

Corporate Governance and R&D Reporting in Malaysian MESDAQ Market

HAMEZAH MD NOR^{a*}, NORMAN MOHD SALEH^b,
ROMLAH JAFFAR^c AND ZALEHA ABDUL SHUKOR^d

*a,b,c,d*Universiti Kebangsaan Malaysia

ABSTRACT

This study examines the relationship between corporate governance and R&D reporting among firms listed on Malaysian MESDAQ market. This study extends previous studies by performing a more detailed analysis on the disclosure of R&D information. R&D information is classified according to whether the disclosure represents forward looking or historical, financial or non-financial and quantitative or non-quantitative orientation of information. Our findings show that an increase in government ownership influence quantitative and financial R&D disclosure. However, family, foreign, management and institutional ownership do not influence R&D disclosure. We also find that audit quality represented by Big 4 audit firms play an important role in promoting R&D disclosure of MESDAQ companies.

Keywords: Corporate governance, R&D disclosure, family ownership, government ownership, independent directors

INTRODUCTION

With the emergence of knowledge-based economy, there is no doubt that the value of firms lie in their intellectual capital (IC) rather than physical capital particularly in knowledge-intensive sector such as information technology (IT). However, the value of IC is not properly disclosed in the current financial statements due to difficulty in estimating the future economic benefits of IC. Thus, financial statements seem to lose their value relevance and information effectiveness, resulting in significant gap between company market value and book value (Liang and Lin, 2008). Furthermore, failure to understand how the value of IC is generated can lead to misallocation of economic resources in the market, which may result in unpredictable volatility in market valuation (CIMA, 2000).

* Corresponding author: Email: miezah@ukm.my

Any remaining errors or omissions rest solely with the author(s) of this paper.

To date, there is no generally accepted definition of IC. Nevertheless, most of IC is defined as a source for long-term value creation for an organization. A brief review of the literatures leads one to divide IC into three common categories namely i) internal structure; ii) external structure; and iii) human capital. This study specifically focuses on Research and Development (R&D) activities, which are classified under the internal structure category (CIMA, 2000). According to The Promotion of Investment Act, 1986, R&D is defined as “*any systematic or intensive study carried out in the field of science and technology with the object of using the results of the study for the promotion or improvement of materials, devices, products, produce or processes, but does not include:*

- quality control or routine testing of materials, devices, products or produce;
- research in the social sciences or the humanities;
- routine data collections;
- efficiency surveys or management studies; and
- market research or sales promotion.”

R&D activities are among the most crucial program involved in technology intensive industry. Generally, R&D activities require a firm to invest a certain amount of capital so that it would create long-term corporate value and firm wealth. Chan, Martin and Kensinger (1990) found that investors react positively to the announcement of R&D expenditures. Furthermore they found that the positive return is driven by the technology-based sector. However, due to a lack of IC reporting framework, current and potential investors are likely to find it very difficult to assess the “*true*” meaning of IC-related information provided by firms (Gerpott, Thomas and Hoffman, 2008). Gerpott *et al.* (2008) suggest that R&D voluntary reporting is important to stay competitive in the market. They also suggest that R&D reporting might become one way to bridge the information gap between managers and investors, particularly among newly set up industries.

Agency theory stress the importance of mechanism designed to monitor the behaviour of corporate management, thereby reducing their tendency to engage in self-serving activities. Corporate governance and disclosure provide mechanisms to protect the interest of investors, thus making capital market more efficient (Patelli and Prencipe, 2007; Fabrizio and Antonio, 2007). Voluntary disclosure is one major platform used by shareholders to scrutinize the activities of corporate management (Jensen and Meckling, 1976). Since voluntary disclosure is subject to managerial discretion, the need for effective governance structure in monitoring managerial actions is required. As a result, the existence of corporate governance mechanism is to ensure transparency in the reporting of voluntary information by firms’ management. It is then expected that higher transparency in reporting will increase firms’ value and shareholders wealth. This is because the aim of R&D expenditures made by firms is to increase firms’ future performance and prospects, which subsequently would increase firms’ value and shareholders wealth. It is

expected that the existence of corporate governance should trigger and further enhance firms' disclosure of their R&D activities. Therefore, the more transparent firms report their R&D activities, the higher is expectation on firms' future cash flows.

Malaysian capital market is however unique with regards to corporate governance issue. This is due to the fact that Malaysian capital market is dominated by government and private institutional investors, highly dependent on bank debt and has significant family ownership influence. These factors may reduce the demand for quality earnings and public disclosure and hence would reduce market efficiency. The public disclosure issue may become more important in technology-based industry i.e. where the risk of R&D success is high. Prior studies show a lack of evidence on whether corporate governance conditions such as the one exist in Malaysia might affect firms' disclosure of R&D activities. Thus, this study examines the relationship between corporate governance and R&D reporting among firms listed on Malaysian Exchange of Securities Dealing and Automated Quotation (MESDAQ) i.e. a market for high technology and growth companies.

This study is different from Hashim and Mohd-Saleh (2007) in the sense that the firms are relatively smaller and younger than those listed on the Main and Second Board of Bursa Malaysia (previously known as Kuala Lumpur Stock Exchange). Hashim and Mohd-Saleh (2007) show that voluntary disclosure in Malaysian multinational companies is related to the level of multinationality indicated by the ratio of foreign sales and the number of foreign countries the products were sold. Because of the size and age of firms in MESDAQ market used as data in this study, it is unlikely for these firms to engage in multinational operations.

Furthermore, unlike previous studies, this study performs a more detailed analysis on the disclosure of R&D information. R&D information is classified according to 3 dimension of disclosure i) time orientation – historical or forward-looking ii) financial or non-financial and iii) quantitative or non-quantitative; rather than one generic or aggregate level. This is because prior studies show that investors put more weight on financial and quantitative information (Wiseman, 1982). While forward-looking information may subject to future litigation risk (Armitage and Marston, 2008), it can become an important factor for business prediction. This detailed analysis would give a richer picture on what factors are associated to more demanded form of information.

MESDAQ market was chosen because R&D activities are very crucial in technology-based companies. In order to stay competitive, these companies have to continually invest in R&D activities (Zainol, Nair and Kasipillai, 2008). Among the corporate governance variables examined include ownership structure (family ownership, foreign ownership, government ownership and institutional ownership), board structure (independent directors and CEO duality) and auditor. R&D disclosure is based on voluntary disclosure of R&D in firms' annual reports. Results indicate that there is a tendency that corporate governance mechanism,

specifically government ownership, the existence of independent directors and auditor, influence the voluntary disclosure of R&D information. However, family, foreign, management and institutional ownership do not influence R&D voluntary disclosures among our sample firms. Findings also suggest that auditors tend to influence the possibility of firms providing more transparent report with regards to R&D information.

Finding from this study will benefit various stakeholders groups – including Securities Commission in regulating the capital market under the Disclosure-Based Regime, Bursa Malaysia in monitoring the transparency of MESDAQ companies, Malaysian Accounting Standards Board in formulating standards and investment analysts in making investment decision.

This paper proceeds as follows: Section 2 discusses relevant literature review of this study and the development of hypothesis. Section 3 discusses methodology applied in this study. Section 4 presents and discusses results. Finally section 5 concludes this paper.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Technology intensive firms are expected to show high voluntary disclosures in order to attract more investors and provide a better picture of the firms (Entwistle, 1999). These firms depend heavily on voluntary disclosure because most of the assets in these firms are in the form of intangible assets, which are not recognized on the balance sheet. One way to ensure firms provide more voluntary disclosure is by having good practice of corporate governance.

Prior studies provide evidence that certain corporate governance mechanisms are found to have positive influence on the level of voluntary disclosures made by firms (see Cheng and Courtenay, 2006 on independent director; Ho and Wong 2001 on audit committee). On the other hand, prior studies also provide evidence that some corporate governance measures may have negative influence on the level of voluntary disclosures made by firms (see Gul and Leung, 2004 on CEO duality; Ho and Wong, 2001 on family ownership). Given the mixed results, plus the lack of evidence regarding the relation between R&D disclosure (and its components) and corporate governance characteristics, this study examines this issue within a context of high family and government influence in firms.

Family Ownership

Family firms are firms that are managed and controlled by founding families (Anderson and Reeb, 2003). According to Ali, Chen and Radhakrishnan (2007), the main source of agency problem in family firms is between controlling and non-controlling shareholders.

In general, family member not only own a considerable share ownership of firm but also manage and sits as boards members of firms. Ali *et al.* (2007) mentioned the adverse effect of this arrangement especially in the reporting of accounting income since management via family members can manipulate accounting numbers to hide, for example, the related party transaction and other activities that transfer wealth from firms to family members. The conflict of interest within family owners and other shareholders has made companies to disclose less voluntary information in the annual report. Ho and Wong (2001) found negative association between family members on board with firm's level of voluntary disclosure. Our study predicts that firms that have high family ownership will disclose less R&D information. Accordingly, H1 is stated as the following:

H1: The level of family ownership of firms is negatively associated with the level of R&D disclosure.

Management Ownership

As stated previously, the disclosure of voluntary information in annual reports, which also include the reporting of R&D information, is under the discretion of the management. The level of disclosure depends on firms' level of information asymmetry which arises when there is a separation between owners and managers of firm (Jensen and Meckling, 1976). To reduce this information asymmetry, managers choose to provide voluntary disclosure in the annual reports. However, the level of disclosure may also depend on the level of managerial share ownership in the firms (Jensen and Meckling, 1976). If managerial ownership is low, information asymmetry can be high since managers may behave opportunistically for their own self benefit. Therefore, outside shareholders will increase monitoring of managers' behavior and demand that they provide more voluntary disclosure (Eng and Mak, 2003; Mohd Ghazali and Weetman, 2006). On the other hand, if managerial ownership increases, the management-shareholders conflict decreases thereby reducing the need to monitor managers activities through transparent reporting (Jensen and Meckling, 1976; Hossain, Tan and Adams, 1994; Kelton and Yang, 2008). Therefore, the level of disclosure might be lower. This study postulates that the level of managerial ownership in the firms is negatively associated with the level of R&D voluntary information in the annual reports. Hence,

H2: The level of management ownership of firms is negatively associated with the level of R&D disclosure.

Government Ownership

Government involvements in firms can be in many forms; among others are the share ownership, subsidizing activities, tax incentives, and grants to companies in

certain industries. This involvement would help at least to ensure that firms would not involve in unwarranted activities and managers do not mismanage fund entrusted to them. The government involvement in the form of share ownership can affect the level of agency conflict between managers and outside shareholders (Gul, 1999).

Eng and Mak (2003) argued that agency costs are higher in companies with government ownership due to conflicting objectives between pure profit goals of commercial enterprise, and goals related to the interest of the nation. This argument is supported by their finding that because of the government's vested interest in these companies and conflicting objectives faced by them, the need to communicate with other shareholders is greater.

In contrast, Mohd Ghazali and Weetman (2006) highlighted that in a developing country like Malaysia, government-owned companies are mostly politically connected, and such companies tend to disclose less information to protect their political linkages or even their beneficial owner. According to Jiang and Habib (2009), government-controlled companies might not disclose information extensively because of: (i) their separate monitoring by the government; (ii) their access to government funding and hence, reduced need to raise funds externally; and (iii) the returns in holding companies are guaranteed to governmental owners (Naser and Nuseibeh, 2003). In addition, government interest in these firms are generally for a long-term basis and being the authority body that overseeing the well being of the country, they can fulfill their information need by directly contacting the firms. Therefore, this study expects that as government ownership increases, the level of voluntary R&D disclosure decreases. Therefore, H3 is stated as follows:

H3: The level of government ownership of firms is negatively associated with the level of R&D disclosure.

Foreign Ownership

The rapid development and changes in the business and IT environment all over the world including Malaysia has encouraged foreign investors to invest in domestic market. This international capital mobility is associated with countries that demonstrated good corporate governance and greater disclosure practices of value relevant accounting information (Guenther and Young, 2003). In general, foreign investors are more likely to be less informed than domestic investors and the cost of gathering information about companies is also likely to be higher. Therefore the high disclosure of accounting information is more likely to favour the interests of the less informed investors (foreign investors) than the more informed investors (local investors). The high disclosure of corporate information also reduces incentives for investors to pay for costly private information (Lundholm, 1999).

Mangena and Tauringana (2007) suggest that foreign investors: (1) generally have a preference for companies that they are well informed as well as for companies in which their investments are more likely to be protected, and (2) avoid companies

in developing countries because of weak corporate governance structures and low disclosure. However, Ananchotikul (2007) found that when foreign investors have control in a firm, hence become part of insider shareholders, they react like other local investors and are related to weak corporate governance. Having weak corporate governance would result in low disclosure (Mangena and Tauringana, 2007).

Nevertheless, firms incorporated in Malaysia generally have low level of foreign ownership due to limitation set on ownership policies by the Malaysian government. Hence foreign investors in Malaysia are expected to react more like other minority shareholders, whereby they will prefer firms to provide high disclosure in order to protect their investments. Based on this argument, this study predicts that the level of foreign ownership of firms is positively associated with the level of R&D disclosure.

H4: The level of foreign ownership of firms is positively associated with the level of R&D disclosure.

Institutional Investors

Institutional investors such as government, financial institutions and unit trust normally invested a big sum of capital for a long term commitment. They not only have the expert and knowledge in the financial matters but also can insert significant influence in the firms' operation (in the case when their voting right of investee firms is more than 20% - associated firms). Short, Zhang and Keasey (2002) propose that institutional investors that hold significant ownership of firms (holding more than five percent) which are also called as block investors or block ownership can influence the level of agency cost and subsequently R&D disclosure practice of firms.

Fama and Jensen (1983) propose that the potential for conflicts between principals and agents as well as opportunistic management behavior are more likely to occur in a widely held company. Consequently, such company is expected to provide additional information to signal that the agents are acting in the best interests of the principals. Proponents of the active monitoring hypothesis argue that institutional investors by virtue of their large shareholdings have greater incentive, power and resources to monitor managers' behavior, as their wealth are tied to the company performance (Jensen and Meckling, 1976; Shleifer and Vishny, 1986; Friend and Lang, 1988; Huafang and Jianguo, 2007). Therefore, they may put more pressure on management to disclose more information (Nazli and Weetman, 2006). Chau and Gray (2002), Haniffa and Cooke (2002) and Huafang and Jianguo (2007) provide support for this argument in revealing a positive relationship between ownership structure and the extent of voluntary disclosure of listed companies in Hong Kong and Singapore, Malaysia and China, respectively.

However, study by La Porta, Lopez de Silanes and Shleifer (1999) and Claessens, Djankov and Lang (2000) reveal that the ownership structure of companies in developing countries including Malaysia is highly concentrated. According to Mohd Ghazali and Weetman (2006), it does not mean that a highly concentrated company faces less agency conflicts and hence has less incentive to disclose more information. They state that in a highly concentrated company, conflicts of interest are between 'insiders' (controlling shareholders and managers) and outside investors. In the absence of large outside share ownership, it is expected that company with concentrated ownership in the hands of 'insiders' or 'controlling owners' is likely to produce less information. In addition, proponents of private benefit hypothesis argue that larger investment by controlling shareholders provide an opportunity to access private information that may be exploited for their self-interested behavior. Shleifer and Vishny (1997) also affirm that if the ownership concentration exceeds a certain threshold, the large shareholders are inclined to pursue their personal benefits at the expense of outside minority shareholders. Consistent with Mohd Ghazali and Weetman (2006) and based on statistics in Capulong *et al.* (2000) that the majority of the largest shareholders in Malaysian public listed companies are 'insiders', we expect low level of R&D disclosure among companies with substantial institutional shareholders. Therefore, H5 is stated as follows:

H5: The level of institutional ownership of firms is negatively associated with the level of R&D disclosure.

Independent Directors

Agency theory explains that separation of ownership and management in companies creates a moral hazard where managers, as agents for shareholders, act for their own best interest (Jensen and Meckling, 1976). Hence, the existence of independent directors is necessary for an effective control mechanism over the corporate management activities. It is argue that the effectiveness of directors in mitigating the agency problem would depend on the level of independence of board directors measured by the ratio of non-executive directors.

Fama and Jensen (1983) suggested that boards composed of a higher proportion of independent outside directors have greater control over managerial decision because independent directors have incentives to exercise their control to preserve their reputational capital. Furthermore, outside directors as referees whose main objective is to ensure that the board, in monitoring managerial decision, protects shareholders' interest (Fama, 1980). Thus, firms with outsider-dominated boards are expected to disclose more voluntary information. This argument is supported by Cheng and Courtaney (2006) that found independent and non-executive directors show a significant and positive association with voluntary disclosures. The result also shows that firms with boards dominated by a majority of independent

directors have significantly higher level of voluntary disclosure than firms with balanced boards. Their study was based on 104 firms listed on the Singapore Stock Exchange in 2000. White, Lee and Tower (2007) also found that the level of board independence had a significant relationship with the level of voluntary intellectual capital disclosure. However, the disclosure was only driven by board independence in large Australia's biotechnology firms. Patelli and Prencipe (2007) note that the insiders (managers) are more willing to disclose information that allows a better understanding of their current performance when, *ex ante*, their opportunistic behavior is limited by monitoring activities carried out by the independent directors. Previous studies also found that firms with outsider-dominated boards are less likely to suffer from financial statement fraud (Beasley, 1996), less earnings management (Klein, 2002) and provide better quality of firms' information to the users of financial reports (i.e. financial analysts) (Byard, Li and Weintrop, 2006).

The Malaysian Code on Corporate Governance was revised in 2007 to improve the quality of the board of public listed companies (PLCs) and to strengthen the audit committee, as well as the internal audit function of PLCs. Every listed company should be headed by an effective board, which consists of a balance of executive directors and non-executive directors (including independent non-executive). To be effective, independent non-executive directors should make up at least one-third of the board membership. Therefore, based on prior literature and the current environment in Malaysian governance scenario, H6 is stated as follows:

H6: The level of proportion of independent directors on the boards of firms is positively associated with the R&D disclosure.

CEO Duality

Board of directors plays an important role to oversee the behaviour of top management. The effectiveness of board of directors will ensure that top managers will act at the best interest of shareholders. However, the effectiveness of board as a control mechanism can be limited if the members of the board are at the same time managers of the company (CEO duality). CEO who is also the chair of the board may have stronger power and control that could allow CEO to engage in opportunistic behaviour. Fama and Jensen (1983) point out that CEO duality signals the absence of separation between decision control and decision management and thus making the control of top management less effective.

On the other hand, proponents of stakeholder theory could argue that outside stakeholders may demand for better disclosure in firms with CEO duality to help monitor the management. In any jurisdiction, an imbalance between CEO duality control and the stakeholders' demand for information could exist. In the end, the amount and quality of disclosure decision depends on shareholders' activism. In a country with weak shareholders activism such as Malaysia, the CEO-Chairman may have stronger influence over disclosure decision.³

The Cadbury Committee Report (1992) recommended that the role of CEO and chairperson should be separated in large corporations. Gul and Leung (2004) argued that concentrated decision-making power arising from CEO duality could constrain board independence and impair the board's oversight and governance roles including corporate disclosure policies. Hence, this could then result in a lower level of voluntary disclosures and of transparency. Gul and Leung (2004) who investigated the linkages of board leadership structure in term of CEO duality and the proportion of expert outside directors on the board with voluntary disclosure in Hong Kong-listed companies, found a negative relationship between the two. Based on the above discussion, H7 is developed as below:

H7: The CEO duality is negatively associated with the level of R&D disclosure.

Auditor

High quality audit helps to mitigate the agency problems since auditing enhance the credibility of the accounting information disclosed by firms. Quality audit consequently diminish managers' ability to bias financial report. DeAngelo (1981a) indicate that audit quality is influenced by the size of audit firm. The justification is that large audit firms (e.g. Big 4) are more competent and independent so that they will offer higher-quality services than small firms. DeAngelo (1981a) argued that large audit firms have more incentive to maintain independence and to impose more stringent and extensive disclosure standards. This is because they have a reputation to uphold and face greater legal liability for making errors. It is also suggested that large audit firms have many clients, and therefore, they are likely to be less dependent on individual clients, which may compromise the quality of their services (Owusu-Ansah, 1998).

Wallace, Naser and Mora (1994) suggest that auditor size may influence the contents of annual reports prepared by firms. Larger audit firms may try to improve the perceived quality of the annual reports by having clients disclose more information. Therefore, firms audited by Big Four auditors may disclose more information than other firms. Archambault and Archambault (2003) find a relationship between audit firm size and corporate disclosure. Barako (2007) finds that external auditor type was positively associated with the two types of voluntary disclosure (i.e. financial information and social and board information). However, for the forward-looking disclosures, Barako finds negative association. Barako argued that this is probably due to the auditor's concern with increased risks involved with forward-looking information. Therefore, H8 is stated as below:

H8: The level of R&D disclosure is higher for firms audited by Big 4 audit firms than firms audited by Non-Big 4.

METHODOLOGY

Sample

The sample consists of all companies listed under the MESDAQ market of Bursa Malaysia in year 2005 and 2006. The number of companies for both years is 222 company-years i.e. 111 companies per year. However, after considering availability of all data necessary to test the relationship between R&D disclosure and corporate governance mechanisms, the sample is reduced to 187 company-years.

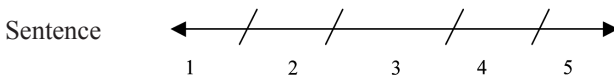
Measurement of Dependent Variable

For the purpose of this study, the dependent variable (voluntary disclosure of R&D information) is defined as the discretionary release of information through companies' annual reports over and above the mandatory requirement. R&D disclosure is measured as the number of text unit. A text unit is defined as a part of a sentence that carries its own meaning or information (Beattie, McInnes and Fearnley, 2004). Therefore, a sentence may contain more than one text units. We describe the process of coding the R&D disclosure in Illustration 1 i.e. R&D disclosure in CWORKS SYSTEMS's 2005 annual report.

Illustration 1: CWORKS SYSTEMS

The Group recognizes the importance of R&D activities as a market differentiator./ Besides constantly improving and enhancing its core CMMS products, / the Group's effort has also been focused on the development of web-native products and mobile applications / as our products are used by field service personnel / who require anywhere, anytime access to their information.

Analysis of text units:



According to the example, CWORKS has 5 text units.

We also perform a more detailed analysis on the text units by classifying the text units according to whether a text unit represents forward looking or historical, financial or non-financial and quantitative or non-quantitative orientations of information (Beattie *et al.*, 2004). These dimensions are shown in Figure 1.

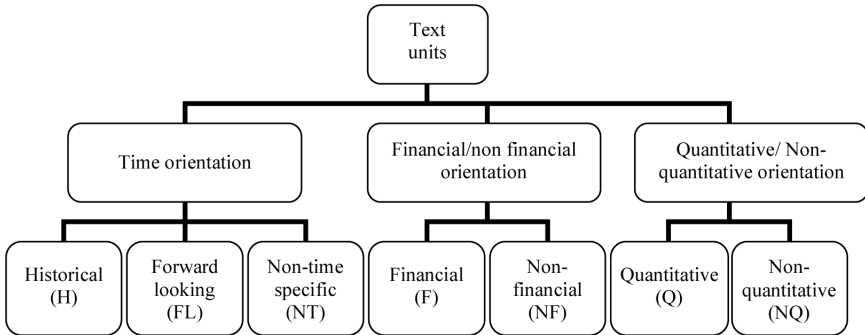
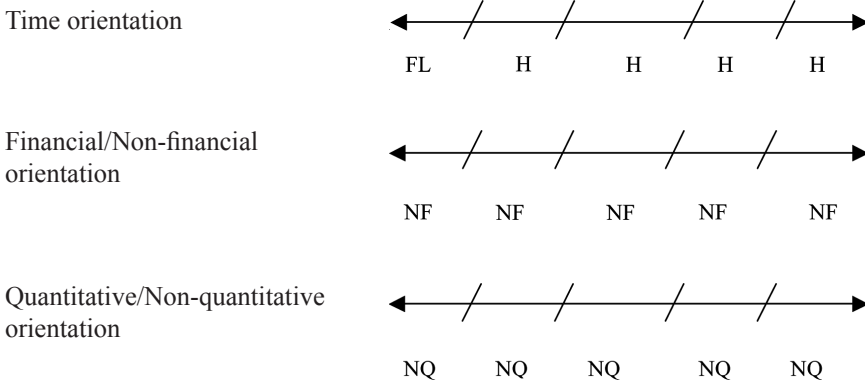


Figure 1 Dimensions of a text unit

According to this format, we classify CWORKS SYSTEMS’s statement as the following:



According to the example, CWORKS has 5 text units that can be classified into (1) 1 forward looking text unit and 4 historical text units, (2) all non financial text units and (3) all non-quantitative text units.

Therefore, as shown in Figure 1, a text unit can be analyzed according to three dimensions, and one generic or aggregate level. This classification is made in order to assess which corporate governance mechanisms are related to the most preferred type of disclosure i.e. financial, quantitative and forward looking information that may assist investors in making decision.

The independent and control variables definition and operationalization are shown in Table 1. Measurements of all independent and control variables are based on prior studies as indicated in the table. The predicted sign of the association is based on prior studies described in the literature review section.

Table 1 Independent and control variables

Variables	Definition	Operationalization	Expected Association
Test Variables			
FMOWN	Family ownership	Percentage of ownership by family (which control more than 10% share in the company)	-
MNOWN	Management ownership	Percentage of ownership by CEO/ Executive Director (Eng & Mak, 2003)	+
GOVOWN	Government ownership	Existence of ownership by government/ government controlled bodies (Eng & Mak, 2003; Nazli & Weetman, 2006)	-
FROWN	Foreign ownership	Percentage of ownership by foreign person/ companies (Barako, 2007)	+
INSTINV	Institutional investor	Percentage of the top three institutional investors	+
INDDIR	Independent director to total director ratio	Percentage of independent director on the total number of directors (Ho & Wong, 2001; Nazli & Weetman, 2006; Cheng & Courtaney, 2006; White, Lee & Tower, 2007; Barako, 2007).	+
CEODUAL	CEO-Chairman duality	Dummy variable being 1 if the CEO and Chairman is the same person and 0 otherwise (Gul & Leung, 2004; Cheng & Courtaney, 2006)	-
AUDITOR	Auditor	Dummy variable being 1 if the auditor is from the big4 and 0 otherwise (Archambault & Archambault, 2003; Barako, 2007)	+
Control Variables			
LEV	Leverage	Total debt to total assets ratio (Gul & Leung, 2004; Barako, 2007)	-
PROFIT	Profitability	Profit before tax to shareholders' fund ratio (Eng & Mak, 2003)	+
RNDCAP	R&D capitalized over total assets	Amount of R&D capitalization to total assets ratio (Bosworth & Rogers, 2001)	+
SIZE	A proxy for political cost	Log 10 number of employees (Nazli & Weetman, 2006)	+
CRATIO	Current ratio	Current assets over current liabilities (Gul & Leung, 2004; Barako, 2007)	+

Data Analyses and Measurement of Independent and Control Variables

The data collected for this study was analysed through the use of bivariate correlation and Tobit regressions. Tobit is used because initially there are many observations in the dependent variable with zero value i.e. many companies do not have any disclosure about R&D. When these values are transformed to logarithm (with an addition of very small value of 0.01), the zero value turns into -2. Therefore, we regard this value as the smallest limit in the dependent variable. We believe that Tobit regression with censored observations is the most appropriate procedure. A Tobit regression was adopted to deal with both, the probability of R&D disclosure and the magnitude of the disclosure. Kennedy (1998) suggests that if the dependent variable is limited (in the presence of many observations at 0, or in our case, -2), OLS estimates are biased. Hence, to avoid this bias, the Tobit regression procedure was adopted. This procedure contains the elements of regressions and probability of being above the limit (probit).² The main regression model is as follows:

$$\begin{aligned} \text{TEXTUNIT}_{it} = & \alpha_0 + \alpha_1\text{FMOWN}_{it} + \alpha_2\text{MNOWN}_{it} + \alpha_3\text{GOVOWN}_{it} + \\ & \alpha_4\text{FROWN}_{it} + \alpha_5\text{INSTINV}_{it} + \alpha_6\text{INDDIR}_{it} + \\ & \alpha_7\text{CEODUAL}_{it} + \alpha_8\text{AUDITOR}_{it} + \alpha_9\text{LEV}_{it} + \\ & \alpha_{10}\text{PROFIT}_{it} + \alpha_{11}\text{RNDCAP}_{it} + \alpha_{12}\text{SIZE}_{it} + \\ & \alpha_{13}\text{CRATIO}_{it} + \varepsilon_{it} \end{aligned}$$

RESULTS

Descriptive statistics are shown in Table 2. The table shows that the average number of text unit per company is 11 while the median is 9. This low level of disclosure about R&D is quite surprising since the companies under MESDAQ market are technology based. We use the logarithm of text unit as dependent variable (LGTX) to meet the conventional normality assumption of the residuals. However, we have to add a small number (0.01) to all observations since we cannot have a logarithm transformation of zero. Therefore, the minimum value of LGTX is -2. Average percentage of family ownership in MESDAQ market is 40.2% while managerial ownership is around 7.5%.

The correlations between independent variables are presented in Table 3. This procedure is important to detect the existence of multicollinearity problem in the case when there is a high correlation between independent variables of a regression. The table shows that the highest correlation is 0.526 i.e. between GOVOWN and INSTINV. This correlation is considered unproblematic since it is still below 0.70. Nevertheless, we conduct additional test on multicollinearity problem whenever appropriate.

We compare the characteristics of the firms under study according to whether the firms disclose R&D information in their annual reports. Table 4 shows that the t-statistics are significant for size, current ratio, family ownership at conventional level. Specifically, the mean of size for companies without R&D disclosure (hereinafter, non-discloser) is higher than companies that disclose R&D information (hereinafter, discloser). This result is not consistent with our expectation that larger sized companies would disclose more than smaller sized companies. It also appears that the percentage of family ownership is significantly higher in non-discloser companies than discloser companies. This is consistent to our prediction earlier, that conflict of interest between family owners and other shareholders has made companies to disclose less R&D information to outsiders.

TABLE 2 Descriptive statistics of all variables (N=187)

	Mean	Median
LGTX	0.298	0.955
TEXTUNIT	11.100	9.000
FMOWN	0.402	0.439
MNOWN	0.075	0.051
GOVOWN	0.008	0.000
FROWN	0.052	0.005
INSTINV	0.013	0.000
INDDIR	2.440	2.000
LEV	0.096	0.037
PROFIT	0.062	0.111
RNDCAP	8.825	2.075
SIZE	1.999	1.959
CRATIO	7.615	3.664

TABLE 3 Pairwise Correlations of all variables (N=187)

	MINOWN	GOVOWN	FROWN	INSTINV	INDDIR	CEODUAL	AUDITOR	LEV	PROFIT	RNDCAP	SIZE	CRATIO
FMOWN	-0.295** 0.000	-0.213** 0.003	-0.007 0.924	-0.197** 0.007	0.088 0.229	0.169* 0.021	-0.109 0.138	-0.053 0.474	0.238** 0.001	-0.210** 0.004	0.009 0.904	-0.108 0.142
MNOWN		0.121 0.099	-0.008 0.913	0.058 0.430	-0.166* 0.023	-0.093 0.205	-0.054 0.460	-0.108 0.140	0.100 0.171	0.089 0.225	0.114 0.120	0.119 0.104
GOVOWN			-0.051 0.487	0.526** 0.000	-0.067 0.363	-0.091 0.213	0.097 0.188	-0.081 0.272	-0.056 0.447	0.208** 0.004	0.106 0.148	-0.079 0.285
FROWN				-0.004 0.955	0.015 0.839	0.114 0.121	0.068 0.358	-0.057 0.440	-0.021 0.780	-0.019 0.791	0.106 0.150	-0.027 0.711
INSTINV					-0.041 0.574	-0.057 0.435	-0.001 0.984	-0.088 0.231	0.022 0.767	0.024 0.740	0.035 0.630	-0.072 0.328
INDDIR						0.089 0.225	0.075 0.310	0.032 0.663	-0.075 0.308	-0.031 0.675	-0.143 0.051	-0.002 0.981
CEODUAL							-0.063 0.390	0.100 0.174	-0.058 0.427	-0.069 0.348	-0.033 0.655	-0.089 0.224
AUDITOR								-0.054 0.465	-0.045 0.539	-0.036 0.621	0.018 0.809	0.012 0.874
LEV									-0.138 0.060	-0.055 0.453	0.243** 0.001	-0.268** 0.000
PROFIT										-0.202** 0.006	0.243** 0.001	0.019 0.797
RNDCAP											-0.264** 0.000	0.040 0.585
SIZE												-0.203** 0.005

** Significant at <0.01 level (2-tailed), * Significant at <0.05 level (2-tailed)

Table 4 Bivariate comparison: Disclosure vs non-disclosure^a

	Mean		t-statistics (sig. 2 tailed)
	Disclosed N=164	Non-disclosed N=23	
FMOWN	0.389	0.492	-2.428 (0.016)
MNOWN	0.075	0.074	0.080 (0.937)
GOVOWN	0.183	0.130	0.616 (0.539)
FROWN	0.050	0.063	-0.495 (0.621)
INSTINV	0.014	0.008	0.836 (0.404)
INDDIR	0.363	0.369	-0.304 (0.761)
INSTINV	0.014	0.008	0.836 (0.404)
CEODUAL	0.220	0.350	-1.204 (0.239)
AUDITOR	0.340	0.260	0.711 (0.478)
LEV	0.096	0.102	-0.226 (0.821)
PROFIT	0.049	0.149	-1.451 (0.148)
RNDCAP	9.993	0.496	1.485 (0.139)
SIZE	1.944	2.393	-5.142 (0.000)
CRATIO	8.174	3.634	3.449 (0.001)

^a R&D Disclosure is given a value of 1 if there is a disclosure about R&D in the company's annual report and 0 otherwise.

We perform Tobit regressions to test the relationship between corporate governance mechanisms and R&D disclosure.

Table 5 shows the result of the regressions, when we utilize a general text unit as dependent variable (second column), only forward looking text units (third column), only quantitative text units (fourth column) and only financial text unit (fifth column) as dependent variable, separately. The table shows that the relationship between corporate governance mechanisms and the occurrence and magnitude of R&D disclosure is non monotonic. While audit quality represented by Big 4 audit firms appears to be significant in three out of four estimations, government ownership is only significant in two estimations and most other corporate governance mechanisms under study are not significant in all regressions. Specifically, we find that audit quality is an important aspect of corporate governance that can promote R&D disclosure in MESDAQ market companies except for the forward-looking type of R&D information. This result could be due to the nature of auditing process that attests the financial and quantitative information. Whereas for forward-looking information, a lack of evidence that can support the prediction made may limit the role of auditors.

Table 5 Tobit regressions

Dependent	All text units	Forward looking	Quantitative	Financial
Constant	2.982*** (3.113)	2.491** (2.484)	1.382 (1.440)	0.103 (0.093)
FMOWN	0.265 (0.363)	0.271 (0.353)	0.633 (0.864)	0.529 (0.617)
MNOWN	1.464 (0.888)	0.975 (0.568)	-1.374 (-0.828)	-0.667 (-0.345)
GOVOWN	-0.385 (-0.983)	0.023 (0.055)	-1.126*** (-2.658)	-1.396*** (-2.780)
FROWN	-0.185 (-0.171)	0.296 (0.263)	-0.010 (-0.010)	-0.806 (-0.647)
INSTINV	2.974 (0.660)	-1.935 (-0.410)	5.531 (1.234)	2.868 (0.537)
INDDIR	-0.386 (-0.306)	0.500 (0.381)	-1.215 (-0.962)	-2.649** (-1.802)
CEODUAL	0.001 (0.004)	-0.145 (-0.471)	-0.397* (-1.331)	-0.249 (-0.713)
AUDITOR	0.614** (2.326)	0.247 (0.896)	0.834*** (3.171)	1.038*** (3.397)
LEV	0.424 (0.401)	0.135 (0.122)	-1.014 (-0.929)	-0.690 (-0.554)
PROFIT	0.053 (0.125)	-0.098 (-0.221)	-0.248 (-0.587)	-0.414 (-0.852)
RNDCAP	-0.008 (-1.450)	-0.008 (-1.442)	-0.002 (-0.367)	0.002 (0.357)
SIZE	-1.563*** (-4.455)	-1.547*** (-4.183)	-0.948*** (-2.720)	-0.297 (-0.734)
CRATIO	0.002 (0.213)	-0.010 (-1.092)	0.004 (0.418)	0.006 (0.601)
R2	0.122	0.086	0.138	0.098
Left censored	46	55	67	82

*, **, *** significant at the 0.10, 0.05, 0.01 level (1-tailed except the constant).

N=187

Consistent with our prediction, disclosure of quantitative and financial information about R&D is less in companies with government ownership compared to companies without government ownership. A possible explanation for the finding is that being an authority body that overseeing the well being of the country, government can fulfill the information need directly by contacting the firms. This result is in contrast to the finding in Eng and Mak (2003) who found that firms are more likely to provide voluntary disclosure as government ownership increases.

The results for independent directors and firm size are inconsistent with our prediction. For independent directors, the result for financial type of R&D information was negative when a positive relationship was expected. This finding however is consistent with Eng and Mak (2003) and Barako (2007) who found a significant negative association between voluntary disclosure and board composition with respect to Singapore and Kenyan companies. The direction is similar with firm size. We found that firm size was negative and significantly associated with the disclosure of R&D information except for financial type. This result is inconsistent with findings of previous studies (Owusu-Ansah, 1998; Eng & Mak, 2003; Barako, 2007).

CONCLUSION

This study examines the relationship between corporate governance and R&D reporting among firms listed on MESDAQ market. The result shows that the level of voluntary disclosure of R&D information is low. Results indicate that there is tendency corporate governance mechanism, specifically government ownership, the existence of independent directors and auditor, influence the voluntary disclosure of R&D information. However, family, foreign, management and institutional ownership do not influence R&D voluntary disclosures among our sample firms. Findings also suggest that auditor tend to influence the possibility of firms providing more transparent report with regards to R&D information.

There are several limitations to our study, and future research can improve and broaden our analyses in several aspects. First, our study focuses on one type of IC information (i.e. R&D information). Further studies should consider the overall disclosure of IC. Second, this study is based on R&D disclosure in annual reports. The extent to which companies voluntarily disclose R&D information through other medium such as the internet and media release, represent a limitation to this study. Finally, the Malaysian environment may be unique and therefore, our findings may not be generalized to other capital markets. Hence the results of this study should be interpreted with caution.

ENDNOTE

¹ Bursa Malaysia or the full name is Bursa Malaysia Berhad (previously known as Kuala Lumpur Stock Exchange) is an exchange holding company. It is listed on the Main Board of Bursa Malaysia Securities, operating a fully integrated exchange and offering the exchange-related services, including trading, clearing, settlement and depository services. http://www.klse.com.my/website/bm/about_us/.

² We use actual censored write-off amount ratio as dependent variable. This is consistent to studies on assets write-offs (Loh and Tan, 2002; Mohd-Saleh and Ahmed, 2007) and goodwill impairment (Duh, Lee and Lin, 2009) where the dependent variables used in these studies are not discrete (1,0).

³ For example a study by Renneboorg, Horst and Zhang (2008) shows that Malaysia, as part of Asia Pacific ranked very low in investors activism.

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