

INFLUENCE OF BOARD CHARACTERISTIC ON ENVIRONMENTAL MANAGEMENT CONCERN IN CONSTRUCTION INDUSTRY (PENGARUH CIRI LEMBAGA TERHADAP ASPEK PENGURUSAN ALAM SEKITAR DALAM INDUSTRI PEMBINAAN)

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Abstract: This study examines board characteristics (i.e., size and tenure) as factors that influence the Environmental Management Concerns (EMC) of construction companies in Malaysia. The study follows a content analysis approach using data from the annual reports of listed construction companies over the period of 2010-2012, which provides the data for the index developed. Overall, the mean score of EMC for construction companies ranges from 7.14% to 100%. The average mean score is 30.56%. The top five companies score higher than 96% regarding EMC disclosure. Using regression analysis, this study provides direct evidence that board characteristic influences EMC in environmentally sensitive sectors. Board tenure, however, does not influence EMC among construction firms. The findings have some significant implications for environmentally sensitive sectors where a larger number of board members will provide such firms with greater knowledge and expertise to access resources effectively. The results of the present study emphasize the continuing importance of the role played by board members in monitoring strategic decision-making processes; and providing counsel and advice to firms.

Keywords: Board size, board tenure, environmental management concern.

Abstrak: Kajian ini mengkaji ciri-ciri Lembaga (saiz dan tempoh) sebagai faktor yang mempengaruhi aspek pengurusan alam sekitar (Environmental Management Concern (EMC)) di kalangan firma-firma pembinaan di Malaysia. Kajian ini menggunakan pendekatan "content analysis" terhadap data yang diperolehi daripada laporan tahunan firma-firma pembinaan yang tersenarai bagi tempohi tahun 2010 hingga 2012. Keseluruhannya, nilai skor min EMC bagi syarikat-syarikat pembinaan adalah di antara 7.14% hingga 100%. Nilai skor min purata adalah 30.56%. Lima (5) syarikat terbaik pula telah mencapai skor tinggi iaitu lebih daripada 96% bagi pendedahan EMC. Menggunakan analisis regresi, kajian ini membuktikan ciri-ciri Lembaga mempengaruhi EMC. Bagi tempoh Lembaga, ianya tidak mempengaruhi EMC dalam kalangan firma-firma pembinaan. Hasil kajian memberi implikasi yang signifikan terhadap industri sensitif alam sekitar di mana lebih bilangan ahli Lembaga akan memberikan khidmat nasihat dan kepakaran dalam menggunakan sumber yang ada dengan lebih efektif. Kajian yang telah dijalankan menegaskan kepinginan Lembaga bagi memantau proses pembuatan keputusan strategik; dan memberi khidmat perundingan dan nasihat kepada firma.

Kata kunci: Saiz Lembaga, tempoh keahlian Lembaga, aspek pengurusan alam sekitar.

Introduction

Most environmental management literature suggests that firms can gain sustainable competitive advantages by reducing the adverse impacts of their operations on the natural surroundings. The impact of environmental issues among firms can be

mitigated if firms operating in environmentally sensitive sectors take proactive action to be environmentally responsible (Aragón-Correa, Hurtado-Torres, Sharma & García-Morales, 2008). Companies should consciously reduce and intelligently handle environmental crisis escalation by having a good environmental

management control system. The role of an environmental management control (EMC) system has become an important focus in modern management accounting. In Malaysian context, EMC is still at a low level (Elijido-Ten, 2009). Due to high costs, environmental decisions are often made with little support from the cost management information system and are made reactively to comply with environmental regulations (Elijido-Ten, 2009; Nik Ahmad & Sulaiman, 2004). EMC is becoming a significant competitive issue and sound business objective, but at the same time provides challenges for management if an EMC is to be successful (Clarkson, Li, Richardson & Vasvari, 2011).

The construction industry contributes significantly to global environmental problems, particularly in regards to energy consumption; indoor air quality; materials utilization; and water consumption. It has been documented that buildings, which is the core product of the property development sector, account for up to 50% of CO₂ emissions; 50% of all material requirements; 40% of energy usage; 16% of water usage; 40% of solid landfill waste; and 71% of electricity used (Newell & Manaf, 2008; Pulselli, Simoncini, Pulselli, & Bastianoni, 2007). Awareness among organizations in the construction industry further develops sustainable construction techniques and policies is still low. In the US, the government offers many incentives including the Green Technology Funding Scheme; tax investment incentives; tax exemptions; stamp duty exemptions; and US\$467 million funding under the National Green Technology to promote and support environmentally conscious activities.

Despite the growth and development in the construction industry in Malaysia, the degree of involvement in environmental activities among construction companies in Malaysia is very limited (Mohamed Zain & Mustaffa Janngu, 2006). Size and tenure of board of directors is expected to influence firm's participation in environmental activities. Existing literatures suggest that entity within

a firm that is responsible for responding to environmental uncertainties is the board of directors (Pfeffer, 1972), and empirical studies have linked board member characteristics to changes in a firm's strategy (Pearce & Zahra, 1991). Furthermore, board tenure is also being taken as a determinant for a firm to be more concerned and responsible for environmental issues. The argument has been put forward that environmentally sensitive sectors require larger membership in the board of directors because such firms face environmental uncertainty and instability. A larger board is expected to be able to provide the firm with greater expertise and access to resources effectively (Journeault, 2010). Therefore, the objective of this study is to examine the influence of board size and board tenure on EMC among construction companies listed on Bursa Malaysia.

A tremendous amount of research has been performed on the disclosure and quality of corporate social responsibility (CSR) (e.g., Nik Ahmad & Sulaiman, 2004; Clarkson, Fang, Li & Richardson, 2013; Al-Tuwaijri, Christensen & Hughes, 2004); Corporate governance-board characteristics and CSR (e.g., Kiel & Nicholson, 2003; Mallin & Michelon, 2013; Shakir, 2008); and board characteristics and firm performance, albeit primarily from a financial accounting perspective (e.g., Fauziah & Yusoff, 2010; Ahmad, Hassan, & Mohammad, 2003). However, it is very rare that researchers examine the role of board characteristics and firm performance from an environmental management accounting (EMA) perspective. Thus, this study aims to explore the influence of board characteristics from an EMA perspective.

The following section provides a literature review of concerning issues relating to board size and tenure in relation to environmental management concerns. Then, the research framework and research methodology for this study are presented, followed by data analysis and discussion of findings in the next section. Finally, the conclusion outlines the limitations and recommendations relating to

the issues discussed in this study; and provides suggestions for future research.

Literature Review

The strategic rationale and driving forces behind companies that engage in environmental management policies relates to the desire to demonstrate concern for stakeholder benefits; that the firm will remain globally sustainable and the firm will act to preserve the environment for humanity and future generations. The effort of the company to remain sustainable will minimize environmental harms of the future and can be implemented as a risk reduction strategy (Jose & Lee, 2007). EMA can be viewed as an information support system that best facilitates communication, motivation and performance evaluation within a variety of organizational structures (Jasch, 2006). Furthermore, EMA can assist managers to make decisions concerning the efficient and effective use of enterprise resources.

Board Size

Based on existing literature, board size and firm performance can be viewed from both an agency theory perspective and a resource dependence theory. From an agency perspective, larger companies require a greater number of directors to monitor and control a firm's activities. From a resource dependence perspective, larger boards will be required when a firm, facing environmental uncertainty and instability, needs new skills in order to pursue new strategies due to the decision-making tasks of managers becoming more difficult and challenging (Pearce & Zahra, 1991).

The aforementioned theories are relevant in the Malaysian context. Zainal Abidin, Mustafa Kamal and Jusoff (2009) find that board characteristics have a positive impact on the sustainability performance of a company. Consistent with a study by Mohd Saleh, Mohd Iskandar and Rahmat (2005), the findings from a study by Shukeri, Shin & Shaari (2012) show that board size has a positive and significant relationship with firm performance. Both

studies provide evidence that larger board size tends to ensure that the management control of the company is strong. Evidence also suggests that large boards perform effectively without significant issues concerning communication and coordination problems among the board members. The study also proposes that boards of directors in Malaysian firms perform more effectively in a larger group. This is contrary to most US studies, which find that a small board size is more effective and performs better.

Prior studies provide evidence that the average (or optimal) board size for U.S. firms is eight to nine directors and generally find that any greater number will interfere with group dynamics and inhibit board performance (Jensen, 1993; Gertner & Kaplan, 1996). In addition, the most stable boards of publicly traded companies generally have eight to eleven directors, which is argued to be representative of the optimal board size. Yermack (1996) finds that when boards are larger than seven or eight people, they are less likely to function effectively.

A board is comprised of persons of high caliber that possess integrity and knowledge; skills and expertise, alongside financial/technical experience; and are professional in their respective fields. As a result, a board is capable to monitor the success of a firm and able to provide sufficient justifications on any corporate strategic formulations. A good governance structure provides good support from the top management (Abdul Rahman & Mohamed Ali, 2006) to ensure an organization's success in their environmental practices. Furthermore, environmental performance and firm performance are influenced by the manner in which a board of directors is established; how companies are managed; and the type of ownership of the company (Sener, Varoglu & Aren, 2011; Sherman, Kashlak & Joshi, 1998). Thus, existing literature clearly indicates the existence of a relationship between board members and EMC, since only capable board members will contribute to better organizational performance.

Board Tenure

Board tenure needs to be considered for the company to be more concern and responsible for environmental issues. A board with short tenure (i.e., one to two years) normally has lack of knowledge, skill, and experience to make effective justifications (Shakir, 2009; Walters, Kroll & Wright, 2007). On the other hand, a board that has served three to eight years may be perceived as possessing sufficient knowledge to engage in strategic decision making; mature; and confident in dealing with an environmental crisis (Wulf, Stubner, Miksche & Roleder, 2010). This is consistent with the argument by Abdul Rahman and Mohamed Ali (2006), who find that directors that have served on a board for a certain period may develop better governance competencies because of their experience, knowledge, and expertise in their related field.

Firms with longer than average board tenures tend to follow existing strategies (Finkelstein & Hambrick, 1996). Thus, as board tenure increases on a given board, the members develop shared beliefs and close friendships; and are less likely to invest much energy into developing new strategies (Hambrick & Fukutomi, 1991). However, Sherman *et al.* (1998) find that CEO tenure does not have a significant effect on firm performance variability. The optimum tenure associated with shareholder returns is just over eight years, which is consistent with Walters *et al.* (2007) that claim the monitoring role of boards appears to become more important as CEO tenure advances.

Considerable empirical evidence indicates that long-term board members (i.e., nine years and above) tend not to make strategic changes in their organizations because they are less likely to become complacent and wedded to the past (Walters *et al.*, 2007). Thus, such board members are less likely to function effectively and efficiently (Finkelstein & Hambrick, 1996). Directors that have served on the same board for some period are likely to develop strong friendships and shared

common understandings, which leads to poor management performance. This assertion contradicts the findings by other empirical studies, which find that longer CEO tenure leads to higher firm performance (Wulf *et al.*, 2010). They claim that longer CEO tenure allows more time for a given CEO to develop their paradigms and gain legitimacy, thus being able to exert a more positive influence on the firm's performance. The conclusion is consistent with the studies performed by Hamid, Ahmad and Embong (2014) and Shakir (2009) in the Malaysian context where board members with longer tenure are found to assist in enhancing firm performance because they possess experience in the field; and are more familiar with, and committed to the business.

Environmental Management Concern (EMC)

Firms put efforts to engage in environmental issues and actions as a means to fulfill the demand from stakeholders. At the same time, environmental strategy increases firm's reputation and image. Aragón-Correa *et al.* (2008) find that environmental capabilities influence the development of a proactive environmental strategy, which, in turn, leads to better organizational performance. Furthermore, several studies include management strategy in models to examine the firm's environmental concern, because management's decision to engage in four activities (i.e., environmental management system; environmental control; shared vision; and organizational learning) is completely voluntary; and the variables are identified as providing evidence of management awareness and concern regarding the environment (Ullmann, 1985; Eljido-Ten, 2007; Al-Tuwajri *et al.*, 2004).

The ability of a business to manage the environmental impacts of its products is now becoming a strategic issue. Implementing a formal environmental management system (EMS) has the potential of helping companies improve environmental performance, while, simultaneously enhancing

economic performance (Sirisom & Sonthiprasat, 2011). Evidence suggests that placing emphasis on an environmental management system (EMS) will result in advantages, particularly among environmentally sensitive industries. ISO 14001 is the world's most recognized EMS framework that, if implemented, helps organizations to better manage the impact of their activities on the environment and to demonstrate sound environmental management (Ann, Zailani & Wahid, 2006). Adopting ISO 14001 assists companies to enhance their economic performance and simultaneously improve environmental performance due to cost savings arising from energy consumption, raw material input, waste management and environmental impact reversal; and improved public image and improved profitability through waste reduction (Melnyk, Sroufe & Calantone, 2003). However, Khalid, Lord and Dixon (2012) find that certification by external bodies, such as ISO14000, involves various processes and documentations, but not necessarily being carried out.

Environmental control is becoming more popular among multinational companies at the international level. Most companies are making effort to disclose their environmental pollution prevention by showing a reduction in environmental index. Evidence exists that a paradigm shift is taking place with respect to corporate sustainability and stakeholder responsiveness, with most companies justifying their environmental control programs based on competitive advantage reasons rather than for compliance reasons (Jose & Lee, 2007). For example, initiatives such as having benchmarking on the reduction of waste, energy consumption, water and electricity used, air quality has an indicator of being environmental concern and environmentally responsible.

'Shared vision' refers to the existence of collective values and beliefs about organizational objectives and mission (Oswald, Mossholder & Harris, 1994). An environmental shared vision relates to the environmental vision of the top management

and the dissemination of the values and beliefs to all employees through close interaction and communication (Aragón-Correa *et al.*, 2008). Shared vision entails a shared feeling that the firm's objectives are important and appropriate; and that all of its members may contribute to defining them. Goal clarity and shared responsibility for organizational objectives are two basic characteristics of shared vision and positively affect organizational learning and employee creativity at the interface between business and the natural environment (Ramus & Steger, 2000). Establishing goal clarity and shared responsibility entails a shared feeling of the importance and appropriateness of the firm's environmental objectives (Aragón-Correa & Hurtado-Torres *et al.*, 2008).

Based on the definition of organizational learning of Fiol and Lyles (1970), organizational learning refers to the development of ecological insight and knowledge; and the associations between past ecological actions, the effectiveness of those actions, and future actions. Environmental learning is the process of change where organizations detect ecological problems and opportunities both within and between the organization, and its changing environment (Kloot, 1997). By improving the environmental information within a firm at a faster rate than its rivals, and developing a path-dependent from unique interactions and activities over a long period, eco-learning is recognized as being difficult-to-imitate and substitute, which makes it capable of contributing significantly to the development of a sustainable competitive advantage (Henri, 2006).

Research Framework

Figure 1 depicts the research framework of this study. This research framework indicates that the dependent variable is EMC, while two independent variables are examined: board size and board tenure. The framework is a combination of agency theory; resource dependence theory; and stakeholder theory.

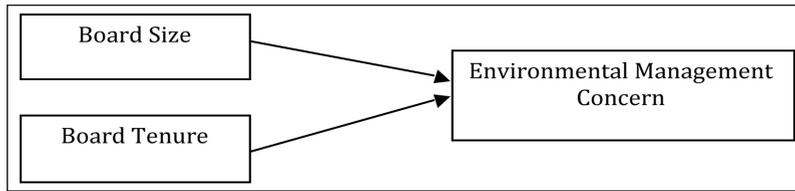


Figure 1: Research framework

Agency theory is concerned with aligning the interests of owners and managers (Jensen & Meckling, 1976) and is based on the premise that an inherent conflict exists between the interests of a firm's owners and its management (Fama & Jensen, 1983). Agency theory argues that the board plays an important role in setting policy and monitoring the management by providing direction, advice, and requests for analyses in the decision-making process (Finkelstein & Hambrick, 1996). Within the framework of agency theory, it is assumed that a board is given power to control the behaviors of the managers through primary internal control systems that fit the interests of shareholders and managers (Jensen, 1993). In the relation of EMC, one of the functions for board members is to place priority on being responsible and accountable for business activities that impact to the environment. Thus, it is assumed that a relationship exists between board size and EMC.

Meanwhile, resource dependence theory (Pfeffer & Salancik, 1978) presents an alternative to agency theory by considering a board of directors as a mechanism that reduces environmental uncertainty (Pfeffer, 1972), manages the external organizational dependencies in order to ensure the resources needed by the organization are acquired and increase organizational legitimacy (Pfeffer & Salancik, 1978). Therefore, organizations should interact closely with its environment. Resource dependency theory suggests that companies with larger boards are better since each board member brings expertise, industry experience, and access to resources. These resources could easily access efficiently and effectively to market, innovation, and invention of their product due to the advance technology nowadays.

Resources may include physical and financial assets; and firm-specific assets, such as employees' skills and organizational processes. A firm's capabilities include its ability to accomplish specific value-added tasks through the deployment of supporting resources. Therefore, the greater the capability of a firm, the more capable that firm can be in regards to environmental responsibility (Clarkson *et al.*, 2011).

As the stakeholder theory of environment posits, environmental concerns affect a wide variety of stakeholders and these stakeholders, in turn, affect corporate environmental practices (Roberts, 1992). Stakeholder theory indicates that one factor in the success of a firm relates to the ability of the firm management to maintain good relationships with its stakeholders. Ullmann (1985) develops a framework that is useful in explaining the correlations between social (and environmental) disclosures and performance, which includes economic performance, comprised of three dimensions. The first dimension (i.e., stakeholder power) explains that a firm will be responsive to the intensity of stakeholder demands. The second dimension (i.e., strategic posture) describes the mode of response the firm is likely to take concerning social and environmental demands. Finally, the third dimension (i.e., past and current economic performance) determines the relative weight of a social demand and the attention it receives. Thus, the first two dimensions examined by Ullmann (1985) are used as indicators to formulate the environmental strategy which are used to increase the reputation and image of a firm by responding to demands from its stakeholders.

Hypothesis Development

CEO power in decision-making increases with board size (e.g., Jensen, 1993). Optimizing cost, time and asset utilization can be achieved if firms are capable of managing, controlling and monitoring their resources. Booth and Deli (1996) indicate that larger boards allow firms access to the necessary expertise to overcome uncertainty and normally provide greater resources than smaller boards.

Firms with larger boards are argued to be better since each board member brings expertise, industry experience and access to resources. These resources could be accessed efficiently and effectively to market, innovation, and invention of their product due to the advance technology. The diversity of larger boards allows members to provide management with high quality advice (Pearce & Zahra, 1991). The board helps ensure the firms success in relation to their environmental practices. Pearce and Zahra (1991) find that larger boards are often more difficult to control and manage since they have their own views, ideas and expertise. However, this contradicts the study performed by Said, Zainuddin and Haron (2009), which finds that board size does not influence the level of corporate social reporting disclosure. Jensen (1993) proposes that larger boards become less effective because the coordination process becomes more challenging in relation to the size of the board. Jensen (1993) suggests limiting the board top approximately eight directors, as any greater number will interfere with group dynamics and inhibit board performance. However, it is a challenge for a smaller board to monitor and manage uncertain environmental costs even in light of agency theory, which claims that a smaller board will mitigate agency conflict between managers and shareholders. Therefore, the first hypothesis tests whether board size influences EMC and is stated as follows:

H₁: Board size is positively associated with EMC.

Existing literature finds that greater CEO experience makes decision processes more

efficient (Hambrick & Fukutomi, 1991; Miller, 1991). Wulf *et al.* (2010) find that a board member with three to eight years of experience will more than likely possess the best combination of maturity and confidence required to deal with an environmental crisis. The longer the coaching tenure, the greater the team success, but after a certain period (13 years, on average) team performance declines steadily (Hambrick & Fukutomi, 1991). Furthermore, longer board tenure is criticized as being inefficient because such board members tend to ignore their environments even when they have the autonomy and desire to influence others. As a result, board members with longer tenures have resistance to change (Miller, 1991), which will affect their performance (Walters *et al.*, 2007). This is consistent with Liu, Li, Hesterly and Cannella (2012) who find that longer tenured executives often lack the knowledge for further development and commercialization, especially when the firm is experiencing radical changes regarding stakeholders, tasks and internal organization. The optimum tenure associated with shareholder returns is just over eight years, which is consistent with Walters *et al.* (2007). However, certain research findings in the Malaysian context indicate that longer tenure may arrive at better decision-making and greater knowledge and experience, thus being beneficial to planning and decision-making processes (Shakir, 2009; Hamid *et al.*, 2014).

However, Sherman *et al.* (1998) find that CEO tenure does not have a significant effect on firm performance. Based on the findings from existing literatures, it can be concluded that board tenure has been found to be positively and negatively associated with environmental concern. Thus, the present study formulates the following hypothesis to test whether the effect of the board tenure is positively or negatively related to environmental concern:

H₂: Board tenure is positively associated with EMC.

Research Methods

The construction industry is chosen for this study due to increasing societal concerns regarding waste, energy consumption and pollution impacts of rapid development activities. Furthermore, the sector is also recognized as an environmentally sensitive sector (Saleh, Zulkifli, & Muhamad, 2010; Smith, 2007). The population for this study consists of all construction companies listed on Bursa Malaysia. 43 construction companies were listed on Bursa Malaysia as of November 2013. The present study examines the annual reports of all construction companies published between 2010 and 2012 (i.e., a three year period). Companies that do not publish annual reports for all three years examined were excluded from the sample, which resulted in a sample of 37 companies. Additional environmental information, such as awards and certifications, was obtained from the internet home page of the respective companies and published reports.

Content analysis is used to analyze the published information of the construction companies. Content analysis is chosen since this method is widely applied in accounting disclosure research (Unerman, 2000). In this study, content analysis is used to investigate

whether certain words and concepts are present within texts. This study utilizes quantitative content analysis, which is considered to be more reliable (Day & Woodward, 2009).

The regression equation used in this study is as follows:

$$TEMC = \beta_0 + \beta_1BSIZE + \beta_2BT + \epsilon$$

Where,

- TEMC – Total EMC
- β_1 - β_2 – Coefficient of slope
- BSIZE – Boards size
- BT – Board tenure (3-8 years)
- ϵ – error

The measurement of the variables is based upon previous studies. Table 1 shows the operational measures of the variables and the source of reference. Four dimensions of EMC are examined: (1) Environmental Management System; (2) Environmental Control; (3) Shared Vision; and (4) Organizational Learning. Each company will score (1) or (0) for each item representing a dimension of EMC. The maximum total score for EMC is 14.

Data Analysis

Table 2 reports the descriptive statistics for the independent variables, board size and board

Table 1: Measures for Independent Variables

Variables	Operational measure	Measurement scale [Yes(1)/ No(0)]	Source
Independent Variables: Board size (BSIZE)	Total number of members of the board of directors	Institution’s annual reports for financial year end of 2010 until 2012	Jensen (1993); Gertner & Kaplan (1996).
Board Tenure (BT)	The proportion of current directors who have served the board between 3 and 8 years	Institution’s annual reports for financial year end of 2010 until 2012	Walters, Kroll & Wright (2007)
Environmental Management systems			Elijido-Ten (2007); Henri & Journeault (2008)
	1. There is an environmental committee or environmental department.	1	
	2. There is implementation of ISO 14001 at the firm level.	1	

Environmental Control		Elijido-Ten (2007); Henri & Journeault (2008)
1. The firm provides information concerning energy efficiency	1	
2. The firm provides information concerning indoor environmental quality	1	
3. The firm provides information concerning sustainable site planning & management	1	
4. The firm provides information concerning the materials and resources used	1	
5. The firm provides information concerning water efficiency	1	
6. The firm provides information concerning waste generation and/or management (e.g., recycling, reusing, reducing, treatment and disposal)	1	
Vision and Strategy Claim		Elijido-Ten (2007)
1. A statement of corporate policy, values and principles, environmental codes of conduct	1	
2. A statement about specific environmental innovations and/or new technologies	1	
3. Product certification with respect to environmental impact (IBS, GBI, QSHE)	1	
4. The firm received environmental awards/certification	1	
Organizational Learning		Henri & Journeault (2010)
1. The firm provides staff with training on environmental issues	1	
2. The firm is actively involved in the community and/or donations related to the environment.	1	
Total Possible Score	14	

tenure. The mean board size is eight members with a standard deviation of 2.04. The minimum board size is four members and the maximum board size is 14 members. This suggests that the board size of firms in Malaysia is relatively small. The average size of board is 8 members.

This study uses board tenure for boards that have served between three and eight years. As indicated by Abdul Rahman and Mohamed Ali (2006), they possess sufficient knowledge to engage in strategic decision-making; and are mature and confident in dealing with an

environmental crisis. Thus, this study had excluded analysis of a board that served for one to two years (12%) and those who served nine years and above (54%), thereby becoming inefficient in strategy making. The mean score for board tenure (i.e., three to eight years) is 34.44% with a standard deviation of 29.89.

EMC consists of four constructs; environmental management system, environmental control, shared vision and organizational learning. Table 2 reports the descriptive statistics for the dependent

variables, EMC. The results show that 24.32% of the companies have externally validated environmental management systems. ISO 14001 and EMAS are the popular types of environmental certifications. The number of such environmental certifications increases between 2010 and 2012, which is consistent with

the statement by Jose & Lee (2007) concerning how companies will seek external validations of their efforts in the future. However, Khalid *et al.* (2012) claim that the ISO14000 certification does not provide an indicator that a company is implementing environmentally sound processes. For example, some companies are

Table 2: Descriptive analysis of variables

Variable	Year	Mean	Minimum	Maximum	Std. Deviation	Skewness	Kurtosis
Board size	2010	7.67	4.00	14.00	2.05	0.69	1.02
	2011	7.84	4.00	14.00	2.03	0.61	0.92
	2012	7.49	4.00	14.00	2.09	0.97	1.61
	Overall	7.68	4.00	14.00	2.04	0.73	0.922
Board Tenure	2010	34.99	-	100.00	30.69	0.72	(0.79)
	2011	34.91	100.00	100.00	30.45	0.83	(0.63)
	2012	33.43	100.00	51.27	29.31	0.74	(0.36)
	Overall	34.44	0.00	100.00	29.89	0.75	(0.65)

Table 3: Descriptive analysis of variables

Variable	Year	Mean	Minimum	Maximum	Std. Deviation	Skewness	Kurtosis
Environmental Management System	2010	20.27	-	100.00	32.19	1.36	0.78
	2011	21.62	-	100.00	32.36	1.24	0.47
	2012	31.08	-	100.00	36.04	0.72	(0.70)
	Overall	24.32	-	100.00	33.53	1.055	(0.089)
Environmental Control	2010	19.37	-	100.00	34.81	1.75	1.57
	2011	21.62	-	100.00	37.23	1.53	0.71
	2012	21.62	-	100.00	37.23	1.53	0.71
	Overall	20.87	-	100.00	36.13	1.55	0.773
Vision Shared	2010	23.65	-	100.00	34.83	1.40	0.71
	2011	26.35	-	100.00	34.83	1.26	0.04
	2012	31.76	-	100.00	36.16	0.84	(0.66)
	Overall	27.25	-	100.00	35.12	1.11	(0.09)
Organizational learning	2010	49.55	-	67.00	18.63	(0.45)	(0.86)
	2011	47.75	-	67.00	18.63	(0.24)	(0.97)
	2012	47.75	-	67.00	18.50	(0.24)	(0.97)
	Overall	48.35	-	67.00	18.59	(0.297)	(0.97)
Total Environmental Concern	2010	28.57	7.14	100.00	29.06	1.67	1.63
	2011	30.11	7.14	100.00	30.08	1.51	1.06
	2012	33.01	7.14	100.00	30.46	1.32	0.56
	Overall	30.56	7.14	100.00	29.65	1.50	0.83

more concerned with environmental practices in urban environments where the awareness of environmental conservation is higher than in rural areas.

The average mean score of environmental control is 20.87%, which indicates a low level of disclosure concerning how companies prevent or control their environmental activities. The mean score for shared vision is 27.25%, which is consistent with the statement of Eljido-Ten (2013) as most corporate environmental performance data is kept confidential in the Malaysian context (Nik Ahmad & Sulaiman, 2004). The mean score for environmental learning is 48.35, which indicates the awareness of the importance of staff training to foster new skills and knowledge concerning environmental issues.

Overall, the mean score of EMC for the construction companies examined ranges between 7.14% and 100%, with an average mean score of 30.56%. Table 4 indicates the five companies that recorded the highest score for EMC.

Table 4: Top companies based EMC score

No	Companies	EMC Score (%)
1	IJM Corporation Berhad	100.00
2	Sunway Holdings Berhad	100.00
3	Gamuda Berhad	94.12
4	Ken Holdings Berhad	98.04
5	Malaysian Resources Corporation Berhad	96.08

Two hypotheses were developed in the present study to determine whether board size and board tenure influence EMC. Table 5 presents the result of the regression analysis employed to examine the relationship between the independent variables and the dependent variables.

The model has R² of 16.1%, which means that the model explains 16.1% of the variance in EMC. The regression model has a fair model fit with adjusted R² of 0.129. The model reaches statistical significance when p<0.05. In this study only board size has a significance of p<0.01. The result indicates that a higher score in relation to board size will result in a higher probability of influence on EMC. Board tenure is found not to significantly influence EMC.

Results and Discussion

According to Yermack (1996), firm value depends on the quality of monitoring and decision-making by the board of directors; and board size represents an important determinant of performance. Thus, to comprehend the consistency of the results with the above statement, the first variable (i.e., board size) is tested. It is confirmed that board size has a strong significant relationship with EMC (p<0.05), as the β-value is positive of 4.328 and the t-value is 3.308. Thus, the hypothesis H₁ is accepted. This result also supports the findings of Jensen (1993), who concludes that larger board become less effective because the coordination process becomes more challenging. Jensen (1993) also suggests limiting a board to

Table 5: Regression results

Dependent variable	Independent variable	Collinearity Statistics					
		B	Beta	t	Sig.	Tolerance	VIF
EMC	Board Size	4.328	0.299	3.308	0.001	0.972	1.029
	Board Tenure	-0.112	-0.113	-1.226	0.227	0.917	1.090
		-2.501					

Model fit: R= 0.401, R²=0.161, Adj R²=0.129; F value=5.088; Sig. F =0.001;

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

approximately eight directors as any greater number will interfere with group dynamics and inhibit board performance. In relation to agency theory, its positive influences board members to mitigate the conflict of interest and personal interest; thus, ensuring that board members strive to work for the betterment of firm performance.

From a resource dependence theory perspective, a larger board brings greater opportunity for more links and access to resources (Henri, 2006). Evidence supporting resource dependence theory includes Pearce and Zahra (1991), who find a positive relationship between board size and environmental uncertainty. New directors will assist the board in developing a more thorough consideration of a wider range of options that should result in higher quality decisions, particularly when the firm recruits new directors possessing different skills; background experiences; and associations with other organizations (Sherman *et al.*, 1998).

The second hypotheses predicts that board tenure influences the environmental concerns of the firm. Board tenure is defined as a board that has served the firm for a period of between three to eight years. This tenure implies that the board had relevant skill, knowledge and experience to make decisions after serving the board for a certain period. Therefore, this study predicts board tenure will have an effect on EMC. Board tenure produces a negative β -value of (0.112) and t-value of (1.226), which indicates the variable to be an insignificant predictor of EMC ($p > 0.01$). Therefore, H2 is rejected. The result is consistent with Cheng (2008) and Sherman *et al.* (1998), that CEO tenure does not have a significant effect on firm performance and firm internalization activity. However, the result contradicts the study of Hambrick and Fukutomi (1991), which finds that a CEO with at least a few years of experience have acquired the task knowledge, confidence, and familiarity. Thus, this CEO functions effectively within the organization. Therefore, it can be concluded that board tenure does not influence EMC.

Based on the above findings, a significant relationship exists between board size and EMC, which is consistent with the findings of previous studies (Jensen, 1993). Board tenure has a significant relationship with EMC, which is also consistent with previous empirical studies (e.g., Cheng, 2008; and Sherman *et al.*, 1998). The summary of the results is presented in Table 6.

Table 6: Summary of regression results

Hypotheses	Details	P-value	Accept/Reject
H ₁	The size of a firm's board of directors is positively associated with EMC.	0.001**	Accept
H ₂	The board of director's tenure is positively associated with EMC.	0.227	Reject

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

Conclusion

This study examines board size and board tenure as factors that influence EMC among construction companies listed on Bursa Malaysia. The study finds that board size influences EMC. The findings of this present study will contribute to the existing body of knowledge and research in environmental management. The present study adds to existing literature by providing direct evidence that environmentally sensitive sectors should be monitored by a board with a larger numbers of members since the activities of the board will encounter issues relating to uncertain environmental costs. This study also provides insight into the current status of EMC practices in environmentally sensitive sectors, which could encourage awareness of EMC among construction companies in Malaysia. The findings can also potentially be used as input

by policy makers engaging in the formulation of relevant regulations; and the structuring of incentives or penalties for activities with environmental impacts, especially in relation to construction companies.

Two principal limitations exist in relation to the present study. Firstly, this study uses a content analysis of annual reports and data available on the websites of the companies examined to measure EMC at the firm level. Companies may use other mediums to channel such information, including the media; separate environmental and social reporting and interim financial statements. However, such forms of information disclosure are not within in the scope of this study. Secondly, this study focuses on 37 construction companies listed on the Bursa Malaysia. Therefore, the level of EMC may not be generalizable to all companies in the construction industry.

Several recommendations are made regarding future research concerning EMC. Future research regarding the EMC could be extended over a longer period using a longitudinal approach instead of the cross-sectional approach adopted in this study. A longer period could provide a better understanding of environmental disclosure information. Alternatively, comparative studies between different industries and countries could also provide more insight into the issues addressed in the present study. Such studies will help to validate the conclusions of the present study and address the possibility that a small, single-period data set may produce biased results. Finally, future in-depth research concerning EMC could use other research methods, such as a mixed method or case studies.

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