ASIAN ACADEMY *of* MANAGEMENT JOURNAL *of* ACCOUNTING *and* FINANCE

AAMJAF, Vol. 5, No. 1, 1–29, 2009

OWNERSHIP STRUCTURE AND INTELLECTUAL CAPITAL PERFORMANCE IN MALAYSIA

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ABSTRACT

The performance of intellectual capital (IC) depends on the efficiency of investments in tangible and intangible resources devoted to value creation activities. The performance of IC investments is important because it affects a company's long term competitive advantage. This paper examines whether ownership structure (whether it is management, foreign, government or family ownership) can explain the variation in a company's IC performance. It provides additional insight into the role and incentives of firm owners and could affect the company's ability to increase value (value creation activities). This research relies on an empirical model using VAIC^{TM} to measure IC performance. The data consists of all companies listed on the Malaysian Exchange of Securities Dealing and Automated Quotation Market (MESDAQ) market in between 2005 and 2007. Family ownership appears to have a negative effect on IC performance. A high degree of family ownership implies a high probability of opportunistic behaviour among families pursuing their objectives at the expense of value creation activities. The results are valuable for capital market regulators in monitoring the efficiency of value creation investments.

Keywords: Foreign ownership, government ownership, management ownership, intellectual capital performance, Malaysia

INTRODUCTION

The emergence of a knowledge-based economy has changed the corporate nature of work. There are changes in the value of corporate performance parameters, as well as their perception. In this century, business communities across the globe agree that knowledge assets are becoming more critical to the corporate value creation process than physical production factors. This is particularly true for knowledge-intensive sectors, such as information technology. Unfortunately,

traditional accounting conventions are unable to accommodate the need to report knowledge assets. Thus, this phenomenon has created a significant disparity between a company's market and book values.

As many researchers have noted, the large gap between a company's book and market values results from failures to report some 'hidden value' in the annual report (Brennan & Connell, 2000; Mouritsen, Bukh & Marr, 2004a). One could argue that this gap reflects excessive speculations by market players. However, in the long run, the discrepancy between market value and book value may be better explained by the change in the sources of value creation as economies have moved from tangible assets to intellectual capital (IC).[1] Assessing the performance of IC is important because it measures the efficiency of value creation activities, which is not reflected in financial statements under the traditional reporting system. In this study, IC performance is broadly defined as the efficiency of investments in resources in generating value.

IC is an essential resource for corporate success in a knowledge economy. As Malaysia moves towards such an economy, there are an increasing number of technology companies. As of December 2007, there were nearly two thousand companies (1,994 companies) established in the Multimedia Super Corridor (MSC), Cyberjaya. These companies attract foreign and domestic investment in the form of share ownership.[2]

According to agency theory, the separation of ownership and control may induce conflicting incentives, leading to agency costs (Jensen & Meckling, 1976). Consistent with this view, we believe that ownership types could, to some extent, determine the performance of investments in IC. Previous research suggests that the ownership structure has a significant effect on a company's efficiency and performance (Bonin, Hasan & Wachtel, 2005; Ng, Yuce & Chena, 2009; Xu, Pan, Wu & Yim, 2006). This is particularly important in the Malaysian context. Claessens, Djankov and Lang (2000) classified Malaysia as having concentrated ownership, in the form of significant family ownership and interlocking business relationships. These types of ownership and control may induce conflicting managerial incentives, namely, whether to create more value

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[1] To date, there is no universal or generally accepted definition of IC. Nevertheless, most of the definitions capture a similar meaning, in which IC is regarded as a source for long-term value creation. According to Edvinsson and Malone (1997), IC is information and knowledge applied to work for value creation. This definition is also consistent with Marr, Schiuma and Neely (2004: 552), who define IC as fundamental strategic levers to manage a company's performance and continuous innovation.

[2] The MSC was formally established in Malaysia in 1996. It intends to be a dynamic ICT hub that houses institutions with activities on multimedia and communications products, solutions, services and research and development.

for the company or to maximise self-interest. This context differs from a Western context, where companies have well-dispersed ownership structures and face high levels of investor activism. In addition, significant state ownership may have detrimental effects on a company's value creation activities, as the influence of the state may change the focus of the company away from creating shareholder value and toward fulfilling social and/or political obligations (Ahmad, 2008).

It is important to determine the efficiency of IC investments as well as to explore the possible factors contributing to or limiting IC performance. This study attempts to measure IC performance at the company level using the Value Added Intellectual Capital Coefficient (VAIC™), a measure developed by Pulic (1998, 2000), and also to test whether ownership structure explains the variation in IC performance for companies listed on the MESDAQ market.[3] This market was chosen because IC performance is critical in technology-based companies. This study considers only listed companies because we can measure public accountability with regards to the performance. We selected 264 observations with complete data between 2005 and 2007. We predict that certain attributes of ownership structure will reduce or increase agency costs, in turn leading to better IC performance, as indicated by VAIC™. Demsetz and Villalonga (2001) and Henry (2009) suggest that corporate governance and performance may have reverse causality or dynamic dependence problems. Thus, we employ the generalised method of moments (GMM) to address potential endogeneity problems between corporate ownership variables and IC performance. The regression results suggest that family ownership is negatively related to IC performance. This finding is supported by a two-stage-least square (2SLS) regression.

Some studies have investigated IC performance and its relationships to board structure (Ho & Williams, 2003) and company performance (Gan & Saleh, 2008). However, our review of the literature suggests that this is the first study to investigate the relationship between IC performance and ownership structure. Investigating IC performance is more significant than other accounting or market-based performance measures because IC performance accounts for the performance of tangible as well as knowledge assets in creating value. From a time perspective, the accounting profit rate is backward-looking, while Tobin's Q is forward-looking and driven by historical accounting numbers as well as a multitude of world events and business strategies affecting investors' forecasts (Demsetz & Villalonga, 2001).

We view the ownership structure as it influences IC performance through representation in the board of directors (which is indirect in nature). However, an

[3] MESDAQ is a specialised market for technology-based and/or high-growth companies.

examination of the factors influencing IC performance may be incomplete without looking at the parties behind the board members. These parties may provide incentives to improve IC performance or otherwise. This study aims to provide additional insights into the role and incentives of the company owners.

The next section discusses the Malaysian institutional background and the MESDAQ market. The third section discusses the literature and empirical predictions. This is followed by a section that describes the methodology. Section five presents the results, and the final section concludes.

THE MESDAQ MARKET AND THE REPORTING ENVIRONMENT IN MALAYSIA

The MESDAQ (Malaysian Exchange of Securities Dealing and Automated Quotation) market was launched in 1997. The objective is to provide a suitable avenue for high growth technology-based Malaysian companies to raise capital as an alternative to bank funding. The market includes companies operating in advanced electronics, information technology, telecommunications, automation manufacturing systems, biotechnology and genetic engineering, healthcare, advanced material, energy, aerospace, transportation and other emerging technologies. However, a clause in the listing requirements stipulates that any companies with high-growth business activities can be listed on the MESDAQ market. Within 10 years, the market has grown from five companies to more than one hundred. Differing from the Main and Second Boards of Bursa Malaysia, the IPO guidelines focus more on qualitative factors, since the companies are relatively young (with high growth potential) and lack established profit track records.[4] The qualitative factors include convincing business plans and models, growth prospects, the strength and integrity of the management, corporate governance mechanisms, and risk management structure and activities. These factors are evaluated for their ability to secure the long term viability of the business and sustain earnings (Securities Commission, 2005). Companies meeting these criteria can be considered for market listings.

MESDAQ-listed companies must adhere to the accounting standards approved by the Malaysian Accounting Standards Board (MESDAQ Listing

[4] Bursa Malaysia was previously known as the Kuala Lumpur Stock Exchange. The Main board refers to a board with larger sized companies that meet more stringent listing requirements compared to the Second board of the exchange. Starting on 3 August 2009, Bursa Malaysia implemented a new board structure. The Main and Second board were merged to become a unified board known as the Main Market, while the MESDAQ market were restructured and renamed as the ACE market. The new ACE market now focuses on emerging companies of all sizes and sectors.

Requirement, 2001). This board requires that material information be disclosed to the respective exchange, in the form of a quarterly report and an annual report. In summary, financial reporting is guided by standards adopted from IFRS. Locally, these standards are known as the Financial Reporting Standard (FRS) by the Malaysian Accounting Standard Board (MASB), the accounting standard-setting body in Malaysia. The Bursa Malaysia and the Securities Commission require mandatory compliance with the approved standards.

While compliance with approved accounting standards is mandatory, companies may send voluntary signals about their activities and performance using private information. Voluntary disclosure is expected to improve users' perception about the underlying economic value and performance of companies. Since the financial reports focus more on the financial results of the companies, additional disclosures in technology-related companies are expected to provide information on the value creation process and results or IC. The financial results, together with a description of IC, would enhance the investors' ability to make informed decisions about their investments. However, a formal investigation into voluntary IC disclosures is beyond the scope of this paper.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Understanding the role of IC in creating value is crucial for attaining a competitive advantage in the marketplace and superior financial performance (Drucker, 1995; Marr & Schiuma, 2003). However, there are few appropriate measures of a company's IC (Chen, Shevlin & Tong, 2005). Thus, the failure to identify, measure and understand the value of relevant IC components may lead to inefficient investment decisions. The collapse of Marconi in the UK and that of Enron in the US provide the best examples of how a sudden switch in corporate value – from heavy dependence on tangible assets (Enron in physical energy production and Marconi in electrical goods and defence) to a company that possesses significant intellectual assets – contributed to confusion among analysts and investors (CIMA, 2000).

There is no universal classification for IC. Prior research has relied on its own classification, such as Scandia Navigator (Edvinsson & Malone, 1997), Balance Score Card (Kaplan & Norton, 1996), Intangible Assets Monitor (Sveiby, 1997), Value Chain Score Card (Lev, 2001), Value Platform (Petrash, 1996) and many others. These IC classifications differ, and some are quite complicated. However, the literature suggests that IC can be classified into three common categories: (i) human capital; (ii) internal structure (i.e., organisational capital); and (iii) external capital (relational capital).

Human capital is the knowledge that employees take with them when they leave the organisation. Knowledge can be unique or generic. It includes innovation, flexibility, tolerance for ambiguity, motivation, satisfaction, learning capacity, loyalty and formal training and education (CIMA, 2000), know how, education, vocational qualification, work-related knowledge and entrepreneurial spirit (Brennan & Torous, 1999). The knowledge that employees embody can be formalised through patents, copyright and brands (Meer-Kooistra & Zjilstra, 2001). Bontis et al. (2000) argued that human capital is important because it is a source of innovation and strategic renewal.

On the other hand, internal structure or organisational capital is knowledge independent of people. It can be defined as the knowledge that stays in the organisation. Examples include intellectual property, contracts, databases, information, systems, cultures, procedures, manual, administrative system, routines and best practices (CIMA, 2000; Brennan & Connell, 2000; Bontis, Keow & Richardson, 2000; Edvinsson & Malone, 1997). According to Bontis (1998), IC will not reach its full potential if an organisation has poor systems and procedures.

The third component of intellectual capital is external structure. External structure (also known as relational capital) is defined as valuable knowledge that interacts with the external sources of the organisation (such as customers, suppliers and creditors) through networks, strategic alliances and distribution channels (Bozzolan, Favotto & Ricerri, 2003; Sveiby, 1997). These external sources contribute to image, reputation, customer loyalty, commercial power, and negotiating capacity with financial entities and environmental activities (CIMA, 2000).

Given the drawbacks of traditional financial statements and the increasing gaps between market and book values, how to measure and manage a company's IC value and performance has drawn attention from various parties. These studies include an individual company's tool kits for internal use, also known as non-dollar valuations of the IC model (Tan, Plowman & Hancock, 2007), such as Balance Scorecard, Performance Prism, Ericsson's Cockpit Communicator, Skandia Navigator and Sveiby's Intangibles Asset Monitor Approach.

Another stream of research has developed several approaches for estimating the value of IC using financial statement data. This is known as the dollar valuation model (Tan et al., 2007). These approaches allow external parties or stakeholders to estimate a company's value of intellectual capital using publicly available information, such as an annual report. These include the EVA and MVA models (Bontis, Dragonetti, Jacobsen & Roos, 1999), Tobin's Q

(Tobin, 1969), Calculated Intangible Value (Stewart, 1997), Matching Assets to Earnings (Lev, 2001), Value Added Intellectual Capital Coefficient (Pulic, 1998) and many others. In this study, we employ the VAIC™ methodology to measure IC performance because it measures the efficiency of a company's value creation activities.[5]

East Asian IC Performance Studies

The VAIC™ method has been applied across industries and in many countries. For example, Williams (2001) investigates the relationship between IC disclosure and its performance in the UK; Firer and Williams (2003) examine the association between IC performance and traditional corporate performance in South Africa; and Chen et al. (2005) test the relationship between IC performance and companies' market value and financial performance in Taiwan. Tan et al. (2007) examine a similar issue in Singapore: determining the relationship between IC performance and financial return. It is also interesting to note that the banking sector is found to be a central concern of VAIC™ studies, as the sector is considered to be knowledge-inclined (e.g., Mavridis, 2004, 2005; Goh, 2005; Kamath, 2007; Yalama & Coskun, 2007).

Goh (2005) and Cheuk, Wong and Kok (2006) have studied IC performance in Malaysia. Goh (2005) aims to measure the IC performance of ten local and six foreign commercial banks between 2001 and 2002. The study finds that about 80% of the value creation capability (VAIC™ value) of both domestic and foreign banks is largely attributed to human capital efficiency (HC), as opposed to structural capital efficiency (SC) and capital employed efficiency (CE). As expected, foreign banks are more efficient than domestic banks. Cheuk et al. (2006) investigate VAIC™ data from 52 public finance companies from the Bursa Malaysia. Their study examines the explanatory power of VAIC™ towards the companies' market value, where market value is denoted by share prices. The results show that the correlation between VAIC™ and share price is negative. In addition, regression analysis indicates that VAIC™ has no explanatory power in predicting market valuation. Recent findings can be drawn from Kamath (2007) and Tan et al. (2007).

Kamath (2007) for example, observes the IC performance of 98 Indian Banks from various groups between 2000 and 2005. The mean VAIC™ score over this five-year period is only about 3.6 in 2000 and 4.1 in 2005, lower than the VAIC™ figure reported by the Malaysian banking sector (Goh, 2005). It appears that most large foreign banks in India are among the top performers, while the performance of domestic banks is worse.

[5] More details on VAIC can be found in the research methodology section.

Tan et al. (2007) examine 150 publicly listed companies of the Singapore Exchange between 2000 and 2002, testing the relationship between the VAIC™ and companies' performance as denoted by ROE, EPS and ASR. The results can be summarised as follows. First, there is a significant relationship between VAIC and companies' performance. Second, the VAIC™ is positively related to a company's future performance. Third, the growth of the VAIC™ is weakly correlated with a company's performance, and the VAIC™ is higher in service and property sectors relative to the trading sector.

The literature suggests that IC performance is related to demographic characteristics of the company, such as performance and size. However, prior studies failed to address one important factor that may have a significant influence on IC performance: the management and owner's commitment, as represented by the governance or ownership structure, toward long term value creation.

INTELLECTUAL CAPITAL PERFORMANCE AND GOVERNANCE STRUCTURE

Agency Theory and Corporate Governance

Jensen and Meckling (1976) define an agency relationship as a contract under which one person (or more than one) engages another (the agent) in order to perform some service on his behalf, where the service involves delegating some decision making authority to the agent. In this contract, the agent is expected to perform his duty to the benefit of the principals (the owners of the company). However, it is impossible for the principals to ensure that the agent will act on their behalf, since the separation between ownership (with the shareholders as the principals) and control (with the management as the agent) creates conflicts (Jensen & Meckling, 1976). The behaviour of the agent will most probably differ if he or she is the owner of the company (Jensen & Meckling, 1976).

However, effective corporate governance mechanisms, such as the quality of an external audit (Becker, DeFond, Jiambalvo & Subramanyam, 1998; Bartov, Givoly & Hayn, 2002), managerial ownership (Warfield, Wild & Wild, 1995), block ownership (Peasnell, Pope & Young, 2000; Yeo, Tan, Ho & Chen, 2002; Jung & Kwon, 2002; Singh & Davidson, 2003) and audit committee (Klein, 2002), may significantly reduce the agency costs. This study focuses on ownership structure, which forms an important part of corporate governance mechanism. This is because the issue of agency conflict induced by different types of ownership has not been given enough attention in prior studies. Ownership structure is considered an external agency mitigating attribute in the

overall governance system (Henry, 2009). The effect of ownership structure on performance may be indirect. Through their representative on the board of directors, owners may determine the decisions that affect value creation activities. In other words, board decisions represent mutual and moderated decisions of all representatives in the board meeting. Therefore, we extend prior research by looking at the players behind the board of directors, who may have determined decisions made by the board and company IC performance.

Companies with good governance are likely to focus their attention on activities that can increase value creation, such as investing more in training, acquiring new experts, improving processes, procedures, and work culture, and working to enhance their relationships with external stakeholders. These efforts would make the companies more efficient and increase their overall performance. In short, good corporate governance practices can promote corporate accountability and business prosperity which, in turn, should enhance shareholders' value. This would, in the end, be reflected in an increase in IC performance.

Ownership Structure and IC Performance

Previous corporate governance studies have examined the association between corporate governance mechanisms and various issues, such as earnings management activities (Klein, 2002; Mohd-Ali, Hassan & Mohd-Saleh, 2007; Mohd-Saleh, Mohd-Iskandar & Rahmat, 2007; Warfield et al., 1995), agency costs (Peasnell et al., 2000; Singh & Davidson, 2003; Yeo et al., 2002) and company performance (Chang & Shin, 2007; Demsetz & Villalonga, 2001; Gunasekarage, Hess & Hu, 2007; Han & Suk, 1998). In sum, good governance practices are expected to increase corporate accountability and performance. We envisage that good governance should promote corporate accountability and strengthen the corporate fundamental value in the form of IC performance. We explore this argument further in the next section.

Family ownership

Family-controlled companies may perform better than non-family-controlled companies. Some argue that this phenomenon may be due to lower agency costs in family companies compared to non-family companies (Maury, 2006; Villalonga & Amit, 2006). The coupling of ownership and control (common in family-owned companies) would result in the convergence of various interests that would, in turn, reduce agency costs (in monitoring the managers). According to Ali, Chen and Radhakrishnan (2007), families are more likely to monitor the management, understand the company's business activities and have longer investment horizons than non-family companies. Therefore, under this

convergence argument, we can expect that the percentage of family ownership is related to company performance.

On the other hand, a larger body of literature suggests that the controlling owner in family companies may extract wealth for private benefits (Claessens, Djankov, Fan & Lang, 2002; Lemmon & Lins, 2003; Villalonga & Amit, 2006). For example, Cohen and Lauterbach (2008) find that CEOs are more highly compensated in companies where the CEO belongs to a family that owns most of the shares. This evidence is consistent with the entrenchment hypotheses (Morck, Shleifer & Vishny, 1988), which predicts that company performance improves as ownership that would reduce agency costs (such as management or family) increases. However, when this kind of ownership is large enough (such that the owners would gain nearly full control over the company), there is a tendency for the owner to use the companies to generate private benefits at the expense of the minority shareholders. The negative impact of family companies on performance is exacerbated when company control is passed to the next generation of the family (Cucculelli & Micucci, 2006). In addition, managers in family companies tend to face cognitive conflicts in maintaining professional relationships versus family relationships. This may hamper cooperation and effective decision making (Kellermanns & Eddleston, 2007).

Since the ownership structure in Malaysia is more concentrated compared to the ownership structure in Western countries (Claessens et al., 2002), we can expect that the existence of family ownership is always coupled with a controlling power over a company. Therefore, the second argument (i.e., the entrenchment hypothesis) would dominate. Since the tendency and the focus of the controlling family are to extract wealth for private benefits, we predict that this activity will reduce the companies' long term investment in IC, reduce their focus on creating value for the company and subsequently have a negative effect on their IC performance. A study by Cheung, Rau and Stouraitis (2006) shows that connected parties (which include families) can extract wealth using related party transactions.

Therefore, our hypothesis is as follows:

H_1: Family ownership is negatively related to IC performance.

Management ownership

Jensen and Meckling (1976) argue that separation between stock ownership and control over public companies creates conflicts of interest between managers and stockholders. The conflict arises when managers are incentivised to increase their own wealth (for example, through the maximisation of bonuses) at the expense of

shareholders. As the proportion of managerial equity ownership increases, the interests of the shareholders and the managers start to converge.

Consistent with this theory, Demsetz and Lehn (1985) and Abor and Biekpe (2007) found a positive relationship between company performance and the level of managerial ownership in companies.[6] Consistent with the argument above, we predict that, as management ownership increases, the management tends to become more involved in value creation activities that would enhance their long term competitive advantage. Therefore, these activities should result in higher IC performance.

Therefore, our hypothesis is as follows:

H_2: Management ownership is positively related to IC performance.

Government ownership

Conventional ideas suggest that government ownership has a negative impact on company performance. Some argue that government: (i) has a preference for social and political goals over the maximisation of profit as a traditional measure of company performance and (ii) may influence the appointment of less experienced staff due to preference over political influence (Boycko, Shleifer & Vishny, 1996; Megginson, Nash & Van Randenborgh, 1994; Vining & Boardman, 1992). Empirical research has suggested a detrimental effect of government ownership on company performance in China (Qi, Wu & Zhang, 2000; Wei, Xie & Zhang, 2005). Similarly, Lin and Zhang (2009) indicate that state-owned commercial banks are less profitable and efficient compared to other banks. These results are consistent with the arguments that state-owned companies allocate funds for political advantage (Sapienza, 2004) and are more vulnerable to political intervention (Clarke, Cull & Shirley, 2005; Classens & Peters, 1997; Djankov, 1999; Shirley & Nellis, 1991). Such political influence also exists in Malaysia (Gul, 2006; Johnson & Mitton, 2003). Gul (2006) argues that politically connected companies face a higher risk of being audited during financial crises due to their vulnerability. In addition, they are more likely to misreport financial results in order to avoid default.

[6] A review of the literature provided by Demsetz and Villalonga (2001) suggests that most studies on insider ownership and performance fail to consider the endogeneity problem in the ownership – performance relationship. Information asymmetry between the management and investors creates incentives for the managers to change their share ownerships in companies as their prediction about the company performance changes (Demsetz & Villalonga, 2001). This study attempts to address the endogeneity issue.

Since there is a greater possibility of political intervention in companies with government share ownership, we do not expect investments in these companies to be geared towards long term sustainability. The resources within the company are instead used for other social and sometimes political activities, perhaps increasing the chances that a favoured politician be re-elected. Therefore, we predict greater government ownership to have a negative effect on IC performance.

Given the background, our hypothesis is as follows:

H_3: Government ownership is negatively related to IC performance.

Foreign ownership

Foreign ownership is predicted to have a positive effect on performance. Bonin et al. (2005) discover a positive relationship in the banking industry. This is due to advanced technology in foreign owned banks, which creates a comparative advantage over local banks (Sabi, 1996). However, Lensink and Naaborg (2007) find domestic banks to be more profitable than foreign banks due to costs associated with the distance between the principal and the agent.

In Malaysia, as part of the emerging market, the corporate governance mechanisms can be seen as inadequate (Khanna & Palepu, 2000) due to the prevalence of family ownership, pyramidal ownership in the business group (Claessens et al., 2000) and more informal relationship-based connections (Gul, 2006). Foreign ownership can be seen as a mechanism that could complement the current governance structure in order to monitor the management of non-value maximising activities. This is due to the fact that their role resembles that of institutional investors (Dahlquist & Robertson, 2001). Consistent with this argument, Chhibber and Majumdar (1999) find a positive relationship between foreign ownership and company profitability in India when there is unambiguous control over the company.

On the acquisition side, R&D seems to be a significant contributor to the long term performance of overseas investment (Alan & Steve, 2005). In order for foreign investors to achieve positive returns (in holding the equity of foreign entities), the investor may influence the domestic company to invest in more value-creating activities that would contribute to better company performance in the long run. This would lead to better IC performance.

Therefore, our hypothesis is as follows:

H_4: Foreign ownership is positively related to IC performance.

All of our hypotheses are stated in alternative form, since prior research and theory show the direction of the relationship between the company ownership structure and IC performance.

METHODOLOGY

Dependent Variable

Intellectual capital is an essential resource of corporate success in a knowledge economy. It is imperative to determine the efficiency of IC investments made by knowledge-inclined companies as well as to explore the factors contributing to the efficiency of intellectual capital. This study attempts to measure IC performance in companies listed on the MESDAQ market using the 'Value Added Intellectual Capital Coefficient (VAIC™)' developed by Pulic (1998, 2000). In addition, we test whether ownership structure is significant in explaining the variation in a company's intellectual capital performance. The VAIC™ is not intended to measure the value of intellectual capital owned by companies. Rather, the VAIC™ is an accounting tool for measuring and monitoring the company's tangible assets performance as well as the performance of the company's intellectual assets as indicated by human capital and structural capital efficiency (Pulic, 2000). Pulic (1998: 3) considers this methodology as a *'universal indicator showing the intellectual abilities of business unit's value creation ability and represents a measure of business efficiency in the knowledge based economy'*. Other authors who have used the VAIC™ include Marr and Schiuma (2001), Lev and Radhakrishnan (2005) and Gan and Saleh (2008).

In line with resource-based theory, the method relies on the premise that the company's value creation relies on the effective management of resources. There are two primary sources in the VAIC™ value creation model: physical capital and intellectual resources. The former refers to tangible assets employed (CE), and the latter refers to human capital (HC) and structural capital (SC). According to the method, the more effective the company is in managing intellectual resources (i.e., the HC, CE and SC), the more efficient is the company's value creation activity. Efficiency refers to the company's value added given current resources. On the other hand, value creation deteriorates if the company fails to manage intellectual assets effectively (Pulic, 2000; Kujansivu & Lönnqvist, 2007a, 2007b; Goh, 2005). There are several advantages of the VAIC™ method (Antola, Kujansivu & Lönnqvist, 2005; CIMA, 2000; Firer & Williams, 2003; Kujansivu & Lönnqvist, 2007a, 2007b):

- The VAIC™ figure is comparable among companies, as it provides a standardised and consistent way of measuring IC performance. It can also be reported to external stakeholders.
- The data is obtainable from the company's financial statement. The data is also objective and reliable, since it is gathered from audited sources.
- The method is simple, and the results are easy to interpret. Thus, the method is most likely to suit the majority's cognitive understanding.

To test the hypotheses developed in the previous section, we use an empirical model for the VAIC™ as a dependent variable to measure IC efficiency or performance (Pulic, 2000). The method for calculating the VAIC™ is presented in Appendix 1.

By calculating the VAIC™, a company can determine the extent of value created by its resources. The higher the VAIC™, the more value has been created by the company given its resources, and vice versa. A measure of value added efficiency generated by IC resources (not by the entire amount of resources) is the sum of HCE and SCE. We denote this as ICE.

The Independent Variables

A family is detected through disclosure of the highest 30 shareholders in its annual report. This data is hand-collected. While La Porta, Lopez-de-Silanes and Shleifer (1999) use a simple measurement of family influence (i.e., when a person owns more than 10% or 20% of the shares in a company), Faccio and Lang (2002) classify a firm as a family firm when the largest controlling shareholder with at least 10% of the voting rights is a family, an individual or an unlisted company owned by a person. A family is defined as an individual or individuals who are related through blood or marriage. We examine the profile of directors first because the Bursa Malaysia listing requires all companies to disclose relationships between the directors and major shareholders. This procedure leads us to identify family involvement in companies, and we subsequently calculate the percentage of ownership. We then use the percentage of ownership to indicate the degree of family involvement in the company. We expect this variable to be negatively related to IC performance.

We use the percentage of share ownership by executive managers to indicate managerial ownership. This measure is used because only executive managers have the power to control most decisions in companies. Therefore, the effect of convergence of interests resulting from managerial ownership is directly reflected in business decisions. The chief executives and directors of a listed company must disclose their interests in the company to the SC. Failure to do so

may result in a criminal sanction of up to RM1 million, imprisonment of up to 10 years, or both (Section 99B of the Securities Industry Act 1983). As such, the data on directors' ownership is readily available from annual reports. We predict this variable to have a positive relationship with IC performance.

Government ownership is measured by the percentage of ownership by government institutions, agencies and government linked companies (GLCs). A list of GLCs was obtained from the Khazanah Nasional Berhad website.[7] The total percentage of government ownership is calculated for each company with government ownership indicated in its top 30 shareholders list. Consistent with the hypothesis, we expect a negative relationship between government ownership and IC performance. Similarly, the total percentage of foreign ownership is calculated once foreign investors are identified. Foreign ownership is expected to have a positive relationship with IC performance.

We also use control variables such as the profitability of the companies indicated by the return on assets (earnings before interest and tax divided by average total assets), the market performance (the logarithm of market value of equity over book value of equity [MVEBVE]) and leverage (the debt to total assets ratio). Prior studies suggest that these variables could have positive (for profitability and market performance) or negative (for leverage) effects on IC performance. The empirical model used in this study is as follows:

$$\begin{aligned} Y_i = \; & \beta_0 + \beta_1 \text{Family ownership}_i + \beta_2 \text{Management ownership}_i + \\ & \beta_3 \text{Government ownership}_i + \beta_4 \text{Foreign ownership}_i + \\ & \beta_5 \text{Profitability}_i + \beta_6 \text{MVEBVE}_i + \beta_7 \text{Leverage}_i + \varepsilon_i \end{aligned} \quad (1)$$

where Y is a measure of IC performance or VAIC™$_i$. Since VAIC™ can be segregated into three components (Appendix 1), and ICE_i is the sum of HCE_i and SCE_i, we replace Y with these respective measures and run separate regressions to determine the effect of ownership structure on each component of VAIC™.

Henry (2009) suggests that there may be an endogeneity problem between corporate governance and performance (i.e., reverse causality or dynamic dependence). The problem is pronounced in attempts to identify the impact of ownership on performance (Hu & Izumida, 2008). When this problem occurs, the independent variable is correlated with the error term in a regression model and results in biased OLS regression coefficients. One of the methods to overcome this problem is instrumental variable regression. We utilise the generalised method of moments. Consistent with Hu and Izumida (2008) and

[7] A company that acts as the investment arm of the government.

Kang and Shivaramakrishnan (1995), we select the lagged one year values of the independent variables as instruments.[8]

Data

The sample consists of all companies listed on the MESDAQ market of Bursa Malaysia in 2005, 2006 and 2007. There are 333 companies. However, after considering the availability of the data necessary to satisfy the model's requirement, we reduced our sample to 264 companies. The years 2005, 2006 and 2007 were selected because they are the most recent.

RESULTS

Table 1 shows the descriptive statistics of all variables used in this study. Human capital efficiency (HCE) recorded the highest average value (2.221).

Table 1
Descriptive statistics.

	Mean	Median
Human capital efficiency	2.221	1.928
Structural capital efficiency	–0.202	0.585
Capital employed efficiency	0.043	0.289
Intellectual capital efficiency	2.019	2.636
Value added intellectual coefficient	2.063	3.024
Leverage	0.302	0.210
Profitability	0.115	0.054
Family ownership	0.414	0.437
Management ownership	0.122	0.071
Government ownership	0.007	0.000
Foreign ownership	0.048	0.005

To investigate whether the ownership factors are different according to different levels of intellectual capital performance, we sort the sample according to the VAIC™ level. According to the sample classification, the average value of the VAIC™ is 2.063. Cheuk et al. (2006) report a mean VAIC™ of 8.03, which is marginally higher than the 7.91 reported by Goh (2005). However, the highest VAIC™ score reported in the Cheuk et al. (2006) study is 108, far larger than highest score reported by Goh (2005), which were 14.62. Similarly, Cheuk et al. (2006) gather VAIC™ data from 52 publicly listed financial companies from the Bursa Malaysia. Therefore, the lower average VAIC found in this study may

[8] In a linear model, Instrument Variable (IV) should be (i) correlated with the endogenous explanatory variables and (ii) uncorrelated with the error term in the explanatory equation.

come from different industry characteristics. However, similar to this study, Cheuk's study finds that about 80% of companies' value creation comes from human capital efficiency (Cheuk et al., 2006).

The leverage level was very low, i.e., an average of nearly 10% of total assets. This is due to 26 companies with zero leverage levels, while a majority of other companies recorded less than 30%. This is a unique characteristic of companies listed on the MESDAQ market. The mean of family ownership for 3 years is 41.4%, while the average level of management ownership is 12.2%.

Table 2 presents comparison tests between groups classified according to the VAIC™ measure. The sample is sorted and classified as one-third of observations in the high, moderate, or low level of VAIC™ classifications. The table suggests that, in most situations, each group's leverage and profitability levels are significantly different. These factors must be controlled in order to analyse the effect of various ownership factors on intellectual capital performance, as they could contribute to differences in the level of VAIC™.

Table 2
Bivariate test.

	Test of differences in company characteristics according to VAIC™ classification of companies					
	Low (1) vs. High (3)		Low (1) vs. Moderate (2)		Moderate (2) vs. High (3)	
	T-stats	Z-stats	T-stats	Z-stats	T-stats	Z-stats
Leverage	0.869	–0.681	–0.125*	–0.420	1.034*	–0.902
Profitability	–5.812	–5.823***	–4.800**	–5.681***	–1.593**	–2.000**
Family ownership	1.117	–0.944	–1.025	–1.179	2.166	–2.042**
Management ownership	–0.284	–0.870	–0.529	–0.697	0.240	–0.363
Government ownership	0.309	–0.553	0.950**	–0.812	–0.588	–0.173
Foreign ownership	–2.733	–2.900**	–0.314	–0.144	–2.310	–2.631**

Note: ***, **, * significant at 0.001, 0.050 and 0.100 level (2-tailed).

Table 3 shows the correlation between the components within the VAIC™ measure. While human capital and structural capital efficiencies are 28.2% correlated, as reported by the Pearson correlation coefficient, neither is correlated with the capital employed efficiency. We also found that structural capital efficiency has no association with capital employed efficiency. As expected, the table displays positive correlations among human capital, structural

capital, capital employed efficiencies and intellectual capital efficiency. The non-parametric Spearman correlations shown below the diagonal confirm the results.

Table 3
Correlations between the VAIC™ components.

	Human capital efficiency	Structural capital efficiency	Capital employed efficiency	Intellectual capital efficiency	Value added intellectual coefficient
Human capital efficiency	1.000	0.282**	0.147*	0.877**	0.751**
Structural capital efficiency	0.507**	1.000	–0.083	0.611**	0.510**
Capital employed efficiency	0.428**	–0.054	1.000	0.084	0.488**
Intellectual capital efficiency	0.871**	0.728**	0.276**	1.000	0.856**
Value added intellectual coefficient	0.874**	0.712**	0.338**	0.994**	1.000

Note: Pearson (Spearman) correlation coefficients are reported above (below) the diagonal.
** Correlation is significant at the 0.01 level (2-tailed).

Table 4 shows the parametric correlations between variables used in the regression. The table suggests that there is a moderate level of correlation between the VAIC™ used as the dependent variable and profitability, one of the independent variables (Pearson coefficient = 0.363). The more efficient the company is in using its knowledge resources, the more profitable it is. The table shows there is a significantly positive correlation between family ownership and profitability (Pearson coefficient = 0.222). This indicates that there could be a positive effect of family ownership in maximising the profitability of companies in the MESDAQ market. However, family ownership is also negatively correlated with management ownership (Pearson coefficient = –0.271) and government ownership (Pearson coefficient = –0.217). These positive and negative effects of ownership structures should be analysed simultaneously in order to examine the effect on intellectual capital performance.

Overall, we find that the highest correlation between independent variables does not exceed 35%. This result suggests that the possibility of multicollinearity in a regression using these variables as the independent variables is very small.

Table 4
Correlations between variables.

	Value added intellectual coefficient	Leverage	Profitability	Family ownership	Management ownership	Government ownership	Foreign ownership
Value added intellectual coefficient	1.000	–0.024	0.363**	–0.034	–0.031	0.037	0.109
Leverage	–0.181	1.000	0.181**	–0.012	0.038	0.094	0.043
Profitability	0.715**	–0.024	1.000	–0.018	–0.025	0.014	0.076
Family ownership	0.027	–0.025	0.193	1.000	–0.271**	–0.217**	–0.100
Management ownership	–0.095	–0.012	–0.007	–0.230*	1.000	0.090	–0.064
Government ownership	–0.040	–0.033	–0.097	–0.206*	0.198*	1.000	–0.044
Foreign ownership	0.096	–0.016	0.209*	–0.033	0.089	0.007	1.000

Note: Pearson (Spearman) correlation coefficients are reported above (below) the diagonal.
*, ** denote correlation is significant at the 0.05, 0.01 level, respectively (2-tailed).

We run one regression using VAIC™ as the dependent variable to investigate the influence of various ownership factors on intellectual capital performance. These results are shown in column (1) of Table 5. We find that profitability is significantly related to VAIC™, as predicted. It also appears from the results that family ownership has a negative effect on IC performance. This suggests that firms with high degrees of family ownership are associated with low IC performance. This implies that high degrees of family ownership indicate high probabilities of opportunistic behaviour among families pursuing their objective at the expense of minority shareholders. Subsequently, these companies should be less efficient users of their knowledge assets. In the end, this will result in lower IC performance relative to companies with lower degrees of family ownership. Therefore, the negative relationship is as expected.

For foreign ownership, our result differs with Goh (2005) in Malaysia and Kamath (2007) in India, who find that foreign companies outperform local companies with respect to IC. The difference could be due to the unique characteristics of the MESDAQ market, which is relatively young and more technology oriented than banks and other listed companies. Therefore, the role of other institutional owners and venture capitalists (which are common in the MESDAQ market), who have knowledge of their investment and competency in

their technology, could outperform foreign investors. However, a formal test of this argument is beyond the scope of this paper. Overall, this result indicates that there is no positive impact of foreign investment in Malaysian technology companies at their initial stage of operations.[9]

Table 5
Regression result using the generalised method of moment procedure.

Dependent variable	VAIC™ (1)	SCE (2)	HCE (3)	CEE (4)	ICE (5)
	Coefficients (t-statistics)	Coefficients (t-statistics)	Coefficients (t-statistics)	Coefficients (t-statistics)	Coefficients (t-statistics)
Constant	3.105***	0.547***	3.002***	0.238***	2.829***
	(21.325)	(15.568)	(5.208)	(17.977)	(19.305)
Leverage	–0.082	–0.015	–0.567	–0.016*	–0.030
	(–0.504)	(–0.480)	(–1.086)	(–1.258)	(–0.178)
Profitability	1.546***	0.150**	1.484***	0.060**	1.513***
	(6.734)	(2.428)	(2.784)	(2.347)	(6.743)
Family ownership	–0.386**	–0.089***	–1.463	–0.031**	–0.390**
	(–2.384)	(–2.715)	(–1.206)	(–2.150)	(–2.317)
Management ownership	–0.355*	–0.034	–0.872	–0.001	–0.359*
	(–1.860)	(–1.063)	(–0.813)	(–0.045)	(1.829)
Government ownership	–0.264	–0.069	–1.024	–0.026*	–0.240
	(–1.260)	(–1.617)	(–1.345)	(–1.850)	(–1.143)
Foreign ownership	–0.383	–0.024	–1.027**	0.018	–0.420
	(1.292)	(–0.422)	(–1.440)	(0.670)	(–1.449)
Adj-R^2	0.484	0.121	0.189	0.525	0.429

Note: ***, **, * significant at 0.001, 0.050 and 0.100 levels (one-tailed).
VAIC™ = value added intellectual coefficient = HCE + SCE + CEE; HCE = human capital efficiency = VA/HC; SCE = structural capital efficiency = SC/VA; CEE = capital employed efficiency = VA/CE; ICE = intellectual capital efficiency = HCE + SCE.

The result also shows that management ownership is not positively related to all indicators of efficiencies, as expected. According to agency theory, management ownership should reduce conflict between the management and shareholders, leading to improved performance (according to agency theory). Instead, the positive effect of management ownership may only reverse when it exceeds a certain threshold (25%, as reported in Warfield *et al.,* 1995). When managerial ownership exceeds this level, it could have a detrimental effect on the minority shareholders. This high level of management ownership may induce management to extract wealth from the minorities (known as the entrenchment

[9] This statement is based on the fact that most MESDAQ companies are listed for less than 10 years.

hypothesis). We expect these positive and negative effects to offset one other, resulting in insignificant results. We perform additional tests in order to assess this concern. We find that four observations are above 25% in our sample and that the maximum level of management ownership is 44%. We test this concern by excluding the four observations. The results show that management ownership is still not significantly related to VAIC™, while our conclusions for the other variables remain unchanged. The insignificant relationship between management ownership and IC performance leads us to question the competency of the managers of MESDAQ companies in creating value given the existing resources. This question is subject to future research, since the competency issues require proper identification of the managerial attributes that would enhance or limit value creation activities. The attributes may go beyond the board characteristics investigated in Ho and Williams (2003) to accommodate issues such as the level of commitment, experience and educational background. This kind of study also requires determination of a different methodology and sample frame in order to test the attributes.

We repeat the test for each component of VAIC^{TM} representing the social capital, human capital, capital employed and intellectual capital efficiencies. There are minor differences in the significance of the independent variables. For family ownership, our conclusion changes from statistically significant to insignificant when we use human capital efficiency as the dependent variable. This result indicates that there is no significant negative effect on human capital efficiency. However, government ownership does not have a significant effect on IC performance in MESDAQ companies.

We perform 2SLS regressions to confirm our results and find that the results are stable and qualitatively similar under both methods. There are slight changes in the t-statistics, but the coefficients remain the same because we utilise the same variables and instruments as in the GMM procedure.

CONCLUSION

It is important to determine the efficiency of IC investments made by knowledge-based companies in the MESDAQ, since investment in IC should contribute to their long term competitive advantages. This paper explores some possible factors contributing to the efficiency of intellectual capital from a corporate governance perspective. We test whether ownership structure is significant in explaining the variation in a company's IC performance. We believe that company ownership structure (ownership by the management, foreign investors, government or families) is important in determining IC policy and monitoring the management's ability to achieve the company's strategy. Although the effects of

ownership structure on performance may not be direct, owners influence decisions affecting value creation. According to this explanation and agency theory, we expect significant relationships between ownership structure and the performance of IC investment.

Consistent with our expectations, our results show that family ownership has a significant negative impact on VAIC™. This suggests that an increase in the probability of opportunistic behaviour of families pursuing their objective at the expense of minority shareholders is associated with the IC performance indicated by VAIC™. Separate regressions of the components of IC performance represented by human capital, social capital, capital employed and intellectual capital efficiencies partially confirm our earlier findings. However, the roles and attributes of the managers promoting IC performance are subjects for future research. It would also be interesting to consider whether the nature of foreign ownership in Malaysia (the level of ownership, participation in decision making or origin) increases the efficiency of value creation activities. The competency of the managers of MESDAQ companies in creating value is also a subject for future research, given the insignificant relationship between management ownership and IC performance. Because the involvement of families in business in East Asian countries is common, further research is also needed to identify the conditions and environment in which families could have a positive or negative contribution to company value. The results of the study are important for regulators of the capital market in monitoring the factors associated with the efficiency of value creation investments in companies listed on the MESDAQ market.

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APPENDIX

VAIC™: The intellectual capital performance

VAIC™ is calculated in several steps. The alphabetic formula of calculating IC performance is as follows:

$$VAIC_i™ = HCE_i + SCE_i + CEE_i \quad (1)$$

where

$VAIC™_i$	= Value added intellectual coefficient for company i	
HCE_i	= Human capital efficiency for company i= VA/HC	[a]
SCE_i	= Structural capital efficiency for company i = SC/VA	[b]
CEE_i	= Capital employed efficiency for company i = VA/CE	[c]

As already mentioned, the VAIC™ value is based on three main sources of efficiency: human capital efficiency (HCE), structural capital efficiency (SCE) and capital employed efficiency (CEE). The first step in calculating VAIC™ is to determine the company's value added. Value added (VA) is defined as output less input and represents the value created by the company in a particular financial period. VA is the summation of retained profit for the year, interest expense, salaries and wages, depreciation, amortisation, dividend, minority profit share and government tax. Therefore, in this study, value added is defined as an increase in the net value of the company due to operations (where operations are proxied by the operating profit before allocations of its asset cost, non-direct expenses and distributions to stakeholders).[10] An increasing value for VAIC™ indicates increased efficiency of value creation activities given the company's total resources.

As indicated in the description of the sub-components of VAIC™ i.e. in [a], [b] and [c], value added for company i (VA_i) is calculated as follows:

$$VA_i \text{ (value added)} = P_i + I_i + C_i + D_i + A_i + DIV_i + MI_i + T_i \quad (2)$$

where
- P = retained profit for the year
- I = interest expense
- C = salaries and wages
- D = depreciation
- A = amortisation
- DIV = dividend
- MI = minority's share of profit
- T = tax

All measures are for company i.

[10] More on VA calculations can be found in Pulic (1998) and Ho and Williams (2003).

Human capital (HC), structural capital (SC) and capital employed (CE) for company i are calculated as follows:

HC_i (Human capital) = salaries and wages
SC_i (Structural capital) = $VA_i - HC_i$
CE_i (capital employed) = Total tangible assets less total liabilities

The HCE_i ratio is derived by dividing VA_i created by the company over its total salaries and wages (HC_i) [a]. This calculation assumes that HC_i is an investment rather than an expense, which is consistent with recognising all human capital as an asset. Thus, salaries and wages should no longer be in an item in the profit and loss account. Instead, they should be recognised as assets on the balance sheet (Pulic, 2000). Accordingly, the ratio indicates the company's value added for every unit of money invested in human capital in the current year.[11]

Third, structural capital (SC_i) is computed by subtracting HC_i from VA_i. Pulic (1998) argues that there is a proportionate inverse relationship between HC_i and SC_i. Thus, structural capital efficiency ratio (SCE_i) is obtained by dividing SC_i over VA_i [b]. Likewise, the SCE_i ratio shows the ratio of structural capital to a unit of the company's value added money.

Finally, capital employed (CE_i) is the net sum of physical and financial assets. The capital employed efficiency ratio (CEE_i) is CE_i [c] divided by VA_i. A large CEE ratio reflects a large contribution by a unit of money invested in physical assets to the company's value added and vice versa.

The overall measure of value added efficiency generated by the entire resource base (proxied by VAIC™ value) is obtained by adding HCE, SCE and CEE [Equation (1)].

[11] However, the HC_i measure is only used as an indicator of human capital value, whereas the true value of human capital may not be captured in current salaries and wages. It also involves formal and informal training in the company. Therefore, HC_i measurement error is a limitation of this study.