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# DOES INTELLECTUAL CAPITAL INFLUENCE FIRMS' FINANCIAL PERFORMANCE? A COMPARATIVE ANALYSIS INTO THREE MALAYSIAN INDUSTRIES

**Hapsah S.Mohammad**♣
*Universiti Teknologi MARA, Kota Kinabalu Campus*

**Imbarine Bujang**
*Universiti Teknologi MARA, Kota Kinabalu Campus*

## ABSTRACT

The aim of the paper is to explore the impact of intellectual capital on financial performance of firms in construction, finance and plantation using value-added intellectual coefficient (VAIC) model. The empirical data were drawn from a panel consisting of 108 firms listed in Bursa Malaysia from 2011 to 2015. Intellectual capital is the independent variable in the study and measured by HCE, SCE, CEE, VAIC. Meanwhile, the dependent variable, financial performance, is proxy by ROA. The findings revealed significant and positive association between intellectual capital and financial performance in construction and finance. Whereby, in plantation, the result indicated significant but negative association. On the components of intellectual capital, the findings revealed that firms in finance employ human capital and structural capital to create value. On the contrary, a negative relationships were documented between human capital, structural capital and financial performance in construction and plantation. Nevertheless, the result indicated that capital employed is significant and positively associated with financial performance in all the three industries implying that physical capital remain the most influential value drivers in generating firms' profitability regardless of the industries type. The study findings have a practical contribution as it establishes suggestions for firms' managers to make legitimate decisions concerning investments on the components of intellectual capital that can foster business growth and sustainable competitive advantage. The data is drawn from three industries only, thus it may limit the generalisation of the findings which become the main limitation of this study.

***Keywords:*** Intellectual capital; VAIC; Financial performance; Resource-Based Theory.

## 1. INTRODUCTION

The world's economy has changed from an industrial economy into a knowledge-based economy. Firm growth is no longer determined by the employment of physical resources, rather wealth creation is associated with the development and maintenance of intangible resources particularly knowledge to create competitive advantages (Goh, 2005; Maditinos, Chatzoudes, Tsairidis, and Theriou, 2011). Knowledge in firms is embedded in their employees, structural design, interaction with their environment and collectively they are referred to as intellectual capital.

♣ Corresponding author: Faculty of Accountancy, Universiti Teknologi MARA, Sabah Branch, Kota Kinabalu Campus, 88997, Malaysia. Email: hapsahsm@sabah.uitm.edu.my

Studies in the past involving intellectual capital performance had a tendency to focus on a single industry. The industry that is frequently analysed is the finance industry particularly banks. This was attributed to the knowledge-intensive nature of banks that made it an ideal industry for reseach on intellectual capital (Goh, 2005; Kamath, 2007). Studies involving banks were done by Goh (2005) in Malaysia; Joshi, Cahill and Sidhu (2010) in Australia; Kamath (2007) in India. Other industry is also investigated such as hotels for example, Laing, Dunn and Hughes-Lucas (2010) studied the intellectual capital performance of hotels in Australia. In addition, on the relationship between intellectual capital and financial performance, prior studies had also indicated the same trend that is the concentration on a particular industry. Kamath (2008) studied the relationship between intellectual capital and firms' financial performance involving pharmaceutical firms in India and Sharabati, Jawad and Bontis (2010) investigated the relationships in Jordanian pharmaceutical sectors. A similar study was done by Bontis, Janosevic and Dzenopoljac (2015) on hotels industry in Serbia.

Meanwhile, a comparative study into financial and non-financial sector in Indonesia revealed that non-financial sector had a better intellectual capital performance (Ulum, Rizqiyah and Jati, 2016). Ulum et al. (2016) contributed this to the ability of non-financial sector to exercise innovation in managing its intellectual capital. Moreover, some scholars suggested that comparative studies involving multiple industries would give an understanding on the contribution of various components of intellectual capital towards their business growth (Joshi, Cahill, Sidhu and Kansal, 2013; Ting and Lean, 2009). Addae, Nyarko-Baasi and Hughes (2013) argued that comparative analysis is important because different industries exhibit different pattern of relationship due to different operational characteristics. Furthermore, the contribution of intellectual capital to firms' performance varied by industry type (Joshi et al., 2013).

In addition to the concentration on a single industry, the findings on the relationship between intellectual capital and financial performance had also documented inconsistency. Some firms recorded positive relationship between intellectual capital and financial performance (Ting et al., 2009; Nik Maheran and Md Khairu, 2009; Khan, Yasser and Hussain, 2015; Nimtrakoon, 2015; Nawaz and Haniffa, 2017; Ozkan, Cakan and Kayakan, 2017) and others documented negative relationship between intellectual capital and financial performance (Kamath, 2008; Maditinos et al., 2011; Mehralian, Rajabzadeh, Sadeh and Rasekh, 2012; Mosavi, Nekoueizadeh and Ghaedi, 2012; Joshi et al., 2013; Bontis et al., 2015).

The mixed and inconclusive findings on the relationship between intellectual capital and financial performance in prior studies and considering the importance of a comparative analysis become the motivation of the study and this study has two main objectives. The first objective is to examine the separate effects of human capital efficiency, structural capital efficiency and capital employed efficiency on financial performance and second, is to measure the impact of intellectual capital on financial performance. Data for the study is based on three industries in Malaysia namely construction, finance and plantation. These industries represent two industry sector in Malaysia, service industry (finance) and non-service industry (construction and plantation). In essence, the findings of the study may uncover the contribution of intellectual capital towards firms' value creation capability and growth potential in the two industry sectors and improve intellectual capital practices.

The remaining parts of this paper are organized as follows: part 2 reviews the literature on intellectual capital, part 3 lays out the data and methodology adopted in the study, while part 4 discusses data analysis and interpretation of statistical findings obtained from the empirical analysis. Part 5 summarizes the entire research with relevant conclusions, some practical contributions of the study and recommendations for future research.

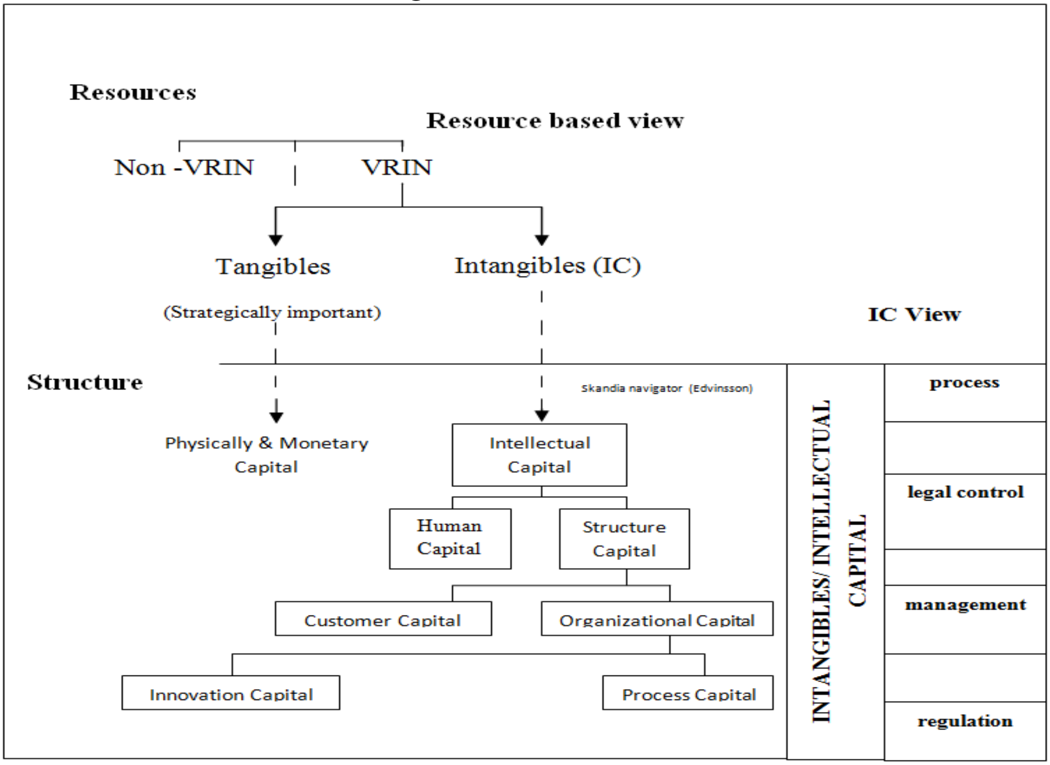
## 2. LITERATURE REVIEW

It is widely recognized that with the transformation of economy into knowledge-based economy, firms' reliance on resources to create value have basically changed from physical resources into intangible resources. Intangible resources are also known as intellectual property, intangible assets, intellectual capital, intellectual assets, knowledge capital and knowledge-based resources (Kristandl and Bontis, 2007). Lev (2001) attributed the numerous terms to the different academic disciplines for example intangibles is used in the accounting literature, knowledge assets by economists, intellectual capital by management and intellectual property in the legal literature. However, he claimed that they refer essentially to the same thing that is a non-physical claim to future benefits.

This study adopts resource-based theory to explain the relationship between intellectual capital and financial performance in firms. The resource-based theory views firm resources as the main drive behind competitiveness and firm performance. Firm resources include all assets, capabilities, organizational processes, firm attributes, information, knowledge which are controlled by a firm that enable the firm to plan and implement strategies that improve its efficiency and effectiveness (Daft, 1992). These resources will be a source of competitive advantage when the firm is able to employ these resources for planning and implementing a value creating strategy (Barney, 1991). According to Barney (1991), not all firms' resources have the capabilities of becoming a source of competitive advantage. To have this capability, a firm resources must have four attributes namely; valuable, rare, inimitable and non-substitutable (VRIN). Valuable is the ability of a firm resources to create sustainable value. The resouces are said to be rare when the resources are heterogeneously distributed across firms, not easily accessible to competitors and possessed by very few firms. Inimitable resources are resources that the firm is able to protect from being copied by competitors. Non-substitutable resouces are resources with no equivalent strategic resources or capabilities.

In addition, firms resources can be classified into two categories namely tangible and intangible resources (Barney,1991; Riahi-Belkaoui, 2002). Tangible resources include physical technology used in a firm, a firm's plant and equipment, its geographic location and its access to raw material and intangible resources are human capital and organizational capital (Barney,1991). Human capital resources include the training, experience, judgement, intelligence, relationships and insight of individual managers and workers in a firm. Organizational capital resources include a firm's formal reporting structure, its formal and informal planning, controlling, and coordinating systems, as well as informal relations among groups within a firm and between a firm and those in its environment.

**Figure 1:** Firms resources




***Source:*** Kristandl et al. (2007). Constructing a definition for intangibles using the resource based view of the firm. Management Decision, 45(9), p.1517

To measure intellectual capital, this study adopts value-added intellectual coefficient model (Pulic, 1998). Value-Added Intellectual Coefficient (VAIC) is based on the assumption that both, intellectual capital and physical capital, are a function of production and mathematically computed as VAIC = ICE + CEE. Intellectual capital efficiency (ICE) is the sum of human capital efficiency (HCE) and structural capital efficiency (SCE), which are proxies for intellectual capital and capital employed efficiency (CEE) represents physical capital. VAIC is used to compute the efficiency level of firms' resources. VAIC is used in the study because the model has been used time and again in the literature of intellectual capital, therefore it has been robustly tested. In addition, VAIC offers simplicity, subjectivity, reliability and comparability in its measurement of intellectual capital which make it an ideal model to measure intellectual capital efficiency (Goh, 2005; Joshi et al., 2013).

## 3. RESEARCH METHODOLOGY

Data for the study were drawn from the Main Board of Bursa Malaysia for three industries namely construction, finance and plantation and the period of analysis is from 2011 to 2015. Data were collected from the audited annual reports of the firms through their websites. There were 120 firms listed in Bursa Malaysia as at 31 December 2015, however 12 firms were dropped from the analysis due to unavailability of data (do not meet the five-year requirement for data collection).

**Table 1:** Number of Firms by Industry Sector

| Number | Industry Sector | Number of Firms | Percentage |
|---|---|---|---|
| 1 | Construction | 41 of 45 | 38% |
| 2 | Finance | 30 of 33 | 28% |
| 3 | Plantation | 37 of 42 | 34% |
| | **Total** | **108 of 120** | **100%** |

This study provides a comparative analysis into three industries in Malaysia and some scholars argued it is important as previous studies have indicated that different industries tend to exhibit different pattern of relationship (Joshi et al., 2013). Addae et al. (2013) attributed the differences to different operational characteristics, different operating profit, different assets.

The three industries which represent two industry sectors in Malaysia, service and non-service, were chosen in the study due to several reasons. First, construction is contributing significantly towards Malaysia economy. This industry is considered as an engine of economic growth specifically in developing economies and construction activities are closely linked with the various phases of economic development of a country (Lean, 2001; Rameezdeena and Ramachandra, 2008; Raza, Mohd and Zulkipli, 2013). These linkages generated higher multiplier effect in the economy (Park, 1989). On top of the above, the construction industry has the ability to create employment opportunities and providing new sources of income for both, skilled and semi-skilled employees. Therefore, construction industry has a great impact on socio-economic development of a country (Raza et al., 2013). Thus, a study of intellectual capital in construction industry is justified because construction industry is heavily reliant on intellectual capital notably in terms of human capital related activities (employment - recruitment, development and retention). The linkages between construction and other sector in the economy is also knowledge intensive, therefore provides an appropriate setting for intellectual capital assessment.

Second, finance is a knowledge-driven sector, which making it an ideal sector for research on intellectual capital (Goh, 2005; Joshi et al., 2013; Al-Musali and Ku Ismail, 2014). In addition, in the new economic era, intellectual capital resources such as human capital and customer relations have become the most important business success factor and the key factor in sustaining competitive advantage and creating value of firms (Maditinos et al., 2011; Shih, Chang, & Lin, 2010; Andriessen, 2004). Accordingly, the potential for creating competitive advantage and long-term value lies more importantly in the efficient management of intellectual capital than in tangible assets. This is so true in knowledge-based industries such as the financial industry particularly banks, as the main resources in these industries are non-tangible and intellectual in nature (Shih et al., 2010). According to Ahuja and Ahuja (2012), an efficient utilization of intellectual capital is more crucial for accomplishing success in banking than other industries, asserting that delivering of high quality services by a bank depends on its investment in items related to intellectual capital such as its human resources, brand building, systems and processes. Goh (2005, p. 386) further states "though physical capital is essential for banks to operate, it is the intellectual capital that determines the quality of services provided to customers." Therefore, it becomes necessary for banks to manage their intellectual capital as efficiently as possible (Al-Musali et al., 2014).

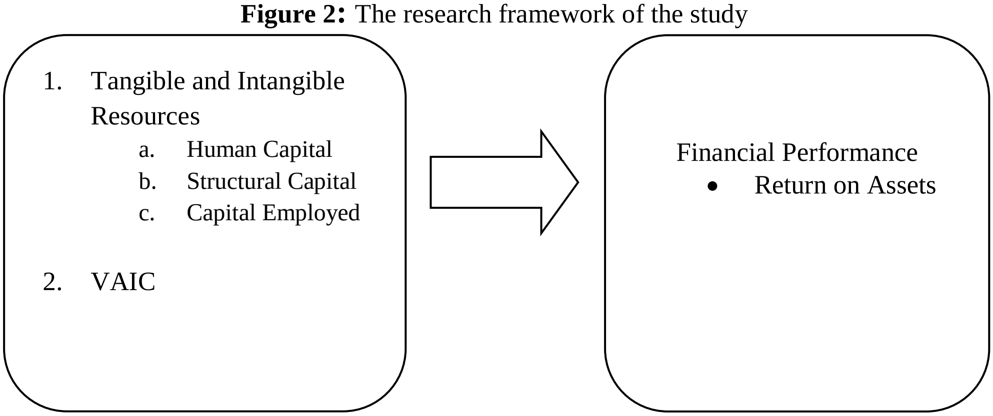
Third, plantation's key product which is palm oil, has become the fastest growing large-scale agricultural product in the world and Malaysia is the world's top exporters of palm oil, contributing about 47% of global exports and second in the world in terms of palm oil production accounting for about 41% of global production (Abdul-Hamid and Dzuljastri, 2015). In addition, the Malaysia plantation industry (comprising plantations, processors, and manufacturers) represents the global industry's technological frontier (Rasiah & Shahrin, 2006). Malaysian palm oil yields appreciated over time reaching its high level in the period of 1998-2008, with yields increasing by about 4% annually (Abdul-Hamid et al., 2015). The increments can be attributed to the highly organized nature of the industry, investment in research and development and strong financial resources. Moreover, plantation industry is an integral part of Malaysia's Economic Transformation Program. This is demonstrated by the fact that, rubber and oil palm are included in the twelve key economic areas that the Malaysian government is promoting. In 2011, plantation industry contributed about 7% to Malaysia GDP and contribution in terms of amount is RM114 billion and it is estimated to increase to RM240 billion by 2020 (Abdul-Hamid et al., 2015). Accordingly, analyzing and evaluating the efficiency of intellectual capital among Malaysian plantation firms is important in order to sustain its competitive advantage.

The aforementioned discourse motivates the choice of the three industries. In addition, this study provides empirical evidences on the extent of intellectual capital utilization in creating value and as a driving force of firm growth in the two industry sectors in Malaysia.

### *3.1. Hypotheses Development*

The research hypotheses of the study are formulated based on theoretical literature and findings from prior empirical studies (Kamath, 2008; Nik Maheran et al., 2009; Ting et al., 2009; Joshi et al., 2013; Ku Ismail and Abdul Karim, 2011; Al-Musali et al., 2014; Nawaz et al., 2017). The mixed and inconclusive empirical findings in prior studies have called for more research on intellectual capital and financial performance particularly across industries. It is expected that intellectual capital of firms across industries may have different implications on firms' value creation capabilities and financial performance. Figure 2 illustrates the research framework of the study.

**Figure 2:** The research framework of the study



Intellectual capital using
Value-Added Intellectual Coefficient Model
Based on the mainstream literature on intellectual capital and financial performance, the hypotheses of the study are formulated as follows:

***H1*** Intellectual capital is positively associated with financial performance.
- *H1a* Human capital efficiency is positively associated with financial performance.
- *H1b* Structural capital efficiency is positively associated with financial performance.
- *H1c* Capital employed efficiency is positively associated with financial performance

***H2*** VAIC is positively associated with financial performance.

### *3.2. Variable Measurements*

In the literature of intellectual capital, scholars often relate them to corporate performance. Corporate performance is classified into productivity, market value and financial performance (Latif, Malik and Aslam, 2012). Various indicators for example asset turnover ratio (indicators for productivity), market to book value ratio (indicators for market value) and numerous indicators of financial performance (profitability) such as, return on investment (ROI), earnings per share (EPS), return on asset (ROA) and return on equity (ROE) had been used in previous study. However, ROA has been commonly used as a key performance indicator of financial performance, therefore, it has been robustly tested as a measure of financial performance in earlier researches (Joshi et al., 2013; Khan et al., 2015; Nimtrakoon, 2015; Ulum et al., 2016; Nawaz et al., 2017; Ozkan et al., 2017). Thus, to be consistent with prior studies (Ting et al., 2009; Nik Maheran et al., 2009; Joshi et al., 2013; Al-Musali et al., 2014; Ulum, Ghozali and Purwanto, 2014; Ulum et al., 2016), this study adopted ROA as financial performance indicator. ROA is calculated as operating profit divided by total assets (Ulum et al., 2014).

This study adopts value added intellectual coefficient (VAIC) model developed by Pulic (1998) to measure intellectual capital and its components. Several steps are taken in order to establish the VAIC. ***Step 1*** is to establish the Value Added (VA). VA is derived from the equation: $VA = OP + EC + D + A$, where OP is operating profit, EC is employee costs, D is depreciation, and A is amortisation. ***Step 2*** is to establish efficiency scores namely HCE, SCE and CEE. To compute human capital efficiency (HCE) the equation is: HCE = VA/HC, human capital (HC) represents the investment made by the firm on its employees. It includes salary, wages and all incentives paid to employees. This ratio gives the contribution made by every unit of money invested in human capital to the value added in the firm. In other words, HCE is an indicator of value added by the human resources employed by the business (Joshi et al., 2013). To compute structural capital efficiency (SCE) the equation is: SCE = VA – HC/VA, SCE indicates the proportion of total VA accounted by structural capital. SCE shows how much of the firm's value creation is generated by the structural capital (Joshi et al., 2013). To compute capital employed efficiency (CEE) the equation is: CEE = VA/CE, capital employed (CE) represents the total assets of the firm (Ulum et al., 2014). CEE is a measure of physical capital. This ratio gives the contribution made by every unit of physical capital to the value added in the firm.VAIC is the sum between intellectual capital efficiency and physical capital and mathematically expressed as VAIC = ICE + CEE. VAIC is an indicator of a firm's intellectual capital efficiency. In addition, VAIC is used as a performance measurement tool where the greater the value of VAIC indicating the higher level of intellectual capital efficiency of the firm (Joshi et al., 2013).

## 4. EMPIRICAL RESULT

### *4.1. Descriptive Analysis*

Information on the descriptive analysis, including the mean, minimum, maximum, standard deviation, skewness and kurtosis of all the variables is provided in the following table.

**Table 2:** Descriptive Analysis by Industry

| Industry | Variables | Mean | Min | Max | Std. Dev. | Skewness | Kurtosis |
|---|---|---|---|---|---|---|---|
| **Construction** | HCE | 5.9257 | -12.0972 | 163.7715 | 15.5339 | 8.3104 | 78.8270 |
| | SCE | 0.7183 | -0.8137 | 9.9797 | 0.7629 | 9.0289 | 108.5940 |
| | CEE | 0.1323 | -0.1264 | 4.2774 | 0.3129 | 11.6348 | 152.3347 |
| | VAIC | 6.7764 | -11.0654 | 169.0428 | 15.8599 | 8.3104 | 79.0608 |
| | ROA | 7.7071 | -21.9002 | 425.0063 | 29.9237 | 13.3171 | 186.3151 |
| | | | **Number of observation** | **205** | | | |
| **Finance** | HCE | 3.3417 | -10.8163 | 24.0885 | 3.0324 | 1.8932 | 21.0934 |
| | SCE | 0.6394 | -0.0951 | 1.4216 | 0.2077 | -0.7706 | 6.0510 |
| | CEE | 0.0556 | -0.1012 | 0.2564 | 0.0489 | 1.2679 | 6.2071 |
| | VAIC | 4.0368 | -9.7791 | 25.1513 | 3.1222 | 1.9795 | 19.6326 |
| | ROA | 3.2973 | -11.6848 | 16.4058 | 3.6326 | 0.6743 | 5.8416 |
| | | | **Number of observation** | **150** | | | |
| **Plantation** | HCE | 64.7006 | 9.6856 | 665.6062 | 87.0528 | 4.1188 | 23.3053 |
| | SCE | 1.0716 | 0.9770 | 1.2941 | 0.0596 | 1.0159 | 4.2412 |
| | CEE | 0.9701 | 0.8968 | 0.9985 | 0.0183 | -0.6729 | 3.4648 |
| | VAIC | 66.7423 | 11.8765 | 667.6123 | 87.0448 | 4.1194 | 23.3099 |
| | ROA | 5.7524 | -7.2112 | 24.5747 | 5.4739 | 0.7789 | 3.6781 |
| | | | **Number of observation** | **185** | | | |

The mean for HCE, SCE, CEE and VAIC are extracted from the above table and presented as follows:

**Table 3:** Mean of Intellectual Capital Performance using VAIC Model

| Industry | HCE | % | SCE | % | CEE | % | VAIC | % |
|---|---|---|---|---|---|---|---|---|
| Construction | 5.9257 | 87.45 | 0.7183 | 10.60 | 0.1323 | 1.95 | 6.7763 | 100 |
| Finance | 3.3417 | 82.78 | 0.6394 | 15.84 | 0.0556 | 1.38 | 4.0367 | 100 |
| Plantation | 64.7006 | 96.94 | 1.0716 | 1.61 | 0.9701 | 1.45 | 66.7423 | 100 |

***Note:*** VAIC is the sum of HCE, SCE and CEE.

The percentage (%) next to the components of intellectual capital indicated the contribution of the components towards VAIC in the respective industry. Basically, HCE has the highest contribution towards VAIC in all the three industries. The contribution of SCE and CEE towards VAIC recorded similarity across industries. In construction after HCE, SCE of 0.7183 stood at second place and followed by CEE at 0.1323. Similar findings is recorded in finance, after HCE, SCE of 0.6394 stood at second place and followed by CEE of 0.0556. The ranking of the components of intellectual capital in plantation exhibited similar pattern that is HCE, SCE and CEE. However, in terms of value creation capability indicated by the efficiency level HCE, SCE and CEE, plantation outperformed finance and construction. For example, for every RM1 invested in human capital, plantation created RM64.7006 whereas in construction and finance value creation is at RM5.9257 and RM3.3417 which are much lower. For SCE, for every RM1 invested in structural capital, plantation created RM1.0716 whereas in construction and finance value creation is at RM0.7183 and RM0.6394 which are quite competitive. As for CEE, for every RM1 invested in physical capital, plantation created RM0.9701 whereas in construction value creation stood at RM0.1323 and finance at RM0.0556 which is considerably low.

The mean values of ROA for the three industries which stood at construction 7.7071, finance 3.2973 and plantation 5.7524 are sound, suggesting that the sample firms were able to generate profit in the period of analysis. However, the mean values of ROA in construction is notably higher in comparison to finance and plantation indicating higher ability to generate profit from its operation.

Meanwhile, the value of standard deviation for SCE and CEE across the three industries recorded small deviation from their mean values (lesser than 1). It shows a high consistency of the treatment in structural capital and physical capital across firms in the three industries. However, HCE exhibited different pattern, the value of standard deviation ranged from 3.0324 to 87.0528. Plantation recorded standard deviation 87.0528, mean 64.7006, minimum values 9.6856 and maximum values 665.6062. It shows a huge variances in the treatment of human capital among firms in plantation industry. Similar pattern is exhibited by construction firms (standard deviation 15.5339, mean value 5.9257, minimum values -12.0972 and maximum values 163.7715). On the contrary, in finance HCE values for mean and standard deviation recorded small deviation indicating high consistency across firms in the treatment of its human capital.

A further characterization of the data statistics includes the skewness and kurtosis, whereby skewness is used to measure symmetry of a data distribution with zero skewness indication a normal distribution. Field (2009) stated that, the farther away the skewness value is from zero, the more non-normal the distribution is. Skewness of a negative value indicates data that are skewed left, meaning that the left tail of the distribution is longer than that the right tail. Likewise, skewness of a positive values indicates data that are skewed right with the tail extending to the right. The rules of thumb for skewness distribution by Bulmer (1979) stated that, if skewness is less than -1 or greater than +1, the distribution is highly skewed. Skewness between -1 and -0.5 or between + 0.5 and +1 indicates the distribution is moderately skewed. While, skewness between -0.5 and +0.5, the distribution is approximately symmetric. Based on Bulmer's rules of thumb, it can be seen from the descriptive analysis table that most variables are highly skewed for all the three industries. The skewness values ranged from 1 (for most variables) to 13 (particularly ROA in construction). Despite the skewness values, these variables are not transformed into a natural logarithm function (a method chosen to mitigate normality problem) due to the data being in percentage.

Kurtosis is defined as a parameter that describes the shape of a random variable's probability of whether the data are peaked or flat relative to a standard bell curve for a normal distribution. A positive kurtosis with a higher value indicates a higher and sharper peak while a lower value indicates a lower and less district peak, thus a flat distribution is indicated by a negative kurtosis. A normal distribution has a kurtosis of three and is referred as mesokurtic (DeCarlo,1997; Akinlawon, Asiribo, and Adebanji, 2008). If kurtosis values is greater than 3, it is leptokurtic and its characteristics comprised the central peak is higher, sharper and its tails are thicker, longer. For kurtosis values that is lesser than 3, it is known as a platykurtic distribution, which is indicated by a wider peak and its tails are shorter, thinner. The kurtosis values as presented in the descriptive analysis table indicated that almost all variables have kurtosis problem (kurtosis values more than three) which indicated a leptokurtic distribution characterized by higher and sharper central peak with tails longer and fatter due to the kurtosis problem (Akinlawon et al., 2008). However, the kurtosis problem in the data may not create an obstacle to produce quality and reliable statistics as this is expected in a research with financial time series. Akinlawon et al. (2008) argued that research with financial time series often exhibited leptokurtosis value greater than 3. A leptokurtic situation may happen in both, the unconditional distribution and conditional distribution of daily asset returns (Akinlawon et al., 2008). In addition, when the sample size is large that is the number of observation is greater than 30, a variable with statistically significant skewness and kurtosis can be considered as a variable with normal distribution (Tabachnik and Fidell, 2007; Hair, Black and Babin, 2010). Since the sample size is large (construction=205; finance n=150; plantation n=185), normal distribution of data can be considered in this study.

### *4.2. Correlation Analysis*

Correlation analysis was carried out on all the variables of the study to determine the direction and magnitude of the relationships in order to gain more insight before testing the hypotheses.

**Table 4:** Pearson Correlation Matrix

| **Industry** | **Variables** | **HCE** | **SCE** | **CEE** | **VAIC** | **ROA** |
|---|---|---|---|---|---|---|
| Construction | HCE | 1.0000 | | | | |
| | SCE | 0.5067 | 1.0000 | | | |
| | CEE | 0.8444*** | 0.0004 | 1.0000 | | |
| | VAIC | 0.9988*** | 0.1037* | 0.8468*** | 1.0000 | |
| | ROA | 0.7432*** | 0.0232 | 0.9509*** | 0.7478*** | 1.0000 |

| Industry | Variables | HCE | SCE | CEE | VAIC | ROA |
|---|---|---|---|---|---|---|
| Finance | HCE | 1.0000 | | | | |
| | SCE | 0.3276*** | 1.0000 | | | |
| | CEE | 0.3160*** | 0.0396 | 1.0000 | | |
| | VAIC | 0.9980*** | 0.3835*** | 0.3252*** | 1.0000 | |
| | ROA | 0.5279*** | 0.2684*** | 0.9259*** | 0.5451*** | 1.0000 |
| Plantation | HCE | 1.0000 | | | | |
| | SCE | 0.5909*** | 1.0000 | | | |
| | CEE | -0.3160*** | -0.5155*** | 1.0000 | | |
| | VAIC | 1.0000*** | 0.5908*** | -0.3154*** | 1.0000 | |
| | ROA | -0.2620*** | -0.4603*** | 0.8965*** | -0.2615*** | 1.0000 |

***Notes:*** ***,**,* correlation is significant at 0.01, 0.05 and 0.1 levels respectively.

In construction, VAIC is significantly and positively related to ROA (r=0.7478, p<0.0001), indicating strong relationship between value efficiency and financial performance. Likewise, HCE and CEE exhibited significant positive correlations with ROA. HCE (r=0.7432, p<0.0001) and CEE (r=0.9509, p<0.0001) have the strongest correlations with ROA Meanwhile, SCE is insignificantly correlated to ROA. It is noted that VAIC has significant positive relationships with its three components, particularly, human capital (r=0.9988, p<0.0001) and physical capital (r=0.8468, p<0.0001) but weakly correlated to structural capital (r=0.1037, p<0.1).

In finance, VAIC has significant positive correlation with ROA suggesting greater intellectual capital efficiency will lead to higher financial performance (r=0.5451, p<0.0001). Likewise, all the three components of VAIC namely, HCE, SCE and CEE, demonstrated significant positive correlations with ROA. Two components of intellectual capital which is CEE (r=0.9259, p<0.0001) and HCE (r=0.5279, p<0.0001), have the strongest correlation with ROA. On the contrary, SCE has a weak correlation with ROA (r=0.2684, p<0.0001). It is noted that VAIC has significant positive relationships with its three components. VAIC has the strongest association with human capital (r=0.9980, p<0.0001) and moderately correlated with physical capital (r=0.3252,p<0.0001) and structural capital (r=0.3835, p<0.1).

In plantation, VAIC has significant but negative correlation with ROA. The result suggested inverse relationship between intellectual capital and financial performance. CEE is the only component of VAIC which has significant and positive correlations with ROA (r=0.8965, p<0.0001), implying that firms with greater CEE have higher financial performance. HCE and SCE, both have negative relationship with ROA. VAIC has the strongest association with human capital (r=1.000, p<0.0001), followed by its relationship with structural capital (r=0.5908,p<0.0001) but negatively correlated to physical capital.

### *4.3. Hypotheses Testing*

There are two hypotheses of the study. The first hypothesis is to assess the effect of HCE, SCE and CEE on financial performance. The second hypothesis is to examine the impact of VAIC on financial performance. To test these hypotheses, two regression models were formulated as follows:

Regression Model 1 $$ROA_{it} = \alpha_{it} + \beta_0 \, HCE_{it} + \beta_1 \, SCE_{it} + \beta_2 \, CEE_{it} + \varepsilon_{it} \quad (1)$$

Regression Model 2 $$ROA_{it} = \alpha_{it} + \beta_0 \, VAIC_{it} + \varepsilon_{it} \quad (2)$$

The results of the regression analyses are presented below together with its interpretation.

**Table 5:** Result of regression model 1: $ROA_{it} = \alpha_{it} + \beta_0 \, HCE_{it} + \beta_1 \, SCE_{it} + \beta_2 \, CEE_{it} + \varepsilon_{it}$

| Industry | **Construction** | **Finance** | **Plantation** |
|---|---|---|---|
| Dependent Variable: | ROA | ROA | ROA |
| Independent Variables | | | |
| Intercept | -0.4231*** | -2.377*** | -48.499*** |
| | (-5.85) | (10.81) | (-1.98) |
| HCE | -0.4772*** | **0.1631*** ** | 0.002 |
| | (-6.73) | **(9.37)** | (0.34) |
| SCE | -0.4922 | **1.4101*** ** | -26.045 |
| | (0.493) | **(3.87)** | (-1.07) |
| CEE | **114.043*** ** | **75.9229*** ** | **74.0803*** ** |
| | **(33.17)** | **(35.48)** | **(17.80)** |
| $R^2$ | 0.9503 | 0.9739 | 0.6983 |
| F-value | 1026.85 | 1455.97 | 111.86 |
| Sig F-value | 0.0001*** | 0.0001*** | 0.0001*** |
| N | 205 | 150 | 185 |

***Notes:*** ***,**,* indicate statistical significance at the 1, 5 and 10 percent level respectively. The figures in the parentheses are the t-statistics. N is the number of observations.

The result above reveals that there are significant differences among the three industries in relation to the value creation capability of the components of intellectual capital. The findings revealed that firms in finance employ human capital and structural capital to create value. On the contrary, the results indicated a negative relationship between human capital, structural capital and financial performance in construction and plantation industries. Hypotheses 1a and 1b are strongly supported in finance but not in construction and plantation. In relation to physical capital (CEE is a proxy for physical capital), it is positive and significantly associated with financial performance in all the three industries. Of the three industries, construction firms recorded the highest coefficient value for physical capital followed by firms in finance and plantation, suggesting that construction firms generated more profit from investment in physical capital than finance and plantation. The coefficent recorded by construction firms is 114, implying that if investment in physical capital increases by RM1, financial performance increases by RM114. On the other hand, the coefficent of physical capital recorded by finance is 75.9229 and 74.0803 by plantation which are much lower than construction. The findings significantly supported hypothesis 1c across the three industries confirming that physical capital remain the most influential value drivers in generating firms' profitability regardless of the industry types.

**Table 6:** Result of regression model 2: $ROA_{it} = \alpha_{it} + \beta_0 VAIC_{it} + \varepsilon_{it}$

| Industry | **Construction** | **Finance** | **Plantation** |
|---|---|---|---|
| Dependent Variable: | ROA | ROA | ROA |
| Independent Variables | | | |
| Intercept | -2.5765* | 0.7434 | 6.6523*** |
| | (-1.79) | (1.34) | (8.71) |
| VAIC | **1.5176*** ** | **0.6327*** ** | -0.0135** |
| | **(16.24)** | **(14.83)** | (-2.21) |
| $R^2$ | 0.6181 | 0.6423 | 0.0040 |
| F-value | 263.78 | 219.93 | 4.87 |
| Sig F-value | 0.0001*** | 0.0001*** | 0.02474** |
| N | 205 | 150 | 185 |

***Notes:*** ***,**,* indicate statistical significance at the 1, 5 and 10 percent level respectively. The figures in the parentheses are the t-statistics. N is the number of observations.

The findings indicated that intellectual capital has a positive and significant association with financial performance of firms in construction and finance, demonstrating that an increase in intellectual capital efficiency affects firms' profitability. However, significant but negative association between intellectual capital and financial performance is found in plantation. The coefficents of VAIC recorded by construction is 1.5176 and 0.6327 recorded by finance which is relatively lower. The lower level of intellectual capital performance of firms in finance as compared to firms in construction may exhibit signs of redundant and non-performing resources. This may suggests the need for a restructuring in order to increase value creation efficiency (Al-Musali et al., 2014). Hypothesis 2 is strongly supported in construction and finance but not in plantation.

## 5. CONCLUSION AND RECOMMENDATION

Intellectual capital is increasingly receiving attention as a value creator in firms as well as to generate competitive advantage in business. The current study provides empirical evidences by exploring the level of performance of intellectual capital, and examining the association between intellectual capital and financial performance in two industry sectors in Malaysia namely service industry (finance) and non-service industry (construction and plantation).

To conclude, the study findings suggested several interesting findings. As expected, service industry which is represented by finance in the study, documented significant and positive relationships between intellectual capital, its components and financial performance. It can be deduced that increasing investment in intellectual capital and its components will lead to higher profit. This could be due to the service industry such as finance rely heavily on the quality of its human capital, structural capital and intellectual capital as a whole because they operate in a dynamic environment which forces them to be consistently on the innovative and creative mode to remain competitive (Hamidreza and Ruzita, 2013). In addition, the positive and significant association between human capital and financial performance suggests investment in employee training programs, financial and non-financial rewards, creating challenging and stimulating working environment which ultimately enhancing employee capability, attitude, and satisfaction.

Likewise, the positive and significant association between structural capital and financial performance may suggest investment in establishing and sustaining corporate culture, strengthening management control system, enhancing information technology and investing in patents, copyrights, and trademarks (Nimtrakoon, 2015). In relation to physical capital, the effect on financial performance is significantly large in comparison to human capital and structural capital suggesting that firms' profitability have been created more by physical capital. The result corroborates with prior studies of Ting et al. (2009) for Malaysian financial sectors; Mehralian et al. (2012) in Iran and Ku Ismail et al. (2011) for banks in Bahrain.

Meanwhile, the non-service industry which are represented by construction and plantation exhibited different pattern of relationships. The findings of the study show that intellectual capital efficiency is greater in construction than plantation. The possible reason for this is that construction is characterized as highly knowledge-intensive, thus reliance on intellectual capital become a source of competitive advantage. The study findings corroborates with prior study which show that positive and significant relationship between intellectual capital and financial performance of High-Tech manufacturing companies in Malaysia (Hamidreza et al., 2013).

The relationship between intellectual capital, its components and financial performance in construction is unique. Intellectual capital and physical capital correlate positive and significantly with financial performance, however human capital and structural capital have a negative relationships with financial performance. The findings may implies that the components of intellectual capital require interaction with each other in order to create value. Prior studies had indicated that one component may affect performance indirectly through its positive impact on other components of intellectual capital (Cabrita and Bontis, 2008; Veltri and Silvestri, 2011; Scafarto, Ricci and Scafarto, 2016). It can be deduced that in construction, one component of intellectual capital is not sufficient per se to deliver superior performance but interaction and support from other components will enable the firm to leverage on its overall intellectual capital (Scafarto et al., 2016).

In plantation, the result shows negative but significant relationship between intellectual capital and financial performance. Likewise, human capital records positive but insignificant relationship, meanwhile structural capital records negative and insignificant relationship with financial performance. On the contrary, physical capital is positive and significantly associated with financial performance, implying that physical capital is the most significant value driver of firms' profitability in plantation industry. The negative association between intellectual capital and its two components (human capital and structural capital) with financial performance may be attributed to the industry characteristics. Plantation firms operate in a stable environment with slower evolution of technology and relying on existing and refinement of existing technology to stay competitive (Hamidreza et al., 2013). Therefore, investment in structural capital is at minimum. Apart from this, plantation is considered labour-intensive industry as such hiring processes focused mainly on unskilled labour. For this reason, the findings suggested that firms in plantation do not capitalized on the knowledge, skill, creativity of theirs' human capital and are not capable of creating technological innovations to materialize the growth potentials (Hamidreza et al., 2013).

In essence, the study findings supported the resource-based theory, indicating that firms relying on resources either tangible or intangible, are likely to become profitable. In the light of its importance, the findings of the study may provide practical contributions for management as they provide the firms with an opportunity to analyse the contribution of intellectual capital to their firms and will aid in the design of strategies to enhance corporate performance. It will also help management to understand the contributions of the various components of intellectual capital to their business growth. Thus, this study establishes suggestions for firms' managers to make legitimate decisions concerning investments on the components of intellectual capital that can foster business growth and sustainable competitive advantage in the context of Malaysia construction, finance and plantation industries.

Last but not least, this study had focused only on three industries in Malaysia namely construction, finance and plantation. Perhaps, future studies should be extended into other Malaysia service industry or non-service industry, to extend the time frame of study beyond five years and to include control variable such as firm-size because some scholars argued that knowledge creation, diffusion and storage are inherently evolutionary in nature (Al-Musali et al., 2014; Nimtrakoon, 2015).

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