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The Role of Corporate Governance on the Relationship between Intellectual Capital performance and Firm value: Pre and Post of MCCG 2017 in Malaysia

[1]Haider Mahdi Saleh, [2]*Mara Ridhuan Che Abdul Rahman, [3]Mohamat Sabri Hasan, [4]Azlina Ahmad

ABSTRACT*-In the age of knowledge economy, intellectual capital (IC) is gaining prominence in academic research and management practices owing to the fact that it is a significant contributor value creation. In order to achieve maximum value, it has been argued that corporate governance (CG) mechanism plays important role by enhancing the management of IC practice via effective control, measurement and reliable reporting of IC. Therefore, this study investigates the moderating effect of CG (characteristics board of directors and audit committee) on the association between (IC) performance and firm value. Further, the study compare CG practices pre and post the implementation of MCCG in 2017and determine the importance of reform CG code and the extent of its impact on the value of the company. This study utilised a sample of 88 largest listed firms in bursa Malaysia from 2015 to 2018. This study examined data before (2015 and 2016) and after (2017 and 2018) the revised MCCG 2017code. Findings of the study show a positive association between intellectual capital performance (VAIC) and firm value. Also, the result of study show the human capital efficiency (HCE) and structural capital efficiency (SCE) were positive associations with firm value, while Capital employed efficiency (CEE) was not significant. Regression result provide evidence that the CG practices are significantly moderate the relationship between VAIC and firm value. The study also reveals that the moderating effect of MCCG 2017 is stronger than MCCG 2012 on the relation, indicating that regulators' efforts in reforming CG practice code are worthwhile in this context. It can be recommended that investment on human capital and structural capital is paramount to influences firm value. The findings provide empirical support for resource base view and agency theory where a better corporate governance mechanism contributes to the better association between IC management practices and firm value.*

Keywords: *Intellectual capital performance, corporate governance, agency theory, Malaysia corporate governance code (MCCG2017), firm value.*

[1]Faculty of Economy and Management, Universiti Kebangsaan Malaysia, [2]Department of Business Administration, Cihan University-Erbil, KRG, Iraq
*[2] *Faculty of Economy and Management, Universiti Kebangsaan Malaysia, mara@ukm.edu.my*
[3] Faculty of Economy and Management, Universiti Kebangsaan Malaysia
[4] Faculty of Economy and Management, Universiti Kebangsaan Malaysia

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I INTRODUCTION

Recently, the explanation of firm value in world is no longer depends on traditional financial reporting (i.e. tangibles), but the creation of IC (Zavertiaeva, 2016). Most of previous studies provide the evidence of IC is useful to investors, because the recognition of IC based on the stock market. Thus, the development of the new "knowledge-based" theory has led to a gap between book-value and market value of companies (Kim and Taylor, 2014; Stewart, 1997; chen et al., 2005). Lev (2004) argued that the consequences of this gap are the lack of confidence of investors in companies, which leads to underfunding problem for companies and create the problem of information asymmetry.

In fact, this study suggest regarding to past studies that the presence of good corporate governance (CG) in the company will improves the quality of information and reduces the asymmetry of information that leads to improved investor confidence in the company. In the other words, good CG will reduce the gap between book-value and market value. The majority of the previous studies that examines the relationship between CG and IC, documents that a robust CG is associated with a higher firm value (e.g. Beiner et al., 2006; Black et al., 2006; and Drobetz et al., 2004). The stronger CG is monitoring the management of IC information for decision making process including "innovation, perception and flexibility on the part of the decision makers" (Mahfoudh & Ku Nor Izah 2014). Core et al. (1999) noted that an agency problem is considering one of the most indictor for weak CG, which lead to more private benefits to the manager. However, many researchers (e.g. Cheffins, 2009; Grosse, 2010; Kirkpatrick, 2009) are convinced that financial crisis over the world proved the CG regulation are not suitable to prevent future financial crisis. Wherefore, many countries around the world have undertaken various measures to improve the efficacy of CG structures.

In Malaysia, Malaysian regulators launched the Malaysian Code on Corporate Governance (MCCG). Liew (2008) mentioned that the corporate governance regulation in Malaysia mostly followed the “Anglo-American” approach in the United Kingdom, essentially drawn from the recommendations of the “Cadbury Report”. These recommendations are focusing on strengthening the role of non-executive directors. For instance, Al-Hiyari (2017) suggested that Cadbury Report is inappropriate to business environment in Malaysian. On 26 April 2017, The Securities Commission of Malaysia (SC) issued the new Malaysian code on corporate governance. The new code (i.e. MCCG 2017) takes effect immediately and replaces the previous 2012 code. The MCCG 2017, which is now the fourth version (with previous ones in 2000, 2007 and 2012) and consider the best practices to strengthen corporate culture pillared on accountability and transparency. The code contains 36 practices to support three core principles with regard to a company’s board, audit and risk management and stakeholders (Securities Commission, 2017). This study anticipates that the amended code MCCG 2017 would serve as a wake-up call to Malaysian companies to induce better IC practices. However, Limited studies have been undertaken to assess the impact of the revised code as moderate the relationship between IC performances with firm value in Malaysia. Therefore, this study investigates corporate governance (the board of directors and audit committee) has a role in the association between the IC performance and firm value pre and post MCCG2017in largest listed companies in Malaysia.

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The reminder of the study is organized as follows. The section two will review past studies and development of the study hypotheses. Section three will discuss methodology utilized in this study. Section four will present and discus the finding. Finally, the concluding section will provide summary of whole paper.

II LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

INTELLECTUAL CAPITAL PERFORMANCE AND FIRM VALUE

Theory of knowledge based proposed that the knowledge is essential Contributor towards creating value in a company through cumulating and usage of all knowledge sources (Sydler et al., 2014; Zhining et al., 2014; Randa & Ariyanto, 2012). In a knowledge-based economy, the traditional approach to measure the value of company is no longer accepted, however it should take into consideration recognize intangible assets (i.e. intellectual capital) to measure firm value (Berzkalnea& Zelgalve, 2014). Knowledge-based theory suggests that the IC is the resource of companies that can usage to creating the value and competitive advantage of companies (Bemby S. et al. 2015; Bontis et al., 2000; Lentjušenkova & Lapina, 2016).

Prior researchers have developed a considerable number of IC measurement approaches (i.e VAIC), it seems empirical public's model gained popularity among prior empirical studies (Mavridis, 2004; Goh, 2005; Kamath; 2007;Ting & Lean, 2009;Mehralian, et al., 2012; Alipour, 2012). Edvinsson defined IC as "the possession of knowledge, applied experience, organizational technology, customer relationships, and professional skills" (Edvinsson, 1997, p. 368). These characteristics of above concept were later categorised into three IC attributes. Pulic (1998) uses an indirect method related to Skandia definition to IC measuring: human capital efficiency (HCE), structural capital efficiency (SCE), and customer capital (CEE). The concepts of three companied Boujelbene & Affes (2013) summarized the following: HCE is captures the knowledge, qualified skills, experience and innovativeness of employees within an organization, while SCE consists of the structures and processes employees develop and deploy in order to be productive, effective and innovative, Wherever, CEE consist the knowledge of market channels, customer and supplier relationships, and governmental or industry networks.

Empirical studies found positive association between intellectual capital and firm value (Cheng, et al., 2005; Shiu, 2006; Wang, 2008; Wang, 2013; Daryaee et al., 2011; Berzkalne and Zelgalve, 2014; Nuryaman, 2015; and Chen, et al., 2005). An association between intellectual capital attributes such as the human capital, structural capital and relational capital with firm value were mix. Sumedrea (2013) found that human capital and structural capital during the crisis period, the development of companies is influenced. Veltri and Silvestri (2011) in their study found that investors place greater value relevance on human capital efficiency (HCE) compared to structural capital efficiency (SCE) and that HCE has moderated variable is involved in the relationship between IC and market value. Berzkalne and Zelgalve (2014) in their study found that increasing IC translates into increasing company value. The results of this research also show that human capital efficiency and capital employed efficiency can be utilised for the calculation of IC but, structural capital efficiency has no significance in the case of intellectual capital and company value. Bchini (2015) supported that components of intellectual capital (human capital, organizational capital, and relational capital) are positive and statistically significant relationship value creation in Tunisian manufacturing companies. Li & Zhao (2017) concluded that human capital has a significant

influence on firm value. The results imply that the improvement of organizational system plays a more important role in raising the value of a firm in a typical developing country, like China. Huang & Hsueh (2007) concluded that SC and CE have enhanced performance, whereas human capital presents the negative effect on firm performance. IC performance has a positive association with firm value and performance, as well as the investors could place a different value for IC attributes (Chen, et al., 2005). Based on resource based view theory and past studies findings, our first hypothesis (H1) is therefore stated as follows:

H 1: Intellectual capital performance and firm value are positively associated.

H1 (a): Human capital and firm value are positively associated.

H1 (b): Structural capital and firm value are positively associated.

H1 (c): Capital employed and firm value are positively associated.

III MODERATING EFFECT OF CORPORATE GOVERNANCE

However, to meet the new challenges in the free global environment business, CG practice is considered as a mechanism of controlling and monitoring of intellectual assets out come and corporate knowledge as being one of the most sustainable sources of competitive advantage in business for achieving supreme efficiency as well as its plays a very significant role in sustainability, productivity and profitability (Makki &Lodhi, 2014). Narrowing the literature to IC and CG, Keenan and Aggestam (2001) stated that wisdom and expertise of CG create and leverage IC to sustain the gains of knowledge- intensive organisations. This advantage is evident because CG systems mobilise different IC components towards realising firms' targets and values.

Empirically, prior studies have indicated different results pertaining to the influence of CG on IC practices. Regarding IC performance, Al-Musalli and Ismail (2012) found that the number of independent directors has a significant adverse effect on IC performance while the other board characteristics (board size, nationality diversity, educational level diversity, and board interlocking) were not related to IC performance. Similarly, Swartz and Firer (2005) found that there is a positive connection between the board of directors from various ethnic groups and IC performance. Yan (2017) investigate the connections among IC, CG and corporate social responsibility (CSR) via direct and indirect statistical examination. Findings of direct tests among IC, CG and CSR indicate statistically significant variances among these constructs.

However, according to Bemby et al. (2015), agency conflict that often occurs is the conflict between shareholders and managers. The manager was given the task by shareholders to run the company, in order to achieve the company shareholders, namely to maximize the value of the company (shareholder wealth) to optimize the available resources to the fullest. The emergence of a potential conflict between the two parties because if the manager will act consistent with the objectives of shareholders prosper (Bemby et al., 2015). Thus, agency theory can explain CG moderating effect as an effective mechanism that plays an important role in reducing information asymmetry. In other words, an effective CG system minimises managers' profit maximisation and facilitates activities that would enable the company to generate more value from IC performance. Besides that, prior studies on IC recommended this theory to explain that IC added to the value of a firm (Zerenler & Gozlu, 2008; Phusavat et al., 2011) as the provision of IC information reduces agency costs. The explanation of IC's association with

agency theory stems from the fact that managers tend to convince stakeholders that they are not working for their self-interest and they are acting ideally by disclosing more IC information. Acquiring and efficiently using IC can be weakened by the need to pay agency cost (Appuhami & Bhuyan, 2015). Further, they argued that because of the need to pay off agency costs and information asymmetry, shareholders fail to capture the full value of the firm's shares, thus adding to the cost of external funds required for IC investment.

On the other side, some of previous empirical studies argued that the CG structures could be not suitable to the business environment of countries. This is because, the CG code has adopted from other legal and cultural environments (Al-Hiyari, 2017; Ahmed Haji, 2014). In particular, Malaysia code mostly followed the "Anglo-American" approach in the United Kingdom, essentially drawn from the recommendations of the Cadbury Report (Liew, 2008). Al-Hiyari (2017) concludes that British approach is unsuitable for Malaysia business environment. Ahmed Haji (2010) results showed that revised code MCCG 2007 was not enhancing the CG compliance in Malaysia. However, Bhatt & Bhatt (2017) found that CG of sample firms shows marked improvements after implementation of MCCG 2012 as compared to MCCG 2007. Machuga & Teitel (2009) argue that CG policy makers should note on legal and culture environments when applying new governance reforms code, otherwise may become unable to achieve the desired goals of change. Therefore, there are limited studies have been compare the impact of the revised code in MCCG 2012 and MCCG 2017 on the relationship between IC performance and firm value in largest listed companies Malaysia. As such, based on previous studies and agency theory, the study proposed our second hypothesis (H2) as follows:

H2: The intellectual capital performance and firm value are moderated by corporate governance.

H2 (a): intellectual capital performance and firm value are moderated by CG in 2012.

H2 (b): intellectual capital performance and firm value are moderated by CG in 2017.

H2(c): The moderation CG effect on those relationships is stronger for MCCG 2017 than MCCG 2012.

IV METHODOLOGY

Since the objective of the current study is to examine the moderating role of corporate government in the association between intellectual capital performance and firm value pre and post Malaysian code of corporate governance MCCG 2017, this research will restrict its sample to listed firms on the main market in top 100 or the market capitalisation (2) billon and above companies from 2015 to 2018 for the following reason. the new code of corporate governance MCCG 2017 practices are applicable only to Large Companies (security commission Malaysia, 2017), which could be a suitable period to measure the development of IC practices in the annual reports of 100 top or 2billon and above Market capitalisation Malaysian listed companies. The sample of our study is originally 900 firm-years data of financial information throughout 2015 until 2018 collected from firms listed on the main market of Bursa Malaysia in various industries. After excluding firms are less than 2billon Market capitalisation (789), firms Finance and closed-end funds firms (17), firms (not listed continuously) (6), the final sample is 88 firm-years data. Sample data is between years 2015 until 2018 mainly due to they represent before (i.e. MCCG 2012) 2015 and 2016 and after (i.e. MCCG in 2017) 2017 and 2018. As such, based on the main objective of this study, our empirical model has independent variable of interest being Intellectual Capital

performance (VAIC), dependent variable being firm value (Tobin Q), corporate government index (CGI) being the moderating variable, and we include (firm size and leverage) as control variables.

V INDEPENDENT VARIABLE

INTELLECTUAL CAPITAL PEEFORMANCE (ICP)

In measuring Value Added Intellectual Capital (VAIC), prior studies divided VAIC into three components representing the independent variables (Williams, 2001; Mavridis & Kyrmizoglou, 2005; Pulic, 1998) namely; Customer Capital Efficiency (CEE), Human Capital Efficiency HCE, and Structural Capital Efficiency (SCE). The current study uses the VAIC, Nazari and Herremans (2007) believed that using the VAIC method to measure the level of intellectual capital usage is more appropriate for statistical analysis. Also, The VAIC data requirement is simple and based on an organization's audited financial report, which is readily available from the organizations. The VAIC model was discussed by Andriessen (2004) to be a better tool for analyzing intellectual capital firstly because the data is available online. Therefore, the VAIC model measures the overall value creation efficiency of an organization. The organization's total value created is the difference between what it produces (output) and what it uses for production (input) (Vergauwen et al. 2009).

Where, VAIC measures the value creation efficiency of tangible and intangible assets within the firm (Tan et al., 2008; Clarke et al., 2011). Specifically, CEE represents the value added (VA) of capital employed. HCE represents VA efficiency of human capital, while SCE signifies VA efficiency of structural capital. Algebraically and conceptually, they can be defined as follows, respectively:

$$VAIC=HCE+SCE+CEE$$

In calculating the VAIC, value added (VA) should be calculated first, which is the corporate ability to create value added to different stakeholders (Tan et al., 2008; Clarke et al., 2011). The value added is the difference between input and output. Where output represents operating revenues and input represents operating expenses except labour expenses since it is considered as firms' entity expenses (Clarke et al., 2011). Thus, VA can be expressed as follows:

$$VA = \text{operating revenues} - \text{operating expenses}$$

The second step in calculating VAIC is to measure human capital efficiency (HCE), in VAIC model HC has been identified as salaries spent by the firm in the identified period (Pulic, 1998), where HCE represents how much VA is generated by the amount of money spent on human capital (Clarke et al., 2011) and is measured as follows:

$$HCE = VA/HC$$

Where: HC = total salaries

The third step is to calculate SCE, where SC represents the amount of money spent on organisational strategy, patents, databases, IT systems, and communication system. In calculation SC, Pulic (1998) and Tan et al. (2008) argued the VA is created by the influence of both HC and SC. SC is dependent of HC and the higher invested efforts on HC result in better internal structure. Thus, Pulic (1998) calculates SC and SCE as follows:

$$SC = VA - HC$$

$$SCE = SC/VA$$

where: SCE has been identified as the amount of money spent by the firm on SC in order to create VA and as HCE increases, SCE increases (Tan et al., 2008; Clarke et al., 2011) Capital employed efficiency (CEE) includes the efficiency that both HCE and SCE could not capture (Clarke et al., 2011). Pulic (1998) argued that the IC value creation cannot be generated if it is not associated with physical and financial capital employed (CE). CE is measured as follows:

CE= total assets – intangible assets CEE = VA/CE

Where: CEE shows how much money is spent by the firm on CE in order to create value.

Thus, the final value added intellectual capital coefficient (VAIC) accumulates all the three efficiency measures in one model:

VAIC=HCE+SCE+CEE

DEPENDENT VARIABLE – FIRM VALUE (TobinQ)

In this study, Tobin's Q was used as a proxy to measure the firm value, which was introduced by James Tobin (1969). Tobin's q is a ratio that compares the market value with asset replacement value. James Tobin (1969) introduced q ratio and theorized that the capital investment in a firm would be dependent on the ratio between stock market valuation of capital assets and their current replacement cost. Further, the Independent variable of the current study is IC, Tobin Q consider a good indicator of intellectual capital. There are several methodologies and formulas used in the calculation of Tobin's Q (for example, see Wernerfelt & Montgomery, 1998; Linderberg & Ross, 1981; Chung & Pruitt, 1994). This study used the methodology by Jin and Jorion (2006). This methodology was used, for example, by Gomez-Gonzales, et al. (2012).

$$\text{Tobin's Q} = \frac{BV\ Total\ Assets - BV\ common\ equity + MV\ common\ equity}{BV\ total\ assets}$$

*where BV is book value and MV is market value.

If Tobin's Q is greater than 1, then the market value is greater than the book value of company assets; the market may be over-valuing the company. On the other hand, if Tobin's Q less than 1, then the market value is less than the book value of the assets; the market may be under-valuing the company. Tobin's Q is used by Coad and Rao (2006); Sorescu (2008); Dotzel, et al. (2013); Wang (2013), Kweh, et al. (2013).

VI MODERATING VARIABLE – CORPORATE GOVERNMENT (CGI)

The current study developed an index checklist to measure corporate governance attributes. This study followed the following steps to develop this index since the aim of the current study is to develop an index checklist which is compatible with the MCCG.

1. The study reviewed Malaysian code of corporate governance listing requirements and both the MCCG issued in the years 2012 and 2017 and has given attention to the amendment initiated in the year 2017 to include the relevant and amended items.
2. This review resulted in a CG index comprising 21 items (please refer to Appendix 1). The CG index was added to the board of directors' items and audit committee items.

With respect to corporate governance index checklist scoring, each item is treated as a dummy variable, where, a value of 1 is assigned if the item is disclosed and 0 otherwise (Qu & Leung, 2006; Cerbioni & Parbonetti, 2007; Li et al., 2008; Hassan, 2012; Ujunwa, 2012; Ho & Taylor, 2013). The corporate governance index score (CGIS) for the company i is treated as a percentage and calculated as follows:

$$CGIS = \frac{Total\ Disclosed\ Items}{Tatal\ Items} \times 100$$

CONTROL VARIABLES

The study's control variables are represented in the following way:

1. Firm size (SIZE) will be measured by firm's total assets at the end of the financial year. This measure has been used by previous research (Cerbioni & Parbonetti, 2007; Ferreira et al., 2012; Ousama et al., 2012; Haji & Mohd Ghazali, 2013).

2. Leverage (LEVER) will be measured by total liabilities to shareholder's equity as measured by previous studies (Williams, 2001; Chen et al., 2005; Whiting & Woodcock 2011; Clarke et al., 2011; Ousama et al., 2012).

REGRESSION MODEL

Based on the research objectives and above discussions, therefore the empirical model in this study is as follows:

TobnQ $jt = \beta\ \theta + \beta$1 VAICit jt + + β2 $SIZEjt$ + β3 LEVjt+ +εit

TobnQ $jt = \beta\ \theta + \beta$ 1 HCE+ β 2 SCE + β 3CEE + β 4 $SIZEjt$ + β 5 LEVjt +εit

TobnQ $jt = \beta\ \theta + \beta$1 VAIC + β2 CGI it jt + β3 VAIC it jt x CGI it jt + β 4 $SIZEjt$ + β 5 LEVjt +εit

Where:

TobnQ: Market-to-book value ratios. VAIC: Value added of intellectual capital coefficient of company. HCE Human capital efficiency of company. SCE Structural capital efficiency of company. CEE Capital employed efficiency of company. CGI Corporate governance index of company. CGI x VAIC Interaction between value added of intellectual capital coefficient and corporate governance. $SIZE$ Firm size of company. LEV Leverage of company. ε error term for the model.

VII FINDINGS AND DISCUSSIONS

Table 6.1 show Tobin Q ranged from 0.3700461 to 8.928513 with a mean of 1.58363 and standard of deviation of 0.1163559. Regarding the mean of Tobin's Q the average of large companies is over-valuing the market.

For the independent variables, table 1 results show that the VAIC ranged from -197.8493 to 30.25186 with a mean of 2.1468 and standard of deviation of 1.495451. This result is consistent with previous studies, for example Firer and Williams (2003), Chen et al. (2005) and Shiu (2006), which a wide difference in measuring IC among large firms in Malaysia. Also, the components of VAIC mean, the result show that the HCS value 2.283768, SCE -0.6493411, and CEE 0.1908589 Sequentially. HCE has the highest mean of components of VAIC. This result supported by Holland J. (2003) extensive use of HCE may bring better value creation of the company. Corporate Governance index (CGI) ranged from 0.206897to 0.931035with a mean of 0.72453. The range between the maximum and minimum CGI was 51.77% (72.45%-20.68%). Furthermore, the CGI during MCCG2012 and

MCCG 2017 show the compliance of largest companies there was a slight increase (6.4%) of the CGI from .6941613 per cent in MCCG2012 to .754898 per cent in MCCG 2017. the results of CG indicated that extent depict that CG has higher divergence among large firms listed in Bursa Malaysia Berhad. This result indicated that these findings are stable with prior studies conducted in Malaysia (Wahab, et al., 2011; Ho and Taylor, 2013).
Descriptive statistics for control variables, firms' size (Total assets) showed a mean value of 15,000,000 and ranged from 189,186 to 151,000,000 and standard of deviation of 21,600,000. Also, Table 5.1 shows SIZE in Log form since it is not normally distributed. L.SIZE showed a mean value 6.811487 and the range from 5.276889 to 8.178956. Firm leverage (LEV) in table 6.1 a mean value 1.346015, and ranged from 0.0492169 to 10.27229 and standard of deviation of 1.507814.

Table 1: Descriptive statistics of variables (N = 88)

Variables	Mean	Std. Dev.	Min	Max
Dependent variables				
TobnQ	1.58363	1.495451	0.3700461	8.928513
Independent variables				
VAIC	1.822805	11.88569	-197.8493	30.25186
HCS	2.283768	2.884203	-5.539841	18.52477
SCE	-0.6493411	11.14914	-197.8546	9.495702
CEE	0.1908589	0.7746625	-0.3278606	13.46495
CGI	0.72453	0.105827	0.206897	0.931035
CG (MCCG2012)	.6941613	.1020261	.206897	.862069
CG(MCCG2017)	.754898	.1009871	.206897	.931035
Control variables				
SIZE	15,000,000	21,600,000	189,186	151,000,000
L.SIZE	6.811487	0.5940036	5.276889	8.178956
LEV	1.346015	1.507814	0.0492169	10.27229

Notes: TobnQ = Tobin Q. VAIC = value add intellectual capital. HCE= human capital efficiency. SCE= Structural capital efficiency.CEE= Capital employed efficiency; CGI = Corporate Governance index. MCCG2012= Malaysian code corporate governance 2012. MCCG2017= Malaysian code corporate governance 2017. SIZE = Total Assets; Ln SIZE = Ln Total Assets; LEV: firm leverage; values are in Malaysian Ringgit.

Table 2 present the correlation matrix of VAIC attributes effect on Tobin Q model. The finding result of table above reveal that Tobin Q is correlated with all VAIC attributes (i.e. HCE, SCE, and CEE). Also, However, CGI was correlated with firm Tobin Q at 0.05. With respect to control variables, Tobin Q was positively correlated with both L.SIZE and LEV, while L.SIZE it was negative correlated with firm size. Moreover, the correlation matrix reported that none of the coefficients exceeded the value of 0.9 which indicate that the models do not witness multicollinearity among the independent and control variables.

Table 2 : Pearson Correlations among Variables (N = 88)

	TobnQ	HCE	SCE	CEE	CGMV	SIZE	L.SIZE	LEV
TobnQ	1							
HCE	0.2596***	1						
SCE	0.0485*	0.0864**	1					
CEE	0.1697***	0.4582***	0.0257*	1				
CGI	0.0938**	-0.0175*	0.0589**	-0.2739***	1			
SIZE	-0.3243***	-0.0811**	0.0261*	-0.0938**	0.1258***	1		
L.SIZE	-0.6041***	-0.0672**	0.0176*	-0.1156***	0.1268***	0.7768***	1	
LEV	0.0363*	0.1631***	0.0551**	-0.0132*	0.0953**	0.1173***	0.1912***	1

Note: ***Correlation is significant at the 0.01 level. **Correlation is significant at the 0.05 level.

TobnQ = Tobin Q. VAIC = value add intellectual capital. HCE= human capital efficiency. SCE= Structural capital efficiency.CEE= Capital employed efficiency; CGI = Corporate Governance index. SIZE = Total Assets; Ln SIZE = Ln Total Assets; LEV: firm leverage; values are in Malaysian Ringgit.

Multivariate regression results

Table 3 presents the findings of regressions models where the intellectual capital performance and attributes measurement is based on VAIC on firm value (Tobin Q) following:

Table 3: Regression model of VAIC and VAIC attributes on Tobin Q (N=88)

	Model 1				Model 2			
	POLS	RE	FE	corrected FE	POLS	RE	FE	corrected RE
VAIC	0.035***	0.014**	0.011*	0.011***				
	[0.010]	[0.006]	[0.006]	[0.003]				
HCE					0.100**	0.038*	0.015	0.062***
					[0.024]	[0.022]	[0.024]	[0.018]
SEC					0.004	0.011*	0.011*	0.010***
					[0.012]	[0.006]	[0.006]	[0.004]
CEE					0.568**	0.060	0.004	0.144
					[0.229]	[0.149]	[0.152]	[0.157]

LnSIZE	-1.200***	-1.125***	-0.250	-0.250	-1.152**	-1.146***	-0.256	-1.314***
	[0.081]	[0.141]	[0.320]	[0.676]	[0.081]	[0.138]	[0.324]	[0.137]
LEV	0.088**	0.055	-0.093	-0.093	0.065*	0.052	-0.094	0.070**
	[0.036]	[0.050]	[0.082]	[0.094]	[0.035]	[0.050]	[0.082]	[0.035]
Constant	9.426***	9.036***	3.186	3.186	8.938**	9.132***	3.225	10.197***
	[0.546]	[0.957]	[2.168]	[4.554]	[0.550]	[0.936]	[2.191]	[0.967]
N	331	331	331	331	327	327	327	327
r2	0.4223	0.4125	0.4125	0.4169	0.465	0.4320	0.024	0.512
r2 adj	0.4169				0.4563			
Breusch and Pagan Lagrangian		227.05***				195.33***		
Hausman test(chi2(6))			25.79***				7.82	
Wald: chi2			6.400***			5.68000***		
Wooldridge test			14.238***			14.228***		
VIF	1.07					1.17		

t statistics in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.000. Source: Stata output of relevant input variables.

The study was adopted panel data regression method. First, this research conducted Multiplier test to choose the best model that suits the data for the three models, which are POOLS, Random effect (RE), and Fix effect (FE). Breusch and Pagan Lagrangian result show the RE is more appropriate model (model 1 and 2) than pols model in Tobin Q , which are high statistically significant (227.05, and 195.33) respectively. Afterwards, The Husman's test has been conducted to select the best model that fits that data (fixed effects or random effects). Thus, Hausman's tests results support the fixed effects assumption for the model 1 (Tobin Q) P-value is 0.000, while results not support the fixed effects assumption for the model 2 (7.82). Nevertheless, model 1 and model 2 Wald chi2 values of 6.400, 5.68000 and Wooldridge test value 14.238, 14.228 which indicates the presence of

heteroscedasticity and autocorrelation problems respectively. From the table 3, a FE (model 1) and RE (model 2) corrected for heteroscedasticity and autocorrelation problems for Tobin Q. Moreover, Table 3 shows R^2 for Tobin Q corrected FE was 0.4223and RE 0.465, which means that the model can explain 41% and 46% respectively of the relationship between IC performances, IC attributes and firm value. Furthermore, this study used predicts cooks to remove the outlier of the model, which was the observation of the models from 352 and after the remove the outlier it was became 331observation in model 1 and 327 observation in model 2.

Table 3 (model 1) shows that VAIC consistently have a positive and significant association at 0.00 % level with Firm value variable, fully supporting our first hypothesis, H1. The findings of the current research were consistent with most prior IC studies (Chen, 2005; Wang, 2008; Berzkalnea and Zelgalve, 2014) which found a significant association between IC performance and firm value. Table 3 (Model 2) present the association between IC attributes and Tobin Q. HCE are positively and significantly to Tobin Q with its coefficient 0.018 at 0.01 levels. Also, SCE is statistically associated with firm value at 1% with P-value of 0.004. However, CEE was not significantly associated with firm value. These results are consistent with findings of previous studies (Clarke et al., 2010; Sta˚hle et al., 2011; Nassar, 2018) and inconsistent with (Pitelli Britto et al., 2014; Kweh et al., 2013). Thus, the study support H1 (a,b) and rejects H1 (c) that states, Capital employed and firm value is positively associated. The previous studies argued that human capital is the most important component of IC since it is the generator of creativity, restitution, and innovation. Further, human capital increases knowledge generation (Stewart, 1997; Landeiro, 2003).

Table 4 shows our findings of objective two on the effect of CG as the moderating variable in the association between IC performance and firm value is following:

Table 4 : Regression of Moderating Variable Corporate Government (N = 88)

	Interaction(Product term)			Interaction(Residual centering)		
	RE	FE	corrected FE	RE	FE	corrected FE
VAIC	-0.006	0.001	0.001	0.011***	0.010***	0.010***
	[0.017]	[0.017]	[0.020]	[0.001]	[0.001]	[0.003]
CGM	1.362**	0.839	0.839	2.243***	2.093***	2.093***
	[0.548]	[0.629]	[0.832]	[0.094]	[0.159]	[0.134]
VAIC*CG	0.016	0.001	0.001	0.987***	0.937***	0.937***
	[0.030]	[0.030]	[0.035]	[0.009]	[0.015]	[0.029]
LnSIZE	-1.470***	-0.665	-0.665	-1.635***	-1.536***	-1.536***
	[0.180]	[0.434]	[0.790]	[0.019]	[0.111]	[0.105]
LEV	0.095	0.005	0.005	0.136***	0.124***	0.124***
	[0.061]	[0.096]	[0.114]	[0.007]	[0.024]	[0.019]
Constant	10.472***	5.491*	5.491	10.891***	10.343***	10.343***

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	[1.218]	[2.831]	[5.070]	[0.140]	[0.720]	[0.641]	t
N	352	352	352	352	352	352	
r2	0.4260	0.4047	0.3910	0.9899	0.937	0.937	
R2 Ajd.	0.4145						
Breusch and Pagan Lagrangian	330.65***			44.03***			
Hausman test		22.93***			22.72***		
Wald: chi2		1.9000***			2.2000***		
Wooldridge test		0.133			4.807***		
VIF	14.87			1.03			

statistics in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.000. Source: Stata output of relevant input variables.

Table 4 shows that variance inflation factor (VIF) in the models is more than 10 in Product term result. Therefore, it can be conduct that the research models do suffer from multicollinearity. However, this study adopted the residual centering to remove the problem of multicollinearity in the both model. Afterwards, Table 4 shows the variance inflation factor (VIF) of residual centering is 1.03, which means that absence of multicollinearity in the corrected model. R^2 and f-test show that the model has good fit.

However, table 4 shows the finding of Breusch and Pagan Lagrangian and Hausman test to select more appropriate model among (POLS, RE, and FE). The finding indicates that the FE effect is more appropriate. Furthermore, there are heteroscedasticity and auto serial correlation problems, whereas Wald: chi2 value (2.2000) and Wooldridge test value (4.807). Therefore, corrected FE for heteroscedasticity and auto serial correlation problems to explain the mutual relations.

Based on corrected FE effect model, the coefficient value (0.937) for interaction term (VAIC*CGMV) is significant, meaning that there is moderation effect. The result indicated that the relation between IC performance and firm value is stronger and better with corporate governance. Thus, the intellectual capital performance and firm value are moderated by corporate governance (CG) is significant. Therefore, hypotheses (H2) is supported and the results are in line with agency theory.

Afterwards, to answer the hypotheses (H2a, b) in this study, which are to examine the moderation effect of CG during MCCG 2012 and MCCG 2017 code on the association between IC performance and firm value, tables 5 (See appendix 2) shows that VIF in the models is more than 10. Therefore, it can be conduct that the research models do suffer from multicollinearity. However, this study adopted the residual centering (orthoganalization powered process) to remove the problem of multicollinearity in the both models. Afterwards, Table 6 shows the variance inflation factor (VIF) of residual centering is 1.09 in MCCG 2012 and 1.02 in MCCG 2017, showing the absence of multicollinearity in the corrected model for both periods.

Table6: Residual centering of CG in 2012 and 2017 on IC performance and firm value

Interaction(Residual centering)		
	MCCG2012	**MCCG2017**

	RE	FE	corrected RE	RE	FE	corrected RE
VAIC	0.149***	0.152***	0.149***	0.008***	0.007***	0.008***
	[0.002]	[0.005]	[0.004]	[0.001]	[0.001]	[0.002]
CGM	2.369***	2.196***	2.369***	3.100***	2.911***	3.089***
	[0.106]	[0.242]	[0.350]	[0.170]	[0.716]	[0.583]
VAIC*CGM	0.995***	0.956***	0.995***	0.997***	0.955***	0.991***
	[0.008]	[0.023]	[0.012]	[0.010]	[0.025]	[0.011]
l.size	-1.342***	-1.429***	-1.342***	-1.798***	-1.596***	-1.797***
	[0.014]	[0.129]	[0.011]	[0.021]	[0.268]	[0.018]
LEVE	0.040***	0.039	0.040***	0.150***	0.127***	0.150***
	[0.006]	[0.023]	[0.003]	[0.008]	[0.048]	[0.006]
Constant	9.098***	9.766***	9.098***	12.049**	10.795**	12.046***
	[0.106]	[0.874]	[0.164]	[0.165]	[1.813]	[0.299]
N	176	176	176	176	176	176
r2	0.9697	0.971	0.995	0.992	0.9921	0.950
R2 ajd	0.9962			0.9918		
Breusch and Pagan Lagrangian	21.49***			5.38***		
Hausman test		8.40			5.08	
Wald: chi2	1.3100***			1.0300**		
Wooldridge test	1.335			2.815*		
VIF	1.09			1.02		

t statistics in parentheses; * p < 0.05, ** p < 0.01, *** p < 0.000. Source: Stata output of relevant input variables.

From the bellow result, the Breusch and Pagan Lagrangian value for both MCCG 2012 and MCCG 2017 are significant 21.49 , and 5.38respectively, which are conducted RE model, is better than Pols OLS test. After that, table 6 show that the Hausman test value 8.40, and 5.08, which not significant respectively, suggesting that a RE models are more appropriate for MCCG 2012 and MCCG 2017. Wald chi2 values (1.3100, and 1.0300), which indicates the presence of heteroscedasticity for models in MCCG 2012 and 2017. Wooldridge test values (1.335and 2.815) are indicates auto serial correlation is significant only in MCCG 2017. Thus, RE corrects models from the suffering heteroscedasticity and auto serial correlation. On the other diagnostic test, R^2 values for both models in residual centering process table shows the model have very good fit. With respect to the moderating effect models' results presented in Table 6, the results report that CG in MCCG 2012 indicate a positive coefficient value (0.995) for the interaction between VAIC and CG, which is significant at (0.000) levels. Furthermore, Table 6 shows that

CG in MCCG 2017 also indicates a positive coefficient value (0.991) and significant relationship, which means is significant at (0.000) levels. Thus, H2 (a) and H2 (b) are supported. These results are consisting with literature review (e.g. Bhatt and Bhatt, 2017) and in line with agency theory. CG can decrease agency problem and information asymmetry. Also, this strength is explained in the essence that CG may purpose as a monitoring instrument in the organisation which permits managers to interconnect IC performance.

However, table 7 shows the comparison by mean difference in CG during MCCG 2012 and MCCG 2017 ranks test in Malaysia. The signed- rank result shows the p-value is significant at 0.000 levels, which means there is significant difference between MCCG 2012 and MCCG 2017. Sum rank result shows the value of MCCG 2017 (37405) is higher than MCCG 2012 value (24723). This means that the H0 not supported. That means H2 (c) is supported. Which means the MCCG 2017 is stronger than MCCG 2012. Therefore, the change of MCCG in 2017 is significant change.

Table 7: Wilcoxon Signed- ranks test result for differences in CG code 2012 and 2017

Sign	Obs.	Sum rank	Expected
0	176	24723	31064
1	176	37405	31064
combined	352	62128	62128
unadjusted variance		911210.67	
adjustment for ties		-26866.58	
adjusted variance		884344.09	
Ho: CG(2015-2016=0) = CG (2017-2018=1)			
Z = -6.743			
Prob > |z| = 0.0000			

Source: Stata output of relevant input variables.

VIII CONCLUSION

This study sought to examine the role of CG as moderation effect in Malaysia on the association between IC performance and firm value. The results of this study support the argument that IC is the resource of companies that can usage to creating the value and competitive advantage of companies. Furthermore, the study sought to support that how CG as moderating role on the association between VAIC and Tobin Q, the study support the argument that the effective of CG mechanism may minimises managers' profit maximisation and facilitates activities that would enable the company to generate more value from IC performance. Besides, the new code MCCG 2017 was focusing on places greater emphasis on the internalisation of corporate governance culture in Malaysia. The above arguments are in line with agency theory. It can be concluded that CG regulation, such as MCCG 2017 adoption, does have a significant positive moderate association with IC performance and firm

performance and value. Thus, MCCG 2017 has handled many determinants in previous code (i.e. MCCG2012) to become more effective practice in Malaysia.

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