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The mediating effect of profitability in the relationship between Intellectual Capital and Market value

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ABSTRACT

The purpose of this study is to investigate empirically the mediating effect of profitability in the relationship between intellectual capital and market value of companies listed in Bursa Malaysia for the period 2006-2011. This research wanted to establish the mediating effect of profitability on the relationship between intellectual capital and market value through panel data and the Generalized Method of Moments (GMM) model in a longitudinal design. In doing so, it applied Pulic's Value Added Intellectual Coefficient (VAIC™) method as the efficiency measure for measuring intellectual capital. In addition, Sobel's z-value, Aroian test, Goodman test, and Kenny and Boran approach which were used for testing the hypotheses for quantitative data was drawn from Malaysian listed companies. Profitability is a significant mediator (partial mediator) in the association between the intellectual capital and market value of the companies and increases the relationship between the two variables by 41.8 percent. This is the first study that shows the mediating effect of profitability in the relationship between the intellectual capital and market value of the companies in Malaysia..

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1. Introduction

The observed promiscuities in the pricing of assets, such as the known effects of accruals (Sloan, 1996) and assets growth (Cooper et al., 2008) have been considerably

The market value of a company is one of the indicators in the financial sector for evaluating the development of a country (Word bank, 2013). Reiter and Steensma (2010) believe that increasing the market value of a company is cause to the growth and development of the company which finally leads to GDP, economic growth, and development of the country. Malaysia intends to change into a developed country until 2020 by the Master Plan (2002), however, it is now far away from the developed countries in Asia such as Japan, China and the Rep of Korea in terms of development indicators as market capitalization or market value of the companies (World Bank, 2013). Therefore, identifying the factors influencing market value (MV) of the companies is the most important issue of Malaysia these days.

Some previous studies show that intellectual capital (IC) has a positive effect on MV (Niazi et al., 2012; Soedaryono and Prihartini, 2012; Maditinos et al., 2011; Firer & Williams, 2003). While some other studies do not show the positive effect of IC on MV (Mehralian et al., 2012; Chu et al., 2011; Wang, 2008). The research results of Khan et al. (2012); Pal and Soriya (2012); Soedaryono and Prihartini (2012) indicate that IC can increase the profitability of companies. This study argues that the positive relationship between IC and MV can be due to profitability, in other words, profitability has a mediating effect on the relationship between IC and MV. According to the Resource Based Theory (RBT), IC as an intangible asset can have effect on profitability (Barney, 1991). At the same time according to signal theory, profitability of the company sends a positive signal to investors which leads to an increase in the evaluation of market value of the companies (Connelly et al., 2011).

IC is one of the most important assets for the most of the companies, especially for the knowledge-based companies in this modern economy (Roslender & Fincham, 2004). IC is an organization's asset which is not recorded in a company's balance sheet (Abeysekera, 2008; Brennan, 2011) but has generated or will generate value to the organization in the future(Holland, 2003).

There is not any accepted public definition and classification of IC (Canibano et al., 2000; Andriessen, 2004; Chu et al., 2011). In one case, Edvinsson and Malone (1997) have categorized IC into two broad senses comprising human capital (HC) and structural capital (SC). They have defined IC as "the sum of all knowledge a company is that able to use in the process of conducting business to create value for the firm" (Edvinsson & Malone, 1997, p: 11). At the same time, they have defined HC as "the combined knowledge, skill, innovativeness, ability of the company's individual employees to meet the task at hand, company's values, culture, and philosophy" (Edvinsson & Malone, 1997, p:11) and SC has been defined as "the hardware, software, databases, organizational structure, patents, trademarks, and everything else of organizational capability that supports those employee's productivity - in other words, everything that gets left behind at the office when employees go home" (Edvinsson & Malone, 1997, p: 11).

In line with RBT, value IC as a resource depends on its efficiency or performance. It means that the performance of IC indicates the value of IC , therefore this research considers the performance of IC or Intellectual Capital Performance (ICP) to measure IC and

uses the VAIC™ model of Pulic (2000) to gauge accordingly, which, after all, is in accordance with the definition of IC by Edvinsson and Malone (1997). VAIC which indicates the firm's intellectual ability or the performance of intellectual capital (Pulic, 2000) stands for Value Added Intellectual Coefficient which recognizes the four components of value added resources, namely, Intellectual Capital Efficiency (ICE), Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) (Pulic, 2000) .

Profitability is the ability of a company to earn a profit. It is a relative measure of success for a business, in other words, an index for measuring the financial performance of the company. The literature shows numerous variables for measuring the performance such as profitability , gross profit, return on asset (ROA), return on investment (ROI), return on equity (ROE), return on sales .(Parnell & Wright 1993; Snow & Hrebiniak 1980; Chen & Huang, 2009; Sharabati et al., 2010; Riahi-Belkaoui , 2003) .There is no sole measure of performance that shows all full aspects of it (Snow & Hrebiniak, 1980).This Study uses Return On Asset (ROA) and Return On Equity (ROE) as the indexes of profitability.

Despite the importance of the role of profitability in linking the relationship between IC and MV, there has been no research specifically about the mediating effect of profitability on the relationship between IC and MV in Malaysia. Therefore, this study attempts to measure the mediating effect of profitability in the relationship between IC and MV at company level. It also wants to find plausible answer(s) to this question: Does profitability mediate the relationship between IC and MV?

This study contributes to the literature by presenting an evidence on the relationship between IC and MV. Hence, it throws more light on and adds to the existing body of knowledge in intellectual capital management. The results of this study will expand the understanding of the role of intellectual capital in the emerging economy of Malaysia. This study practically confirms the resource based and signalling theories. The findings of this study would help the policy makers have greater focus on the development of IC and MV due to economic growth. It is becoming increasingly difficult for potential investors, creditors, managers, researchers, and financial data analysts to ignore the effect of IC on MV in order to make possible predictions for the firms' future growth and to help make careful decisions (Christelis et al., 2010).

The next section of this paper includes a short summary of the related literature, followed by the research framework, the development of the hypotheses, the research methodology, and finally discussion and conclusions which are presented afterward.

2. Literature review

The research literature in the field of financial variables shows that IC has an effect on profitability from theoretical and empirical perspectives. According to the resource-based theory (RBT), resources strategies, capabilities and competence of a company can create a competitive advantage for it (Barney, 1991). Identifying and developing a firm's potential key resources and capabilities are the ways to reach to a superior competitive advantage because resources, capabilities, and competence are the determinants of a managerial strategy and performance (Dierickx & Cool, 1989).

The competitive advantages of a company can be superior long-term performance, higher profits relative to competitor or increased sales (Strebel, 1983). Resources for making the competitive advantage must have four features including: valuable, rare, poorly imitable and lacking tactically alike substitute (Barney, 1991). As a result, according to RBT, IC as intangible asset can create competitive advantages such as profitability.

The companies with high profitability have more motivation for dividend and pay more shares profit than the companies with low profitability (Zare et al., 2013). According to Signalling Theory, an increase in the profitability is making a positive signal to shareholders and investors regarding the company's future prospected earnings that would contribute to an increase in evaluating the market value of the companies by shareholders and investors (Saif et al., 2013). Therefore, from the perspective of theory, predicting the effect of IC on profitability and profitability on market value of the companies is not improbable.

In 2013, VAIC™ method was applied by Joshi et al. (2013) in investigating some 33financial companies with the best market value that were selected in a short period of 2006-2008 in Australia. They compared IC and its components and analyzed the variances in VAIC scores among the financial sub-sectors, and examined the effect of IC on ROA, as well.

Their results indicated that HCE had more effect on creating VAIC or IC efficiency than SCE and CEE. Investment companies had greater VAIC value due to the greater levels of HCE in comparison with banks, insurance and real estate investment trust companies. Insurance companies had more CEE than other companies that is contributed to a lower VAIC. Amusingly, high levels of HCE and SCE did not necessarily result in higher level of ROA unlike CEE.

Some other studies have also been done in 2013 regarding the effect of the IC on the performance of companies. In one case, Bontis et al. (2013) explores the effect of IC and its different components on financial performance of 100 companies in Serbia. They used VAIC™ method for measuring IC, and used net profit, operating revenues, operating profit, ROE, and ROA for measuring financial performance. They also used multiple-regression model for assessing the relationship variables. Their results indicate that IC does not have an effect on net profit, operating revenue, and operating profit, while HCE and SCE have an effect on ROE and ROA, but the level of influence is still low, and it is found that CEE has an effect on ROE only in 2010.

In another study, it is claimed that VAIC and its components have a significant positive profitability. This is the result of a survey on Iran insurance companies during the period 2005-2007. This research was done by Alipour (2012) who used VAIC™ for measuring ICP and Return On Asset (ROA) as an index for measuring performance.

The literature has also identified a number of studies on this topic in Malaysia. Ting and Lean (2009) have surveyed ICP by using VAIC™ model from 1999 to 2007 in 20 financial institutions. Their results showed that ICP and ROA are positively related in addition to HCE, SCE. eThese result ar consistent with the findings of Sofian et al. (2006) and Tan et al. (2007) in Malaysia. Overall, most of the literature on intellectual capital shows that IC as a strategic asset can create profitability (Bontis et al., 2000; Jardón & Martos, 2009; Maheran & Muhammad, 2004; Tovstiga & Tulugurova, 2007).

Cho and Pucik (2005) in investigating the relationship between profitability and market value of companies found that there is a positive relationship between these variables in a sample of Fortune 1000 companies. Their results have also shown the mediating effect of profitability on the relationship between innovativeness and market value. In one other study, Seiford and Zhu (1999) indicated the positive relationship between profitability and marketability of the top 55 U.S. commercial Banks. Casta et al. (2007), Bouden (2006) and Cazavan (2001) in their studies, considered profitability as an effective variable in market value in their models researching the intangible assets, and argued that profitability has a positive effect on market values. Generally, from the previous studies discussed above, it can be forecasted that profitability can mediate the relationship between IC and the market value of companies.

3. Methodology

For the purpose of this study a research framework as depicted in the following figure has been developed to examine the effect of profitability as a mediator in the relationship between intellectual capital (IC) and market value (MV) of companies which is measured by market to book equity (MBE) .This model is based on

resource based theory, signalling theory and the findings of past studies. This study expects a positive effect of IC on market value and profitability. It can also be predicted that profitability is mediating the relationship between IC and MBE.

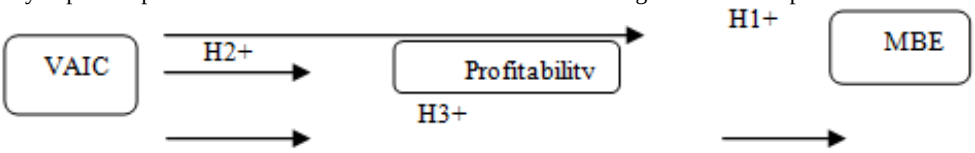

Fig 1: The mediating effect of profitability on the relationship between IC and MV

3.1. Variable definition

Market- to- book equity (MBE) as Dependent variable

The market value of the companies is very useful to make the information on the performance of the companies in the past and its prediction for the future available. The market-to-book value ratio is also simply calculated (Jafari, 2012). According to Gitman (2009) Market ratio is related to a firm's market value, as measured by its current share price, to certain accounting value. This measurement provides the evaluation of how investors observe the performance of the company (Gitman, 2009). Besides, the choice of market-to-book equity ratio (MBE) as a measure of the company's market value is based on the research that has been conducted before, such as Sedaryono and Prihartini (2012), Zéghal and Maaloul (2010), and Chan (2009).

IC as Independent Variable

The literature suggests several ways to measure the intellectual capital, but there is no a comprehensive and accepted method. In this study, we adopted the VAIC™ model because of the following reasons:

- This method is a quantifiable, objective and quantitative method without the prerequisite of any subjective grading.
- It considers the stakeholder' view and resource-based view via a value added approach in measuring IC.
- It is simple and intelligible for management and business people.
- To measure IC, it uses the available financial data consequently and improves the reliability of the measurement, and data availability.
- It also considers human capital as the main key resource of IC in accordance with IC definitions in the literature.
- The validity of this method in different countries is increasing due to its excessive use.

VAIC is based on the following calculations (Pulic, 2000):

The value added (VA) can be calculated as:

VA = OP + EC + D + A

Where OP = Operating Profit, EC = Employee Cost, D = Depreciation and A = Amortization

HCE (Efficiency of human capital) = VA / HC (Total salaries and wages for company)

SCE (structural capital efficiency) = SC / VA

SC (structural capital) = VA - HC

ICE (intellectual capital efficiency) = HCE + SCE

CEE (capital employed efficiency) = VA / CE

CE = book value of the net asset for a company

VAIC™ (value added intellectual coefficient) = ICE + CEE

Control variables

The literature shows numerous variables for measuring performance such as profitability that includes gross profit, return on asset (ROA), return on investment (ROI), return on equity (ROE), and return on sales (Parnell & Wright, 1993; Snow & Hrebiniak, 1980; Chen & Huang, 2009; Sharabati et al., 2010, and Riahi-Belkaoui, 2003). There is no sole measure of performance that shows all full aspects of it .This study will use return on asset (ROA) and return on equity (ROE) as indexes of profitability.

ROA = earnings before interest and tax divided by total assets

ROE = earnings before interest and tax divided by total equity

3.2. Developing the hypotheses

According to the resource-based theory (RBT), the intellectual capital as an intangible asset can create profitability as well as based on signalling theory an increase in profitability can lead to an increase in MV. Alnajjar and Riahi-belkaoui (2001) Showed that value added intellectual capital (Pulic's VAIC model) and its components (Intellectual Capital Efficiency (ICE), Human Capital Efficiency (HCE) Structural Capital Efficiency (ICE) and Capital Employed Efficiency (CEE) have significant positive relationships with companies' profitability. Riahi-belkaoui and Picur (1998), on the other hand, submitted a model that shows profitability has an effect on MB. Also, Cho and Pucik (2005) revealed the mediating effect of profitability on the relationship between innovativeness and market value (MV) in their study.

Consequently, it is now logical to verify empirically whether profitability has a mediating effect on the relationship between IC and MV or not. The current study uses Pulic's VAIC model for measuring IC that capital employed (CE) used instead of relational capital which is intended as a component of structural capital.

The following hypotheses are proposed to examine the relationship among variables:

H1: There is a positive relationship between VAIC and MBE.

H1a: There is a positive relationship between ICE and MBE.

H1b: There is a positive relationship between HCE and MBE .

H1c: There is a positive relationship between SCE and MBE.

H1d: There is a positive relationship between CEE and MBE.

H2: There is a positive relationship between VAIC and Profitability (ROA).

H2a: There is a positive relationship between ICE and profitability (ROA).

H2b: There is a positive relationship between HCE and profitability (ROA).

H2c: There is a positive relationship between SCE and profitability (ROA).

H2d: There is a positive relationship between CEE and profitability (ROA).

H3: profitability (ROA) mediates the positive relationship between VAIC and MBE.

H3a: profitability (ROA) mediates the positive relationship between ICE and MBE.

H3b: profitability (ROA) mediates the positive relationship between HCE and MBE.

H3c: profitability (ROA) mediates the positive relationship between SCE and MBE.

H3d: profitability (ROA) mediates the positive relationship between CEE and MBE.

3.3. Research method

The test for mediation applied Baron and Kenny method (1986) as follows:

Step 1: Regression test between the independent and dependent variable (Direct effect)

$MBE = \beta 10 + \beta 11 VAIC + €1$ $MBE = \beta 10 + \beta 11\ ICE + €1$

$MBE = \beta 10 + \beta 11 HCE + €1$

$MBE = \beta 10 + \beta 11 SCE + €1$ $MBE = \beta 10 + \beta 11 CEE + € 1$

Step 2: Regression test between the independent and mediating variables

$ROA = \beta 20 + \beta 21 VAIC + €2$ $ROA = \beta 20 + \beta 21\ ICE + €2$

$ROA = \beta 20 + \beta 21 HCE + €2$

$ROA = \beta 20 + \beta 21 SCE + €2$ $ROA = \beta 20 + \beta 21 CEE + € 2$

Step3: Simultaneous Regression tests the independent and mediating variables with dependent variable.

$MBE = \beta 30 + \beta 31 VAIC + \beta 32\ ROA + €3$

$MBE = \beta 30 + \beta 31\ ICE + \beta 32\ ROA + €3$

MBE = β30 + β31HCE + β32 ROA + €3 MBE = β30 + β31SCE + β32 ROA + €3 MBE = β30 + β31CEE + β32 ROA + €3

Two conditions are necessary to confirm the mediating variable in step 3 including:

β32 must be significant.

β31 must be a smaller value than β11

Mediation is in two forms of complete and partial. The mediating variable is a complete mediation if the independent variable is no longer significant in step3 in comparing with step 1 or β11 = 0. The mediating variable is a partial mediation if the independent variable is still significant in step3 or 0 < β11 < β32. Complete mediation means that only the mediating variable can predict the dependent variable changes, but in partial mediation status both the independent and mediating variables significantly predict the dependent variable. We will use the Sobel, Aroian and Goodman test for checking statistically the significance of mediation effect.

3.4. Data and sample selection

The sample of the study included the companies listed on Bursa Malaysia during 2006 to 2011. The companies included in the research sample meet the following criteria:

Since the smallest value of VAIC is zero, the companies with negative values for VAIC and its components will be excluded (Shiu, 2006).

The companies should have positive book value (Frer & Williams, 2003).

Before the financial year of 2006, the stock exchange has been registered in Malaysia.

In the period 2006-2011 about which this research is done, the companies have not been removed from the Malaysian stock exchange.

Data required by the researcher would have existed during the period 2006 – 2011.

The companies with the missing key data will be removed.

After considering the above conditions, the final sample consisted of 188 companies during 6 years. In other words, it included 1128 observations. The data were extracted from Data Stream as well as annual reports on the respective websites in Bursa Malaysia. After collecting the data along with the other requisite information, they were organized by Excel Software. Then, they were subjected to Eviews and SPSS for the final analysis.

The normal distribution of data was checked by investigating Skewness, Kurtosis statistics and Jarque-Bera statistics before analyzing the data. The result indicated the Non-normality distribution in some of the data. We applied Box Cos transformation for normalizing the distribution of data, but the problem could not be removed. Non-normality distribution in financial data is usually seen in financial research which is not a major problem (Abdul-Rahim et al., 2011; Cont, 2001).

4. Results

4.1. Descriptive statistics

Table 1 indicates the descriptive statistics for the dependent and mediate variables. It shows that HCE still dominates the majority of intellectual capital efficiency, while SCE is not doing so. The mean of 2.308 for HCE suggests that about 81% (2.308/2.833) of efficiency created by IC is related to the efficiency of human capital.

It is inferred here that there were applied expert and efficient employees in our sample. At the same time, it shows that the main percentage of VAIC is related to HCE, that is to say, HC is the most important element in creating VAIC or ICP and the companies with higher HCE have higher VAIC. This issue is shown in research by Rehman et al. (2011).

Table 1: Descriptive statistics

	VAIC	ICE	HCE	SCE	CEE	MBE	ROA	ROE
Mean	3.170	2.833	2.308	0.525	0.337	0.892	0.073	0.100
Median	3.005	2.652	2.122	0.529	0.316	0.801	0.068	0.092
Maximum	6.806	6.429	5.607	0.863	0.778	2.912	0.255	0.458
Minimum	1.118	0.968	0.504	0.117	0.056	0.243	0.000	0.001
Std. Dev.	0.941	0.956	0.826	0.144	0.137	0.381	0.042	0.067
Observations	1128	1128	1128	1128	1128	1128	1128	1128

Correlation coefficient indicates a quantitative assessment of the power of the linear relationship between independent and dependent variables. Pearson correlation shows that VAIC and its elements have significant positive correlation with MBE in Table 2.

The ROA is significant and positively correlated with VAIC and its elements that is consistent with findings of Bontis et al. (2000); Jardón and Martos (2009); Maheran and Muhammad (2004); Tovstiga and Tulugurova (2007). The positive and significant association between VAIC and its elements with MBE and ROA prepares the preliminary evidence for investigating the mentioned hypotheses.

Table 2: Pearson's correlations

Correlation							
Probability	**VAIC**	**ICE**	**HCE**	**SCE**	**CEE**	**MBE**	**ROA**
ICE	0.989***	1					
HCE	0.988***	0.998***	1				
SCE	0.905***	0.916***	0.887***	1			
CEE	-0.032	-0.176***	-0.173***	-0.175***	1		
MBE	0.402***	0.365***	0.361***	0.348***	0.215***	1	
ROA	0.395***	0.357***	0.349***	0.370***	0.222***	0.428***	1
ROE	0.355***	0.315***	0.308***	0.323***	0.241***	0.416***	0.684***

***Correlation is significant at 0.000 level (two-tailed).

**Correlation is significant at 0.001 level (two-tailed).

*Correlation is significant at 0.05 level (two-tailed).

4.2. Result of Regression

Considering the panel data character that includes observations on cross-sectional (companies) over numerous time periods, the researchers used panel methodology in this study. Since the number of time series for every cross-sectional is the same, we applied the balanced panel. The panel data are able to determine

and compute the effects much better that cannot be easily discovered in cross-section and time series data (Gujarati, 2003).

To select the suitable method of estimation between fixed effect and the pooled OLS model we utilized redundant fixed effect - likelihood ratio test (Greene, 2003). The results rejected the use of pooled model in for all models. Husman test was used for selecting a suitable method between fixed and random effect model, and the results rejected using the random effect method for all models. So, this study fixed the effect of cross section and period in Panel Least Squares method.

Lagrange Multiplier (LM) test was also applied to check the existence of homoscedasticity in the error terms (Khalifa et al., 2012; Marinov, 2012 and Nasution, 2008) and the results show that heteroscedasticity is rejected in all models.

Durbin Watson statistics have shown the existence of autocorrelation in all models. We added the lagged MBE into the list of explanatory variables on the right side of the equation to solve the autocorrelation's problems and used the generalized method of moments (GMM) model (Roodman, 2006; Andrews & Lu, 2001; Bond et al., 2001 and Blundell & Bond, 2000). The Breusch-Godfrey (BG) test was used for re-examining the autocorrelation in the residuals (Boonsaeng et al., 2008; Lindé & Riksbank, 2001; and Galeotti & Schiantarelli, 1994), and the results confirmed the existence of no autocorrelations in the residuals. The validity of overidentifying restrictions was checked through J - statistic test that the result showed the overidentifying restrictions are acceptable and the model's moment conditions contest the data well(Dumitrescu et al., 2013; Candelon et al., 2011; Stock and Wright, 2000).

Multicollinearity between the independent and mediating variables is captured through the drawing correlation matrix (Table 2) and Variance Inflationary Factor (VIF) test. The correlation between the independent variables can be 0.90 (Tabachnick et al., 2001). At the same time, Variance Inflationary Factor (VIF), a reduced amount of 10.00, shows that none of the independent variables do describe other mediating variables (Myers, 1990). Other fundamental assumptions of regression are also evaluated, such as zero mean residuals, normality of error distribution, and linearity of the relationship between dependent and independent variables. The only problem that is observed is the non-normality of the distribution of residuals in some models.

Table 3 shows a summary of the regression in the three stages. The regression between VAIC and its elements with MBE is positive and significant in the first step as well as in the second step as VAIC and its elements with ROA. Two conditions have been met as required for confirming the mediating variable in the third step:

- In the third step, the coefficient of ROA is significant.
- The beta coefficient for the independent variable in the third step is smaller than the first step.

According to the mentioned conditions, we can conclude that ROA has mediating effect on the relationship between IV and DV. Since the beta coefficient for the independent variable in the third step is still significant and smaller than first step as well as greater than zero, therefore the mediating variable is a partial mediation. It means that both the independent and mediating variables significantly predict the dependent variable.

In the meantime, the significance of the mediation was examined by calculating Sobel's z-value, Aroian test and Goodman test. The findings, indicated in table 4, show that the Sobel's z-value, Aroian's z-value and Goodman's z-value are great (more than +/- 1.96)with a p-value less than 0.05; it means that there exists a significant mediation of ROA in the relationship between IV and DV, while the association between IV and DV has been significantly reduced by including ROA in the third regression model.

The results indicated that 41.7 % of the impact of VAIC on MV is through ROA (indirect effect) and about 58.2 percent of the effect is direct. Also, the results for the other elements of intellectual capital are calculated as follows:

β11 - β31/ β11*100 = indirect effect IV on DV

VAIC = 0.115 - 0.067 / 0.115*100 = 41.7%

ICE = 0.113 - 0.062/ 0.113*100 = 45. 1%

HCE= 0.127 - 0.070/ ٠.127 *100 = 44.8%

SCE= 0.639 - 0.328 / 0.639*100 = 48.6 %

CEE = 0.833 - 0.487/ 0.833*100 = 41.5%

Table 3.: The result of regression

Step	IV	DV	C	Coefficients β		T-Statistic		Sig.		D.W	Adjusted R^2
				IV	C	IV	C	IV	C		
1	VAIC	MBE		0.115a		8.556		0.000		2.072	0.724
	ICE	MBE		0.113a		7.912		0.000		2.07	0.721
	HCE	MBE		0.127a		7.796		0.000		2.067	0.72
	SCE	MBE		0.639a		6.855		0.000		2.105	0.715
	CEE	MBE		0.833a		7.821		0.000		2.083	0.72
2	VAIC	ROA		0.025		15.056		0.000		2.140	0.665
	ICE	ROA		0.024		13.262		0.000		2.276	0.65
	HCE	ROA		0.028		13.633		0.000		2.140	0.65
	SCE	ROA		0.141		11.924		0.000		2.193	0.633
	CEE	ROA		0.168		12.359		0.000		2.191	0.637
3	VAIC	MBE	ROA	0.067b	1.911	4.476	6.613	0.000	0.000	2.119	0.739
	ICE	MBE	ROA	0.062b	2.015	4.030	7.080	0.000	0.000	2.121	0.738
	HCE	MBE	ROA	0.070b	2.034	3.977	7.176	0.000	0.000	2.12	0.738
	SCE	MBE	ROA	0.328b	2.161	3.347	7.772	0.001	0.000	2.138	0.736
	CEE	MBE	ROA	0.487b	2.041	4.295	7.338	0.000	0.000	2.124	0.739

D.W = Durbin -Watson a = β 11 DV = dependent Variable C = Control Variable B=β31
IV = Independent variable α = 0.05

C	IV	DV	Test Statistic (sample test)	Aroian test	Goodman test
ROA	VAIC	MBE	6.055***	6.043***	6.066***
ROA	ICE	MBE	6.245***	6.231***	6.259***
ROA	HCE	MBE	6.349***	6.336***	6.363***
ROA	SCE	MBE	6.511***	6.495***	6.527***
ROA	CEE	MBE	6.309***	6.294***	6.324***

***: p-value = 0.000

Sensitivity analysis

In this research, another profitability ratio is also applied as return on equity (ROE) for reconfirming our hypotheses; that is a supplementary test of the robustness of the result. The results reported in table 5 and 6 show that ROE as a mediating variable has an effect on relationship between VAIC and its elements with MV. These results are in the same direction and comparable with the results reported using ROA. These findings indicate the validity of applying ROA for measuring profitability.

Table 5: The result of regression

Step	*IV*	*DV*	*C*	*Coefficients β*		*T-Statistic*		*Sig.*		*D.W*	*Adjusted R^2*
				IV	C	IV	M	IV	C		
1	VAIC	MBA		0.115a		8.556		0.000		2.072	0.724
	ICE	MBA		0.113a		7.912		0.000		2.07	0.721
	HCE	MBA		0.127a		7.796		0.000		2.067	0.72
	SCE	MBA		0.639a		6.855		0.000		2.105	0.715
	CEE	MBA		0.834a		7.821		0.000		2.083	0.720
2	VAIC	ROE		0.032		12.73		0.000		2.102	0.687
	ICE	ROE		0.031		11.413		0.000		2.096	0.675
	HCE	ROE		0.035		11.251		0.000		2.102	0.674
	SCE	ROE		0.171		9.497		0.000		2.117	0.660
	CEE	ROE		0.272		13.872		0.000		2.153	0.697
3	VAIC	MBA	ROE	0.077b	1.174	5.348	6.177	0.000	0.000	2.112	0.737
	ICE	MBA	ROE	0.074b	1.246	4.957	6.656	0.000	0.000	2.114	0.736
	HCE	MBA	ROE	0.083b	1.257	4.879	6.731	0.000	0.000	2.112	0.736
	SCE	MBA	ROE	0.407b	1.341	4.263	7.290	0.000	0.000	2.136	0.734
	CEE	MBA	ROE	0.501b	1.222	4.292	6.276	0.000	0.000	2.116	0.734

D.W=Durbin-Watson Stat a= β 11 DV= dependent Variable C=control Variable
b= β31 IV=Independent variable α=0.05

Table 6: Sobel test

C	IV	DV	Test Statistic (soble test)	Aroian test	Goodman test
ROE	VAIC	MBE	5.557***	5.544***	5.571***
ROE	ICE	MBE	5.749***	5.733***	5.766***
ROE	HCE	MBE	5.776***	5.759***	5.793***
ROE	SCE	MBE	5.782***	5.762***	5.802***
ROE	CEE	MBE	5.717***	5.705***	5.730***

***: p-value = 0.000

5. Conclusion

This study investigated the mediating effect of profitability on the association between intellectual capital (IC) and its elements with market value of the companies in Malaysia. The research conceptualizes the mediating effect profitability on the association between the intellectual capital and the market value of companies. The findings indicate that the mediating effect of profitability on the relationship between intellectual capital and market value fulfills the conditions of mediation which has been subjected by Baron and Kenny (1986).

As mentioned earlier, according to the resource based theory (RBT), IC as an intangible asset can have effect on profitability (Barney, 1991). At the same time, according to signal theory, profitability of the company sends a positive signal to investors which leads to an increase in the evaluation of the market value of companies (Connelly et al., 2011).

The results of this study indicate that IC and its components have a positive and significant effect on MV (Table 3, step. 1). Therefore, the hypotheses H1, H1a, H1b, H1c and H1d are confirmed.The findings also show that about 58.2 percent of the effect is direct. In addition, it can be inferred that in assessing the value of companies of Malaysia, 58.2 percent of intangible assets (IC) and their potential of future benefits is considered by investors. The results also show that 41.8% of the effect of IC on MV is through profitability; it means that 41.8% of the changes in MV via IC are due to the positive effect of IC on profitability. So, the profitability from investing in IC increased 41.8% of the market value of companies in Malaysia during the period of research. As a result, the profitability of companies is considered to be one the most important elements in evaluating the stock market price by the investors, and it is because the profitability increases the probability of distribution of dividends by companies.

Based on the results of this research, it is claimed that IC and its elements are causing profitability, thus supporting H2, H2a, H2b, H2c, and H2d. This finding links well with the previous studies as mentioned in the literature review (Chen et al., 2005; Ting & Lean, 2009; Clarke et al., 2011; Alipour, 2012; and Mehralian et al., 2012) and the resource based theory.

Finally, the results of this study indicate that ROA as an index of profitability can mediate the relationship between IC and its elements with MV. Thus, the hypotheses H3, H3a, H3b, H3c, and H3d are confirmed. In brief, the founding of this study confirmed the main aim of this research as the mediating effect of ROA on the relationship between IC and MV.

Since investing in intellectual capital can increase the market value of a company, the findings of this study are significant for managers who want to increase the market value of their companies. This study helps the managers in assessing the performance of HC, SC, and CE to improve the general company efficiency. The results of this research would give a suggestion to policy makers to put a greater emphasis on the development of IC which causes an increase in the market value resulting in an increase in the gross domestic production and consequently in economic growth.

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