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**Article**

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## FINANCIAL ECONOMICS | RESEARCH ARTICLE

# On intellectual capital and financial performances of banks in Malaysia

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**Abstract:** The purpose of the study is to consider and measure the intellectual capital towards the financial performances of the local banks in Malaysia. The study will implement the Value Added Intellectual Coefficient (VAIC) method to evaluate the financial performances of the ten local banks in Malaysia. The study will determine how the intellectual capital influences the financial performances of banks in terms of two periods which are latest six years from 2011 to 2016 and the past ten years from 2007 to 2016. The regression analysis results to indicate that the components of intellectual capital have their influences towards the bank's financial performances indicators. Over the six years and ten years periods, Capital Employed Efficiency has the significant relationship on Return on Assets. For the Return on Equity, Human Capital Efficiency (HCE) has the significant relationship over the latest six years while Structural Capital Efficiency (SCE) has the significant relationship over the ten years. Then, SCE has the significant relationship towards the Leverage (LEV) for the latest six years compare to the past ten years whereby HCE has the significant relationship towards the LEV. These results determine that the banks need to focus on the three components of intellectual capital whereby all the three efficiencies have the influences to enhance the best financial performances in Malaysia's banking sector.

**Subjects:** Economic Forecasting; Development Economics; Banking; Investment & Securities

**Keywords:** intellectual capital; financial performance; human capital efficiency; structural capital efficiency

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### PUBLIC INTEREST STATEMENT

The overall performances of business not only determined by the management of tangible resources, but also on the intangible resources. Nowadays, intellectual capital became new and important components that contribute value creation for an organization. The determination of banks might have good financial performances over a particular period however not necessarily show that they are managed the intellectual capital efficiently.

The present study will analyze the intellectual capital towards the financial performances of banks in Malaysia by using Value Added Intellectual Coefficient (VAIC) Model over the periods from 2007 to 2016.

## 1. Introduction

Nowadays, the knowledge-based and challenges environment had influenced the productive of the business industries which lastly demonstrate the country's development. There were numerous of business industries considered that the value creation became important elements to implement the competitive advantages for their business. The value creation of the business wouldn't only performed by the physical assets, but also preferred on how successful by the management on the intellectual capital. The firms focused on the non-physical assets or intellectual capital had the influences and interactions within the process of the business whether successful or not. Therefore, the increasing number of the sectors made the changes and considerations on the non-physical assets or intellectual capital in the current business market.

Due to the improvements and changes in business fields, the firms believed that the non-physical capital or intellectual capital became an important component and asset in measuring and evaluating the performances among the business sectors. Previous researchers explained by Marr, Gray and Neely (2003) indicate that the firms' values in the current business environment are based on the intangibles or intellectual capital (IC). They believed that the intellectual capital will become the lever for maintaining competitive advantage and sustainable corporate performances for the companies and organizations. Additionally, there were numerous of companies and organizations had changed their measurement and evaluation of financial performances in many sectors such as banking sector, construction sector and manufacturing sector.

Besides that, the performances of the business industries were more depending on non-physical capitals or intellectual capital rather than physical assets in the wealth of the modern economy. There were numerous business industries expected that the efficiency of intellectual capital had direct impacts on the firms performances especially to build an issue of practical interest to managers and shareholders. Due to the reasons, Wiig (1997) had agreed that the intangible assets or intellectual capital were considered as one of the sources for the business industries as well as national competitive markets and developments in generating better performances in the countries.

Among the business industries or sectors, the banking sector had provided the main functions and developments for the process and flow of businesses financial properly. The connections between banking sector to allocate and progress the financial in the business environment markets helped all the business sectors to manage their business activities more effectively and efficiently. Thus, the banking sector not only influenced the physical asset of the business environment, but also implemented the direct and indirect effects towards the intangible assets among all the sectors. The arguments had mentioned by Ernst and Young (2011) whereby the increasing of awareness and consideration on intellectual capital became another elements for measurement of the performances.

As seen on the developed countries, most of the firms had applied new accounting standard to measure the financial performances of the business. The changes to new accounting standard rather than based on the traditional accounting standard which based on the considerations of the intellectual capital. Most of the developed countries believed that the influences by the intellectual capital directly and indirectly towards the performances from different sectors such as Australia, Japan and Germany. The application of new accounting standard had increased in many sectors which had proved that the importance of intellectual capital in the business market.

Moreover, the banking sector at the beginning time had started to implement and focus on the intellectual capital in developed countries. There were showing that good financial performances based on the financial statements in banking sector did not considered that the banks had managed their intellectual capital effectively and efficiently. The measurement of the intellectual capital had expanded in other sectors in developed countries such as pharmaceutical sector, manufacturing sector and construction sector which determined the improvement and competitive in business

fields. The considerations of the intellectual capital and its influences in different sectors became the gap to identify the study in other countries.

Oppositely, there were not familiar in measuring the intangible assets or intellectual capital compared to tangible and physical assets in the developing countries. The banking sector in developing countries mainly influenced by the management of central banks, banks and other financial institutions of the countries. The focusing of banking sector in developing countries will only depend on the banks and non-bank financial intermediaries who developed for the banking system directly. In Malaysia, there were a lot of industries and sectors not yet implemented the measurement of intellectual capital in the businesses. There was a gap for the researchers to conduct the studies of intellectual capital for the banking sector.

Additionally, the financial analysts and managers considered and determined the profits as the guidelines to measure the effectiveness and efficiency of management in banking industry. The performances in banking sector in the past few years only showed that the effectiveness and efficiencies of organizations' operations, but it may not taken to create the frameworks for accounting and reporting based on the intellectual capital. The increasing on the productivity and performances of banks had shown that the roles and effects by the intellectual capital. Due to the reasons, the study determines that the gap about not only to determine the efficiency of the banks' performances in Malaysia, but also need to identify that how the banks are managing and evaluating their intellectual capital.

## 2. Literature review

### 2.1. Intellectual capital (IC)

The rapid increasing of innovation, technologies and knowledge-led organizational strategies had influenced today business environments which had led the shift of attention from traditional financial and physical resources to intangible resources which supported by Khan and Ali (2010). There were a lot of financial institutions especially in banking sector had experienced competitive and dynamic environment in today global economy. These companies and institutions had faced the challenges and changes in respect of valuation and reporting of intellectual capital in financial statements which does not adequately reflect them. Thus, the intellectual capital had become more important in measuring the efficiency and the financial performances whereby how the firms managed the level of the intellectual capital.

There are a lot of definitions and understanding of intellectual capital appeared and explained in the literature review. The concepts of intellectual capital also were explained differently by many researchers. The intellectual capital in the early years explained as the non-physical assets or intangibles that provided values and competitive to the firms such as information about the business, applications of technology and systems (Itami, 1987). Next, Klein and Prusak (1994) referred to high-value assets be produced by formalizing the intangible materials. The changes of understanding on intellectual capital will be generated based on the knowledge focused. As seen the concept developed by Edvinsson and Malone (1997) believed that the intellectual capital can be make the conversion into values and knowledge. At the same time, Stewart (1997) described that the intellectual capital as the tools of intangibles resources which the implementation of wealth creation.

The concept of intellectual capital was being spread in many organizations and used as the resources in the organizations in order to help the businesses to be more competitive in the markets. Roos, Roos, Edvinsson, and Dragonetti (1997) stated that the intellectual capital can classify into a framework build up with five resources which facilitate all the resources in the organizations. Then, the intellectual capital had developed in the business not only can evaluate the performance of the firms, but also helped in enhancing the value of the business (Bontis, Keow & Richardson, 2000; Roos et al., 1997). The concepts used in the business market became different and generated in the specific broad or area such as Andriessen and Tissen (2000) had identified that the intellectual capital

became an equivalent with accounting point among the book values and market values, and also had the ability changed for the profit and benefit in the companies.

The concepts on intellectual capital became more complex and broad where the firms need to consider on the importance and effects. Dzinkowski (2000) stated that the intellectual capital can be considered on the differences among both book values and market values. For Sullivan (2000), the concept defined similarly with Stewart (Stewart) which the intellectual capital was an important knowledge and the ability to make the conversion of value to the firms. Additionally, Low (2000) had mentioned that the performance of the organizations had indicated on the importance of intangibles or non-financial as the whole. The intellectual capital hasn't only been measured by the companies for the improvement in management for both internal and external aspects, but also considered for the accounting and reporting base. This statement had been supported by Bharathi (2010) and Young et al. (2009) where for the maximization of the business value and the value-added especially in service-based industries. There were the differences in traditional measurement and focused on the non-physical resources of the companies (Tai & Chen, 2009). The shift to intellectual capital by focusing on the value creation through the measurement of intangibles of the companies (Stahle et al., 2011). By reviewing, there were the influences towards the value creation of the business based on the management of intellectual capital (Alipour, 2012).

## **2.2. Components of intellectual capital**

The classifications of intellectual capital had been proposed and identified by a number of researchers. There were similar among the researchers for the classifications of intellectual capital. In the early research, Saint-Onge (1996) stated that intellectual capital can be classified into three components included customer capital, structural capital and human capital where the categories also be supported by (Stewart, 1997) according to the three classifications. Sveiby (1997) also classified the intellectual capital into three types known as human capital, structural capital and relational capital.

There was similar description proposed by Petty and Guthrie (2000) and Kujansivu (2005) who stated that human capital, structural capital and relational capital were the three main combinations of intellectual capital. Besides that, Petty and Cuganesan (2005) had classified the intellectual capital into three types included human capital, internal capital and external capital. Hsu and Fang (2009) who proposed that the categories of intellectual capital can consider into three types, which were human capital, innovation capital and structural capital whereby all the three types as the knowledge of integration.

For the explanations for the three components in intellectual capital, the definitions for each component stated differently within the periods of years. The main classifications of intellectual capital which was human capital. According to Roos et al. (1997), the employees of the companies that generated the abilities, knowledge and skills, and experiences defined as human capital. Bontis et al. (2000) had explained that the employees of the organizations were the human capital. Besides that, the human capital was the process of innovation created by the capital which defined by Riahi-Belkaoui (2003). Nielsen, Bukh, Mouritsen, Johansen and Gormsen (2006) explained that human capital became important and the main element in intellectual capital which the influences of the capital towards the performance of the companies and also developed for efficiencies and capabilities of the capital.

Then, Edvinsson and Sullivan (1996) explained that structural capital as the resources and tools helped the employees to enhance their creative and knowledge. Bontis (1998) stated that structural capital as the firms used their available knowledge for the organizations such as the organization's system and procedures. Roberts (2003) stated that two main value drivers in structural capital which consists of internal value drivers and external value drivers included organizational structures and processes, business databases and software, and the relationships among business partners. Moreover, Chen, Zhu and Xie (2004) agreed that structural capital became independent of human

capital based to changes of time and process. Another researcher was Halim (2010) mentioned that structural capital whereby the firms owned a stock of knowledge included explicit knowledge and information technology, corporate culture, innovation on the products and process optimization.

The last component of intellectual capital was the relational capital. The relation capital was the interaction and relationship of a company with their internal and external people (Bontis, 1998; Edvinsson & Malone, 1997; Sveiby, 1997). For the relational capital, also known as capital employed which the relationships build with the external stakeholders of the business (Riahi-Belkaoui, 2003). The other researchers named Kamath (2008) stated that the relations of customers, satisfaction and loyalty of the customers and lastly contributed to the value-added customer relations as measurement of capital.

### **2.3. Value-added intellectual coefficient and its components**

The movement towards the intellectual capital and its components of intellectual capital had been failed to appear in traditional accounting. This was because the traditional accounting did not show the management of intellectual capital and the statement supported by Bozzolan et al. (2003). The previous researchers agreed and supported that the changes of traditional to new models and methods in measurement of performances based on the intellectual capital more convenient in to-day economic environment (Edvinsson & Malone, 1997; Pulic, 1998; Stewart, 1997).

The VAIC method was the most suitable method to make the analysis in measuring the intellectual capital in many sectors and industries because this method had been used by many researchers and business people in many regions around the world (Chan, 2009a, 2009b; Pulic, 2000, 2004). On the other side, Pulic (2004) implemented that the measurement of the values and efficiency of intellectual capital were more convenient by value-added intellectual coefficient (VAIC) which depends on three efficiencies included structural capital efficiency (SCE), capital employed efficiency (CEE) and human capital efficiency (HCE). The VAIC method had expanded by (2008) that the investment in one unit of money for every assets and resources might create a new value.

Pulic (2008) and Firer and Williams (2003) had stated that the measurement of intellectual capital performances which considered on the combinations of value-added capital coefficient (VACA), structural capital value-added (STVA) and value-added human capital (VAHU) in VAIC model. According to Nazari and Herremans (2007), there were three major component ratios considered as VAIC index which included internal and relational capital efficiency with the combinations of HCE and SCE while CEE categorized as physical and financial capital efficiency. The modification on the method by Pulic (2008) had identified that the HCE and SCE were independent and related with each others, then combined them into Intellectual Capital Efficiency (ICE).

### **2.4. The intellectual capital and financial performances in banking sector**

The intellectual capital had been introduced and applied to many countries internationally by different researchers for studying in banking sector. There were many firms and researchers determined that the intellectual capital became important assets and components for the measurement of financial performances. These countries had been developed the application of intellectual capital in banking sector such as in Australia (Pulic and Bornemann, 1999); Japan (Mavridis, 2004); Malaysia (Goh, 2005); UK (El-Bannany, 2008), Hong Kong (Chan, 2009a, 2009b) and India (Singh, & Joshi, 2016).

The studies of intellectual capital by the previous researchers had been implemented in developing countries. Chen, Chen and Hwang (2005), the study examined the intellectual capital and market value towards the financial performance among the companies in Taiwan. Besides that, Mohiuddin, Najibullah and Shahid (2006) measured the intellectual capital performance on 17 commercial banks in Bangladesh from 2002 to 2004 by using VAIC. Another researcher studied the influences of value added intellectual coefficient (VAIC) towards the profitability of Turkish banks (Yalama & Coskun, 2007). Similarly, Kayacan and Ozkan (2015) examined the relationship on intellectual

capital performance of the participation banks operated in Turkey towards the financial performances in terms of profitability ratio. Moreover, the study indicated based on the 20 banks in India whereby consists of 10 public and 10 private sector banks within the year from 2007 to 2011 (Singh et al., 2016). The last but not least, Thakur (2017) conducted the analysis on effects of intellectual capital and the financial performances of public and private sector banks in India over the period 2013 to 2015.

There were several studies conducted for intellectual capital towards financial performances of banking sector in Malaysia market. There was not familiar for the banking sector in Malaysia to evaluate the financial performances in term of intellectual capital. The measurement of intellectual capital with the performance in Malaysia among the commercial banks for the year of 2001 to 2003 had been conducted by Goh (2005). Ting and Lean (2009) had investigated the study on financial sector in Malaysia for the relationship and influences among the intellectual capital and the financial performance. Additionally, Latif, Malik, and Aslam (2012) examined the study on value added efficiency with the dimensions of performance among the Islamic and conventional banks. According to Abd Zin Hassan, Ahmad (2014), the researchers considered on 21 commercial banks in Malaysia within five years from 2008 to 2012. Sufian et al. (2016) presented that the efficiencies of the banking sector in Malaysia throughout 10 years from 1999 until 2008 and make the comparisons among the banks.

### **3. Methodology**

In this section, we consider the appropriate methods to evaluate the findings in the analysis. The analysis will obtain the variables based to the annual bank level data of selected local banks over the periods. Besides that, the annual bank-level data were collecting from the secondary data which from published financial statement in annual reports of each individual bank. The study chosen the most popular method for measuring the relationship between intellectual capital and financial performances of banking sector in Malaysia which known as VAIC Model. All the details about the sample selection, variables, hypothesis and method will be explained in the following.

#### **3.1. Sample selection**

According to Bank Negara Malaysia, the banking sector consists a lot of banks included local banks, foreign banks and other financial institutions. Since that the study focused on the banking sector, the study chosen the local banks in Malaysia as the sample. Additionally, the study considered local banks which operated in Malaysia in order to maintain homogeneity and the information can be obtained easily.

Among the local banks in Malaysia, the study chosen ten local banks as the sample which included Public Bank Berhad, Hong Leong Bank Berhad, Maybank Berhad, CIMB Bank Berhad, Ambank (M) Berhad, RHB Bank Berhad, Alliance Bank Malaysia Berhad and Affin Bank Berhad; while another two banks categorized as Islamic Bank which were Bank Simpanan Nasional and Bank Muamalat Malaysia Berhad.

Besides that, the published annual report of each local banks can be get from the bank's website. The financial statement of each bank important for the study to determine the influences and relationship of intellectual capital. Hence, the study will conduct and analyse for two periods of time which are 6-year period from 2011 to 2016 and 10-year period from 2007 to 2016 where the data and information collected from the financial statements of the banks.

#### **3.2. VAIC model and variables**

##### **3.2.1. VAIC model**

The VAIC Model is a quantifiable measurement tool for intellectual capital (IC) that is used in the investigation and the relationship of the study. Based on the initial study on intellectual capital, the VAIC model was developed by Ante Pulic in 1998.

The initial model had focused on the interaction between intellectual capital and performances which related on the financial indicators. The model focused on the value creation obtained by different companies in various regional. Pulic (2000, 2004) developed the method which to evaluate the efficiency of the intangible resources of the business. Subsequently, the model was improved and determined that the investment of money in each resources created a new value for the companies. The model considered that the human resources and structural resources related with each other to combine as particular resources while the companies may create greater value added and coefficient (Pulic, 2008).

Besides that, the model was outperform than other models whereby the model mostly been used to measure the performances in banking sector from different countries over the last three years such as in Japan, Turkey, Malaysia, India and Sweden. The increasing number of awareness and measurement on intellectual capital had proposed that the importance and improvement of management on different sectors.

According to Pulic (1998, 2000, 2004), the formulas and its components of the model in calculating the intellectual capital as proposed below:

#### **Value Added (VA)**

$$VA_i = I_i + DP_i + D_i + T_i + M_i + R_i + WS_i \quad (1)$$

where  $I_i$  is the sum of interest expenses;  $DP_i$  is the depreciation expenses;  $D_i$  is the dividends;  $T_i$  is the corporate taxes;  $M_i$  is the equity of minority shareholders in net income of subsidiaries;  $R_i$  is the profits retained for the year and  $WS_i$  is the wages and salaries.

The value added also can be simplify as:

Output = Gross income

Input = Operating expenses (excluding personal costs)

**Value added = Output - Input**

#### **Human Capital Efficiency (HCE)**

$$HCE_i = VA_i / HC_i \quad (2)$$

$VA_i$ , VA for firm  $i$ ; and  $HC_i$ , total salary and wage costs for firm  $i$

#### **Structural Capital Efficiency (SCE)**

$$SC_i = VA_i - HC_i \quad (3)$$

$$SCE_i = SC_i / VA_i \quad (4)$$

$SC_i$ , SC for company  $i$ ; and  $VA_i$ , VA for firm  $i$

#### **Capital Employed Efficiency (CEE)**

$$CEE_i = VA_i / CE_i \quad (5)$$

$VA_i$ , VA for firm  $i$ ; and  $CE_i$ , book value of the net assets for firm  $i$

### Value Added Intellectual Coefficient (VAIC)

$$VAIC^T M_i = HCE_i + SCE_i + CEE_i \quad (6)$$

#### 3.2.2. Independent and dependent variables

The VAIC, HCE, SCE and CEE categorized as the four independent variables of the study. The classifications of the variables were based on the intellectual capital who proposed by Pulic (1998).

There are three dependent variables in the study which are based to the banks' financial performances indicators. The study will look for the financial performance indicators among the local banks include Return On Assets (ROA), Return On Equity (ROE) and Leverage (LEV).

#### 3.3. Research hypothesis

The study of the paper will identify that how the intellectual capital (VAIC) and its components HCE, SCE and CEE influence the financial performances of the banks (Return On Assets (ROA), Return On Equity (ROE) and Leverage (LEV)). In order to achieve the above aims, there were hypotheses examined as below:

H1a: There is a significant relationship between VAIC and financial performance indicator of banks (ROA).

H1b: There is a significant relationship between VAIC and financial performance indicator of banks (ROE).

H1c: There is a significant relationship between VAIC and financial performance indicator of banks (LEV).

H2a: There is a significant relationship between HCE and financial performance indicator of banks (ROA).

H2b: There is a significant relationship between HCE and financial performance indicator of banks (ROE).

H2c: There is a significant relationship between HCE and financial performance indicator of banks (LEV).

H3a: There is a significant relationship between SCE and financial performance indicator of banks (ROA).

H3b: There is a significant relationship between SCE and financial performance indicator of banks (ROE).

H3c: There is a significant relationship between SCE and financial performance indicator of banks (LEV).

H4a: There is a significant relationship between CEE and financial performance indicator of banks (ROA).

H4b: There is a significant relationship between CEE and financial performance indicator of banks (ROE).

H4c: There is a significant relationship between CEE and financial performance indicator of banks (LEV).

#### 4. Results and findings

##### 4.1. Regression analysis results

Table 1 presents the overall results for ten local banks with the highest efficiency of VAIC towards the financial performances indicators in terms of ROA, ROE and LEV within the latest six years from the year of 2011 to 2016 by using regression analysis. Based on the results, it shows that eight banks consider the dependent variable in terms of Return Of Assets (ROA) has the relationship by the CEE. These banks and its  $R^2$  Value includes Bank Muamalat Malaysia Berhad ( $R^2 = 0.903$ ), Maybank Berhad ( $R^2 = 0.891$ ), CIMB Bank Berhad ( $R^2 = 0.864$ ), Bank Islam Malaysia Berhad ( $R^2 = 0.782$ ), Hong Leong Bank Berhad ( $R^2 = 0.718$ ), Public Bank Berhad ( $R^2 = 0.657$ ), Ambank (M) Berhad ( $R^2 = 0.373$ ) and Alliance Bank Malaysia Berhad ( $R^2 = 0.301$ ). Then, Affin Bank Berhad has the relationship by the HCE with the  $R^2$  Value of  $R^2 = 0.694$  while RHB Bank Berhad considers the relationship in both variables, HCE and VAIC with the same  $R^2$  Value of  $R^2 = 0.881$ . Therefore, the results indicate that positive coefficient of determination for the relationship between the CEE, HCE and VAIC towards the ROA.

For the second dependent variable, there are five banks prefer the relationship on the CEE towards the Return Of Equity (ROE). These banks are including Public Bank Berhad ( $R^2 = 0.861$ ), CIMB Bank Berhad ( $R^2 = 0.807$ ), Maybank Berhad ( $R^2 = 0.736$ ), Ambank (M) Berhad ( $R^2 = 0.672$ ) and Bank Islam Malaysia Berhad ( $R^2 = 0.548$ ). There are three banks have the relationship on the HCE towards the ROE which are Bank Muamalat Malaysia Berhad ( $R^2 = 0.910$ ), Affin Bank Berhad ( $R^2 = 0.825$ ) and RHB Bank Berhad ( $R^2 = 0.668$ ). Next, Hong Leong Bank Berhad consider the relationship on SCE with the  $R^2 = 0.404$  while Alliance Bank Malaysia Berhad have the relationship on VAIC and its  $R^2 = 0.218$ . The results prove that the CEE, HCE and SCE have the relationship with positive coefficient of determination towards the ROE.

**Table 1. The regression analysis results for the year of 2011 to 2016**

Banks	$R^2$ value and its significant for independent variables towards dependent variables					
	ROA	Significant	ROE	Significant	LEV	Significant
Affin Bank Berhad	0.694 (HCE)	0.020	0.825 (HCE)	0.005	0.860 (SCE)	0.003
Alliance Bank Malaysia Berhad	0.301 (CEE)	0.202	0.218 (VAIC)	0.451	0.837 (CEE)	0.004
Ambank (M) Berhad	0.373 (CEE)	0.145	0.672 (CEE)	0.024	0.672 (CEE)	0.024
Bank Islam Malaysia Berhad	0.782 (CEE)	0.008	0.548 (CEE)	0.057	0.256 (HCE)	0.247
Bank Muamalat Malaysia Berhad	0.903 (CEE)	0.001	0.910 (HCE)	0.001	0.029 (HCE)	0.714
CIMB Bank Berhad	0.864 (CEE)	0.002	0.807 (CEE)	0.006	0.237 (CEE)	0.268
Hong Leong Bank Berhad	0.718 (CEE)	0.016	0.404 (SCE)	0.125	0.210 (CEE)	0.301
Maybank Berhad	0.891 (CEE)	0.001	0.736 (CEE)	0.013	0.345 (CEE)	0.166
Public Bank Berhad	0.657 (CEE)	0.027	0.861 (CEE)	0.003	0.817 (VAIC)	0.005
RHB Bank Berhad	0.881 (VAIC & HCE)	0.002	0.668 (HCE)	0.025	0.151 (SCE)	0.389

Leverage (LEV) still develop the most by the CEE in Alliance Bank Malaysia Berhad ( $R^2 = 0.837$ ), Ambank (M) Berhad ( $R^2 = 0.672$ ), Maybank Berhad ( $R^2 = 0.345$ ), CIMB Bank Berhad ( $R^2 = 0.237$ ) and Hong Leong Bank Berhad ( $R^2 = 0.210$ ). Affin Bank Berhad and RHB Bank Berhad have the highest efficiency in SCE with the  $R^2 = 0.860$  and  $R^2 = 0.151$  respectively while Bank Islam Malaysia Berhad and Bank Muamalat Malaysia Berhad implement the relationship on HCE with  $R^2 = 0.256$  and  $R^2 = 0.029$  respectively. Public Bank Berhad has the highest  $R^2$  Value of 0.817 on VAIC towards the LEV. Therefore, the positive coefficient of determination perform by the banks towards the Leverage (LEV) have the relationship by all the variables in intellectual capital include CEE, SCE, HCE and VAIC.

When the results of the study indicate a statistically significant relationship between the independent variable and dependent variable, the significance value is less than 0.05 ( $p < 0.05$ ) which means that at least 95 percent certain that the association between two variables could not have occurred by chance factor alone. Due to the regression analysis results, there are identifying that the significant relationship of intellectual capital towards the financial performances indicators in term of ROA. Among the banks, Bank Muamalat Malaysia Berhad ( $p = 0.001$ ), Maybank Berhad ( $p = 0.001$ ) and CIMB Bank Berhad ( $p = 0.002$ ) are to be significant predictors at the significant level of 5% in CEE while RHB Bank Berhad ( $p = 0.002$ ) has the significant value in VAIC and HCE at the significant level of 5%. As seen on the results, the VAIC, HCE and CEE have significance contribution on the ROA while the hypothesis in H1a, H2a and H4a are accepted. Oppositely, there is no relationship between SCE towards the ROA, so the hypothesis of H3a to be rejected.

For the ROE, there are finding only have two efficiencies in intellectual capital have the highest significant in the study. Bank Muamalat Malaysia Berhad and Affin Bank Berhad are determining to enhance the performances at the significant level of 5% with the value of  $p = 0.001$  and  $p = 0.005$  respectively by HCE. Oppositely, Public Bank Berhad becomes as the significant predictors in CEE with the significant value of  $p = 0.003$  at the significant level of  $p < 0.05$ . Hence, there are the significant in HCE and CEE towards ROE and prove that the hypothesis in H2b and H4b to be accepted in this study whereby to help the banks to manage efficiently for the shareholders. The H1b and H3b consider as null hypothesis in the study which the hypothesis do not contributed the significance value level, so the hypothesis have to reject in the study.

The last dependent variable is Leverage (LEV). There are consists of three efficiencies on intellectual capital have the greatest significant relationship towards the financial performances indicator. Affin Bank Berhad ( $p = 0.003$ ), Alliance Bank Malaysia Berhad ( $p = 0.004$ ) and Public Bank Berhad ( $p = 0.005$ ) are contributing the significant relationship at the significant level of 5% in SCE, CEE and VAIC respectively. Therefore, the hypothesis in H1c, H3c and H4c have accepted since that VAIC, HCE and CEE contribute to help the banks to minimize the leverage. The HCE in H2c has to reject because it only has the relationship but not significant relationship towards the leverage among the banks.

Table 2 shows that the regression analysis results for ten local banks with the greatest efficiency of VAIC towards the financial performances indicators in term of ROA, ROE and LEV within the latest ten years from the year of 2007 to 2016. Based on the analysis results, it shows that there are five banks with higher  $R^2$  Value consider the CEE has the relationship towards the ROA. These banks are including Bank Islam Malaysia Berhad ( $R^2 = 0.909$ ), CIMB Bank Berhad ( $R^2 = 0.768$ ), Hong Leong Bank Berhad ( $R^2 = 0.431$ ), Maybank Berhad ( $R^2 = 0.406$ ) and Public Bank Berhad ( $R^2 = 0.272$ ). Then, Alliance Bank Malaysia Berhad ( $R^2 = 0.709$ ), Affin Bank Berhad ( $R^2 = 0.539$ ) and Bank Muamalat Malaysia Berhad ( $R^2 = 0.227$ ) have higher  $R^2$  Value in SCE. RHB Bank Berhad ( $R^2 = 0.643$ ) and Ambank (M) Berhad ( $R^2 = 0.252$ ) have the relationship and higher  $R^2$  Value on VAIC and HCE. Hence, the results indicate that positive coefficient of determination for the relationship between the CEE, SCE and VAIC towards the ROA.

For the second dependent variable, there are five banks prefer the relationship and higher  $R^2$  Value on the SCE towards the ROE which the banks include Alliance Bank Malaysia Berhad ( $R^2 = 0.770$ ),

**Table 2. The regression analysis results for the year of 2007 to 2016**

Banks	<i>R</i> <sup>2</sup> value and its significant for independent variables towards dependent variables					
	ROA	Significant	ROE	Significant	LEV	Significant
Affin Bank Berhad	0.539 (SCE)	0.016	0.338 (SCE)	0.078	0.470 (SCE)	0.029
Alliance Bank Malaysia Berhad	0.709 (SCE)	0.002	0.770 (SCE)	0.001	0.293 (SCE)	0.106
Ambank (M) Berhad	0.252 (HCE)	0.139	0.126 (HCE)	0.313	0.737 (HCE)	0.001
Bank Islam Malaysia Berhad	0.909 (CEE)	0.000	0.065 (CEE)	0.477	0.532 (CEE)	0.017
Bank Muamalat Malaysia Berhad	0.227 (SCE)	0.164	0.307 (SCE)	0.097	0.322 (SCE)	0.087
CIMB Bank Berhad	0.768 (CEE)	0.001	0.656 (CEE)	0.005	0.097 (HCE)	0.381
Hong Leong Bank Berhad	0.431 (CEE)	0.039	0.482 (SCE)	0.026	0.286(SCE)	0.112
Maybank Berhad	0.406 (CEE)	0.047	0.378 (VAIC)	0.059	0.312 (HCE)	0.094
Public Bank Berhad	0.272 (CEE)	0.122	0.714 (SCE)	0.002	0.545 (SCE)	0.015
RHB Bank Berhad	0.643 (VAIC)	0.005	0.691 (VAIC)	0.003	0.215 (CEE)	0.177

Public Bank Berhad ( $R^2 = 0.714$ ), Hong Leong Bank Berhad ( $R^2 = 0.482$ ), Affin Bank Berhad ( $R^2 = 0.338$ ) and Bank Muamalat Malaysia Berhad ( $R^2 = 0.307$ ). Next, the banks that consider the relationship on CEE and its  $R^2$  Value are CIMB Bank Berhad ( $R^2 = 0.656$ ) and Bank Islam Malaysia Berhad ( $R^2 = 0.065$ ). RHB Bank Berhad and Maybank Berhad consider the relationship on VAIC the  $R^2$  Value of  $R^2 = 0.691$  and  $R^2 = 0.378$  respectively while Ambank (M) Berhad only prefer the relationship on HCE and its  $R^2$  Value of  $R^2 = 0.126$ . Based to the results, it can be explained that the positive coefficient of determination by all the independent variables towards the ROE.

The last dependent variable is Leverage (LEV) whereby the variable still develop the most by the SCE and its higher  $R^2$  Value by five banks in the study which are Public Bank Berhad ( $R^2 = 0.545$ ), Affin Bank Berhad ( $R^2 = 0.470$ ), Bank Muamalat Malaysia Berhad ( $R^2 = 0.322$ ), Alliance Bank Malaysia Berhad ( $R^2 = 0.293$ ) and Hong Leong Bank Berhad ( $R^2 = 0.286$ ). The second higher number of banks prefer the relationship towards the LEV is HCE which include Ambank (M) Berhad, Maybank Berhad and CIMB Bank Berhad with  $R^2$  Value of  $R^2 = 0.737$ ,  $R^2 = 0.312$  and  $R^2 = 0.097$  respectively. There are two banks prefer the relationship on CEE and its  $R^2$  Value include Bank Islam Malaysia Berhad ( $R^2 = 0.532$ ) and RHB Bank Berhad ( $R^2 = 0.215$ ) towards the LEV. Therefore, the positive coefficient of determination by the SCE, HCE and CEE present that the relationship on the Leverage (LEV).

There is a very low significance value which usually is less than 0.05 ( $p < 0.05$ ) means that the coefficient is unlikely to have occurred by chance alone, then identify that the independent variable and dependent variable has a statistically significant relationship. Due to the regression analysis results, there are showing that three efficiencies of intellectual capital have significant relationship towards ROA. Bank Islam Malaysia Berhad ( $p = 0.000$ ) and CIMB Bank Berhad ( $p = 0.001$ ) are to be significant predictors at the significant level of  $p < 0.005$  by CEE. Next, for the significant level of  $p < 0.005$ , Alliance Bank Malaysia Berhad has the significant relationship in SCE with the significant value of  $p = 0.002$  while RHB Bank Berhad to be significant predictors in VAIC with the significant value of  $p = 0.005$ . The banks able to transform the assets into profits through the management of VAIC, SCE and CEE. Therefore, the hypothesis in H1a, H3a and H4a are accepted. So, HCE only has the low relationship but not significant for influencing the ROA, the hypothesis in H2a to be rejected.

For the significant relationship in ROE, the findings prove that the significance value level on SCE by Alliance Bank Malaysia Berhad ( $p = 0.001$ ) and Public Bank Berhad ( $p = 0.002$ ) perform efficiently at the significant level of 5%. Then, RHB Bank Berhad has the significant value of  $p = 0.003$  in VAIC while CIMB Bank Berhad has the significant value of  $p = 0.005$  in CEE to enhance the performances at the significant level of  $p < 0.005$ . Hence, the three components, VAIC, SCE and CEE have the contributions to reward the shareholders based to for the investment, so the hypothesis in H1b, H3b and H4b are accepted. Since that HCE in the study only have the least relationship but not significant, thus hypothesis in H2b has to reject.

For the significant relationship in Leverage (LEV), HCE is the highest significance value by Ambank (M) Berhad with the  $p = 0.001$  which at the significant level of  $p < 0.005$ . HCE contribute the strong effects towards the leverage which determine that the human resources able to control and minimize the level of leverage in banks. Hence, the hypothesis in H2c to be accepted. VAIC do not has any relationship towards the LEV while SCE and CEE only have low relationship but not significant in the study, therefore the hypothesis in H1c, H3c and H4c have to reject.

#### **4.2. Comparisons of regression analysis results among the periods**

Based to the Table 3, there are showing that the comparison of regression analysis for the six years periods and ten years periods. The results indicate that both periods for the significant relationship between independent variables and dependent variables have the lowest significance value of  $p < 0.005$ . By making the comparison on the ROA, there are the significant relationship among the intellectual capital efficiency in terms of VAIC ( $p = 0.002$ ), HCE ( $p = 0.002$ ) and CEE ( $p = 0.001$ ) in six years periods while the intellectual capital efficiency in terms of VAIC ( $p = 0.005$ ), SCE ( $p = 0.002$ ) and CEE ( $p = 0.000$ ) in ten years periods towards the ROA. The results implement that the VAIC and CEE are the components to enhance the performances efficiently on ROA for both periods of time. The the changes of technology and reduction used of human resources forces the banks consider on SCE over ten years period to HCE over the latest six years. The HCE and SCE are related with each other which the contribution in one resource, the other resource need to reduce.

Besides that, there are the significant relationship between the intellectual capital efficiency in terms of HCE ( $p = 0.001$ ) and CEE ( $p = 0.003$ ) in six years periods which have the lowest significance value of  $p < 0.005$ . For the ten years period, the VAIC ( $p = 0.003$ ), SCE ( $p = 0.001$ ) and CEE ( $p = 0.005$ ) have performed the significant relationship toward the Return On Equity (ROE) with the lowest significance value of  $p < 0.005$  level. So, the results determine that the internal changes among the banks make the banks need to maximize the use of resources efficiently, so the differences over the both periods based on the HCE, SCE and VAIC in order to enhance the performances.

There are the significant relationship between the independent towards the Leverage (LEV) with the significance value of  $p < 0.005$ . The results indicate that the VAIC ( $p = 0.005$ ), SCE ( $p = 0.003$ ) and CEE ( $p = 0.004$ ) have the significant relationship towards Leverage (LEV) in six years periods while only has the significant relationship on HCE ( $p = 0.001$ ) in ten years periods. The differences on intellectual capital over the periods which determine that how the banks manage leverage or liabilities well. Since the improvement of technology, the changes of use the resources in term of HCE over the ten years to VAIC, SCE and CEE over the latest six years so that the banks may manage the leverage efficiently.

**Table 3. Comparison of regression analysis results between 6 years and 10 years periods**

Dependent variables	Significant relationship	
	6 Years	10 Years
ROA	VAIC, HCE, CEE	VAIC, SCE, CEE
ROE	HCE, CEE	VAIC, SCE, CEE
LEV	VAIC, SCE, CEE	HCE

**Table 4. Comparison of significant financial predictor between 6 years and 10 years periods**

Dependent variables	Significant predictor	
	6 Years	10 Years
ROA	CEE	CEE
ROE	HCE	SCE
LEV	SCE	HCE

Table 4 presents that the significant financial predictor in determining the intellectual capital towards the financial performances among all the banks over six years and ten years periods. By making the comparison, the CEE is the significant predictor in determining the financial performances in terms of ROA over the six years and ten years periods. So, the banks prefer that the CEE becomes important component for improving the performances in terms of ROA while the result is similarly by Ting and Lean (2009). Based to the previous results by Ting and Lean (2009), the banks are most considering on human resources to increase the profitability in terms of ROA. Since the technology improvement in the business market, the banks have started focus on CEE to enhance the profitability of the banks.

Then, the banks prefer significant predictor on HCE towards the financial performances in terms of ROE in six years periods who Maditinos, Chatzoudes, Tsairidis and Theriou (2011) also conducted the same findings. By comparison, there is determine that the banks prefer on SCE in ten years periods which the results supported by Chan (2009b). The results indicate that the determination of SCE by the banks help to enhance the ROE in the ten years period efficiently. Due to the above statement for the profitability, the results state that the importance of HCE for the business operations, so the banks prefer on HCE as the financial predictor in the latest six years.

The last but not least, the financial predictor of intellectual capital towards the Leverage (LEV) in six years period and ten years period have changed. The SCE is the significant predictor in determining the financial performances in terms of Leverage (LEV) in six years periods while the banks change the financial predictor to HCE in ten years periods. The results present that HCE may not perform efficiently in managing the leverage since that the improvement of technology help the banks to increase the ability for enhancing the SCE in the latest six years period. The abilities of human resources in banking sector have to reduce and the banks have to change to structural resources in order to increase the performances.

### 5. Conclusion

In this paper, the study has identified the significant of intellectual capital towards the financial performances in Malaysia banking sector. By using the VAIC model, the study find that the efficiencies of intellectual capital have the significant relationship towards the financial performances indicators in terms of Return On Assets (ROA), Return On Equity (ROE) and Leverage (LEV). The findings of the study for the latest six years from 2011 to 2016 have determined that CEE has the significant relationship towards ROA, HCE has the significant relationship towards ROE and SCE has the significant relationship towards LEV.

Oppositely, the findings of the study for the past ten years from 2007 to 2016 have the different results. The findings of the study have identified that CEE still has the significant relationship towards ROA, SCE has the significant relationship towards ROE and HCE has the significant relationship towards LEV. The study provides an opportunity for all the banks to make the contribution of intellectual capital for enhancing their business operations. It will also prepare the decisions on the awareness of the importance of intellectual capital in banking sector especially in the knowledge-based and technology changes market environment today.

However, there are several limitations when conducted the study on intellectual capital towards banks financial performances in Malaysia. The limitations of the study have to identify in order to give the suggestions for the future research. One of the limitation is there is a few numbers of banks selected for this study. There are still having a lot of banks in Malaysia do not select for the study in order to analyse their intellectual capital and its banks financial performances. Besides that, there are a few numbers of variables taken for the study in measuring the performances in banking sector. In addition, the study only focused on one sector which in banking sector and its financial performances without evaluate on other business sectors and industries.

The future research may consider on more variables in evaluating the intellectual capital towards the financial performances of banking sector in Malaysia. Moreover, the future research can conduct the study by including the local and foreign banks in the study and make the comparison among the local and foreign banks in Malaysia. The future researchers also may study on several sectors in Malaysia and the results may present how the sectors manage their intellectual capital.

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