

Exploring the Effects of Board Characteristics on Innovation Capital Disclosure: Evidence from Malaysia

Nur Hani Othman, Azwan Abdul Rashid, Norhayati Mat Husin

Abstract — Innovation is one of the major determinants for competitive advantage and long-term success for business growth. As a result, there is an increased demand for information on innovation activities of firms among stakeholders. The main objective of this research is to investigate whether board characteristics influence the disclosure of innovation capital in the Malaysian public listed companies. The sample consists of 68 public listed companies in the Main Market of Bursa Malaysia over a five-year period from 2011 to 2015. The research employs content analysis methodology to measure the extent of the innovation capital disclosure in the annual report. The multiple regression analysis is then used to investigate the relationships between five board variables and innovation capital disclosure. In general, the extent of innovation capital disclosure indicates an increasing trend in the sample years. The result also reveals that there are significant differences between categories of innovation capital disclosure, with external capital identified as having the highest disclosure. The multiple regression results provide evidence that all five board variables were significantly associated with innovation capital disclosure. Board size, board independent, foreign directors, board meeting, and director age are related to the extent of innovation capital disclosure.

Index Terms— Disclosure, Innovation Capital, Board Characteristics.

I. INTRODUCTION

The transformation of industrial to knowledge economy increases the relevance of innovation capital. Innovation capital has become the fundamental of intellectual capital in providing an influential drive for gaining and sustaining competitive advantage and describes the ability of a firm to generate and use innovative solutions [1, 2]. Besides, innovation capital consists intangible assets and innovative capacity which is used to expand new skills and products, and also intellectual property such as patents, copyrights, trademarks and so on [3]. Traditional growth is declining the importance of investment in physical assets, while on a macro-economic level innovation has become a major driver of economic growth [4]. Factors such as globalization, advance in technologies and increasing competition have resulted in increasing demand for voluntary

reporting and decreasing the importance of financial reporting [5, 6]. Most of the previous studies are dealing with the voluntary disclosure of intellectual capital in general, however very few studies dealing with voluntary innovation capital disclosure [7]. Therefore, disclosures of innovation capital information can improve the financial disclosures, thus improving a firm's level of transparency.

Today's innovation focus tends to be on building a comprehensive market-oriented capability by systematically focus on process elements and cultural aspects. According to [8], a culture of innovation may be necessary to evolve and succeed in today's constantly changing business environment. In addition, organizations that have strong orientation toward either bottom-up or top-down management teams generally know what to do, at least in theory, to make their firm into sustained innovators [9]. Hence, organizational leadership is needed where firms need to embed innovation into a comprehensive corporate governance system. This means that business leader need to identify and address all the fundamental questions regarding the placement of innovation. The OECD Principles of Corporate Governance describe corporate governance as a set of relationships between a firm's management, its board, its shareholders and other stakeholders [10]. Firms with good corporate governance is expected to increase management incentives to disclose more information for stakeholders. Hence, most developed nations have been actively reviewing and improving their regulatory frameworks, particularly in corporate governance, transparency and disclosure [11].

Empirical evidence from developing countries like Malaysia has mainly focused on broad understanding of intellectual capital disclosure [6, 12-14]. However, researches that clearly addressing other intellectual capital categories such as innovation capital is still lacking [7]. This study aims to narrow the gap by focusing on innovation capital with the following objectives; firstly, to assess the extent of innovation capital disclosure, secondly, to identify the factors that influence the extent of board characteristics on innovation capital disclosure in annual reports of Malaysia public listed companies over a five years period (2011–2015).

The remainder of the paper is organized in the following manner. Section 2 provides brief background information on the Malaysian economy. Section 3 discusses the literature related to innovation capital disclosure and board characteristics. Section 4 describes the methodology and data collection. Section 5 discusses on empirical results. Finally, concluding comments are presented in section 6.

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II. AN OVERVIEW OF THE MALAYSIAN ECONOMY

In the past 30 years, Malaysia has transformed itself from a producer of raw materials into an emerging multi-sector economy. The country has succeeded in nearly eradicating poverty and achieved robust growth in GDP. The World Bank has indicated that Malaysia's goal to achieve high income country status by 2020 is well within reach, while ensuring sustainable growth. Overall, Malaysia's short-term economic outlook remain favorable. Accelerated implementation of productivity-enhancing reforms to increase the quality of human capital and create more competition in the economy will be the key for Malaysia to secure a lasting place among the ranks of high-income economies. There is a continued challenge to transform and boost the Malaysian economy dynamically, and innovation will play a major part in this process.

Malaysia has proven its strengths in identifying major challenges. As a result, in order to remain competitive in the world economy, the nation needs to persistently generate and establish new innovation strategies. One of the measures is to increase the nation's capability in the adoption and development of science and technology through R&D and innovation. During the Malaysia 11th Plan (2016–2020), innovation is known as a game changer to sustain economic growth and improve the wellbeing of the people. Innovation is also known as a key driver for economic growth as it raises productivity through new or improved processes, technologies, and business models. In addition, innovation can create additional sources of revenue through differentiated products and services that serve unmet customer needs. As Malaysia continues with strong focus on the services and manufacturing sectors, innovation will be crucial to raise the overall efficiency and thus productivity of each sector.

Malaysia's economy has proven resilient to global headwinds, but more can be done to boost innovation is to raise productivity and shift to a more sustainable growth path that will boost living standards for all, according to two new reports from the OECD. The first OECD Economic Assessment of Malaysia recognizes that growth is moderating, but it remains moderated by domestic demand and should be above 4% in both 2016 and 2017 (Figure 1). The assessment underlines the need to continue fiscal consolidation, to provide a barrier conditions decline, and lays out a series of reform recommendations for maintaining economic resilience, raising productivity and fostering inclusiveness.

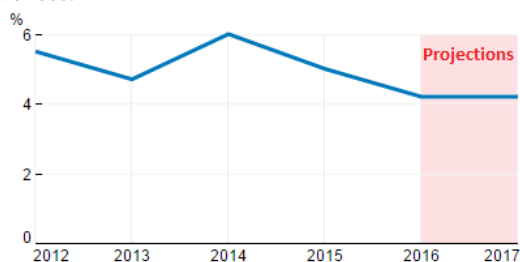


Figure 1: Real GDP growth, annual % change
Source: OECD Economic Survey of Malaysia 2016

A new Review of Innovation Policy of Malaysia shows that Malaysia has expanded its science, technology and innovation, raising R&D spending to nearly 1.3% of GDP in 2014, from 0.2% in 1996, and investing strongly in education and skills. To progress further, and raise the chances of innovation-led productivity gains, Malaysia should modernizes its public research institutes, enhance their links with universities and provide more public support to firms to boost the private sector's potential to innovate. Better coordination between and streamlining of the numerous public bodies involved in science, technology and innovation policy making would also be helpful.

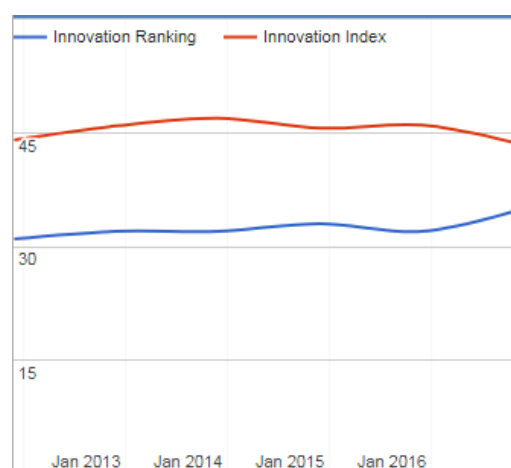


Figure 2: Malaysia – Global Innovation Index
Source: GII 2016 data

Malaysia placed 37th among all the countries in the Global Innovation Index (GII) in 2017, slightly below the 33rd rank it achieved in 2014 (Figure 2). Malaysia's innovation index score fell from 45.60 in 2014 to 42.72 in 2017. The report stated that Malaysia was among the top economies in Asia, behind Singapore, South Korea, Japan, Hong Kong, New Zealand and Australia, and that the country was among the middle-income economies that were the closest to the top 25 in 2017. In 2016, Malaysia was in the 35th position in the GII report, which measured the innovation performance of 127 economies around the world. The inclusion of the Russian Federation and Argentina in the middle-income group had led to the downward movement of Mexico, Malaysia, Turkey, and Thailand economies that have been in the middle-income top 10 since the innovation quality metric was introduced (Figure 3). The report stated that Malaysia also had the best cluster development and information and communication technology use, and had maintained its strengths in high-technology imports and exports and creative goods exports, among other indicators. The relative fall in the rank is a consequence of other countries improving their scores much more than Malaysia. Although Malaysia's move is affected by its drop of five spots on the output side, it shows improvement in rankings across the Human capital and research, Infrastructure, and Market sophistication pillars.

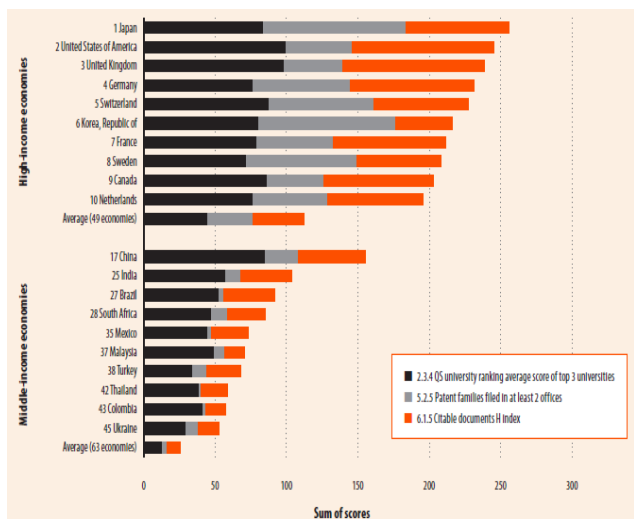


Figure 3: Metrics for quality of innovation: Top 10 high- and top 10 middle-income economies
Source: GII 2017 data

Government support of innovation in Malaysia occurs primarily through its science, technology, and innovation policies that began to be implemented in the 1980s. The types of programs, focal areas, and target groups are shown in Figure 4; these are administered by the government directly and through the coordination of other public bodies. The Ministry of Science, Technology and Innovation (MOSTI) supports the creation, research, development, and commercialization of innovative activities in Malaysia. The number of projects approved by MOSTI and the amounts involved have increased since the government's first efforts, in 1991, to provide R&D grants following the introduction of the Action Plan for Industrial Technology Development to stimulate R&D in the country.

Malaysia outperformed its middle-income peers in all seven pillars of the GII over the period 2011-2014. Its general institutions for stimulating innovation are good, as can be seen from the improvements in its ranking in the ease of starting a business indicator, from 90th in 2012 to 15th in 2014. Malaysia's ranking in Business environment, has also improved, seen it rise from 53rd place in 2011 to 25th in 2014. At the same time, the government's increasing focus on research funding has helped stimulate expansion in innovation inputs and outputs, evidenced by the rise in R&D expenditure as a share of GDP, R&D researchers and scientists per millions persons, and number of doctoral graduates and scientific publications. Both the leadership at MOSTI and the National Science Research Council (NSRC) have systematically tried to address the need to target expenditure to the priority that can be generate innovation.

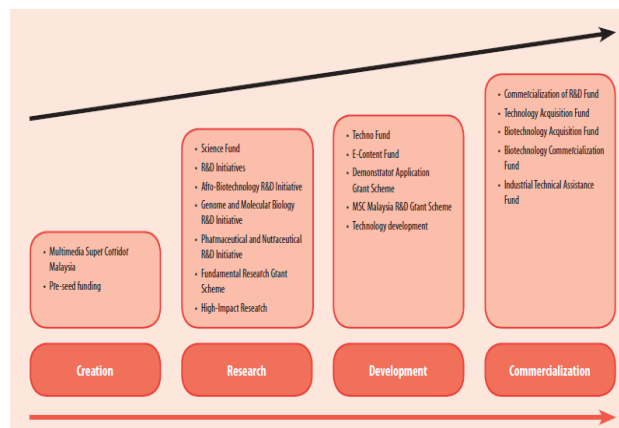


Figure 4: Public funding of innovation, Malaysia.
Source: Adapted from Ministry Science, Technology and Innovation, 2013.

Despite being an innovation outperformed, some weakness still need to be addressed. Malaysia's performance in the efficiency of innovation has not kept pace with the significant improvements made in several pillars. Although Malaysia's Innovation Efficiency Ratio placed it 72nd in the 2014 GII (score 0.74), dropping from 52nd in 2013 (score 0.81), it was ranked 84th in 2012 (score 0.69) and 77th in 2011 (0.66). This relatively low performance can be attributed to its weak institutions, trade balance in royalties and licensing fees, and knowledgeable output (Figure 5).

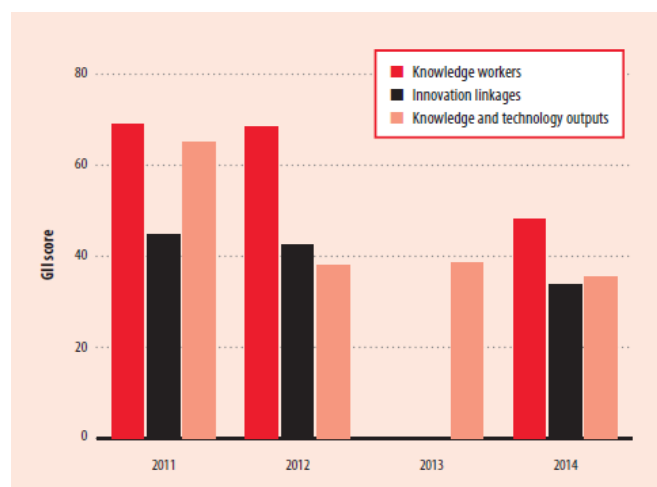


Figure 5: Knowledge workers, Innovation linkages, and knowledge and technology output scores: Malaysia, 2011-2014
Source: GII, 2011-2014.

III. LITERATURE REVIEW

A. Innovation Capital Disclosure

In recent decades, Western economies have experienced a shift from industrial sector to the service sector. Consequently, the major production factors are no longer tangible assets such as materials, machines and equipment but knowledge and information. In this knowledge economy, intangible resources such as brands, customer and supplier relations, know-how, networks and patents play a major role.

More recently, the focus has widened to intangible assets such as human capital or innovation capital [15]. As a reaction to these developments, different institutions and committees have recommended a stronger future orientation and a focus on non-financial items in disclosure (e.g. AICPA, 1994; IASB, 2007; ICAEW, 2005).

Innovation capital is a metaphor which consists of the two components of major significance. The two words are in marked opposition term capital notes to the financial well-being, while the word innovation is stand for intangibles [16]. The study explained that, the two elements are based on the two types of economies; one based on tangible assets showed by the term capital and the other based on the knowledge which represented by the word intellectual. Most economist assume that, innovation capital is seen as decisions and activities that happen from the recognition of a need or a problem, through R&D and commercialization of an invention [16, 17]. Based on [4], innovation consists the overview of a new product, process, and marketing method in organizational practices within a firm and workplace or in foreign affairs. Along the way, many scholars have tried to capture the principal of the concept. One of the earliest definition of innovation capital is given by [1] where they define innovation capital as a renewal capabilities and the related results in the terms of intellectual capital property rights and other intangible assets. The research added that, innovation capital is described the ability of a firm to generate and use innovative solutions in the future.

It is important to highlight that the first study to summarize intangibles reporting is by [18]. Later, the literature on intangible assets disclosure has developed to the production and distribution of information about intellectual capital [19]. Besides, there are studies that provide useful outline of content analysis on intellectual capital disclosure [20, 21] where these study addressed categories of intellectual capital disclosure in annual reports. [22] focused on internal, external, and human capital in annual report, however, there is lack of studies that clearly convey other types of intellectual capital such as innovation capital.

Overall, these studies outline the variation between firms on how they present their intellectual capital. Nevertheless, this study differ in ways in which investigate other types of intellectual capital, such as innovation capital. [23] shows that innovation capital disclosure is not restricted to indicators from one intellectual capital category, but is rather dispersed across internal, external, and human capital. Additionally, this study discovers that innovation capital is part of narratives which explain on how intellectual capital resources can generate innovation.

B. Innovation and Board Characteristics

Innovation is important because it is one of the key strategic decisions for which the board of directors is responsible is the firm's level of investment in innovation, including its approach to knowledge and intellectual property management. [9] have mentioned that corporate governance starts with management commitment to promote many types innovation for example to encourage everyone in the organization to consider opportunities for innovation in all aspects. Innovation is part of governance where board of directors exercising their innovation governance responsibilities. Role of board of directors is critical in shaping management and their firm's performance to

innovation in terms of how to stimulate, steer, and promote it corporate-wide. Besides, board needs to regularly reflect on whether innovation receives sufficient attention during board meeting, and board of directors should play a role regard to management on the topic of innovation [9]. He added that, although board of directors do not interfere with firm leaders in the management innovation, but they should include a strong innovation element in their traditional corporate governance missions.

Although there is a growing literature on corporate governance issues, discussions on the function of directors in the disclosure process have not been extensively explored [24]. Various determinants of firm's voluntary disclosure practices have been investigated by previous studies which focus on the firm's characteristics such as firm's size, leverage, profitability and industry [25-27]. However, research related to corporate disclosure with particular attention to corporate governance is needed for example board size, board composition, CEO duality, share concentration, and audit committee formation [13, 28, 29]. In general, the empirical findings on the relationship between board variables and corporate disclosure is mixed, thus, further research is required.

C. Board Size

Monitoring and controlling management activities are the most important roles of the board of directors, which is central to decision-making within the organization [30]. The study added that the total number of directors on the board may affects the style in which the directors carry out their responsibilities. [31] found that board size is a key determinant of voluntary corporate disclosure. Similarly, [32] and [33] find that there is a positive relationship between board size and the level of voluntary disclosure. Larger board size are able to monitor business operations better than smaller size, however a board that is too large makes the process of monitoring ineffective [25]. [34] found that there is a negative relationship between board size and the extent of CSR disclosure, as the larger board size leads to ineffective management in communication and decision-making; however the results show a positive relation.

Hypothesis 1: There is a significant relationship between board size and the extent of innovation capital disclosure.

D. Board Independence

One of the variables commonly used in recent disclosure studies is the ratio of board independence. Most researchers generally believe that board independence from management is the most effective tool in monitoring and control organization's activities. [24] found that board independence improve the quality of the disclosure. This argument is based on the view that, board independence enhances the monitoring quality and reduces the chances of information asymmetry. Besides, there are several researchers reported that board independence have significant positive influence on the level of CSR disclosure [26, 36]. Hence, it can be argued that the presence of board independence on board enhances disclosure.

There are several studies that find negative relationship of the board independence and disclosure. In view of the significance of knowledge as valuable assets in the

knowledge economy, many firms will avoid from revealing too much information in order to protect its strategic importance even with a larger proportion of independent non-executive directors [6, 37]. In contrast, [38] found that independent commissioners of a family control firms are very related to voluntary disclosure. The research also highlighted that the independent commissioners might have a lack of independence and tend to be dominated by management in decision-making.

Hypothesis 2: There is a significant relationship between board independence and the extent of innovation capital disclosure.

E. Foreign Directors

Foreign directors have an understanding and a unique knowledge of various strategies of international market area which a firm wants to explore. The existence of foreign directors may be an added value for a firm to expand globally. The argument was supported by [39] where foreign directors' experience have access to a larger and more diverse set of governance practices than directors who only sit on domestic firms' boards. According to [40], the presence of foreign directors were capable to improve disclosure that reflect the internal control.

However, in contrast, previous findings by [41] that foreign directors were not significantly influence of sustainability disclosures. In this case, as an expert foreign directors have their responsibility to effectively monitor to avoid value destruction from the manager's interests. Besides, foreign directors have the ability to control and guide the firm because of their background, and their expertise in technology and that will strengthen the internal control disclosure [40].

Hypothesis 3: There is a significant relationship between foreign directors and the extent of innovation capital disclosure.

F. Board Meeting

Several studies have found that board and compensation committee meeting frequency is positively associated with the extent of compensation practice disclosure when directors have more time together as a group to discuss various aspects of compensation disclosure [42, 43]. Recently, there are few reported studies that link the frequency of board meetings and carbon emission disclosure. nonetheless, in the context of voluntary disclosure in general, for example, [32] indicated that the number of board meetings is positively correlated to the level of voluntary disclosure. [44] found that the quantity of disclosure is positively related to the frequency of board meetings. Equivalently, [43] found that board meeting frequency is statistically related to CSR disclosure using a sample of large US commercial banks for the period 2009-2011. However, [45] did not confirm any relationship between board meetings and voluntary corporate governance disclosure. Similarly, [46] found insignificant relationship between board meetings and the nature and extent of statutory executive stock option disclosures by Australian listed companies. In addition, the number of board meeting is examined, in relation to the extent of CSR disclosure. However, there is no evidence in academic literature as far as it concerns the number of board meeting and CSR disclosure [25].

Hypothesis 4: There is a significant relationship between board meeting and the extent of innovation capital disclosure

G. Director Age

[47] argued that age can be seen as an asset to the board and it is considered as part of human capital. This argument is supported by [48] where age can reflect experience and risk-taking. However, nowadays in corporate world, most of the members in the board are generally old, and the representation of young directors is very limited [49]. As young directors have received their education recently, they tend to be more knowledgeable and they may bring different perspectives and new ideas to the firm [25, 49]. In addition, younger board members are more innovative and more efficient in governance oversight [50]. The issue of the age of director has not been investigated thoroughly, and there are no available empirical study exists as regards to the director age and the extent of innovation capital disclosure.

Hypothesis 5: There is a significant relationship between director age and the level of innovation capital disclosure.

IV. METHODOLOGY AND DATA COLLECTION

A. Sample Selection

The initial sample consists of top 100 public listed companies by market capitalization for the period 2011 to 2015, obtained from the Main Market of Bursa Malaysia. The final sample includes 340 company-year observations of annual reports. (68 companies x 5 years) that meet all of the following criteria:

- Annual reports for the period 2011 to 2015 can be downloaded from company websites;
- Data can be obtained from annual reports of sample companies; and
- Comprise only non-financial companies. Banks, unit trust, insurance and finance companies are excluded from the study due to different regulatory requirements.

Data related to disclosure variable and board characteristics was manually collected from annual reports. The analysis of the innovation capital disclosure is based on examining the contents of annual reports. The use of annual report as the document to be analyzed is consistent with prior voluntary disclosure study [12, 51]. This is because annual report is regarded as the main document that provides a lot of important information about a company and is publicly available to the stakeholders [13].

B. Content Analysis

A content analysis of 68 annual reports was carried out for five years (2011–2015) to gauge innovation capital disclosure. [52] underlined that the classification of categories must be clearly and functional in order for the content analysis to be effective. This study adapts the innovation capital disclosure checklist developed by [7]. The checklist comprised of three categories namely internal capital, external capital and human capital, which is represented by 14 attributes. The extent of innovation capital disclosure is measured using frequency count, in which every occurrence of a given attribute is recorded. By capturing repeated information, the study can provide evidence about company's disclosure strategies and the importance of disclosing each attributes of innovation-related information.

The study follows the reliability assessment of [53]. A list of coding rules was defined and tested against ten annual reports. Subsequently, any unclear coding rules were reviewed and rectified.

C. Regression model

To test the association between dependent variable (INCD) with the independent variables (BSize, BInd, FDir, BMeet and DAge), a multiple linear regression model is constructed. The model is represented as:

$$INCD = \beta_0 + \beta_1 BSize + \beta_2 BInd + \beta_3 FDir + \beta_4 BMeet + \beta_5 DAge + \varepsilon_i$$

Where:

- INCD= Innovation capital disclosure
- BSize = Represents the total number of directors
- BInd = Represents the percentage of independent non-executive directors on the board
- FDir = Represents the percentage of foreign directors on the board
- BMeet = Represents the total number of meeting per year
- DAge = Represents average age of directors
- β = Represents the regression coefficients
- ε = Represents the residual.

V. RESULTS AND DISCUSSION

A. Descriptive Statistics

The summary descriptive statistics for the independent variables are presented in Table 1. The mean board size is approximately nine members. The average proportion of independent directors is 45%, suggesting compliance with the recommendation of the Main Market Listing Requirements (2016). The study observes that board members meet, on average, about seven times per year. In terms of foreign director participation, majority of companies are comprised of 10% foreign directors. The mean director age is 59, ranging from a minimum of 51 to a maximum of 79, suggesting the representation of young directors is lacking.

Table 1: Descriptive statistics for independent variables

Variables	Mean	Skew	Kurtosis	Min	Max
BSize	8.94	0.56	-0.41	5.00	15.00
BInd	0.45	0.49	-0.13	0.20	0.75
FDir	0.10	1.65	1.85	0.00	0.67
BMeet	6.54	2.35	8.08	2.00	27.00
DAge	59.47	0.57	0.91	51.00	79.00

Table 2 shows the frequency of disclosure according to the major categories of innovation capital over a five-year period from 2011 to 2015. On the whole, the result shows that external capital was the mostly disclosed category followed by human capital, while internal capital was the least popular category.

Table 2: Extent of innovation capital disclosure by category

Categories	2011	2012	2013	2014	2015	2011 – 2015
Internal Capital	18%	15%	16%	15%	17%	16.2%
External Capital*	54%	57%	56%	58%	57%	56.4%
Human Capital	28%	28%	28%	27%	26%	27.4%
Total	100%	100%	100%	100%	100%	100%

As shown in Table 3, management philosophy, management process, and infrastructure were the most reported items under the internal capital category. The least reported items in the category were intellectual property and corporate culture which in line with previous studies in Malaysia [12, 13]. Under external capital category, distribution channels and firm reputation were highly disclosed. Meanwhile, customers & market was the least reported element in the external capital category. Employees and training & education were the most reported items under human capital category. Item that rarely disclosed under human capital category was innovativeness of employees. The summary of innovation capital disclosure is in Table 3.

Table 3: Number of companies disclosing innovation capital information

Categories & attributes	No. of companies	% of companies
Internal capital		
Intellectual property	4	5.88
Management philosophy	37	54.41
Corporate culture	2	2.94
Management process	28	41.18
Information and networking system	11	16.18
Infrastructure	17	25.00
External capital		
Customer & market	3	4.41
Distribution channels	47	69.12
Firm reputation	67	98.53
Business collaborations	16	23.53
Human capital		
Employees	67	98.53
Training & education	66	97.06
Work-related knowledge	12	17.65
Innovativeness of employees	3	4.41

B. Multiple Regression

The regression model was tested to explore whether board characteristics influence the innovation capital disclosure. Table 4 presents the empirical results for the multiple regression using innovation capital index as the dependent variable for the sample companies. Adjusted R² of 24.6 per cent implies that the variance in innovation capital disclosure is largely explained by board variables included in the model. Overall, the results suggest that all explanatory variables namely, board size, board independence, foreign

directors, board meeting, and director age, significantly influence the extent of innovation capital disclosure.

Table 4: Multiple regression results

Variable	Coefficient	Std. error	t-statistic
BSize	.786	.224	3.513*
BInd	16.27	4.116	3.955*
FDir	11.69	2.626	4.452*
BMeet	.309	.136	2.265**
DAge	-.296	.115	-2.583**

Note:

R-squared: 24.63

Adj R-squared: 23.51

F-statistic: 21.84

* and ** represent statistical significant at the 0.01 and 0.05 level

The study finds that the board size is positively associated with the extent of innovation capital disclosure ($p < 0.01$), implying that as the number of directors on board increased, the firms tend to have a higher innovation capital disclosure level. This finding is consistent with previous studies [6, 32] that larger board size are more likely to disclose more information. It also supports [33] notion that larger board size tend to voluntarily disclose more information in annual report. An inference might be drawn that, at a practical level, the priorities, concerns and responsibilities of firm's boards in Malaysia, especially firms with larger boards, are to help improve the performance of the firm and activate the role of board supervision. Thus, it can be suggested that larger boards of listed firms in Malaysia do pay attention to the importance of disclosing innovation capital information.

For board independence, the study finds that innovation capital disclosure is positively related to the proportion of independent non-executive directors on board ($p < 0.01$). The results suggest that, as the proportion of independent non-executive directors on board increased, the firms tend to have higher level of innovation capital disclosure. The findings is equivalent with several studies [26, 36] reported that board independence have significant positive influence on the level of disclosure. This is because, at the personal level, the high level of risk exposure faced by independent directors provides incentives for them to voluntarily disclose more information [54]. In addition, [55] found that innovation is influenced by board independence, with a strongly significant positive relationship between the variation in independent directors and patents. The study explained that independent directors have no material connection to the firm and its management, however they need to monitor and advise the management as to maximize firm and shareholder values in the long-term.

From Table 4, the results demonstrate a significant positive relationship between the percentage of foreign directors on board and innovation capital disclosure ($p < 0.01$). Several studies have argued that foreign directors may enhance the firm's corporate reporting practices [56, 57]. In addition, it is in line with previous argument that firms tend to disclose more information to reduce the high level of information asymmetry faced by foreign directors [29]. For large companies, they strongly agreed that diversity helps drive

innovation. When directors serve on multiple boards, they intentionally or unintentionally transfer knowledge across companies, which increase companies' investment in research and development (R&D) [58]. This finding indicates that as the number of foreign directors increased, the firms is likely to have higher innovation capital disclosure level.

There is also positive and significant relation at 5 per cent level between innovation capital disclosure and board meeting, suggesting that the higher the number of board meeting, the better the effectiveness of a board and the level of monitoring on innovation activity. In line with [42], where they found that board meeting frequency is positively related with the extent of compensation practice disclosure. According to [59], unlocking innovation needs to be first priority of board development, as to cultivate creative thinking that leads to innovative approaches where board meeting is set up to convey, receive, and process large amount of information within the limits of available time. Thus, this result leads to conclusion that the frequency of meeting provide an important venue for board of directors to acquire information that is required to be disclosed.

Unexpectedly, the direction of the association between director age and the extent of innovation capital disclosure was found to be significantly negative at the 10 per cent level. This suggest that a firm with long-serving board members have lower tendency to disclose innovation capital information in annual report. The results from previous studies find that young directors tend to be more knowledgeable, innovative, and more efficient which they can bring new ideas to the firm [25, 49]. One possible explanation is that aging directors are more risk averse thus leads to cautious reporting [60].

VI. CONCLUSION

The main objective of this study is to examine the association between board characteristics and the extent of innovation capital disclosure in the annual reports among top 100 public listed companies in Malaysia. The sample comprise of 68 companies listing on Bursa Malaysia over the period from 2011 to 2015. The study provides valuable insight on the factors affecting innovation capital disclosure using multiple regression analysis. In general, the results provide evidence that board size, board independence, foreign directors, and board meeting significantly influence the extent of innovation capital disclosure in public listed companies in Malaysia. On the other hand, the study finds significantly negative relationship with director's age.

The study also presents the trend on innovation capital disclosure in Malaysian public listed companies. It reveals that the extent of innovation capital disclosure of a firm disclosed 15.39 per cent of the 14 items included in the disclosure index. The results also indicates that external capital was the mostly disclosed category where firm reputation information is disclosed most frequently followed by distribution channels, business collaborations, and customers & market. This study provides important signal to academic and regulators that there is an urgent need for innovation capital information as board of directors' role is to encourage everyone in the organization to consider innovation in all aspects and able to influence the firm to disclose more information.

This study offers substantial implications in the following ways. First, the findings of the study help to extend previous research on intellectual capital disclosure in specific area, i.e. to explore the determinants of innovation capital disclosure in Malaysia, particularly in board variables. Recognizing the importance of innovation in knowledge economy, the presence of innovation capital information is crucial supplement to report information for revealing the firm's value creation potential. Therefore, this study provides an overall view of the future and direction of innovation capital disclosure practices, specifically on board variables.

Second, the regulators and policy makers may find the results informative in dealing with determinants that enhance innovation capital disclosure. In view of Malaysia corporate governance reforms agenda, the present study need empirical support of the efforts to devise an index that can be extended as potential policy to assess the success of government innovation policy. The index can act as a substance for emerging new methods to corporate reporting that include greater disclosure of innovation. The low level of innovation capital disclosure indicates that the progression of innovation capital reporting in Malaysia is limited due to the absence of specific guidelines for public listed companies on how to incorporate values of innovation capital disclosure into their reporting.

Although this study contribute to an understanding of innovation capital disclosure in Malaysian public listed companies, it is limited in two ways. First, this study only examine the determinants of innovation capital in one country. Future study should seek to enlarge the sample to further explore the nature of innovation capital disclosure and enhance the comparability between nations. Second, the method analyzing the content only focuses on the extent of innovation capital which is measured using frequency count. Therefore, future research should seek to measure both the extent and the quality of innovation capital disclosure.

REFERENCES

[1] L. Edvinsson and M. S. Malone, *Intellectual capital: The proven way to establish your company's real value by finding its hidden brainpower*: Piatkus, 1997.

[2] P. H. Sullivan, *Profiting from intellectual capital: Extracting value from innovation*: John Wiley & Sons, 1998.

[3] L. Wang and Y. Wang, "Global exponential stabilization for a class of distributed parameter control systems with Markovian jumping parameters and time-varying delay," *Journal of Vibration and Control*, vol. 17, pp. 873-880, 2011.

[4] OECD. (2010), The OECD innovation strategy - Getting a head start on tomorrow. Available: Available on the internet at http://www.oecd-ilibrary.org/science-and-technology/measuring-innovation_9789264059474-en

[5] B. Lev and P. Zarowin, "The boundaries of financial reporting and how to extend them," *Journal of Accounting research*, vol. 37, pp. 353-385, 1999.

[6] A. Abdul Rashid, M. Kamil Ibrahim, R. Othman, and K. Fong See, "IC disclosures in IPO prospectuses: evidence from Malaysia," *Journal of Intellectual Capital*, vol. 13, pp. 57-80, 2012.

[7] L. Bellora and T. W. Guenther, "Drivers of innovation capital disclosure in intellectual capital statements: Evidence from Europe," *The British Accounting Review*, vol. 45, pp. 255-270, 2013.

[8] C. Cancialosi. (2017). *Why Culture Is The Heart of Organizational Innovation*. Available: <https://www.forbes.com/sites/chrisancialosi/2017/02/07/why-culture-is-the-heart-of-organizational-innovation/#5f7346333f4d>

[9] J.-P. Deschamps and B. Nelson, *Innovation governance: how top management organizes and mobilizes for innovation* vol. 42. West Sussex, United Kingdom: John Wiley & Sons, Ltd, 2014.

[10] OECD. (2015), Principles of Corporate Governance. Available: <https://www.oecd.org/daf/ca/Corporate-Governance-Principles-ENG.pdf>

[11] S. S. Ho and K. S. Wong, "A study of the relationship between corporate governance structures and the extent of voluntary disclosure," *Journal of International Accounting, Auditing and Taxation*, vol. 10, pp. 139-156, 2001.

[12] C. P. Goh and P. K. Lim, "Disclosing intellectual capital in company annual reports: Evidence from Malaysia," *Journal of Intellectual Capital*, vol. 5, pp. 500-510, 2004.

[13] A. A. Haji and N. A. Mohd Ghazali, "Intellectual capital disclosure trends: some Malaysian evidence," *Journal of Intellectual Capital*, vol. 13, pp. 377-397, 2012.

[14] M. J. Hashim, I. Osman, and S. M. Alhabshi, "Effect of intellectual capital on organizational performance," *Procedia-Social and Behavioral Sciences*, vol. 211, pp. 207-214, 2015.

[15] B. Lev, *Intangibles: Management, Measurement, and Reporting*: Washington: Brookings., 2001.

[16] D. C. Duran, M. L. Gogan, and V. Duran, "Innovation Capital—A Possible Approach In Evaluation The Intangibles Assets," *Network Intelligence Studies*, vol. 2, pp. 217-221, 2014.

[17] E. M. Rogers, *Diffusion of innovations*. New York: A Division of Macmillan Publishing Co., Inc., 2003.

[18] J. Guthrie and R. Petty, "Intellectual capital literature review: measurement, reporting and management," *Journal of intellectual capital*, vol. 1, pp. 155-176, 2000.

[19] E. Giacosa, E. Giacosa, A. Ferraris, A. Ferraris, S. Bresciani, and S. Bresciani, "Exploring voluntary external disclosure of intellectual capital in listed companies: An integrated intellectual capital disclosure conceptual model," *Journal of Intellectual Capital*, vol. 18, pp. 149-169, 2017.

[20] S. Pisano, L. Lepore, and R. Lamboglia, "Corporate disclosure of human capital via LinkedIn and ownership structure: An empirical analysis of European companies," *Journal of Intellectual Capital*, vol. 18, pp. 102-127, 2017.

[21] F. Tejedo-Romero and J. F. Ferraz Esteves de Araujo, "Human Capital information: Generating intangibles and social responsibility," *Cuadernos de Gestión*, vol. 16, pp. 125-143, 2016.

[22] R. A. Razak, J. Mohammad, and S. M. Tobiagi, "Intellectual Capital Disclosures Practices and Intellectual Capital Performance in Saudi Arabia Financial Institution," *Journal of Business Studies Quarterly*, vol. 7, p. 1, 2016.

[23] J. Mouritsen, P. N. Bukh, and H. K. Bang, "Understanding Intellectual Capital in an Innovative Medium-sized Firm: The Case Of Maxon Telecom," *Australian Accounting Review*, vol. 15, pp. 30-39, 2005.

[24] R. Haniffa and T. Cooke, "Culture, corporate governance and disclosure in Malaysian corporations," in *Presented at the Asian AAA World Conference in Singapore*, 2000, p. 30.

[25] G. Giannarakis, "The determinants influencing the extent of CSR disclosure," *International Journal of Law and Management*, vol. 56, pp. 393-416, 2014.

[26] M. B. Muttakin, A. Khan, and N. Subramaniam, "Firm characteristics, board diversity and corporate social responsibility: evidence from Bangladesh," *Pacific Accounting Review*, vol. 27, pp. 353-372, 2015.

[27] R. H. Whiting and J. Woodcock, "Firm characteristics and intellectual capital disclosure by Australian companies," *Journal of Human Resource Costing & Accounting*, vol. 15, pp. 102-126, 2011.

[28] A. Alhazaimeh, R. Palaniappan, and M. Almsafir, "The impact of corporate governance and ownership structure on voluntary disclosure in annual reports among listed Jordanian companies," *Procedia-Social and Behavioral Sciences*, vol. 129, pp. 341-348, 2014.

[29] I. I. M. Sartawi, R. M. Hindawi, R. Bsoul, and A. e. J. Ali, "Board composition, firm characteristics, and voluntary disclosure: The case of Jordanian firms listed on the Amman stock exchange," *International Business Research*, vol. 7, p. 67, 2014.

[30] E. F. Fama and M. C. Jensen, "Separation of ownership and control," *The journal of law and Economics*, vol. 26, pp. 301-325, 1983.

[31] C. G. Ntim, K. K. Opong, J. Danbolt, and D. A. Thomas, "Voluntary corporate governance disclosures by post-apartheid

- South African corporations," *Journal of Applied Accounting Research*, vol. 13, pp. 122-144, 2012.
- [32] M. Allegrini and G. Greco, "Corporate boards, audit committees and voluntary disclosure: Evidence from Italian listed companies," *Journal of Management & Governance*, vol. 17, pp. 187-216, 2013.
- [33] K. Samaha, K. Dahawy, K. Hussainey, and P. Stapleton, "The extent of corporate governance disclosure and its determinants in a developing market: The case of Egypt," *Advances in Accounting*, vol. 28, pp. 168-178, 2012.
- [34] R. Said, Y. Hj Zainuddin, and H. Haron, "The relationship between corporate social responsibility disclosure and corporate governance characteristics in Malaysian public listed companies," *Social Responsibility Journal*, vol. 5, pp. 212-226, 2009.
- [35] R. M. Haniffa and T. E. Cooke, "The impact of culture and governance on corporate social reporting," *Journal of accounting and public policy*, vol. 24, pp. 391-430, 2005.
- [36] H. Jo and M. A. Harjoto, "Corporate governance and firm value: The impact of corporate social responsibility," *Journal of business ethics*, vol. 103, pp. 351-383, 2011.
- [37] P. G. Vergauwen and F. J. Van Alem, "Annual report IC disclosures in the Netherlands, France and Germany," *Journal of Intellectual Capital*, vol. 6, pp. 89-104, 2005.
- [38] S. Darmadi and A. Sodikin, "Information disclosure by family-controlled firms: The role of board independence and institutional ownership," *Asian Review of Accounting*, vol. 21, pp. 223-240, 2013.
- [39] P. Iliev and L. Roth, "Governance Transfer Through Directors' Foreign Board Experiences," 2017.
- [40] T. Dewayanto, H. Kurniawanto, D. Suhardjanto, and S. Honggowati, "Audit Committee Toward Internal Control Disclosure with the Existence of Foreign Directors as Moderation Variable," *Review of Integrative Business and Economics Research*, vol. 6, p. 324, 2017.
- [41] T. Jangu, F. Darus, M. M. Zain, and Y. Sawani, "Does good corporate governance lead to better sustainability reporting? An analysis using structural equation modeling," *Procedia-Social and Behavioral Sciences*, vol. 145, pp. 138-145, 2014.
- [42] I. Laksana, "Corporate board governance and voluntary disclosure of executive compensation practices," *Contemporary Accounting Research*, vol. 25, pp. 1147-1182, 2008.
- [43] M. I. Jizi, A. Salama, R. Dixon, and R. Stratling, "Corporate governance and corporate social responsibility disclosure: Evidence from the US banking sector," *Journal of Business Ethics*, vol. 125, pp. 601-615, 2014.
- [44] P. Kent and J. Stewart, "Corporate governance and disclosures on the transition to international financial reporting standards," *Accounting & Finance*, vol. 48, pp. 649-671, 2008.
- [45] D. Cormier, M.-J. Ledoux, M. Magnan, and W. Aerts, "Corporate governance and information asymmetry between managers and investors," *Corporate Governance: The international journal of business in society*, vol. 10, pp. 574-589, 2010.
- [46] J. Nelson, G. Gallery, and M. Percy, "Role of corporate governance in mitigating the selective disclosure of executive stock option information," *Accounting & Finance*, vol. 50, pp. 685-717, 2010.
- [47] J. A. Sonnenfeld, "What makes great boards great," *Harvard business review*, vol. 80, pp. 106-113, 2002.
- [48] S. Darmadi, "Board diversity and firm performance: the Indonesian evidence," 2010.
- [49] A. H. Ibrahim and M. M. Hanefah, "Board diversity and corporate social responsibility in Jordan," *Journal of Financial Reporting and Accounting*, vol. 14, pp. 279-298, 2016.
- [50] R. K. Van Ness, P. Miesing, and J. Kang, "Board of director composition and financial performance in a Sarbanes-Oxley world," *Academy of Business and Economics Journal*, vol. 10, pp. 56-74, 2010.
- [51] A. Yi and H. Davey, "Intellectual capital disclosure in Chinese (mainland) companies," *Journal of intellectual capital*, vol. 11, pp. 326-347, 2010.
- [52] Guthrie, R. Petty, K. Yongvanich, and F. Ricceri, "Using content analysis as a research method to inquire into intellectual capital reporting," *Journal of intellectual capital*, vol. 5, pp. 282-293, 2004.
- [53] K. Krippendorff, *Content analysis: An introduction to its methodology*: Sage, 2004.
- [54] S. Lim, Z. Matolcsy, and D. Chow, "The association between board composition and different types of voluntary disclosure," *European Accounting Review*, vol. 16, pp. 555-583, 2007.
- [55] B. Balsmeier, L. Fleming, and G. Manso, "Independent boards and innovation," *Journal of Financial Economics*, vol. 123, pp. 536-557, 2017.
- [56] R. Lambert, C. Leuz, and R. E. Verrecchia, "Accounting information, disclosure, and the cost of capital," *Journal of accounting research*, vol. 45, pp. 385-420, 2007.
- [57] M. Hassan Che Haat, R. Abdul Rahman, and S. Mahenthiran, "Corporate governance, transparency and performance of Malaysian companies," *Managerial Auditing Journal*, vol. 23, pp. 744-778, 2008.
- [58] C. Helmers, M. Patnam, and P. R. Rau, "Do board interlocks increase innovation? Evidence from a corporate governance reform in India," *Journal of Banking & Finance*, vol. 80, pp. 51-70, 2017.
- [59] C. Cuesta, "Unlocking Innovation in Board Development," *The Journal for Nonprofit Managers*, vol. 24, 2010.
- [60] M. Martikainen, J. Kinnunen, A. Miihkinen, and P. Troberg, "Board's financial incentives, competence, and firm risk disclosure: Evidence from Finnish index listed companies," *Journal of Applied Accounting Research*, vol. 16, pp. 333-358, 2015.