



The Influence of Corporate Governance on Enterprise Risk Management Implementation: A Study on Non-Financial Public Listed Companies in Malaysia

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Abstract: Despite attention given to ERM, particularly after the global financial crisis, Malaysia is still lagging behind in ERM implementation. The development and application of ERM is rather limited in practice. Policymakers, regulators and academics identify the combination of weaknesses in governance structures and failures in risk management as the key causes of the financial crisis. Strength of business performance and growth, depend on both ERM and corporate governance. Hence, this study investigates the influence of corporate governance on enterprise risk management (ERM) implementation. The subject of investigation is non-financial public listed companies (PLCs) of high-risk sectors in Malaysia. The high-risk sectors are utility, energy, and telecommunication and media. The dependent variable is ERM implementation proxy by ERM Score. The independent variable is corporate governance proxy by size of BOD, BOD independence, audit committee (AC) independence, AC financial education, size of risk committee (RC) and RC independence. Data are collected for 2016-2017 and analyze using regression analysis. The study finds size of BOD has positive significant relationship with ERM implementation. While, sector has significant negative relationship with ERM implementation. In the context of Malaysian PLCs of high-risk sectors, corporate governance influence ERM implementation. The size of the board is the significant driver “tone from the top” for ERM implementation. This conclusion leads to recommendations to regulators to emphasize the importance of board members’ roles and responsibilities in providing risk oversight. In addition, a policy on minimum and maximum number of board members need to be develop in order to ensure effective risk management oversight.

Keywords: enterprise risk management, ERM, ERM implementation, corporate governance

1. Introduction

Enterprise risk management (ERM) is a new concept in majority countries of Asia (Manab et al, 2010). In Malaysia, even though there is a trending that ERM practices are increasing, not all companies adopted ERM (Wan Daud & Yazid, 2009). Malaysia is still lagging behind in implementing ERM (Togok, 2016). The development and application of ERM is rather limited in practice (Mohd Sanusi et al., 2017). According to Wan Daud and Yazid (2010), despite more attention given to ERM in past years, ERM is still not widely practice in Malaysia. ERM implementation is still at a low level particularly among PLCs (Mohd Sanusi et al., 2017). The study examines ERM practices by public listed companies (PLCs) listed on Bursa Malaysia’s main market. The results, ERM practices are at infancy level, and only 30% of the sample companies implemented ERM programs (Mohd Sanusi et al., 2017).

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In 2007 and 2008, the Global Financial Crisis (GFC) hit world economies. Policymakers, regulators and academics identify the combination of weaknesses in governance structures and failures in risk management as the key causes of the financial crisis (Elull, 2015). According to Quon et al (2012), ERM and corporate governance are interdependent and interrelated in nature. ERM is an integration of traditional risk management and risk governance (Lundqvist & Wilhelmsson, 2018). For a company, strength of business performance and growth, depend on both ERM and corporate governance (Sobel & Reding, 2004; Manab et al., 2010). Associating ERM with corporate governance assists companies to embrace their corporate risks in order to reduce their impact (Zahiruddin & Norlida, 2013).

Against these backgrounds, this study argues that in tandem with ERM implementation is an effective corporate governance. Yet, there is lack of studies on ERM implementation in Malaysia, specifically studies dedicated to the association of corporate governance and ERM implementation. According to Lechner & Gatzert (2018), empirical literatures on ERM are grouped into three main categories, i.e. ERM implementations using surveys, determinants of ERM implementations and effect of ERM implementation on shareholders' value. Hence, this study belongs to the second category of ERM empirical literature group. As stated by Lundqvist & Wilhelmsson (2018), ERM is an integration of risk management and corporate governance. Hence, this study contributes to ERM literatures by investigating the determinants of ERM implementations from corporate governance perspectives. The objective is to determine the relationship between corporate governance factors and ERM implementation. This study contributes to enhance understanding on ERM implementation by PLCs in Malaysia from the perspective of corporate governance.

2. Literature Review

2.1 ERM and Its Importance to Companies

The Committee of Sponsoring Organizations of the Treadway Commission (COSO) defines ERM as “a process, effected by an entity’s board of directors, management and other personnel, applied in strategic setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives” (COSO, 2004). According to Meulbroek (2002), ERM is a structured risk management process. It requires a company to identify, analyze and evaluate relevant critical risks that may affect the value of the company. From the identified risks, the company develops an enterprise-wide approach in managing and mitigating the critical risks. The enterprise-wide approach risk management enables the company to achieve its strategic objectives. The main characteristics of ERM are integrative and holistic. Essentially, ERM manage risks of an enterprise by holistically view all risks in the organization, and integrating the risks into the organization’s objectives (Rodriguez and Edwards, 2009). In contrast, a traditional risk management (TRM) approach uses a silo or isolation base approach. However, TRM approach lack coordination and communication between various departments in an organization. Resulting in inefficiencies and deficiencies of risk management program.

The objective of implementing ERM is to provide a reasonable assurance that a company's can achieved its business objective and enhanced firm value (Nocco & Stulz, 2006). ERM is fundamental element of a modern business. ERM is a robust and dynamic risk management framework that elevates companies' appetite for upside risk (Stokes, 2004; Woon et al., 2011). Companies with ERM program have the capability to sustain their competitive advantage compared to companies that manage and monitor risks in silos. ERM helps in strengthening the company’s ability to perform its strategic plan (Nocco & Stulz, 2006). Many studies find ERM has positive impact on company’s performance (Grace et al., 2015; Eckles et al., 2014; Pooser, 2012; Lai, 2010; Segal, 2011; Hoyt & Liebenberg, 2010; Gordon et al., 2009; COSO, 2004) and maximizes shareholyder values (Pagach & Warr, 2011; Hoyt & Liebenberg, 2011; Beasley et al., 2008; COSO, 2004; CAS, 2003).

2.2 Implementation and Measurement of ERM

- **ERM Proxy Search.** ERM proxy search is using ERM related keywords as a proxy of ERM implementation (Eckles et al., 2014; Hoyt & Liebenberg, 2011; Tahir & Razali, 2011; Pagach & Warr, 2010; Beasley et al., 2008; Liebenberg & Hoyt, 2003) Examples are Chief Risk Officer, risk management committee, board risk management committee, and audit committee. The keyword search methodology is a common method to determine ERM implementation in companies. Ten out of twenty-five studies use keywords as proxy for ERM implementation (Kraus & Lehner, 2012). However, the limitation of keywords search is it cannot measure levels of ERM implementation. Regardless, studies still use the keyword search methodology to detect ERM implementation (Mikes & Kaplan, 2013; Fraser & Simkins, 2010).
- **ERM Rating from Standard & Poor’s.** ERM rating develops by Standard and Poor's (S&P) is a tool to measure ERM implementation (Lin et al., 2012; Pooser, 2012; McShane et al., 2011). S&P ERM Rating is an assessment tool to measure level of ERM implementation. Initially, S&P develops ERM Quality Scale (S&P, 2006), to assess level of ERM implementation by insurance companies. Later, S&P expands and integrates the scale with

ERM characteristics for banking and nonfinancial companies. Originally, the S&P ERM Quality Scale consists of four categories: weak, adequate, strong, and excellent. In 2009, S&P revises the scale into five categories: weak, adequate, adequate with risk controls, strong and very strong (S&P, 2010). A weak or adequate level indicates a traditional risk management implementation, instead of ERM. Strong and excellent levels indicate an ERM implementation (McShane et al., 2011).

- **ERM Index.** ERM index is a measurement tool to determine level of ERM implementation. Gordon et al. (2009) develops the COSO ERM Effectiveness Index. The index assess a company's capability to meet its objectives on strategy, operations, reporting, and compliance. Desender (2011) develops a questionnaire consists of 70 items based on eight components of COSO ERM Framework. The components are internal environment, objective setting, event identification, risk assessment, risk response, control activities, information and communication, and monitoring. The items in the questionnaire are scored zero if absence, and one if presence. The original questionnaire consists of 108 items using the same scoring (Desender & Lafuente, 2010). Quon et al. (2012) develop ERM Index to assess ERM implementation on different types of risks such as financial, business and operational risks. The ERM Index includes implementation on risk identification, management for each type of risk, the level of exposure and consequences of each risk. Grace et al. (2015) uses an ERM survey by Tillinghast Towers Perrin as the basis for their ERM Index. However, the ERM Index focuses on the insurance industry. The index evaluates ERM implementation based on six variables. The variables are economic capital model and metric of market value based risk, CRO or significant risk management entity, the board, the CFO, the CEO or a committee having responsibility for risk management reports, whether practice of risk management influences executive compensation and whether the company practice risk based decision-making.

2.3 Corporate Governance and Its Relationship between ERM

Corporate governance and ERM are interrelated as both assist companies to understand their risks, assess, mitigate and manage risks in a structured manner (Zahiruddin & Norlida, 2013). ERM normalizes the relations between the BOD, top management and shareholders. The integration of governance, risk, and compliance (GRC) is important to a company to achieve its objectives of enhancing shareholders value (PriceWaterHouseCoopers, 2004). Mohd Sanusi et al. (2017) investigates the impact of governance structures on ERM practices by companies listed in Bursa Malaysia. The governance structure is proxy by the establishment of risk management committee (RMC), board independence, auditor quality and institutional ownerships. The study finds that the establishment of RMC leads to greater ERM practices. Maruhun et al. (2018) conducts similar study. The study investigates the influence of corporate governance on ERM implementation of Shariah-compliant companies in Malaysia. The study uses ERM Dimension index (ERMDi) to measure ERM implementation. Data on ERM implementation is collected using a questionnaire. Corporate governance characteristics are proxy by RMC, the board size, percentage of non-executive directors and board expertise. The study finds board size and board expertise had significant associations with ERM implementation.

- **Board of Directors (BOD) Characteristics.** The BOD plays a key oversight role in risk management processes of a company (Branson, 2010) and a crucial factor influencing ERM implementation (Kleffner et al., 2003). The BOD is the internal driver for ERM implementation (Deloitte, 2008, Kleffner et al., 2003). BOD encouragement and leadership are the key driving forces in ERM implementation (Abdul Manab and Kassim, 2012). Mohd Sanusi et al. (2017) find companies with higher board independence are more likely to provide support and encouragement to ERM implementation. The BOD oversight on risk management is the foundation for the implementation of risk management and internal controls.
- **Size of the Board.** Size of the board influences company performance (Belkhir, 2009; Kyereboah-Coleman & Biepkle, 2006). Yermack (1996) finds companies with small size of board member has a higher company value compared to company with large board size. Restricting size of the board to a specific level increases the performance of a business. Larger boards brings with them poor communication and decision making of larger groups. Fama and Jensen (1983) and Lipton and Lorsh (1992) recommends the effective size of the board is seven to eight, with the maximum number of ten members. Board with members of more than seven or eight are likely to be ineffective. A board with five members is sufficient to enable informed decision-making and effective monitoring. In Malaysia and Singapore, corporate performance is highest when the board consisted of five members (Mak & Yuanto, 2003).
- **Board of Directors (BOD) Independence.** ERM implementation is positively influenced by BOD independence (Beasley et al., 2005; Desender, 2009; Wan Daud et al., 2009; Gatzert & Martin, 2015; Mohd Sanusi et al., 2017; Setiyono & Tarazi, 2018). Bursa Malaysia requires that BOD of a company to consist of minimum one-third of independent members (Bursa Malaysia, 2001). Similarly, the Malaysian Code of Corporate Governance (MCCG) emphasizes the importance of board independence (MCCG, 2017). The code recommends that at a minimum, half of the board member should be independent directors. While, for a larger board, majority of the board member should be independent directors. The reason being, BOD with a higher proportion of independent member are more likely to provide oversight of a company's risk management activities.

- **Audit Committee (AC) Characteristics.** AC plays a significant role and oversight in risk management activities (Livingston, 2005; Paape & Speklé, 2012). However, AC should be independent, possess financial and accounting knowledge and had sufficient members (Demidenko and McNutt, 2010). Therefore, effective monitoring functions can be accomplished. Bursa Malaysia requires the AC to consist of non-executive directors only (Bursa Malaysia, 2019). MCCG recommends that all Malaysian companies must create an AC to strengthen the internal control system MCGG (2017) and improve corporate governance practices (Sori, Ramadili & Kabhari, 2009). A good quality AC can potentially improve companies' performance by providing advice for enhancement in the field of management and governance structures (Turley & Zaman, 2004).
- **Audit Committee (AC) Independence.** Krishnan (2005) finds that independent and financial competence AC is less likely to be associated with internal control problems. AC consisting of all independent members and with a minimum of one financial competence member are negatively associated with financial restatements (Abbott et al., 2004). The requirements on the number and independence of the audit committee encourage companies to pay more attention to risk management (Dionne and Triki, 2005). MCGG (2017) also recommends that the AC should comprise of independent members only.
- **Financial Education of the Audit Committee (AC).** Ghafran and Sulliva (2012) find that investors value the presence of AC and have positive perception on AC consists of financial experts. Krishnan (2005) finds that the incidence of internal control problems is less likely to occur when AC members are independent and consists of financial experts. AC with financial education monitor reports of financial and operational matters efficiently (Rahmat, Iskandar & Saleh, 2009). They are capable of in-depth understanding on risks issues and auditing, and the audit procedures to determine and tackle issues on risks (DeZoort & Salterio, 2001). AC members with financial education have the skill to understand and communicate risk management activities (Liu et al., 2018; Yang et al., 2018). Hence, companies with at least one financial competence member in the AC can encourage active engagement in the risk management process.
- **Risk Committee (RC) Characteristics.** The BOD has full responsibility of ERM implementation. However, they can delegate this function to the board-level risk management committee or risk committee (RC) (Anju & Uma, 2017; Chapman, 2018; Mikes & Kaplan, 2015). Companies that establish the RC to act as a representative of the BOD provides better oversight on ERM and increases the company's value (Mohd Sanusi et al., 2017). The RC is an indicator of good corporate governance and efficient ERM implementation. The RC on behalf of the board supports ERM monitoring and oversight functions (Subramaniam et al., 2009; Sekome & Lemma, 2014). The benefit by having a separate RC is crucial on risk management activities (Yatim, 2009). RC on behalf of the BOD performs close monitoring on risk management activities. In addition, RC also manage and monitor risk-taking by the management, with shareholder value maximization in mind (Tao & Hutchinson, 2012). RC also provides advisory role concerning risk management strategies dealing with both present and future risks (Walker, 2009).
- **Size of the Risk Committee (RC).** The size of the RC has significant impact on its performance and capabilities. RC needs at least three members to ensure proper functioning (Erkens et al., 2012 and Smith, 2003). Increasing the size of the RC with varied knowledge increases managers' behavior towards risk management (Aebi et al., 2012; Yatim, 2010). DeFond and Francis (2005) assert that the RC needs to have sufficient authority and resources in order to operate effectively. Ng et al. (2013) argues that a large number of members in RC can enhance ERM functions. The larger the size, the more diversity and expertise it can be. Hence, the RC can solve variety of issues and provide recommendations to the BOD (Bedard et al., 2004). However, large RC raises a free-rider problem (Karamanou & Vafeas, 2005). The problem where the members tend to comfort each other, loose focus and become less efficient (Dalton et al., 1999).
- **Independent Risk Committee.** The independence of the RC increases ERM implementation (Walker, 2009; Gatzert & Martin, 2015). An independence RC means an independent CRO working under the guidance of the RC (Walker, 2009). An independent RC enable them to endure top management's expectation and pressure, and attain the necessary information and plan actions for better risk management (Yeh, Chung & Liu, 2011). For example, during the financial crisis, companies with an independent RC successfully reduces risk-taking activities leading to reduction in profit losses (Minton et al., 2010). An independent RC enable better monitoring of risk management activities and ensure the achievement of companies' strategies (Tao & Hutchinson, 2012). Apart from RC independent from top management, Brown et al. (2009) suggests independence of RC from AC as well. The separation of RC from AC is to ensure the full independence of RC.

2.4 Other Factors and ERM Implementation

- **Company Size.** Colquitt, Hoyt and Lee (1999) argue that ERM implementation depends on the company's size. Bigger companies are likely to adopt and implement ERM due to their relatively high complex business (Hoyt & Liebenberg, 2011). The fact that they faced various risks, their company size enables them to absorb the

administrative and operational costs of ERM implementation. In addition, bigger companies are inclined to allocate more resources to implement ERM (Beasley, Clune & Hermanson, 2005; Golshan & Rasid, 2012; Yazid, Razali, and Hussin 2012), Eckles et al. (2014) also agree that ERM implementation is influenced by company size. In other words, company sizes have positive relationship with ERM implementation (Colquitt, Hoyt, and Lee, 1999). According to Faisal & Hassan (2020), as companies' size increases, the larger is the companies' exposure to risks. The larger the risk exposures, increases the possibility to implementing ERM. In addition, as companies increase the scope of their business, their risk exposures become more complex. Hence, these large companies need ERM to manage their risks (Gatzert & Martin, 2015) and being large companies, they have the resources to invest in ERM (Lechner & Gatzert, 2018). In addition, previous studies commonly use company size as a control variable in the studies of ERM and firm value. For example, Gordon, et al. (2009) uses company size as a control variable, and finds company size had a positive influence on firm performance. Several studies have also use company size as a control variable in their investigation on the relationship between ERM implementation and firm value (Grace et al., 2015; Florio & Leoni, 2017; Lechner & Gatzert, 2018; Lin, et al., 2012; Wu et al., 2014). Their result agrees to Gordon, et al. (2009), company size has positive influence on ERM implementation and firm value.

- **Financial Leverage.** Pagach and Warr (2007) state that companies with higher leverage are more involved in ERM. In Malaysia, according to Yazid, Razali, and Hussin (2012) ERM implementation is influenced by the company's financial leverage. Similarly, a study by Golshan and Rasid (2012) on 90 PLCs, find that companies with greater financial leverage are inclined to embed ERM framework. Generally, financial leverage is likely to have positive influence on ERM adoption (Liebenberg & Hoyt, 2003), yet the relationship between financial leverage and ERM adoption is unclear (Hoyt & Liebenberg, 2011; Mikes & Kaplan, 2013). According to Gatzert, et al. (2015), leverage has positive (Pagach and Warr, 2007), negative (Lechner & Gatzert, 2018) and no influence (Desender, 2011) on ERM implementation.
- **Industry Types.** The extent of companies' ERM implementation is influenced by industry related characteristics (Paape & Speklé, 2012). Companies operating in regulated and high-risk industries are more likely to adopt ERM. Examples of these regulated industries are financial companies, banking, insurance, education, and energy companies (Beasley et al., 2005, Pagach & Warr, 2011), and companies in high-risk industries are utilities, telecommunications, and oil and gas (Frantz, 201). Companies in financial services have long implement ERM (Pagach and Warr, 2011 & Liebenberg and Hoyt, 2003).

2.5 Conceptual Framework

A conceptual framework is developed from the literature and presented in Figure 1.

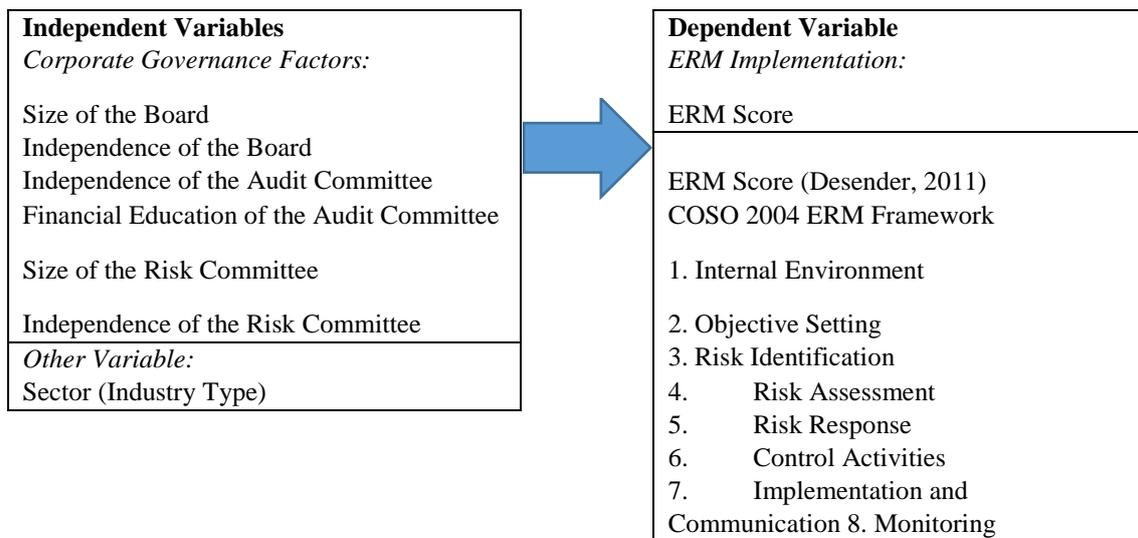


Fig. 1 - Conceptual framework

3. Research Methodology

3.1 Research Design

The objective of the study is to determine the relationship between corporate governance and ERM implementation by non-financial PLCs in Malaysia. To achieve the objectives, the study adopts the quantitative approach using secondary data. The study adopts the quantitative method because the dependent variable (ERM Score) and independent variables

(corporate governance factors) can be quantified and categorized into numerical forms (Fabozzi, et al., 2005). Moreover, the result obtains from quantitative analysis are objective, reliability and specific (Fabozzi et al., 2005). The advantage of using secondary data is that the data provide high quality and an unbiased data source (Cheng & Phillips, 2014). Most importantly, this study adopt the quantitate approach, because it is doable, practical, less expensive and efficient as the data is readily available and accessible (Hulley et al., 2013).

3.2 Sample

The PLCs are selected using purposive sampling. The selection criteria are (i) the companies issue annual reports and audited financial statements as at 31st December 2016 and 31st December 2017, and (ii) the annual reports are available on the company's or Bursa Malaysia website. Annual reports are a form of corporate information verified by an independent auditing process and officially published for stakeholders. Annual reports published on a company's website reflect the official disclosure of corporate information to stakeholders. Initially, 64 PLCs are selected for data collection (32 from Energy, 13 from Utilities, and 19 from Telecommunications and Media sectors). However, 20 companies do not meet the selection criteria and removes from the sample. The final sample consists of 44 companies. Examples of the company are Alam Maritim Resources Berhad (Energy), Maxis Berhad (Telecommunication), Media Prima Berhad (Media) and Malakoff Corporation Berhad (Utility). Table 1 presents the numbers of sample companies against total number of companies listed in Bursa Malaysia.

Table 1 - Number of companies in the study against the total number of listed companies in Bursa Malaysia

Sector	Total number of companies listed in Bursa Malaysia	Number of companies included in the study (sample)	Percentage of sample vs. total companies (by sector)
Energy	32	22	68%
Utilities	13	10	77%
Telecommunications and Media	19	12	63%
Total	64	44	-

3.3 Data Collection and Variable

Data are collected from published annual reports for the financial years ending 31 December 2016 and 31 December 2017. Table 2 describes all the variables. The dependent variable is ERM implementation, proxy by ERM Score. The ERM Score is calculated using ERM index developed by Desender (2011). Desender (2011) develops a questionnaire consist of 70 items on ERM implementation. The questionnaire is based on eight components of COSO ERM Framework. The assessment results are either "0" for absence or "1" for the presence of an item in the company's annual report. Therefore, the range of score is between 0 and 70. The average aggregate scores of items are then calculated into a total ERM Score for a company. ERM Score of 0% represents no ERM implementation and a score of 100% represents full ERM implementation. Table 3 presents selected items in the questionnaire.

Table 2 - Variable's description, measurement and data source

Variable	Acronym/ Inference	Description/ Measurement	Data Source
Dependent Variable			
Enterprise Risk Management Score	ERMS	The percentage of ERM Aggregate Score measured by disclosed item practices in a questionnaire checklist.	Published Annual report
Independent Variables			
Size of the board	BS	The total board members.	Published Annual report
Board independence	BI	The percentage of the independent members of the entire board.	Published Annual report
Audit committee independence	ACI	The percentage of a member being independent of the entire audit committee.	Published Annual report

Financial education of the audit committee	ACE	The percentage of members who have education in finance for the entire committee.	Published Annual report
Size of the risk committee	RMCS	The total members of risk committee.	Published Annual report
Risk committee independence	RMCI	The percentage of members being independent for the entire risk committee.	Published Annual report
Dummy Variable			
Sector	IND	Value=1, Energy sector. Value=2, Utilities sector. Value=3, Telecommunications and Media sector.	Bursa Malaysia website
Control Variables			
Company Size	FSIZE	A log of total revenues.	Website, published annual report
Company Leverage	FLEV	A ratio of total debt to equities (Liabilities / Stakeholder's Equity).	Website, published annual report

Table 3 - ERM Score questionnaire: COSO ERM components and examples of items under each components

1. INTERNAL ENVIRONMENT	5. RISK RESPONSE
Is there a charter of the board? Information on the code of conduct/ethics?	Financial risk General description of risk processes for determining how risk should be managed. Information on written risk guidelines about how risk should be managed. Compliance risk
2. OBJECTIVE SETTING	Response to litigation risk?
Information on company's mission? Information on company's strategy?	Response to compliance with regulation risk?
3. RISK IDENTIFICATION AND 4. RISK ASSESSMENT	Technology risk
Financial risk Information on extent of liquidity? Information on interest rate?	Response to data risk? Response to computer system risk?
Compliance risk Information on litigation issues? Information on compliance with regulation?	6. CONTROL ACTIVITIES
Technology risk Information on data management? Information on computer systems?	Information on sales control. Information on contingency plans or DRP (Disaster recovery plans)
Economical risk Information on the nature of competition?	7. INFORMATION AND COMMUNICATIONS
Reputational risk Information on environmental issues?	Information on verification of completeness, accuracy and validity of information? Information on channels of communication with customers, vendors and other external parties?
	8. MONITORING
	Information on how processes are monitored. Information about Internal Audit?

3.4 Data Analysis

Descriptive analysis for the calculation of arithmetic mean, standard deviation (SD), maximum (Max) and minimum (Min). Correlation analysis using Pearson correlation coefficient analysis to test the relationship between

independent variables. Multiple regression analysis to obtain the relationship between dependent and independent variables. The model of regression analysis is:

$$ERMS = \beta_0 + \beta_1BS + \beta_2BI + \beta_3ACI + \beta_4ACE + \beta_5RMCS + \beta_6RMCI + \beta_7IND + \beta_8FSIZE + \beta_9FLEV + \varepsilon_i$$

4. Results

4.1 Mean, Standard Deviation, Minimum and Maximum

Table 4 presented descriptive results of the mean, standard deviation, minimum and maximum values of the dependent, independent, dummy and control variables.

Table 4 - Descriptive results

	N	Mean	Std. Deviation	Minimum	Maximum
ERMS	88	0.79	0.11	0.43	0.97
BS	88	8.41	2.13	4	15
BI	88	0.52	0.11	0.33	0.80
ACI	88	0.83	0.16	0.50	1
ACE	88	0.41	0.20	0	1
RMCS	88	4.18	2.43	0	14
RMCI	88	0.54	0.31	0	1
IND	88	1.77	0.85	1	3
FSIZE	88	8.70	0.89	6.57	10.39
FLEV	88	1.66	2.34	0.03	14.54

The ERM Score (ERMS) has a mean score of 79%, a minimum score of 43% and a maximum score of 97%. The result implies that majority of PLCs implemented ERM. The mean of board size (BS) is 8 members. The minimum is 4 members and maximum is 15 members. The mean of the independence of the board (BI) is 52%, ranging from a minimum of 33% to a maximum of 80%. This result implies that on average, more than half of BOD are independent members. The independence of audit committee (ACI) has a mean of 83%, with a minimum of 50% and a maximum of 100%. Implying, the majority of the audit committee consists of independent non-executive members. The mean for the financial education of the audit committee (ACE) is 41%, with a minimum of zero to a maximum of 100%. This result shows that on average, nearly half of the audit committee members have financial competencies. The size of the risk committee (RMCS) has a mean of 4 members, minimum of zero and maximum of 14 members. The mean of risk management committee independence (RMCI) is 54%, with a minimum of zero to a maximum of 100%. This result implies that on average, majority members of the risk management committee are independent. Company size (FSIZE) has a mean of RM 8.70 billion, ranging from a minimum of RM 6.57 billion to a maximum of RM 10.39 billion. The mean of company leverage (FLEV) is 1.66. Minimum leverage is 0.03 and maximum is 14.54.

4.2 Correlation Analysis

Table 5 presents the results of correlation analysis. Correlation exist between the independence of the board (BI) and the size of the board (BS); the size of the risk committee (RMCS) and the size of the board (BS); and the independent audit committee (ACI) and the independent of the board (BI).

Table 5 - Correlation Analysis

Variable	N	BS	BI	ACI	ACE	RMCS	RMCI
BS	88	1					
BI	88	-0.225*	1				
ACI	88	-0.098	0.222*	1			
ACE	88	-0.145	0.135	-0.046	1		
RMCS	88	0.332**	0.162	-0.084	0.152	1	
RMCI	88	0.103	0.156	0.028	-0.116	0.172	1

** Significant correlation is at the 0.01 level (2-tailed).
 Significant correlation is at the 0.05 level (2-tailed).

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4.3 Results of Regression Analysis

Table 6 presents results of the regression analysis, between corporate governance factors and ERM Score. Table 7 presents the analysis of variance.

Table 6 - Results of regression analysis

Variables	Unstandardized Coefficients		Standardized Coefficients	t-Statistic	Sig.
	B	Standard Error	Beta		
Constant	.499	.153		3.264	.002
BS	.016	.006	.318	2.753	.007
BI	.105	.107	.106	.980	.330
ACI	-.073	.070	-.106	-1.048	.298
ACE	.053	.054	.100	.971	.335
RMCS	-.003	.005	-.068	-.634	.528
RMCI	-.053	.036	-.154	-1.473	.145
FSIZE	.031	.013	.256	2.304	.024
FLEV	-.007	.005	-.145	-1.481	.143
IND	-.040	.013	-.317	-3.096	.003
R	.546 ^a	Adjusted R Square	.217		
R Square	.298	Std. Error of the Estimate	.095		

Table 7 - Analysis of variance

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	.301	9	.033	3.682	.001 ^b
Residual	.708	78	.009		
Total	1.009	87			

The results show only one corporate governance factors, i.e. the size of the board (BS) has significant positive (p-value= 0.007 < 0.05) influences on ERM implementation. Holding other variables constant, one unit raised in board size leads to 0.016 unit raised in ERM Score. Reflecting that size of board members positively influences ERM implementation. While, the type of industry (IND) has significant negative influence (p-value= 0.03 < 0.05) on ERM implementation. The other corporate governance factors, i.e. board independence (BI), audit committee independence (ACI), financial education of the audit committee (ACE), size of risk management committee (RMCS) and independence of risk management committee (RMCI) have insignificant influence on ERM implementation. The coefficient of R Square is

0.298 indicating that 29.8% variance in the dependent variable ERM implementation (ERMS) is explained by the independent variables.

5. Discussions

Based on the descriptive results, this study concludes that all PLCs in Malaysia implement ERM. The average level of ERM implementation for 2016-2017 is 79%. This result shows an improvement in ERM implementation in comparison to Mohd Sanusi et al. (2017). Mohd Sanusi et al. (2017) finds ERM implementation is still low and only 30% of the PLCs in Malaysia implement ERM. In the context of non-financial PLCs in Malaysia, audit committee independence, the size of the risk committee and the risk committee independence are insignificant to ERM implementations. These findings contradict Dionne and Triki (2005). Dionne and Triki (2005) state that independent audit committee encourages companies' attention to risk management. Ng et al. (2013) finds that a large number of members in a risk committee enhance ERM functions. Yeh, Chung, and Liu (2011) argue that an independent risk committee monitor and control risks effectively.

The size of the board is significant factor influencing ERM implementation. Reinforcement from BODs is one of the driving forces in ERM implementation (Kleffner et al., 2003). Corporate governance characteristic, particularly, the size of the board is the major determinant of ERM implementation by Malaysian PLCs (Maruhun et al., 2017). The average size of the board is eight members. Eight is the optimal board members number (Fama and Jensen, 1983; Lipton and Lorsh, 1992). Type of industry is also a significant factor contributing to ERM implementation. Energy, Utilities, Telecommunications and Media sectors are industries with the highest risk (Frantz, 2011). Regarding board independence, MCCG (2017) recommends that at least half (50%) of the BOD members should be independent. This study finds the average board independence is 52%, with a minimum of 33%. Meaning not all companies comply with MCCG (2017) recommendation on the board independence principle. The average audit committee independence is 83%. Meaning that not all PLCs audit committee members are fully (100%) independent. A practice that is in contrast to MCCG (2017) recommendations. MCCG (2017) recommends the audit committee to comprise independent members only.

6. Limitations and Future Recommendations

This study has the following limitations. The context of the study is limited to high-risk sectors of Energy, Utilities, Telecommunications and Media sectors, leading to a small sample size that limited the generalizability of findings to all non-financial sectors and companies in Malaysia. Data is collected for 2-year period from 2016 to 2017. Collecting 2 years of data from annual reports of 44 companies are practical and doable. However, a 2-year data may not be sufficient to get comprehensive views of ERM implementation being influenced by corporate governance. This study uses the ERM Score developed by Desender (2011) to measure ERM implementation. However, the score was not developed for Malaysian setting and business environment, as the score is based on the COSO ERM Framework. It was a challenge to pin down a good representative measure of ERM implementation level for the Malaysian setting. However, the ERM Score developed by Desender (2011) is easy to use because it contained 70 questions. To calculate the score, users only need to check and compare each item in the questionnaire against information documented in the published annual reports. This study proposes that future studies may consider data collection of more than 2 years and a larger sample representing the population of non-financial PLCs. A larger sample enable generalization of the relationship between corporate governance and ERM implementation. A method to measure ERM implementation in PLCs in Malaysia is needed. Future studies may incorporate other global risk management standards such as International Organization for Standardization (ISO) 31000 as an ERM implementations assessment dimension, in addition to the assessment dimensions based on components of the COSO ERM Framework.

7. Conclusion

This study contributes to enhance understanding on the level of ERM implementation, and influence of corporate governance on ERM implementation in Malaysian non-financial PLCs. Despite ERM being considered as a new concept, PLCs in Malaysia do implement ERM in their organization. However, the level of implementations varies. The variation in ERM implementation can be calculated using ERM index develops by researchers such as Desender (2011), Quon et al. (2012) or Grace et al (2015). However, Malaysia is yet to have a tool to measure ERM implementation develop for PLCs in the country. In the context of Malaysian PLCs in high-risk sectors, corporate governance influence ERM implementation. The size of the board is the significant driver "tone from the top" for ERM implementation. This conclusion leads to recommendations to regulators to emphasize the importance of board members' roles and responsibilities in providing risk oversight. In addition, a policy on minimum and maximum number of board members need to be develop in order to endure effective risk management oversight.

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