listed companies (Nicolo *et.al*., 2021). Vitolla *et.al*. (2020) also reported a positive relationship between board independence and IC disclosure quality based on integrated reports of international firms. In contrast, Tejedo-Romero *et.al*. (2017) found a negative relationship between board independence and IC disclosure. As a result the following hypothesis is presented:

H2b. There is a significant association between board independence and the extent of disclosure.

2.2.3 Board reputation

Board reputation can be discerned as a function of directors' business acumen, knowledge of the firm, their general managerial capability, and the several directorships they hold. Firms disclose information as a consequence of different economic, social, political, and environmental factors (Brown & Deegan 1998). Based on legitimacy theory, it is expected that companies with a greater board reputation will behave in a socially desirable manner by disclosing more information on IC to satisfy stakeholders. That is, the IC disclosure assists the companies to legitimatize their place in society (Kent & Zunker, 2013). Hence, we present the following hypothesis:

H2c. There is a significant association between board reputation and the extent of disclosure.

2.2.4 Retained ownership

Based on agency theory, the degree of ownership retained after an IPO may have an effect on the level of IC disclosure, and thus the extent of information asymmetry. For example, when existing shareholders anticipate lower involvement with the firm after the IPO, they may intend to sell more shares on the market. As a result, they will encourage more information to be disclosed to inform investors in order to support a successful IPO. Conversely, based on signaling theory, the retention of ownership by existing shareholders may be a signal of firm's quality and expected future performance making IC disclosure less important. However, if a high percentage of previously held shares is to be sold on the market, it may be taken to imply something negative about the firm's future performance and as a result a company may disclose more information to compensate for this potentially disappointing signal (Alcaniz *et al*., 2015). The hypothesis is therefore formed below:

H2d. There is a significant association between retained ownership and the extent of disclosure.

2.3 IC disclosure and IPO underpricing

Corporate reports based predominantly on accounting standards involve the measurement and valuation of physical capital like plant, equipment and inventory. This accounting process neglects the recognition of IC and fails to comprehensively measure and report it to external users such as decision makers and investors. It is claimed that potential agency problems can be mitigated through a higher quality of information disclosure (Singh & Van der Zahn, 2007). As a result, there is a demand for better corporate disclosure in order to address any agency problem and specific to this research greater disclosure of both financial and non-financial information by an IPO can be employed as a possible mechanism to reduce asymmetrical information in this process (Hopp & Dreher, 2013).

The concept of asymmetric information features in most established underpricing models. The prediction based on theories of underpricing is that the degree of asymmetric information is positively associated with underpricing (Singh & Van der Zahn, 2007). It is claimed that in the circumstances of information asymmetry investors face difficulties in evaluating a firm; thus, they will undertake a private search for more information about the firm in order to enhance the accuracy of their estimate of a firm's value. The collection of private information can be expensive for investors; therefore, issuers often release equity at a lower price as compensation to the investors for this search (Darmadi & Gunawan, 2013).

In the voluntary disclosure literature, theoretical models have been proposed that greater disclosure reduces information asymmetry or uncertainty,

and hence the extent of underpricing. It could be said that information asymmetry between the issuer and investor initiates the IPO underpricing phenomenon whereas institutional and regulatory factors influence the extent of underpricing. That is, increasing adherence to accounting standards and transparency or increasing voluntary disclosure are negatively related to underpricing. Or put another way, superior accounting standards and greater disclosure will reduce the level of underpricing (Hopp & Dreher, 2013). In findings consistent with this view, Mondal and Ghosh (2021) find a negative association between the IC disclosure and cost of equity capital based on research undertaken in India. However, in their Malaysian research, Too and Wan Yusoff (2015) reported no significant association between the IC disclosure and the level of underpricing. Evidence contradictory to the theoretical prediction was found by Van der Zahn *et al*., (2007); their research in Singapore showed a positive relationship between the extent of IC disclosure and underpricing. Thus, the empirical evidence indicates mixed findings on this issue and based on theory, the current study formalizes the hypothesis as below:

H3. The level of IC disclosure is negatively associated with the level of underpricing.

2.4 Mediation role of IC disclosure on the relationship between Board characteristics and IPO underpricing

Based on hypotheses formed in 2.1 – 2.3, it is expected that board characteristics will influence IPO underpricing and IC disclosure. Then, IC disclosure is anticipated to impact IPO underpricing. Consequently, the indirect effects of IC disclosure are presumed to affect the relationship between board characteristics and IPO underpricing. The hypotheses for the multilateral

association between board structure, IC disclosure and the level of underpricing are as follows:

H4a. Disclosure mediates the association between board size and the level of underpricing.

H4b. Disclosure mediates the association between board independence and the level of underpricing.

H4c. Disclosure mediates the association between board reputation and the level of underpricing.

H4d. Disclosure mediates the association between retained ownership and the level of underpricing.

3. Research Methodology

3.1 Research setting and background

This research examines the IC disclosure from IPO prospectuses issued in ASEAN countries between 2014 and 2017. A brief background of these countries and their economies is therefore appropriate. The establishment of the Association of Southeast Asian Nations or ASEAN was on 8 August 1967 in Bangkok, Thailand, by the collaboration of five ASEAN founders, namely Indonesia, Malaysia, Philippines, Singapore, and Thailand. In later years, five more countries joined the ASEAN, namely Brunei Darussalam, Vietnam, Laos PDR, Myanmar, and Cambodia. The objectives of ASEAN include encouraging economic growth, promoting stability and active collaboration on matters of common interest, providing assistance in the form of training and research, collaborating more effectively for the greater utilization of their agriculture and industries and maintaining beneficial cooperation with existing international and

regional organizations (ASEAN, 2017a). Hence there is benefit in comparing corporate information insights on some of the constituent countries.

A more recent development was the creation of the ASEAN Economic Community (AEC) (commencing from the end of 2015) in order to create a fully liberalized, single-region common market with a free flow of goods, services, labour, and capital in a market of 2.6 trillion U.S. dollars and over 622 million people (ASEAN, 2017b).

The five ASEAN founders, which are the largest economies in the region, were chosen for this research due to the accessibility of the data and their comparable financial and economic structures. However, the Indonesia stock exchange (IDX) only provides IPO prospectuses in the Indonesian language; thus, Indonesia is excluded from the analysis, resulting in a focus on the other four ASEAN founders, Malaysia, Philippines, Singapore, and Thailand. These countries are different regarding population, GDP, GDP per capita, growth rate, and unemployment rate. Philippines is the largest among four countries in terms of population while Singapore is the smallest country. The GDP of all four countries is comparable, in the range of 300 and 400 billion U.S. dollars. However, when GDP per capita is considered, Singapore has the highest among four ASEAN countries with a huge difference from the other countries.

Since the early 1980s, the four selected ASEAN countries have reformed their financial market infrastructure as well as enhanced their disclosure standards, capital rules, and other statutory and prudential provisions. Macroeconomic stability has developed while the financial sector has been liberalized. Consequently, financial market infrastructures have been reinforced and can be favorably compared to other emerging markets (Gray, Felman, Carvajal & Jobst, 2014). The average market capitalization/GDP for Singapore, Malaysia, Thailand, and the Philippines was 168.37%, 167.26%, 59.06%, and

53.32% respectively. This demonstrates a significant stock market in all of these countries (Azali, Habibullah & Azman-Saini, 2014).

3.2 Sample selection

The data are drawn from the four stock exchanges, the Bursa Malaysia (BM), the Philippines Stock Exchange (PSE), the Singapore Exchange (SGX), and the Stock Exchange of Thailand (SET). The sample consists of IPOs fulfilling the following conditions. The IPO was listed on one of the four stock exchanges between 1 January 2014 and 31 December 2017; the IPO issued equity shares not formerly publicly traded; the IPO is not a life investment fund, stock index fund, real estate unit fund or limited partnership. There were 192 IPO firms which satisfied all the criteria. This period was before the Covid19 pandemic and straddles the creation of the AEC mentioned above. Table 1 shows the number of IPO firms by year of listing and country with Thailand having the most over this four-year period and Philippines, with the lowest GDP and GDP per capita, having the fewest. The highest number of IPOs occurred in 2014 and the lowest in 2016, immediately following the forming of the AEC, though this recovered substantially in 2017.

Table 1. IPO firms by year of listing and countries

Countries/ Stock exchanges	**Number of IPO firms by year of listing and countries**				**Total**	**%**
	2014	**2015**	**2016**	**2017**		
Malaysia/ BM	14	9	11	10	44	23%
Philippines/ PSE	7	4	4	4	19	10%
Singapore/ SGX	21	12	13	16	62	32%
Thailand/ SET	16	20	10	21	67	35%
Total	58	45	38	51	192	100%

The IPO prospectuses of all the sample companies were collected from the websites of the four stock exchanges and companies' websites and where these were not available any missing data were obtained from the DataStream database.

3.3 Variable measurement

The measurement of all variables is summarized in Table 2.

Table 2. Measurement of variables

Variables	Measurement
Underpricing (UP)	Initial return of newly listed stock can be calculated as the formula below: where, P_1 refers to the closing price on the first day of trading for a newly listed share, and P_0 refers to the offer price or issue price of the firm's share: Underpricing $= (P_1 - P_0) / P_0$
IC disclosure (ICD)*	A percentage disclosure index for each IPO prospectus is computed as following formula: where, d_i refers to item i with the value 1 if the item i was disclosure in IPO prospectus and otherwise 0, and M refers to the total items measured, which is 79 items: Disclosure index $= \sum_{i=1}^{m} \left(\frac{di}{M}\right) * 100\%$
Board structure (BSt):	Board structure variables include board size, board independence, board reputation, and retained ownership.
Board size (BS)	Total number of directors on the board.
Board independence (BI)	Percentage of independent non-executive directors on boards.
Board reputation (BR)	Total number of board directorships at other firms held by non-executive directors.
Retained ownership (RO)	Percentage of the number of shares retained by the owners after the IPO.
Firm size (FS)	Logarithm of the number of employees.
Firm age (FA)	A number of years before IPO. Only full years are considered while any fractions of a year are omitted.
Industry (Ind)	Classification industry in four stock exchanges. Dummy variable of "1" is assigned for high tech industry and "0" is assigned for other industries

Variables	Measurement
Country (Cou)	Categorical variable of "1" for Philippines; "2" for Malaysia; "3" for Singapore and "4" for Thailand

Note: * Regarding the IC disclosure variable, it is common practice within IC disclosure research to collect the data in this manner using content analysis of the IPO prospectuses. The 79 items were originally developed by Bukh (2005) also used by Garanina and Dumay (2017). They contain six categories, including human resource capital, customer capital, IT capital, process capital, R&D capital and strategic capital, resulting in 79 items (for further details refer to the Appendix).

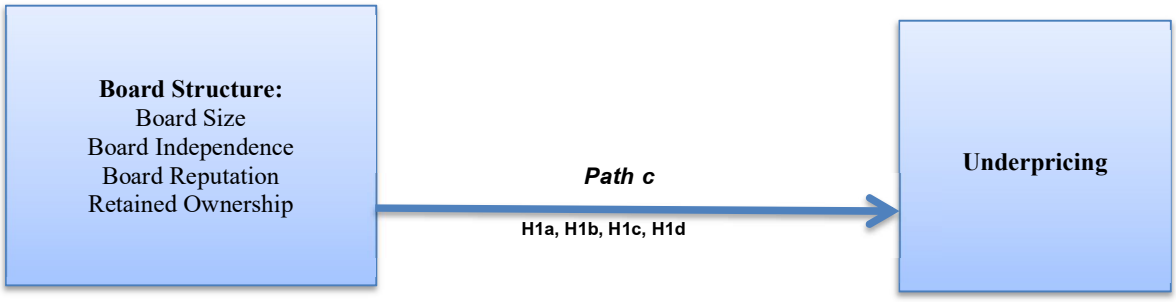
3.4 Research framework and data analysis

The interrelationships of the variables in question are examined in the research framework displayed in Figure 1 which proposes a causal chain via a path diagram. There are two causal paths affecting underpricing: the direct impact of board structure (*Path c*) and the impact of IC disclosure (*Path b*). There is also a path from board structure to IC disclosure (*Path a*). The framework and any possible mediation effect of IC disclosure is further elaborated in section 4.3.

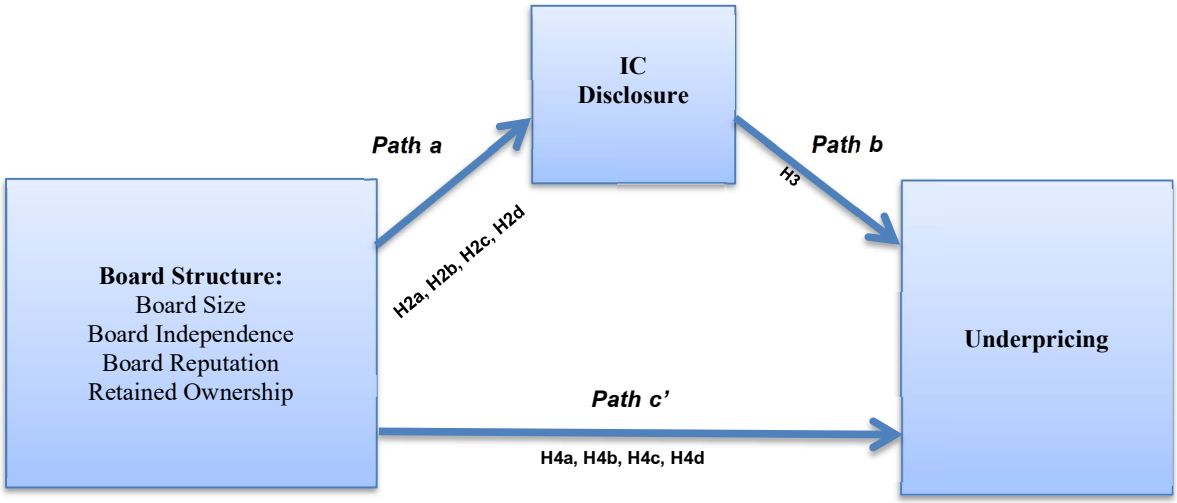
The data analysis presented here involves three sections, namely descriptive statistical analysis, correlation coefficient analysis, and path analysis. Descriptive analysis focuses on the characteristics of the variables over time and between countries in addition to the pooled sample. Correlation analysis provides a general impression about the association among the variables. The hypotheses are finally tested using path analysis, by which a series of separate, but interdependent, multiple regression equations are estimated simultaneously (Baron & Kenny, 1986).

Figure 1. Research Framework

Direct effect of board structure variables on underpricing.



Indirect effect of board structure variables on underpricing through IC disclosure.



Note: Any possible mediation effect (Hypotheses H4a, H4b, H4c and H4d) is tested by comparing path c and path c' in the path analysis, refer to section 4.3 for further elaboration.

4. Research Findings

4.1 Descriptive statistics

4.1.1 Underpricing

The descriptive statistics for underpricing, the initial return of newly listed stock, are presented for the pooled sample, by year and by country in Tables 3 and 4.

Table 3. Descriptive statistics of underpricing breakdown by year

Year	n	Mean	Std. deviation	Maximum	Minimum
2014	58	0.1512	0.4774	1.8000	-0.8629
2015	45	0.2349	0.4904	2.0000	-0.6222
2016	38	0.1890	0.3624	1.1639	-0.6147
2017	51	0.1510	0.2771	1.0125	-0.8019
Total	192	0.1783	0.4125	2.0000	-0.8629

Average underpricing and its standard deviation for the pooled sample over the four-year period are 0.1783 and 0.4125, respectively. The underpricing peaked in 2015 with the mean score of 0.2349, immediately prior to the establishment of the AEC. It subsequently declined in 2016 and 2017 with the average underpricing of 0.1890 and 0.1510, respectively. An ANOVA test performed to investigate the variation in underpricing by year showed no significant differences in annual mean underpricing ($p > 0.05$). However, we can see that whilst the number of IPOs prior to the creation of the AEC fell, those that took place exhibited the greatest underpricing, perhaps indicative of firms acting in anticipation of the AEC.

Table 4. Descriptive statistics of underpricing breakdown by country

Countries	n	Mean	Std. deviation	Maximum	Minimum
Malaysia	44	0.0431	0.3117	1.1333	-0.6147
Philippines	19	0.0899	0.3195	0.6087	-0.4441
Singapore	62	0.1680	0.3502	1.0500	-0.8629
Thailand	67	0.3016	0.5080	2.0000	-0.8019
Total	192	0.1783	0.4125	2.0000	-0.8629

Amongst the four ASEAN countries, Thailand has the highest average underpricing, which is 0.3016, followed by Singapore, with Philippines and Malaysia substantially lower. The difference in underpricing can be explained by general risk and return theory. A study of Noviayanti and Husodo (2018) reported the level of volatility across ASEAN stock markets and found that the Malaysia stock market had the lowest volatility indicating lowest risk while the Singapore and Thai stock markets possess much higher levels of volatility indicating higher risk. In other words, the lower returns (low underpricing) in Malaysia occurs as a response to lower volatility (risk), whereas the higher return (higher underpricing) in Singapore and Thailand is a response to higher volatility (risk). However, the explanation of risk and return theory does not appear to explain the low underpricing recorded in the Philippines, though the number of IPOs reported is substantially lower than the other countries. An ANOVA test reveals that underpricing in two country groups, specifically Malaysia and Thailand ($p < 0.01$), are significantly different. Table 5 demonstrates an ANOVA result of underpricing by country.

Table 5. The ANOVA result of underpricing by country

Underpricing by country	Malaysia (n = 44)	Philippines (n = 19)	Singapore (n = 62)	Thailand (n = 67)	F Statistics
Mean	0.0431	0.0899	0.1680	0.3016	4.058**
Pairwise Comparison:					
Malaysia		-.0468	-.1248	-.2584**	
Philippines			-.0781	-.2117	
Singapore				-.1336	

*Significant at the 0.05 level **Significant at the 0.01 level

Value in pairwise comparisons are mean differences.

4.1.2 IC disclosure

IC disclosure is initially explored in terms of frequency and percentage of companies making disclosure of the 79 items in the index. The average disclosure of all the items included in the IC disclosure index is 20 percent (see Appendix), this is comparable with Bukh *et al*. (2005) who reported disclosures of 22 percent of items in Danish IPO prospectuses. Of the six elements of the IC disclosure index, "R&D capital" and "IT capital" are the information categories where most information is disclosed with the percentage of 27.67 percent and 23 percent, respectively. Further detailed information on frequency and percentage of companies making disclosure is provided in the Appendix.

The average annual disclosure has been computed and divided into the six elements for each year of the four-year period, Table 6 presents the trend of information disclosed. ASEAN IPO disclosure is highest in the year 2015, immediately prior to the creation of the AEC and counter to expectations this coincides with the highest level of underpricing. On the cusp of the creation of the AEC it may have been an example of firms ensuring the IPO was successful. Concerning the six categories, it is observed that there is a noticeable increase in disclosure from 2014 to 2015 in all categories. Some disclosure increased into

2016 but others fell away and surprisingly the disclosed information of almost all elements reduced in 2017.

Table 6. Average number of items per prospectus for each year

Max. items Year	Human resource capital (28)	Customer capital (14)	IT capital (6)	Process capital (9)	R&D capital (8)	Strategic capital (14)	Total (79)
2014 (n = 58)	4.79	2.71	1.24	1.60	2.00	2.47	14.81
2015 (n = 45)	5.11	2.80	1.60	2.16	2.33	3.38	17.38
2016 (n = 38)	5.76	2.53	1.63	1.47	2.66	2.97	17.03
2017 (n = 51)	5.71	2.53	1.16	1.20	2.02	2.02	14.63

An ANOVA test reveals that IC disclosures, specifically process capital, strategic capital and total disclosure, of the year 2015 and the year 2017 are significantly different. Table 7 presents the ANOVA result of IC disclosure by year.

Table 7. An ANOVA result of IC disclosure by year

IC disclosure by year	2014 (n = 58)	2015 (n = 45)	2016 (n = 38)	2017 (n = 51)	F Statistics
Human resource capital (28)					
Mean	4.79	5.11	5.76	5.71	2.474
Customer capital (14)					
Mean	2.71	2.80	2.53	2.53	.309
IT capital (6)					
Mean	1.24	1.60	1.63	1.16	1.550
Process capital (9)					
Mean	1.60	2.16	1.47	1.20	4.875**
Pairwise Comparison:					

2014		-.552	.130	.407	
2015			.682	.959**	
2016				.278	
R&D capital (8)					
Mean	2.00	2.33	2.66	2.02	2.493
Strategic capital (14)					
Mean	2.47	3.38	2.97	2.02	4.659**
Pairwise Comparison:					
2014		-.912	-.508	.446	
2015			.404	1.358**	
2016				.954	
Total (79)					
Mean	14.81	17.38	17.03	14.63	3.708*
Pairwise Comparison:					
2014		-2.567	-2.216	.183	
2015			.351	2.750*	
2016				2.399	

*Significant at the 0.05 level **Significant at the 0.01 level

Value in pairwise comparisons are mean differences.

The average disclosure by country in shown in Table 8, companies in Singapore disclose the most information, with the average disclosure items of 19.45 items. This is followed by firms in Malaysia with the average disclosure items of 16.84 items. Companies in Philippines and Thailand have a much lower level of information disclosure. Singaporean companies disclosed more information on almost all elements, except for IT capital on which surprisingly their companies disclosed the lowest of the countries. Companies in Philippines disclosed lowest on customer capital and R&D capital with the average of 1.21 items and 1.42 items whereas those in Thailand disclosed lowest on human resource capital, process capital, and strategic capital with the average of 3.67 items, 1.16 items, and 2.25 items, respectively.

Table 8. Average number of items per prospectus for each country

Max. items Country	Human resource capital (28)	Customer capital (14)	IT capital (6)	Process capital (9)	R&D capital (8)	Strategic capital (14)	Total (79)
Malaysia (*n* = 44)	5.52	3.25	1.89	1.25	2.57	2.36	16.84
Philippines (*n* = 19)	5.00	1.21	0.95	2.11	1.42	2.63	13.32
Singapore (*n* = 62)	7.00	3.48	0.84	2.16	2.65	3.32	19.45
Thailand (*n* = 67)	3.67	1.88	1.67	1.16	1.81	2.25	12.45

An ANOVA test reveals that overall IC disclosures and the disclosures on six elements are significantly different across countries. Table 9 presents the ANOVA result of IC disclosure by country.

Table 9. An ANOVA result of IC disclosure by country

IC disclosure by country	Malaysia (n = 44)	Philippines (n = 19)	Singapore (n = 62)	Thailand (n = 67)	F Statistics
Human resource capital (28)					
Mean	5.52	5.00	7.00	3.67	44.346**
Pairwise Comparison:					
Malaysia		.523	-1.477**	1.851**	
Philippines			-2.000**	1.328*	
Singapore				3.328**	
Customer capital (14)					
Mean	3.25	1.21	3.48	1.88	23.001**
Pairwise Comparison:					
Malaysia		2.039**	-.234	1.369**	
Philippines			-2.273**	-.670	
Singapore				1.603**	
IT capital (6)					
Mean	1.89	0.95	0.84	1.67	8.017**
Pairwise Comparison:					
Malaysia		.939*	1.048**	.215	
Philippines			.109	-.724	
Singapore				-.833**	
Process capital (9)					
Mean	1.25	2.11	2.16	1.16	9.733**
Pairwise Comparison:					
Malaysia		-.855	-.911**	.086	
Philippines			-.056	.941*	
Singapore				.997**	
R&D capital (8)					
Mean	2.57	1.42	2.65	1.81	8.613**
Pairwise Comparison:					
Malaysia		1.147**	-.077	.062*	
Philippines			-1.224**	-.385	

Singapore				.839**	
Strategic capital (14)					
Mean	2.36	2.63	3.32	2.25	3.880*
Pairwise Comparison:					
Malaysia		-.268	-.959	.110	
Philippines			-.691	.378	
Singapore				1.069**	
Total (79)					
Mean	16.84	13.32	19.45	12.45	30.745**
Pairwise Comparison:					
Malaysia		3.525*	-2.611*	4.393**	
Philippines			-6.136**	.868	
Singapore				7.004**	

*Significant at the 0.05 level **Significant at the 0.01 level

Value in pairwise comparisons are mean differences.

4.1.3 Board structure

Board structure variables including size, independence, reputation and retained ownership are explored for both the pooled sample and by country. Their descriptive statistics are illustrated in Table 10.

Table 10. Descriptive statistics of board structure variables

Board size (persons):	Mean	Std. deviation	Minimum	Maximum
Pooled sample (N = 192)	7.65	2.15	4	15
Malaysia (n = 44)	6.82	1.48	4	12
Philippines (n = 19)	8.21	1.51	7	11
Singapore (n = 62)	6.02	0.97	4	8
Thailand (n = 67)	9.54	1.96	6	15
Board independence (percentage)	**Mean**	**Std. deviation**	**Minimum**	**Maximum**
Pooled sample (N = 192)	46.04	11.10	18.18	75.00
Malaysia (n = 44)	51.48	9.87	33.33	75.00
Philippines (n = 19)	27.68	4.31	18.18	36.36
Singapore (n = 62)	51.86	7.20	37.50	75.00
Thailand (n = 67)	42.29	8.81	33.33	71.43

Board reputation (companies)	Mean	Std. deviation	Minimum	Maximum
Pooled sample (N = 192)	21.60	23.06	3	218
Malaysia (n = 44)	24.11	14.83	3	67
Philippines (n = 19)	9.21	5.83	3	21
Singapore (n = 62)	30.24	34.94	4	218
Thailand (n = 67)	15.48	10.10	3	43
Retained ownership (percentage)	Mean	Std. deviation	Minimum	Maximum
Pooled sample (N = 192)	71.64	13.02	0.00	95.90
Malaysia (n = 44)	58.32	17.75	0.00	75.24
Philippines (n = 19)	73.13	10.23	50.86	89.70
Singapore (n = 62)	78.31	7.26	46.15	89.80
Thailand (n = 67)	73.78	6.54	45.24	95.90

The average board size of the pooled sample is 7.65 with the standard deviation of 2.15. The companies in Thailand and Philippines tend to have larger average board size of 9.54 and 8.21 compared to those in Malaysia and Singapore. Regarding board independence, the overall sample has an average percentage of independent non-executive directors on boards of 46.04% with the standard deviation of 11.10. Companies in Singapore and Malaysia maintain the highest level of board independence of about 50%. Companies in Philippines have a much lower level of board independence of 27.68%. Interestingly, firms in Malaysia and Singapore, which have smaller board sizes, have a higher level of board independence than those in Thailand and Philippines. An obvious corollary of this is that those with larger boards would require a higher number of independent non-executive members to display a similar percentage of board independence.

Concerning board reputation, the pooled sample has an average number of board directorships at other firms held by non-executive directors of 21.60 with the standard deviation of 23.06. On this basis, companies in Singapore have highest board reputation score averaging 30.24. Those in Philippines have the lowest score for board reputation of 9.21. In relation to retained ownership, the

pooled sample have the average percentage of shares retained by the owners after the IPO of over 70%. The results for companies in Singapore, Thailand and Philippines all show a very similar retained ownership above 70 percent whereas those in Malaysia maintain a lower proportion.

4.1.4 Firm characteristics

Firm size and firm age, which are measured as a ratio scale, are displayed in Table 11. Industry and country, which are measured using a nominal scale, are presented in terms of frequency and percentage (Table 12).

Table 11. Descriptive statistics of firm size and firm age

Variables	Mean	Std. deviation	Minimum	Maximum
Firm size (persons)	1,006.39	2,738.61	5	26,795
Firm age (years)	23.77	16.05	2	124

Table 12. Descriptive statistics of industry

No. of companies	High technology industry			Other industries				Total
	Pharmaceutical and research	IT and technology	Sub Total	Trade and service	Production	Property and construction	Sub Total	
Frequency	14	15	29	70	67	26	163	192
Percentage	7.30	7.80	15.1	36.50	34.90	13.50	84.90	100.00

The average firm size is about 1,000 employees and in further analysis a logarithm format is used. Concerning firm age, the average is almost 24 years, the oldest firm has been in the business for 124 years whereas the youngest firm has been in the operation for only 2 years before the IPO.

Companies in trade and service as well as production dominate listings on the four ASEAN stock exchanges, incorporating 137 firms out of 192 firms. This is consistent with the ASEAN study of Azis (2018) who indicated that the manufacturing sector retains importance for ASEAN development. It is also in

line with the observation by Kawai and Naknoi (2017) that ASEAN has grown into a key manufacturing centre for global MNCs from Japan, the US, Europe and other emerging Asian firms, by joining East Asia's supply chains and production networks.

4.2 Correlation Analysis

The relationships among the variables of interest are first explored using correlation analysis, presented in Table 13. Spearman's correlation coefficient analysis, a non-parametric statistical test, is applied in order to accommodate the non-normality of some of the data.

Table 13. Correlation (Spearman) matrix

Variable	UP	ICD	BS	BI	BR	RO	FS	FA
UP	1.000							
ICD	-0.101	1.000						
BS	0.093	-0.385***	1.000					
BI	-0.048	0.246***	-0.587***	1.000				
BR	-0.048	0.186***	-0.096	0.322***	1.000			
RO	0.141*	0.074	-0.098	0.014	-0.084	1.000		
FS	-0.028	-0.078	0.342***	-0.286***	-0.036	-0.006	1.000	
FA	-0.094	0.134*	0.072	-0.086	-0.022	-0.159**	0.430***	1.000

Note: *Significant at the 0.10 level (2-tailed). ** Significant at the 0.05 level (2-tailed). *** Significant at the 0.01 level (2-tailed). UP underpricing; ICD IC disclosure; BS board size; BI board independence; BR board reputation; RO retained ownership; FS firm size; FA firm age.

There is a positive significant (though weak) relationship between underpricing and retained ownership, with a correlation coefficient of 0.141 ($p < 0.10$). This is indicating that when existing shareholders expect to retain a greater shareholding and involvement with the firm after the IPO, there is a greater initial return to any new investor. As predicted in the literature review and H3,

underpricing has a negative relationship with IC disclosure, however this is not at a statistically significant level. Underpricing has also been found not to associate (with statistical significance) with any of the other board variables.

We find that IC disclosure is related to three of the board characteristics. Specifically, disclosure is found to negatively relate to board size ($r = -0.385$; $p < 0.01$). This implies that firms with a larger number of board members tend to disclosure less information on IC compared to firms which have smaller board size. It may be because firms with a larger board size (ie. larger firms in our sample, see below) are indifferent to disclosure, surprisingly, or their decision-making over this is less clear because of the complexity introduced by size (Rashid *et al*., 2012).

The result also shows an association between IC disclosure and board independence ($r = 0.246$; $p < 0.01$). It is suggested that firms with a greater percentage of independent non-executive directors on the board tend to disclosure more information on IC. This could be attributable to the role played by these independent directors, which is to protect shareholders' and investors' interests through greater extent and clarity of disclosure. It has some justification within the agency literature where independent directors may seek to alleviate the information asymmetry between principal and agent by disclosing more information (Cordazzo & Vergauwen, 2012).

IC disclosure is also found to have a positive association with board reputation ($r = 0.186$; $p < 0.01$). That is, firms with greater board reputation and higher quality (experience) of directors are likely to disclose more information on IC. Thus generally, firms with a good reputation, who attract good highly qualified directors are inclined to make more IC information available.

It is noted that there is a weak association between IC disclosure and firm age ($r = 0.134$; $p < 0.10$) implying older firms disclose more IC information; this is perhaps counter intuitive because older firms are likely to be more well-known and hence have less need to broadcast to investors their IC credentials.

The three board characteristics are found to correlate with one another. Specifically, board independence is found to negatively relate to board size ($r = -0.587$; $p < 0.01$). Thus, firms with a larger board size do not tend to have an equivalently large number of independent directors on the board. Discussion around any trend towards larger or smaller boards is beyond the scope of this paper, however it is reasonable to assume that large boards would not seek to recruit an equally large proportion of independent directors (based on both availability of the directors and for the communication challenges this may present, despite the benefits of the greater network and insights that may be made available). Board independence is positively associated with board reputation ($r = 0.322$; $p < 0.01$). This infers that firms with more independent directors on the board have a propensity to have a higher 'quality' of directors, this is reinforcement of the quality and experience of the directors. Retained ownership, which perhaps captures a different characteristic of the board structure, is the only variable which has no significant relationship with other board variables.

Concerning the control variables, it is observed that firm size is significantly and positively related to board size ($r = 0.342$; $p < 0.01$) (generally, larger firms have somewhat larger boards). Firm size is negatively related to board independence ($r = -0.286$; $p < 0.01$) which is a logical development from earlier relationships, that is, larger firms with larger boards have not appointed a proportionately similar large number of independent directors.

Firm age is significantly negatively associated with retained ownership ($r = -0.159$; $p < 0.05$), implying the directors of these older firms do not retain as much of the investment compared to newer members of the sample, a funding and investment decision having underpricing implications. This is plausible, given that over time ownership may dissipate, whereas some new firms may be smaller, family start-ups. Firm age is significantly associated with firm size ($r = 0.430$; $p < 0.01$), older firms issuing these IPOs are larger, they have grown over time. Finally, based on the correlation matrix, there is no sign of multicollinearity since correlation coefficients among all predictor variables are substantially less than 0.80. Consequently, multicollinearity does not appear to present a problem for any subsequent multiple regression analysis.

4.3 Path Analysis

To test the hypotheses, path analysis has been performed through a series of multiple regression equations (Baron & Kenny, 1986) as indicated in Section 3.4 and Figure 1 with the results presented in Table 14. According to the four types of board characteristics, path analysis has been repeatedly performed for each board variable. The multiple regression equations are shown below:

Equation 1: Test path c

$$UP = \alpha + \beta_1 BSt + \beta_2 FS + \beta_3 FA + \beta_4 Ind + \beta_5 Cou + \varepsilon$$

Equation 2: Test path a

$$ICD = \alpha + \beta_1 BSt + \beta_2 FS + \beta_3 FA + \beta_4 Ind + \beta_5 Cou + \varepsilon$$

Equation 3: Test path b by controlling for the independent variable and Test path c' by controlling for the moderating variable.

$$UP = \alpha + \beta_1 BSt + \beta_2 ICD + \beta_3 FS + \beta_4 FA + \beta_5 Ind + \beta_6 Cou + \varepsilon$$

Where, UP = Underpricing; ICD = Intellectual capital disclosure; BSt = Board structure variables, including board size (BS), board independence (BI), board reputation (BR), and retained ownership (RO); FS = Firm size; FA = Firm age; Ind = Industry; Cou = Country

Mediation can be established when the following conditions hold. First, there is a significant relationship between the independent and dependent variables (β_1 in path c is significant). Second, there is a significant relationship between the independent variable and mediator (β_1 in path a is significant). Third, there is a significant relationship between the mediator and dependent variable (β_2 in path b is significant). Last, when the mediator is incorporated into the model, the strength of the relationship between the independent and dependent variables is significantly reduced (β_1 in path c' is smaller than β_1 in path c). A complete mediator is assumed when β_1 in path c' is not significant whereas a partial mediator is presumed when β_1 in path c' is still significant but smaller than β_1 in path c (Frazier, Tix & Barron, 2004). Table 14 presents the path analysis results.

Table 14. Summary of path analysis results

Equation 1: Test path c: $UP = \alpha + \beta_1 BSt + \beta_2 FS + \beta_3 FA + \beta_4 Ind + \beta_5 Cou + \varepsilon$								
	BSt = BS		BSt = BI		BSt = BR		BSt = RO	
	beta	t-statistics	beta	t-statistics	beta	t-statistics	beta	t-statistics
Constant		-0.469		0.831		-0.021		-0.282
BSt	0.040	0.501	-0.109	-1.456	-0.077	-1.075	0.006	0.077
FS	-0.020	-0.237	-0.040	-0.486	-0.013	-0.159	-0.010	-0.123
FA	-0.053	-0.631	-0.052	-0.626	-0.058	-0.693	-0.051	-0.611
Ind	0.054	0.739	0.060	0.831	0.044	0.598	0.051	0.701
Cou	0.200	2.515**	0.226	3.025***	0.211	2.842***	0.212	2.749***
Adjusted R^2 = 0.034 *F*-value = 2.339**			Adjusted R^2 = 0.043 *F*-value = 2.735**		Adjusted R^2 = 0.039 *F*-value = 2.531**		Adjusted R^2 = 0.033 *F*-value = 2.287**	
Equation 2: Test path a: $ICD = \alpha + \beta_1 BSt + \beta_2 FS + \beta_3 FA + \beta_4 Ind + \beta_5 Cou + \varepsilon$								

	BSt = BS		BSt = BI		BSt = BR		BSt = RO	
	beta	t-statistics	beta	t-statistics	beta	t-statistics	beta	t-statistics
Constant		11.664***		4.673***		9.090***		6.251***
BSt	-0.380	-5.034***	0.244	3.303***	0.165	2.312**	0.095	1.277
FS	0.039	0.490	0.012	0.142	-0.050	-0.625	-0.062	-0.755
FA	0.119	1.512	0.107	1.307	0.119	1.436	0.108	1.287
Ind	0.015	0.221	0.016	0.230	0.053	0.729	0.028	0.377
Cou	-0.019	-0.250	-0.177	-2.406**	-0.145	-1.955*	-0.175	-2.256**
Adjusted R^2 = 0.133 *F*-value = 6.846***			Adjusted R^2 = 0.069 *F*-value = 3.839***		Adjusted R^2 = 0.042 *F*-value = 2.679**		Adjusted R^2 = 0.023 *F*-value = 1.905*	
Equation 3: Test path b and path c': UP = $\alpha + \beta_1$ BSt + β_2 ICD + β_3 FS + β_4 FA + β_5 Ind + β_6 Cou + ε								
	BSt = BS		BSt = BI		BSt = BR		BSt = RO	
	beta	t-statistics	beta	t-statistics	beta	t-statistics	beta	t-statistics
Constant		0.546		1.167		0.715		0.365
BSt	-0.001	-0.010	-0.088	-1.140	-0.061	-0.841	0.016	0.216
ICD	-0.107	-1.390	-0.087	-1.173	-0.097	-1.319	-0.108	-1.492
FS	-0.016	-0.188	0.039	-0.474	-0.018	-0.219	-0.017	-0.206
FA	-0.040	-0.476	-0.043	-0.512	-0.046	-0.553	-0.039	-0.470
Ind	0.056	0.764	0.062	0.851	0.049	0.669	0.054	0.745
Cou	0.198	2.196**	0.210	2.778***	0.197	2.632***	0.193	2.478**
Adjusted R^2 = 0.039 *F*-value = 2.281**			Adjusted R^2 = 0.045 *F*-value = 2.513**		Adjusted R^2 = 0.042 *F*-value = 2.408**		Adjusted R^2 = 0.039 *F*-value = 2.289**	

*Significant at the 0.10 level (2-tailed). ** Significant at the 0.05 level (2-tailed). *** Significant at the 0.01 level (2-tailed). UP = Underpricing; ICD = Intellectual capital disclosure; BSt = Board structure variables, including board size (BS), board independence (BI), board reputation (BR), and retained ownership (RO); FS = Firm size; FA = Firm age; Ind = Industry; Cou = Country

In line with the structure developed in the literature review, we shall start by examining the impact of board variables on IPO underpricing. No significant association can be observed between the effect of the board variables and the level of underpricing (*Path c*) so the hypotheses H1a, H1b, H1c, H1d cannot be supported. This finding differs from that of Darmadi and Gunawan (2013) who reported a negative relationship between board size and the level of underpricing and no relationship between board independence and underpricing, in their

Indonesian research. The current study suggests that board variables are not relevant in influencing the level of underpricing.

Referring to the effect of board characteristics on IC disclosure and confirming the insights from the correlation analysis, three board variables appear to be determinants of IC disclosure (*Path a*), that is size, independence and reputation. Specifically, board size is seen to be an explanatory variable for the extent of IC disclosure ($\beta = -0.380$, $p < 0.01$); therefore, the result confirms the hypothesis H2a. The current findings suggest that the ASEAN companies with larger board size tend to disclose less information on IC compared to those with smaller board size. Board independence is found to have significant influence on the extent of IC disclosure ($\beta = 0.244$, $p < 0.01$); hence, hypothesis H2b is supported. It implies that ASEAN companies with a higher percentage of independent non-executive directors on boards have a tendency to disclose more information on IC. Board reputation is significantly and positively related to the extent of IC disclosure with the standardized coefficient of 0.165 ($p < 0.05$); hence, hypothesis H2c is confirmed. This implies that high-quality directors (with greater reputation) tend to encourage companies to disclose more information on IC, in line with the legitimacy theory discussed earlier. Retained ownership is not found to relate to the extent of IC disclosure hypothesis H2d). In other words, no matter what percentage of the existing shares holders intend to retain, the extent of IC disclosure is not affected. The reason for such an insignificant result could be that the extent of retained ownership captures a substantially different characteristic of board structure than the other items measured. Perhaps the result is confounded by the 'signaling' implications of retained ownership, as discussed below.

The impact of IC disclosure on the level of underpricing is shown in *Path b*. Based on the voluntary disclosure literature, a negative relationship between

the extent of IC disclosure and the level of underpricing is expected. That is, it is anticipated that the IC disclosure will reduce information asymmetry and uncertainty (Hopp & Dreher, 2013), and thus eventually reduce underpricing and consequently a firm's cost of capital (Singh & Van der Zahn, 2007). The current research found that the standardized coefficients between IC disclosure and underpricing are negative, as predicted in the theoretical model, however they are not statistically significant. It can be concluded that there is no measurable effect of the extent of IC disclosure on the level of underpricing for these ASEAN IPOs. The results therefore do not support the hypothesis H3. As a result of these finding, we can also state that there is no indirect effect of board variables on the level of underpricing via the extent of IC disclosure *(Path c')* and H4a, H4b, H4c, H4d are not supported.

To perform the robustness test for path analysis, the statistical procedure for the assessment of linear recursive simultaneous equation models as a whole is considered. Based on Specht's method, two regression equations are formed (Specht, 1975). It is noted that retained ownership is omitted from the model due to its insignificance in Baron and Kenny's path analysis method. The structural equations for this model are:

$$ICD = \alpha + \beta_1 BS + \beta_2 BI + \beta_3 BR + \beta_4 FS + \beta_5 FA + \beta_6 Ind + \beta_7 Cou + \varepsilon$$

$$UP = \alpha + \beta_1 ICD + \beta_2 BS + \beta_3 BI + \beta_4 BR + \beta_5 FS + \beta_6 FA + \beta_7 Ind + \beta_8 Cou + \varepsilon$$

The results are shown below in the equation form by inserting the beta value and indicating the significance level (* 0.10, ** 0.05, *** 0.01).

$$ICD = -.334BS^{***} + .035BI + .140BR^{**} + .052FS + .143FA^{*} + .095Ind - .020Cou + \varepsilon$$

$$UP = -.096ICD - .063BS - .107BI - .049BR - .034FS - .046FA + .030Ind + .236Cou^{***} + \varepsilon$$

The robustness test mostly confirmed the path analysis result based on Baron and Kenny's model. Board size and board reputation are found to be explanatory factors for IC disclosure; however, board independence is insignificant. None of corporate governance and IC disclosure variables can predict IPO underpricing. Therefore, IC disclosure does not mediate the relationship between board structure and IPO underpricing.

In summary, based on the pooled sample of ASEAN IPOs we observe that IC disclosure does not influence underpricing at a statistically significant level, though all coefficient signs for this relationship are in the hypothesized direction. Further, that whilst board structure characteristics have a statistically significant impact on IC disclosure, that IC disclosure does not act as a mediator between board structure and underpricing. We shall discuss the implications of these findings below.

4.4 Discussion

The results of the path analysis lead to various topics worthy of further discussion and development. Regarding the impact of IC disclosure on the level of underpricing a negative association is indicated and this is in line with the theoretical prediction; however, this is not statistically significant. This is consistent with the study of Too and Wan Yusoff (2015) who did not discover any significant connection between the extent of disclosure and the level of underpricing for Malaysian IPOs. The reason for the insignificant association in the current research may be because of the somewhat low level of IC disclosure in the ASEAN IPO prospectuses, resulting in an inability to reduce the information asymmetry gap between managers and investors. It may also be the case that the sample of IPOs, being drawn from four different countries confounds the relationships, despite the countries operating within the AEC,

complying with international regulations and publishing their data in a common language. Whilst all the countries are within ASEAN and AEC, their economic, stock market and political environments may be at slightly differing stages of development. For example, investment liberalization, and skilled labor movement continue to present challenges (Chia, 2016), there are some conflicting domestic economic interests in member countries (Yean & Das, 2015) and the political determination for developing integration among member countries is uncertain (Witkowska, 2016).

The current findings suggest a negative significant relationship between board size and the extent of IC disclosure. This is consistent with the results from Yatim (2011) and Rashid *et al*. (2012). Yatim (2011) argued that firms with smaller board size are more harmonious and more effective in other words, more conducive to monitoring with lower costs of collaboration and coordination. We find evidence to support this assertion, in other words firms with a larger board size can suffer delays, conflicts or confusion in senior management decision making and as a consequence a decrease in IC information disclosure.

Board independence was found to be a positive determinant of IC disclosure at a significant level. This finding is in line with the Malaysian study of Rashid *et al*. (2012) who revealed a significant impact of board independence on IC disclosure based on IPO prospectus as well as the study of Muttakin *et al*. (2015) who found a positive association between board independence and the extent of IC disclosure in annual reports of Bangladeshi companies. One explanation for a positive relationship between board independence and information disclosure is the role played by independent directors. They undertake an increasingly important role within corporate governance in protecting shareholders' interests in managerial decision-making (Fama &

Jensen, 1983), and reducing the information asymmetry by encouraging greater information disclosure including that of IC (Cordazzo & Vergauwen, 2012).

Board reputation was also shown to significantly influence IC disclosure, in particular, boards with high calibre directors, those who were carrying out non-executive roles in other firms seem to exercise a positive influence on companies making IC disclosure. This dimension of board structure has not received as much exposure in the literature and offers scope for further and more detailed investigation within corporate governance.

Retained ownership is shown not to have a significant relationship with any outcome variable; this is an interesting and potentially 'different' board characteristic compared to the other aspects studied. A high retained ownership is a signal that the existing owners have confidence in their business and its future projects, compared to diversifying their investment into other businesses. Furthermore, this is a characteristic which it is difficult and costly for low quality firms to imitate. Additionally, the significance of any findings may have been distorted by the IPO having been priced low, for example, as a 'sweetener' for this new issue or to give the issuer scope to 'manage' the composition of any new ownership (Cornanic & Novak, 2015), for example, to be selective over the mix of future shareholding and thus to influence decision-making or voting. This has implications also for overall company funding and investment and the propensity of the owners to fund the company at an appropriate level or to liquidate some of their investment. Hence a different research approach involving a more exploratory enquiry involving interviews or case studies might be used to shed light on the impact of this variable.

Regarding control variables, country is found to have a significant relationship with underpricing in almost all regression models. An ANOVA test on this current study indicates that Thai IPO companies in the sample display

significantly higher level of underpricing compared to Malaysian firms which can be explained by risk and return theory.

Regarding the role of IC disclosure in the board structure - underpricing relationship, it can be declared that in this case IC disclosure does not perform a mediating role between board characteristics and underpricing. As this research does not find statistically significant support for the relationship between board characteristics and underpricing we cannot take further any examination of mediation from these results. This topic has received relatively little attention in the literature and further research in line with the framework proposed in this paper is recommended.

5. Conclusion

This study provides the first comprehensive investigation of the interaction of board characteristics, IC disclosure and underpricing in ASEAN. Analysis is based on data collected from 192 ASEAN IPO prospectuses for the period 2014 to 2017, dates which straddle the creation of the AEC. The findings reveal that voluntary disclosure of IC information is relatively small with the IC disclosure index of 20 percent. This is consistent with the prior study of Too and Wan Yusoff (2015) and comparable with Bukh *et al*. (2005) for Danish IPO prospectuses. But it implies that the extent of IC disclosure in ASEAN IPO prospectuses still lags that of those in more developed economies, for example, Garanina and Dumay (2017) reported an index of 24 percent from technology firms listing on the NASDAQ.

The disclosure trend of ASEAN IPO firms increased substantially from 2014 to 2016; however, the disclosure in 2017, post the creation of AEC, has dropped in almost all elements. Concerning country, Singaporean IPO

prospectuses disclose substantially more IC information, while Thai IPO prospectuses disclose less, compared to the other ASEAN founders in this study.

Relating to models of asymmetrical information which aim to describe and explain the level of underpricing, a negative relationship between the extent of IC disclosure and the level of underpricing has been hypothesized. The current analysis indicates that the level of IC disclosure is not statistically significantly related to the level of underpricing, though the direction of the associations are all as predicted. This lack of statistical significance may be due to the current extent of IC disclosure in ASEAN countries and may not therefore have sufficient impact to mitigate the information asymmetry in relation to the level of underpricing.

Regarding policy implications of the research, current voluntary practice could be encouraged, and governance procedures could be enhanced to promote still further the disclosure of IC and other intangible resources. This would result in a more informed investor base, improved value relevance of financial reporting generally and IPOs, which in particular, could be revealed in a change in the degree of underpricing. Currently we are able to report the significant impact of board characteristics on IC disclosure, but we are not able to report any direct (or indirect effect through IC disclosure) of board characteristics on the level of underpricing.

6. Limitations and Potential for Future Research

In the context of the above findings and contributions, the research contains some limitations which should be acknowledged. The study examines four ASEAN founders owing to the general availability of IPO prospectus in

these regions and the common language in the documents; hence, any generalization of findings beyond these should be undertaken with care.

The disclosure literature and the concept of asymmetric information proposed that IC disclosure reduces information asymmetry and uncertainty, and thus a firm's cost of capital and underpricing (Singh & Van der Zahn, 2007; Hopp & Dreher, 2013). However, there might be other types of information disclosure in IPO prospectuses that can reduce the information gap between managers and investors, and eventually reduce the level of underpricing; this provides opportunities for future research. Additionally, future studies could include more disclosure items or other types of non-financial information, which may have potential to reduce information asymmetry. This may supplement or improve the IC disclosure index which may increase the opportunity to discover a linkage to the level of underpricing.

It is possible that IC related information is considered by companies to be of strategic importance and hence they may not want to publicly disclose in entirety any competitive advantage they believe they hold. In which case this topic may only move forward if greater publication is mandated say in a system of structured integrated reporting.

The current research employed the IPO prospectus as the main source of data. Although IPO prospectuses offer more information on strategy, intangibles and an emphasis on future orientation compared to annual reports (Cordazzo, 2007), it is still a one-way communication with investors and the investing community and only one source of data. Hence future research could consider using other media as sources of data, the internet (Massaro, Dumay & Bagnoli, 2017), social media and other reports like integrated reports (Haji & Anifowose, 2017), or precise documents that communicate more directly with investors containing additional narrative referring to IC related information.

Different research approaches may also be adopted to give us alternative perspectives on these issues, for example conducting case studies, undertaking data collection through semi-structured interviews, in order to gain a richer awareness of the relationships being studied as well as new insights using critical reflection of company cases (Dumay & Roslender, 2013).

In the future to capture a bigger picture of ASEAN and to grow the research base and sample population, researchers could expand the scope of the study by including more countries from ASEAN to obtain a more comprehensive appreciation of the ASEAN region. This has the potential to provide a greater volume of data but also presents challenges of data collection across languages and involves countries which exhibit even more differing degrees of economic development, stock market maturity and political emphasis. For example, Aziz and Sundarasen (2015) have pointed to corruption and the impact of different political regimes in the region being factors causing greater uncertainty.

Notwithstanding the above limitations the current research has found several interesting and relevant relationships which are in line with theory and resonate with findings from research in other geographical areas. It has also disclosed characteristics of companies' boards, IC disclosure and underpricing in four major countries within ASEAN and the relationships between them. It has contrasted the findings between these countries for a period immediately before and after the creation of the AEC. It has revealed statistically significant relationships between board characteristics and IC disclosure, plausible relationships between board characteristics, IC disclosure and underpricing, has pointed to avenues of further research and has generated new information and insights on a topic and in a region where there is limited prior knowledge.

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References

Abeysekera, I. (2008) "Intellectual capital disclosure trends: Singapore and Sri Lanka", *Journal of Intellectual Capital*, Vol. 9 No. 4, pp.723 - 737.

Alcaniz, L., Gomez-Bezares, F., & Ugarte, J.V. (2015) "Firm characteristics and intellectual capital disclosure in IPO prospectuses", *Academia Revista Latinoamericana de Administracion*, Vol. 28 No. 4, pp.461-483.

Alfraih, M.M. (2018) "The role of corporate governance in intellectual capital disclosure", *International Journal of Ethics and Systems*, Vol. 34, No. 1, pp.101-121.

Ali, S.T., Yang, Z., Sarwar, Z., & Ali, F. (2019) "The impact of corporate governance on the cost of equity", *Asian Journal of Accounting Research*, Vol. 4 No. 2, pp.293-314.

ASEAN (2017a) "About ASEAN: overview", available at: https://asean.org/about-asean/ (accessed December 29, 2017).

ASEAN (2017b) "ASEAN Economic Community", available at: http://asean.org/asean-economic-community/ (accessed January 15, 2018).

Aslam, E., & Haron, R. (2020) "The influence of corporate governance on intellectual capital efficiency: evidence from Islamic banks of OIC countries", *Asian Journal Accounting Research*, Vol. 5 No. 2, pp.195-208.

Azali, R.Z.M., Habibullah, M.S., & Azman-Saini, W.N.W. (2014) "Monetary policy effectiveness and stock market cycles in ASEAN-5", *Applied Economics*, Vol. 46 No. 20, pp.2362-2374.

Azis, I.J. (2018) "ASEAN Economic Integration", *Journal of Southeast Asian Economies*, Vol. 35 No. 1, pp.2-12.

Aziz, M.N., & Sundarasen, S.D.D. (2015) “The impact of political regime and governance on ASEAN Economic Growth”, *Journal of Southeast Asian Economies*, Vol. 32 No. 3, pp.375-389.

Baron, R.M., & Kenny, D.A. (1986) “The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations”, *Journal of Personality and Social Psychology*, Vol. 51 No. 6, pp.1173-1182.

Bontis, N. (1999) Managing organizational knowledge by diagnosing intellectual capital: framing and advancing the state of the field. *International Journal of Technology Management,* Vol. 18 No. 5-8, pp.433 - 462.

Brown, N., & Deegan, C.M. (1998) “The public disclosure of environmental performance information—a dual test of media agenda seeting theory and legitimacy theory”, *Accounting and Business Research*, Vol. 19 No. 1, pp.21-41.

Bukh, P.N., Nielsen, C., Gormsen, P., & Mouritsen, J. (2005) "Disclosure of information on intellectual capital in Danish IPO prospectuses", *Accounting, Auditing & Accountability Journal*, Vol. 18 No. 6, pp. 713 – 732.

Chia, S.Y. (2016) “ASEAN Economic Integration and Physical Connectivity”, *Asian Economic Papers*, Vol. 15 No. 2, pp.198-215.

Cordazzo, M. (2007) “Intangibles and Italian IPO prospectuses: a disclosure analysis”, *Journal of Intellectual Capital*, Vol. 8 No. 2, pp. 288-305.

Cordazzo, M., & Vergauwen, P.G.M.C. (2012) "Intellectual capital disclosure in the UK biotechnology IPO prospectuses", *Journal of Human Resource Costing & Accounting*, Vol. 16 No. 1, pp.4-19.

Cornanic, A., & Novak, J. (2015) "Signaling by underpricing the initial public offerings of primary listings in an emerging market", *Journal of Economics and Finance*, Vol. 65 No. 4, pp.307-335.

Darmadi, S., & Gunawan, R. (2013) "Underpricing, board structure, and ownership: An empirical examination of Indonesian IPO firms", *Managerial Finance*, Vol. 39 No. 2, pp.181-200.

Dumay, J., & Cai, L. (2014) "A review and critique of content analysis as a methodology for inquiring into IC disclosure", *Journal of Intellectual Capital*, Vol. 15 No. 2, pp. 264-290.

Dumay, J., & Roslender, R. (2013) "Utilising narrative to improve the relevance of intellectual capital", *Journal of Accounting & Organizational Change*, Vol. 9 No. 3, pp.248-279.

Edvinsson, L., & Malone, M. (1997) *Intellectual Capital: Realizng Your Company's True Value by Finding Its Hidden Brainpower*. New York: HarperCollins.

Fama, E.F., & Jensen, M. (1983) "Separation of ownership and control", *Journal of Law and Economics*, Vol. 26 No. 2, pp. 301-26.

Fariha, R., Hossain, M.M., & Ghosh, R. (2022) "Board characteristics, audit committee attributes and firm performance: empirical evidence from emerging economy", *Asian Journal of Accounting Research*, Vol. 7 No. 1, pp.84-96.

Frazier, P.A., Tix, A.P., & Barron, K.E. (2004) "Testing moderator and mediator effects in counseling psychology research", *Journal of Counseling Psychology*, Vol. 51 No. 1, pp.115-134.

Garanina, T., & Dumay, J. (2017) "Forward-looking intellectual capital disclosure in IPOs: Implications for intellectual capital and integrated reporting", *Journal of Intellectual Capital*, Vol. 18 No. 1, pp.128-148.

Ghazali, N.A.M. (2020) "Governance and ownership in Malaysia: their impacts on corporate performance", *Asian Journal of Accounting Research*, Vol. 5 No. 2, pp. 285-298.

Gray, S., Felman, J., Carvajal, A., & Jobst, A.A. (2014) *Developing ASEAN-5 bond markets: what needs to be done?*, Crawford School of Public Policy, The Australian National University and Wiley Publishing Asia Pty Ltd.: Canberra.

Guthrie, J., Petty, R., & Ricceri, F. (2006) "The voluntary reporting of intellectual capital: Comparing evidence from Hong Kong and Australia", *Journal of Intellectual Capital*, Vol. 7 No. 2, pp.254 - 271.

Haji, A.A., & Anifowose, M. (2017) "Initial trends in corporate disclosures following the introduction of integrated reporting practice in South Africa", *Journal of Intellectual Capital*, Vol. 18 No. 2, pp.373-399

Hopp, C., & Dreher, A. (2013) "Do differences in institutional and legal environments explain cross-country variations in IPO underpricing?", *Applied Economics*, Vol. 45 No. 2013, pp.435-454.

Itami, H. (1987) *Mobilizing Invisible Assets*. London: Harvard University Press.

Jensen, M.C. (1993) "The modern industrial revolution, exit, and the failure of internal control systems", *Journal of Finance*, Vol. 48 No. 3, pp. 831-80.

Kamat, G.B. (2020) "Role of corporate governance in the voluntary disclosure of intellectual capital", *International Research Journal of Business Studies*, Vol. 12 No. 3, pp.243-256.

Kawai, M., & Naknoi, K. (2017) "ASEAN's trade and foreign direct investment: long-term challenges for economic integration", *The Singapore Economic Review*, Vol. 62 No. 3, pp.643-680.

Kent, P., & Zunker, T. (2013) "Attaining legitimacy by employee information in annual reports", *Accounting, Auditing & Accountability Journal*, Vol. 26 No. 7, pp.1072-1106.

Lev, B. (2001) *Intangibles: Management, and Reporting*, Washington, DC.: Brookings Institution Press.

Lev, B., & Zarowin, P. (1999) "The boundaries of financial reporting and how to extend them", *Journal of Accounting Research*, Vol. 37 No. 2, pp.353-383.

Massaro, M., Dumay, J., & Bagnoli, C. (2017) "When the investors speak: Intellectual capital disclosure and the web 2.0", *Management Decision*, Vol. 55 No. 9, pp.1888-1904.

Mondal, A., & Ghosh, C. (2021) "Effect of intellectual capital disclosure on cost of equity capital: a study on Indian companies", *Asian Journal of Accounting Research*, Vol. 6 No. 2, pp. 165-179.

Muttakin, M.B., Khan, A., & Belal, A.R. (2015) "Intellectual capital disclosures and corporate governance: An empirical examination", *Advances in Accounting, incorporating Advances in International Accounting*, Vol. 31 No. 2015, pp.219-227.

Nicolo, G., Aversano, N., Sannino, G., & Polcini, P.T. (2021) "ICD corporate communication and its determinants: evidence from Italian listed companies' websites", *Meditari Accountancy Research*, Vol. 29 No. 5, pp.1209-1232.

Nimtrakoon, S. (2015) "The relationship between intellectual capital, firms' market value and financial performance" *Journal of Intellectual Capital* Vol 16 No. 3 pp 587-618.

Noviayanti, P., & Husodo, Z. A. (2018) "Exposure to common idiosyncratic volatility on stock returns in ASEAN stock markets", *International Journal of Business and Society*, Vol. 19 No. 4, pp.499-516.

Rashid, A.A., Ibrahim, M.K., Othman, R., & See, K.F. (2012) "IC disclosures in IPO prospectuses: evidence from Malaysia", *Journal of Intellectual Capital*, Vol. 13 No. 1, pp.57-80.

Roos, J., Roos, G., Edvinsson, L., & Dragonetti, N. C. (1997). *Intellectual Capital: Navigating in the New Business Landscape*. Houndsmils: Macmillan.

Scott, W. R. (2000) *Financial Accounting Theory* (2nd ed.). Upper Saddle River, NJ: Prentice-Hall.

Singh, I., & Van der Zahn, J.-L.W. M. (2007) "Does intellectual capital disclosure reduce an IPO's cost of capital? The case of underpricing", *Journal of Intellectual Capital*, Vol. 8 No. 3, pp.494-516.

Singh, I., & Van der Zahn, J.-L.W. M. (2008) "Determinants of intellectual capital disclosure in prospectuses of initial public offerings", *Accounting and Business Research*, Vol. 38 No. 5, pp.409-431.

Specht, D.A. (1975) "On the evaluation of causal models", Social Science Research, Vol. 1975, No. 4, pp.113-133.

Stewart, T. A. (1997) *Intellectual Capital: The Wealth of New Organizations*. London: Nicholas Brealey Publishing.

Sveiby, K. E. (1997) *The new organizatinal wealth: Managing and measuring knowledge-based assets*. New York: Berret-Koehler.

Tayles, M., Pike, R., & Sofian, S. (2006) "Intellectual capital, management accounting practices and corporate performance: perceptions of managers" *Accounting, Auditing and Accountability Journal*, Vol 20 No. 4 pp522-548.

Tejedo-Romero, F., Araujo, J.F.F.E., & Emmendoerfer, M.L. (2017) "Corporate governance mechanisms and intellectual capital", *Review of Business Management*, Vol. 19 No. 65, pp.394-414.

Too, S.W., & Wan Yusoff, W.F. (2015) "Exploring intellectual capital disclosure as a mediator for the relationship between IPO firm-specific characteristics and underpricing", *Journal of Intellectual Capital*, Vol. 16 No. 3, pp.639-660.

Van der Zahn, J-L.W. M., Singh, I., & Heniro, J. (2007) "Is there an association between intellectual capital disclosure, underpricing and long-run performance?" *Journal of Human Resource Costing & Accounting*, Vol. 11 No. 3, pp.178-213.

Vitolla, F., Raimo, N., Marrone, A., & Rubino, M. (2020) "The role of board of directors in intellectual capital disclosure after the advent of integrated reporting", *Corporate Social Responsibility and Environmental Management*, Vol. 27. No. 1, pp.2188-2200.

Weqar, F., Zubair, A. S., & Haque, S. M. I. (2021) "Nexus between intellectual capital and business performance: evidence from India" *Asian Journal of Accounting Research*, Vol. 6 No. 2 pp 180-195.

Witkowska, J. (2016) "Integration processes in the global economy: Current state and prospects. The cases of the European Union, ASEAN Economic

Community, and NAFTA", *Comparative Economic Research*, Vol. 19 No. 4, pp. 47-65.

Yan, X. (2017) "Corporate governance and intellectual capital disclosures in CEO's statements", *Nankai Business Review International*, Vol. 8 No. 1, pp.2-21.

Yatim, P. (2011) "Underpricing and board structures: an investigation of Malaysian initial public offerings (IPOs)", *Asian Academy of Management Journal of Accounting and Finance*, Vol. 7 No. 1, pp.73-93.

Yean, T.S., & Das, S.B. (2015) "The ASEAN Economic Community and conflicting domestic interests: An overview", *Journal of Southeast Asian Economies*, Vol. 32 No. 2, pp.189-201.

Appendix

Frequency and percentage of companies making IC disclosure

IC disclosure items (79 items)*	**Frequency** of companies making disclosure (N = 192)**	**Percentage of companies making disclosure**
Human resource capital (28 items):	**36.36**	**18.94**
Employee breakdown by age	0	0.00
Employee breakdown by seniority	11	5.73
Employee breakdown by gender	0	0.00
Employee breakdown by nationality	1	0.52
Employee breakdown by department	52	27.08
Employee breakdown by job function	125	65.10
Employee breakdown by level of education	0	0.00
Rate of employee turnover	0	0.00
Comments on changes in the number of employees	66	34.38
Comment on employee health and safety	65	33.85
Employee absenteeism rate	0	0.00
Comments on employee absentee rate	0	0.00
Discussion of employee interviews	0	0.00
Statements of policy on competency development	150	78.13
Description of competency development programs and activities	74	38.54
Education and training expenses	7	3.65
Education and training expenses by number of employees	0	0.00
Employee expenses by number of employees	0	0.00
Recruitment policies of the firm	7	3.65
Separate indication firm has a HRM department, division or function	71	36.98
Job rotation opportunities	4	2.08
Career opportunities	37	19.27
Remuneration and incentive systems	90	46.88
Pensions	76	39.58

IC disclosure items (79 items)*	**Frequency** of companies making disclosure (N = 192)**	**Percentage of companies making disclosure**
Insurance policies	81	42.19
Statements of dependence on key personnel	101	52.60
Revenues to employee	0	0.00
Value added by employee	0	0.00
Customer capital (14 items):	**36.29**	**18.90**
Number of customers	21	10.94
Sales breakdown by customer	62	32.29
Annual sales per segment or product	103	53.65
Average purchase size by customer	1	0.52
Dependence on key customer	97	50.52
Description of customer involvement in firm's operations	6	3.13
Description of customer relations	39	20.31
Education/training of customers	3	1.56
Value added per customer or segment	0	0.00
Absolute market share of the firm within its industry	6	3.13
Relative market share (not expressed as a percentage) of the firm	0	0.00
Market share breakdown by country, segment, or product	2	1.04
Repurchases by customers	86	44.79
Item category and item description	82	42.71
IT capital (6 items):	**44.17**	**23.00**
Description of investments in information technology	16	8.33
Reason(s) for investments in information technology	16	8.33
Description of existing information technology systems	116	60.42
Software assets held or developed by the firm	68	35.42
Description of intellectual technology facilities	46	23.96
Information technology expenses	3	1.56

IC disclosure items (79 items)*	**Frequency** of companies making disclosure (N = 192)**	**Percentage of companies making disclosure**
Process capital (9 items):	**34.11**	**17.77**
Information and communication within the company	33	17.19
Efforts related to the working environment	58	30.21
Working from home	0	0.00
Internal sharing of knowledge and information	37	19.27
External sharing of knowledge and information	3	1.56
Measure of internal processing failures	25	13.02
Measure of external processing failures	5	2.60
Discussion of fringe benefits and company social programs	21	10.94
Outline of environmental approvals, statements and policies	125	66.10
R&D capital (8 items):	**53.13**	**27.67**
Statements of policy, strategy and objectives of R&D activities	175	91.15
Ratio of R&D expenses to sales	27	14.06
R&D invested into basic research	3	1.56
R&D invested into product design and development	67	34.90
Details of future prospects regarding R&D	11	5.73
Details of existing company patents	120	62.50
Number of patents and licenses	12	6.25
Information on pending patents	10	5.21
Strategic capital (14 items):	**36.50**	**19.01**
Description of new production technology	1	0.52
Statements of corporate quality performance	5	2.60
Information about strategic alliances of the firm	83	43.23
Objectives and reason for strategic alliances	64	33.33
Comments on the effects of the strategic alliances	0	0.00

IC disclosure items (79 items)*	**Frequency** of companies making disclosure (N = 192)**	**Percentage of companies making disclosure**
Description of the network of suppliers and distributors	6	3.13
Statements of image and brand	58	30.21
Corporate culture statements	29	15.10
Statements about best practices	2	1.04
Utilization of energy, raw materials and other input goods	65	33.85
Investment in the environment	18	9.38
Description of community involvement	89	46.35
Information on corporate social responsibility and objective	90	46.88
Description of employee contracts	1	0.52
All items (79 items)	**38.41**	**20.00**

Note: * 79 IC disclosure items are based on the study of Garanina and Dumay (2017).

** The total provided for each sub-category is an average of the companies disclosing at least one of each item in the category.