Nexus between Intellectual Capital and Profitability: Evidence from Listed SMEs in Malaysia

Hapsah S. Mohammad
Faculty of Accountancy,
Universiti Teknologi MARA, Sabah Branch, Malaysia

ABSTRACT

This paper examines the impact of intellectual capital and its components on profitability using the Modified Value Added Intellectual Coefficient (MVAIC) methodology. Data was collected from 26 listed SMEs in Malaysia from 2017-2019 providing 78 observations. This study employed the fixed-effect and random-effect models. The results showed that the MVAIC was significant and positively associated with profitability. Of the four components of the MVAIC, human capital efficiency and capital employed efficiency correlated positively and significantly with profitability. Structural capital efficiency was negatively associated with profitability. While, relational capital efficiency revealed an insignificant association with profitability. Overall, listed SMEs profitability was driven by both intellectual capital and physical capital, however the magnitude of contribution varied. The effect of capital employed efficiency presented a superior relative magnitude in comparison to human capital, structural capital and relational capital suggesting that physical capital was the main drive behind profitability. This study presented a robust theoretical foundation and employed a validated methodology. Therefore, it extends knowledge of intellectual capital among academicians and stakeholders as well as highlights its contribution to value creation.

Keywords: intellectual capital, profitability, SMEs, MVAIC models.

INTRODUCTION

The Malaysian Economy over the last few decades, has experienced a significant change from an agricultural economy to an industry-based economy and is currently in the era of a knowledge-based economy. The rise of the knowledge-based economy has led to an increased interest in intellectual capital as a source of competitive advantage (Al-Musali & Ku Ismail, 2016). The resource-based theory established in the mid-1980s is one of the most influential theories describing the value of intellectual capital. The basic concept underlying the theory is that firms' are concerned with their competitive advantage which represents a firms' strength that is superior to their competitors within the same industry. Basically, this theory investigates maximising a firms' resources in creating wealth (Verbeke & Tung, 2013). For instance, low-technology firms continue to imitate their rivals, and close the gap and keep up with new developments. Yet technological accomplishment is not the only way to achieve the optimal output rate. Firms' success or failure depends on using available resources with the latest technologies or conventional manufacturing methods. In addition, this principle emphasises people who can handle the activities rather than the shareholders' physical capital investment (Barney & Clark, 2007). The principle of the resource-based theory began by analysing the influence of various resources on firm performance (Penrose, 1960). The theory then evolved to conclude that there are valuable, rare, inimitable and non-substitutable resources that relate to the competitive advantage of a firm (Barney, 1991; Barney & Arikan, 2001). In addition, the resource-based theory has been expanded to accommodate the view of dynamic capabilities (Helfat & Peteraf, 2003), the view of competencies (Javidan, 1998) and the view of knowledge (Grant, 1996; Felin & Hesterly, 2007).

Since the 1990s, small and medium-sized enterprises (SMEs) have been central to the economic transformation of Malaysia. Undeniably, SMEs are the driving force of employment and economic growth (Muda & Rahman, 2018; Shaari, Isa, & Khalique, 2018). Despite the importance of SMEs to the Malaysian economy, SMEs face numerous challenges, however, the effect of these challenges may be reduced by employing intellectual capital. Efficient and effective management of intellectual capital is crucial in achieving and sustaining superior performance (Nawaz & Haniffa, 2017). In addition, intellectual capital has been acknowledged as the most important

source of competitive advantage that leads to product innovation and high-quality services which result, in improved performance (Subramaniam & Youndt, 2005; Nawaz & Haniffa, 2017). Intellectual capital is the hidden asset comprising human capital, structural capital and relational capital (Ting, Ren, Chen, & Kweh, 2020). Human capital is the expertise, skills, knowledge of employees and managers (Chen, Liu, Chu, & Hsiao, 2014; Millán, Congregado, Román, Praag, & Stel, 2014). The blend of the firm employees' expertise, skill and knowledge can be used collectively for the production of quality and distinct products (Vidotto, Ferenhof, Selig, & Bastos, 2017). While, structural capital represents processes and procedures created and stored in the firms' network as well as improving the speed of information flow within a firm (Carson, Ranzijn, Winefield, & Marsden, 2004; Youndt, Subramaniam, & Snell, 2004). In addition, structural capital is a knowledge resource held by the firm which includes specific expertise, process management, corporate culture, product innovation and information technology (Kamukama, Ahiauzu, & Ntayi, 2011). Structural capital is linked to a firm as a whole and remains in the business, even though a worker resigns. In the meantime, relational capital represents the relationship with stakeholders such as the customers, suppliers, government. Relational capital is a crucial element of intellectual capital particularly to SMEs (Welbourne & Pardo-del-Val, 2009). It facilitates SMEs to cope with the competition in the market and ultimately enhance performance. Most firms in developing-countries depend on relational capital, as they have limited funds and a lesser capacity to expand their businesses. Accordingly, these firms depend on intellectual capital for their market survival, despite having investments in tangible assets (Jardon & Martos, 2012).

There has been a collection of studies that have examined the impact of intellectual capital and firm performance of SMEs both locally and abroad. Studies done abroad on the relationship between intellectual capital and firm performance, the source of data collection covers both primary data (Khalique, Hina, Ramayah, & Shaari, 2020) as well as secondary data (Ramirez, Dieguez-Soto, & Manzaneque, 2020; Xu & Li, 2019), therefore providing a more holistic and comprehensive empirical findings. However, studies involving the influence of intellectual capital on firm performance of SMEs in Malaysia is based only on perceptual measures such as questionnaires, observations, interviews, therefore the empirical findings are subjective in nature (Khalique et al., 2020). In addition, the theoretical

implication of this study lies in its position as the only study to examine intellectual capital performance of listed SMEs in Malaysia by employing the MVAIC model. Therefore, this study offers new insights into the study of intellectual capital, its components and their relations with profitability of Listed SMEs in Malaysia. Overall, the empirical findings showed significant relations between intellectual capital, physical capital and profitability, thus supports the resource-based theory of the study.

Within this context, this study leads to a two-way body of knowledge on intellectual capital. First, the research expands prior intellectual capital literature by analysing the association between intellectual capital and firm performance of listed SMEs in Malaysia. Evaluating and recognizing how intellectual capital is related to SMEs' success is not adequately provided. Further, limited research has focussed on the effect of each intellectual capital components on the performance of SMEs. Consequently, the results of the study are anticipated to widen our awareness of intellectual capital and its influence on SMEs' performance in an emerging economy such as Malaysia. Second, the empirical findings will provide owners and managers of SMEs with some insights and understanding on how to handle intellectual capital effectively and efficiently.

The paper is separated into five sections. Section 2 presents an overview of SMEs in Malaysia, a review of the literature and the hypotheses. Section 3 discusses the data, variables and research methodology used. Section 4 presents the findings of the empirical analysis and discussion of the results and section 5 concludes with limitations of the study and some recommendations for future research.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Definition of SMEs

The acronym SMEs has a vast diversity of meanings, varying from nation to nation and reporting statistics for SMEs between sources. The principles covered are the number of employees, gross net assets, income and amount of investment. Employee numbers and sales turnover are the

most commonly used principle criteria (NSDC, 2013). The definition encompasses all sectors, including manufacturing, services, construction, agriculture, quarry and mining management. In the manufacturing sector, the annual turnover threshold has doubled from RM25 million to RM50 million or full-time workers not exceeding 200. In contrast, the sales turnover threshold in the services sector has quadrupled from RM5 million to RM20 million, or full-time employees of no more than 75.

However, development organisations such as the World Bank, the United States Agency for International Development (USAID), and the United Nations Organization for Industrial Development (UNIDO) offer different meanings. Depending on the number of employees and total assets, the World Bank describes SMEs; as a manufacturer or service provider with an estimated 300 workers and total assets of USD$15 million. According to USAID, companies with less than 50 workers are small, whereas for UNIDO firms with 10 to 49 workers and registered private equity of over USD$42,300 could be classified into the small business class. In contrast, medium-sized businesses hire between 50 and 249 workers and have a registered private equity of over USD$42,300. Nevertheless, a standard definition of SMEs is challenging to determine. However, as this analysis would highlight SMEs in Malaysia, the definition of the Malaysian SME Firm 2013 will be used, which is summarised as follows:

Table 1: Definition of Small and Medium-Sized Enterprises (SMEs)

Category	Sales Turnover	Employees
Manufacturing	RM15 Million to ≤ RM50 Million	75 to ≤ 200 employees
Services and Others	RM3 Million to ≤ RM20 Million	30 to ≤ 75 employees

Source: SME Corp. Malaysia, 2019.

An organisation would be considered to be an SME if it satisfies one of the two specified qualification requirements, notably sales turnover or the number of fulltime workers, whichever is less.

Importance of SMEs to Malaysia's Economy

The SME sector is the backbone of the country's economy, with enormous potential to become a driver and a significant source of growth within the new economy. In reality, SMEs make up 99% of Malaysia's total business establishments, and, according to the SME Annual Report 2018/19

issued by SME Corp Malaysia; SMEs contributed 50-60% of the added value. Expansion in all sectors of the economy helped the higher growth. As regards economic contribution, SMEs contributed 38.3% to total GDP, 17.3% to total exports and 66.2% to employment growth during the year (SME Corp. Malaysia, 2019).

The Malaysian SMEs continued to demonstrate their resilience by reporting a growth of 6.2% in 2018 (2017: 7.1%), marginally above the 6.0% long-term average growth (2001-2017), amid a challenging global and domestic economic climate. This result surpassed the overall GDP and non-SME GDP of 4.7% and 3.8% respectively in 2018 (SME Corp. Malaysia, 2019). SME GDP's higher growth suggested that SMEs were not negatively affected and were able to withstand external shocks, such as on-going trade tensions between the U.S. and China, and sluggish global development. This is partly due to the fact that most SMEs are operated domestically and have proved to be more robust than the big corporations. SMEs are the driving force for employment and export in Malaysia.

Employment
SMEs play a significant role in job creation whereby Malaysia's SMEs employed 66.2% of the total employment in 2018, slightly higher than in the previous year at 66.0 % (Department of Statistics Malaysia, 2019).
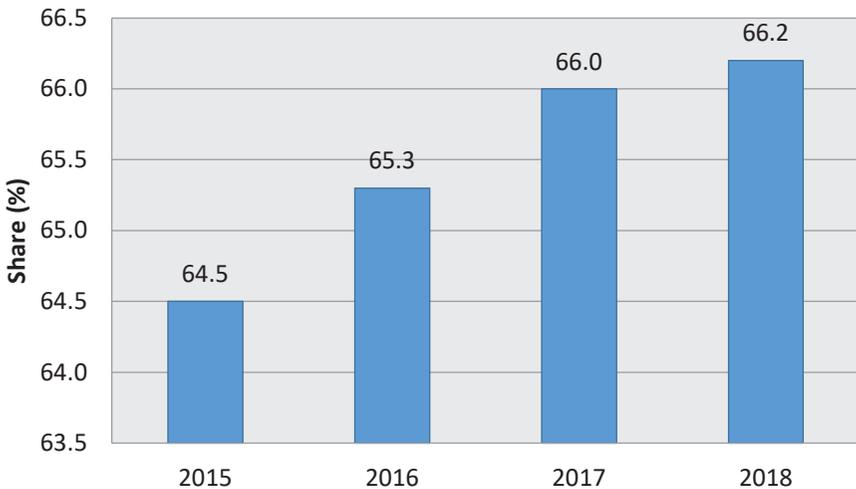

Figure 1: Contribution of SMEs to Total Employment
Source: Department of Statistics, Malaysia, 2019.

The growing trend of SMEs' share of employment over time was partly due to the provision of a favourable ecosystem and policies supporting self-employment, business growth, particularly micro-enterprises and entrepreneurs. It is also due in part to the fact that, due to economic conditions, the large firms may be taking fewer new workers or even laying off workers. From a sectoral viewpoint, the majority of SME employment were produced by the services sector (62.3%), followed by manufacturing (16.4%), agriculture (10.7%), construction (10.3%), and mining and quarrying (0.3%).
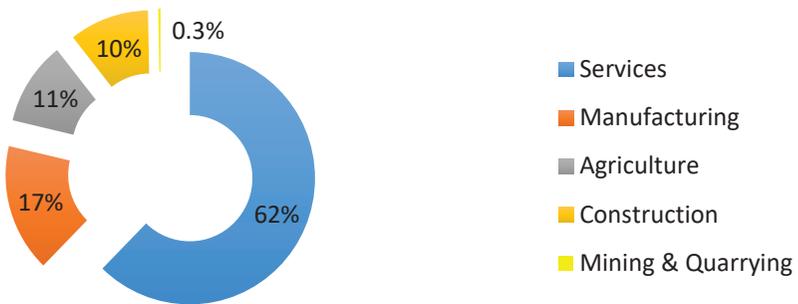

Figure 2: Components of SME Employment by Economic Sector (%)
Source: Department of Statistics, Malaysia, 2019.

As an open economy to trade and investment flows, Malaysia was affected by both reduced global GDP and trade growth in 2018. The economy faced many external challenges, including rising global trade tensions, on-going policy uncertainty following the results of Brexit negotiations and volatile commodity prices.

Export

Despite the challenges, the weakness in external demand due to a relatively low export market exposure had affected SMEs lesser than large firms. SMEs demonstrated high resilience in 2018 by reporting a growth of 3.4% in 2018 (2017: 7.2%), while non-SME growth slowed dramatically in 2018 (2017: 17.0%) (SME Corp. Malaysia, 2019). In terms of value, SME exports in 2018 grew from RM166.2 billion in 2017 to RM171.9 billion, while the share of total exports stayed at 17.3% (2017: 17.3%). Export growth momentum was powered by manufacturing SMEs that contributed

48.3% of total SME exports in 2018, backed by manufactured goods, chemicals, and beverages and tobaccos. Singapore, which accounted for 18.6 %, followed by PR China (8.9 %) and the United States (7.8 %), was the major destinations for SME exports in the manufacturing sector.

The services sector, which accounted for 50.3% of total SME exports, grew at a more modest rate of 2.0% in 2018 (2017: 7.1%). The slower growth was attributed to fewer tourist arrivals throughout the year, resulting in lower travel and other business services exports. Nonetheless, SME exports earned some support from higher growth in transport exports, such as freight and postal and courier services. In contrast, SME export growth in agriculture continued to decline by 2.0% (2017: -6.3%) due to lower exports of vegetables, bananas, pineapples, and other tropical fruits such as watermelon, guava, and others. The main agricultural export destinations for SMEs were Singapore, Thailand, and Japan.

Intellectual Capital and Firm Performance

A study by Ramirez et al. (2020), investigated the influence of intellectual capital efficiency on SMEs' performance in Spain. They analysed the effects of intellectual capital and its components, human capital and structural capital, on SMEs firms' performance. The research used a panel data set of 6,132 Spanish manufacturing SMEs from 2000-2013 from ESEE database. The results of the study showed that both, intellectual capital and its components had a significantly positive effect on Spanish SMEs' success. In another study, Khalique et al. (2020), investigated the impact of intellectual capital on organisational performance of SMEs operating in the tourism sector of Pakistan using the integrated intellectual capital model (IICM). This model was based on six components of intellectual capital namely human capital, customer capital, structural capital, social capital, technological capital and spiritual capital. A survey method and primary data were collected through a standardised questionnaire. The results of this study showed that customer capital and technological capital as the major contributors to enhance the organisational performance of SMEs in the tourism sector. In contrast, human capital, social capital, and spiritual capital appeared as insubstantial predictors. However, their analysis failed to note any significant correlation between structural capital and organisational performance.

Empirical research conducted by Xu and Li (2019) in China aimed at providing insights into the relationship between intellectual capital and internal performance (earnings, profitability and operating efficiency) of high-tech and non-high-tech SMEs. The research used data from the Shenzen stock exchanges of 116 high-tech SMEs and 380 non-high-tech SMEs during 2012–2016. The model of modified value-added intellectual coefficient (MVAIC) which combines four components: human capital, structural capital, relational capital and capital employed (physical capital) was employed in the study. Results revealed a significant positive relationship between intellectual capital and financial performance of high-tech and non-high-tech SMEs. Notably, intellectual capital is positively correlated with earnings, profitability and operating efficiency. Among the MVAIC components, the most crucial value factors for the success of two forms of SMEs were structural capital efficiency, capital employed efficiency, and human capital efficiency. In another similar study conducted by Sardo, Serrasqueiro and Alves (2018) on 934 Portuguese SMEs hotels during 2007 and 2015, indicated that structural capital, relational capital and human capital have a positive effect on the financial performance of Portuguese SME hotels. Structural capital and awareness of human capital tend to be crucial factors for the performance of SME hotels, which are the basis of quality service in the hotel sector.

In Malaysia, a research by Khalique, Bontis, Shaari, Yaacob, and Ngah (2018), using the integrated intellectual capital model (IICM) examined the impact of intellectual capital on firm performance of SMEs. The sample was gathered through an authenticated survey instrument conducted on the basis of all 150 SMEs operating in the electrical and electronics manufacturing sector in Penang and Selangor, Malaysia. This initiative resulted in a total sample size of 237 respondents. Cronbach's alpha and confirmatory factor analysis were applied to assess reliability and validity of the research instrument. Also, structural equation modelling was utilised to test the hypotheses. Results showed that intellectual capital components were linked to organisational performance, thus indicating that intellectual capital has a direct effect on the output of Malaysian-based SMEs. In another study Shaari, Isa, and Khalique (2018), examined the impact of intellectual capital on organisational performance of ICT SMEs in Penang. This research used the convenience sampling technique and five hundred fifty questionnaires were sent by surface mail to selected respondents. The empirical findings

indicated that intellectual capital had a positive and significant impact on organisational performance of ICT SMEs in Penang. Furthermore, the results also showed that customer capital had a strong positive impact on ICT SMEs' organisational performance. At the same time human capital, structural capital, social capital, technical capital, and spiritual capital were insignificant.

The analysis by Muda and Rahman (2018) revealed that only two components, namely human capital and relational capital, had major positive impacts on firm results. While structural capital and firm performance had no clear correlation. Their study used 98 SMEs in the services and manufacturing sectors. Their research explored the impact of human, structural, and relational capital on SMEs' performance in Malaysia. Meanwhile, Zin and Ashari (2020) discussed the impact of intellectual capital and Islamic work ethics on SME financial success from a review of documents and interview sessions. Using the qualitative method, the findings reinforce SME business owners in understanding the impacts of intellectual capital and Islamic work ethics on financial success and facilitating their decision making. Through the interview conducted, three entrepreneurs (the sources of data) gave insights on how intellectual capital and Islamic work ethics attempted to effect SME financial success. SMEs must understand the need to preserve a competitive edge and improve the potential to build productivity by deriving resources from their intellectual capital and Islamic work ethics. In another related study, Muda, Rahman, Hamzah, and Saleh (2020) investigated the influence of intellectual capital components on performance from lifecycle stages. This research used a questionnaire-based survey method. A sample of 153 usable responses were returned from CEOs and SME managers from different sectors, including the certified food and beverage and engineering sector. The result suggested that all intellectual capital components had a significant positive effect on firm performance. Findings also showed that human capital on firm performance was growing stronger. The effect of structural capital and relational capital on performance had not changed in different lifecycles. Table 1 provides a summary of studies on the impact of intellectual capital and firm performance of SMEs.

Table 2: A summary of Studies on the Impact of Intellectual Capital on Firm Performance of SMEs

No	Authors	Year	Country	Research Sample	Observation	Year of Observation	Research Focus	Source of Data Collection
1	Ramirez et al.	2020	Spain	SMEs manufacturing sector	6,132	2000-2013	Profitability	Secondary Data
2	Khalique et al.	2020	Pakistan	SMEs tourism sector	220	2018	Organisational performance	Primary Data
3	Xu and Li	2019	China	SMEs manufacturing sector	2,480	2012-2016	Earnings, Profitability and efficiency	Secondary Data
4	Sardo et al.	2018	Portugal	SME hotels	934	2007-2015	Profitability	Secondary Data
5	Khalique et al.	2018	Malaysia	SMEs electrical manufacturing sector	237	-	Organizational performance	Primary Data
6	Shaari et al.	2018	Malaysia	ICT SMEs	237	-	Organizational performance	Primary Data
7	Muda et al.	2018	Malaysia	SMEs services and manufacturing sector	98	-	Operational and financial performance	Primary Data
8	Zin et al.	2020	Malaysia	SMEs	3	-	Profitability	Primary Data
9	Muda et al.	2020	Malaysia	SMEs	153	-	Profitability, growth and productivity	Primary Data

Source: This study.

There are attempts to investigate the association between intellectual capital and firm performance of SMEs, however, in the context of Malaysia, this relationship has not been examined using secondary data. Therefore, this study aimed to extend previous studies by using the MVAIC model in exploring the association between intellectual capital and firm performance of listed SMEs in Malaysia.

Hypotheses Development

Both scholars and researchers have shown great interest in understanding intellectual capital as knowledge-based assets and their impact on firm performance. The relationship between intellectual capital and firm performance, measured through profitability, productivity, earnings, growth and market performance, has become the subject of in-depth research. For instance, in a study of the impact of intellectual capital on profitability of Islamic financial institutions across Asia, Europe, Middle-East, Nawaz and Haniffa (2017) observed a significant and positive contribution of intellectual capital towards firm performance. Further, unfolding the influence of intellectual capital on firm performance measured through profitability and market value across five ASEAN countries, Nimtrakoon (2015) noted that intellectual capital efficiency was significantly associated with profitability and market value. Overall, human capital and capital employed had a positive and significant impact on firm performance. The empirical findings endorsed the resource-based theory which emphasizes the importance of intellectual capital for firm performance. In another study conducted by Soewarno and Tjahjadi (2020) investigating the influence of intellectual capital and its components on profitability, productivity and market value, concluded a positive and significant relationship. Guided by the study of Nimtrakoon (2015); Nawaz and Haniffa (2017); Soewarno and Tjahjadi (2020), a hypothesis was formulated as follows:

H_1: Intellectual capital measured using the MVAIC model is positive and significantly associated with ROA.

The concept of intellectual capital has been discussed and elaborated at lenght in prior studies. For instance, Bontis (1998) described the construct of intellectual capital as human capital, structural capital and relational capital. This classification might be the most representative framework for

intellectual capital (Ni, Cheng, & Huang, 2020). Further, this study adopted the MVAIC model which is based on the assumption that both, intellectual capital and physical capital are a function of production (Nimtrakoon, 2015; Ulum, Rizqiyah, & Jati, 2016; Xu & Li, 2019). Therefore, human capital efficiency (HCE), structural capital efficiency (SCE), relational capital efficiency (RCE) represent intellectual capital and capital employed efficiency (CEE) is a proxy for physical capital.

Human capital represents a firm's employees and their knowledge, experience, commitment and motivation (Ni et al., 2020; Ginesti, Caldarelli, & Zampella, 2018; Singh & Rao, 2016). Scholars such as Ni et al. (2020) argue that human capital has the most profound effect on learning and is the key driver of corporate reputation. While, Soewarno, and Tjahjadi (2020) demonstrated that human capital efficiency had a positive relationship with various measures of financial performance. With regard to structural capital, Roos and Roos (1997) pointed out that structural capital includes procedures, systems and techniques to achieve process quality and operational efficiency which envelopes the knowledge management of the firm. In the meantime, Darroch (2005) argued a firm with knowledge management capability will lead to higher profitability. As for relational capital, Chen, Zhu, and Yuan (2004) defined relational capital as the marketing capability of the firm that leads to customer loyalty. It covers the relationship between the firm and its environment which includes social networks, trust, firm reputation, customer requirements, competitors and suppliers. Meanwhile, Cheng, Lin, Hsiao, and Lin (2010) argued that higher investment in relational capital drives wealth creation. With reference to capital employed, Nimtrakoon (2015) revealed that capital employed efficiency had a positive effect on profitability. Following this line of argument, the following hypotheses was proposed.

H$_2$: Components of Intellectual capital measured using the MVAIC model are positive and significantly associated with ROA.

H2a HCE has a positive and significant impact on ROA.
H2b SCE has a positive and significant impact on ROA.
H2c RCE has a positive and significant impact on ROA.
H2d CEE has a positive and significant impact on ROA.

DATA AND METHODOLOGY

Sample Description

The data was drawn from listed SMEs on the Leading Entrepreneur Accelerator Platform Market (LEAP Market) of Bursa Malaysia. The study covered a period of three years from 2017 to 2019. As of 31 December 2019, there were 34 SMEs listed in the LEAP market, however usable data for the analysis was drawn from 26 firms, thus, providing 78 observations. The analysis was based on three-year period because the LEAP market is a new market established by Bursa Malaysia for SMEs and it started operations in July 2017, therefore, providing a fruitful setting for intellectual capital assessment.

Measurement of Variables

This section describes the variables and measurements adopted in this study.

Dependent Variables: Consistent with the study of Xu and Li (2019) and Soewarno and Tjahjadi (2020), this study employed Return on Asset (ROA) as an indicator of profitability measured by net income divided by total assets.

Independent Variables: Inspired by the work of Nimtrakoon (2015) and Xu and Li (2019), the MVAIC Model and its four components namely HCE, SCE, RCE and CEE were used as independent variables in this study. The higher the MVAIC value, the higher the value creation capability of firms. The computation of the MVAIC model is elaborated below:

$$VA = OP + EC + D + A, \ HCE = VA / HC, \ SCE = VA - HC / VA, \ RCE = RC / VA,$$
$$CEE = VA / CE \text{ and } MVAIC = HCE + SCE + RCE + CEE$$

Where VA is value added of a firm; *OP* is operating profit, *EC* is employee costs, *D* is depreciation, *A* is amortisation. *HCE* the human capital efficiency, *HC* the human capital measured by salary, wages and all incentives paid to employees. *SCE* the structural capital efficiency,

SC the structural capital, measured by VA-HC. *RCE* the relational capital efficiency, *RC* the relational capital, measured by marketing cost. *CEE* the capital employed efficiency, *CE* the capital employed measured by total assets less intangible assets.

Control Variables: Similar to prior studies (Sardo et al., 2018; Saewarno and Tjahjadi, 2020), two control variables were included into the regression models. The two control variables were firm size measured as the natural logarithm of total assets and leverage measured by total debt to total assets. Table 3 below summarises the variables and measurements used in this study.

Table 3: Summary of Variables and Measurements

Construct	Variables	Measurements	Adopted from
Firm Performance	ROA	Net Income / Total Assets	Nimtrakoon (2015) Xu and Li (2019) Soewarno and Tjahjadi (2020)
Intellectual Capital	HCE	VA / HC	Nimtrakoon (2015) Xu and Li (2019)
	SCE	VA – HC / VA	
	RCE	RC / VA	
	CEE	VA / CE	
Control Variables	Firm Size	Natural Logarithm of Total Assets	Sardo et al. (2018) Soewarno and Tjahjadi (2020)
	Leverage	Total Debt / Total Assets	

EMPIRICAL FINDINGS

The research hypotheses of the study were tested through descriptive statistics, correlation analysis and multiple regression models.

Descriptive Statistics

The descriptive analysis of the study is presented in Table 4. The mean value of ROA was 0.0739, implying that SMEs were struggling in making a profit. The mean MVAIC of 3.0490 revealed that SMEs created RM3.0490 for every RM1 invested. Of the four components of MVAIC, HCE was the most influential component with the greatest mean value of

2.1910 in relation to CEE, SCE and RCE with the mean value of 0.2501, 0.5103 and 0.0975, respectively. CEE represents the value generated by one unit of physical capital, while the aggregate mean value of HCE, SCE and RCE represent intellectual capital efficiency. The sum mean value of HCE, SCE and RCE was 2.7988, which is higher than 0.2501 the mean value of CEE, indicating that firms created value more efficiently from intellectual capital. Last, the mean value of Firmsize and Leverage are 6.2041 and 0.3485 respectively. In sum, these findings are in line with the findings of Nimtakoon (2015), Xu and Li (2019), Soewarno and Tjahjadi (2020), Tran and Vo (2020).

Table 4: Descriptive Analysis

Variables	Mean	Std. Dev	Minimum	Maximum
HCE	2.1910	1.7999	-1.73557	7.5658
SCE	0.5103	0.6549	-1.1534	5.2854
RCE	0.0975	0.2387	0	1.1672
CEE	0.2501	0.2073	-0.2535	0.9755
MVAIC	3.0490	2.1333	-0.4128	8.7579
ROA	0.0739	0.1251	-0.4525	0.4809
LnSize	6.2041	2.8126	0	8.0029
Lev	0.3485	0.2074	0	0.7362

Notes: Number of observation is 78.

Correlation Analysis

Table 5 shows the result of the correlation analysis of the variables. Correlation analysis was used as a preliminary examination of how firms' profitability is affected by intellectual capital. As expected, the MVAIC had a significant and positive correlation with ROA. The findings is broadly in line with prior studies (Nimtakoon, 2015; Xu & Li, 2019; Tran & Vo, 2020). Concerning the four components of the MVAIC, HCE and CEE were positive and significantly associated with ROA. This observation is consistent with the argument of Al-Musali and Ku Ismail (2014) that human capital and physical capital are the driving factors affecting firms' profitability in developing economies. However, SCE demonstrated a negative and insignificant relationship with ROA and this findings is consistent with Nimtrakoon (2015), Nawaz and Haniffa (2017) and Smriti and Das (2018). While, RCE had no significant effect on ROA and this result supports the findings of prior studies (Andreeva & Garanina, 2016; Bayraktaroglu, Calisir, & Baskak 2019). In addition, it was noted that firm

size had a positive and significant correlation with ROA, implying that the bigger the firm the higher the profit. Similar associations were revealed by the MVAIC and its components, suggesting that firm size affect utilization of intellectual capital. Meanwhile, the relationship between leverage and ROA was positive and significant. The findings suggest that the leverage ratio is influenced by profitability, the more profitable the firm, the higher the leverage ratio, a pattern of financing in line with the trade-off theory.

The pair-wise correlation between MVAIC and HCE exceeded 0.8 (0.9476, p<0.0000), implying a multicollinearity problem (Gujarati, Porter, & Gunasekar, 2012). To address the multicollinearity issue, MVAIC and HCE were separated into Model 1 and Model 2. Further, variance inflation factor (VIF) was computed to test the presence of multicolinearity and the mean VIF for Model 1 and 2 were 2.24 and 1.91. The results suggested that multicollinearity problem between explanatory variables, using a cut-off factor of 10 and below, was weak or non-existent (Tran & Vo, 2018).

Table 5: Correlation Analysis

Variables	HCE	SCE	RCE	CEE	MVAIC	ROA	LnSize	Lev
HCE	1.0000							
SCE	0.2155*	1.0000						
RCE	-0.0633	-0.1132	1.0000					
CEE	0.4619***	0.0332	0.1106	1.0000				
MVAIC	0.9476***	0.4793**	0.0345	0.5094***	1.0000			
ROA	0.6358***	-0.1768	0.0210	0.7882***	0.5610***	1.0000		
LnSize	0.5454***	0.3201**	0.2144*	0.4932***	0.6303***	0.2365*	1.0000	
Lev	0.5488***	0.4681***	-0.0514	0.4559***	0.6452***	0.2344*	0.7323***	1.0000

Notes: Number of observation is 78. The sign ***, **, * denotes the correlation significant level at 0.01, 0.05 and 0.1 respectively.

Regression Results

To test the hypotheses of the study, the following regression models were formulated:

Model 1 $ROA_{it} = \beta_0 + \beta_1 MVAIC_{it} + \beta_2 LnSize_{it} + \beta_3 Lev_{it} + \varepsilon_{it}$

Model 2 $ROA_{it} = \beta_0 + \beta_1 HCE_{it} + \beta_2 SCE_{it} + \beta_3 RCE_{it} + \beta_4 CEE_{it} + \beta_5 LnSize_{it} + \beta_6 Lev_{it} + \varepsilon_{it}$

Where *i = 1 ..., n and t = 1 ..., n; i and t represent firm and year, respectively;* ε denotes the disturbance.

The study dids not apply the pooled OLS because unobserved effects will result in inefficient estimators. Therefore, both fixed-effect and random-effect models were employed to account for differences across the sample firms. Then, a Hausman test was performed to determine the model estimators. The result showed that Model 1 was estimated used the random-effect model while Model 2 used the fixed-effect model.

Table 6 presents the regression results for Models 1 and 2 in the study. The explanatory power of Model 1 was 0.3456 indicating that the model was able to explain 34.56% variations in ROA. Meanwhile, for Model 2 with an adjusted R2 of 0.8368 having control variables of firm size and leverage in the analysis, the components of the MVAIC were able to explain 83.68% variations in ROA. The increase in explanatory power from 34.56% in Model 1 to 83.68% in Model 2 may suggest that stakeholders place different emphasis on the four components of MVAIC (Al-Musali & Ku Ismail, 2014). The models, with wald-Chi2 of 48.70 (p<0.0000) for Model 1 and F-statistic of 79.73 (p<0.0000) for Model 2, were fit for predictions.

The result revealed that the MVAIC was positive and statistically significant in affecting ROA. The findings suggest that if MVAIC increased by 1 unit, the ROA of Listed SMEs will increase by 0.0449 unit. Hence, H1 was supported. Two components of the MVAIC, HCE and CEE, were positive and significantly associated with the ROA but at a different efficiency levels. If the firms generate HCE for one unit, their ROA increased by 0.0329 unit. However, a unit increase of CEE results in 0.5267 unit increase of the ROA, which is higher than HCE. Overall, the significant association of CEE leads to the conclusion that physical capital is the main driver behind profitability of listed SMEs in Malaysia and they emphasize return of physical assets. An inverse relationship was noted for SCE and ROA, a unit increase in SCE will cause ROA to decrease by 0.0241 unit. The analysis showed that the listed SMEs were not efficient in employing their internal resources to generate profits. This is similar to the report of Smriti and Das (2018) who used data from Indian listed firms and found significant but negative association between SCE and ROA. Meanwhile, RCE did not affect ROA and this result is in line with many prior studies which reported RCE as the least influential component of MVAIC in affecting ROA (Nimtrakoon, 2015; Xu & Li, 2019). Thus, the findings supported H2a, H2d. H2b, H2c were not supported.

In addition, the impact of firm size and leverage on ROA in Model 1 was negative, while Model 2 recorded an insignificant association between leverage and ROA, firm size was significant but negatively associated with ROA. The inverse relationship between firm size and ROA may imply that big firms are associated with complex management structure contributing to diminishing efficiency and profitability (Zeglat & Zigan, 2014; Sardo et al., 2018).

Table 6: Regression Results for Model 1 and 2

Model	1	2
Variables	ROA	ROA
Cons	0.0003 (0.01)	-0.0014 (-0.13)
MVAIC	0.0449*** (5.92)	NA
HCE	NA	**0.0329*** (6.60)**
SCE	NA	-0.0241** (-2.25)
RCE	NA	0.0620 (1.19)
CEE	NA	**0.5267*** (12.73)**
LnSize	-0.0070 (-1.09)	-0.0213*** (-5.99)
Lev	-0.0563 (-0.61)	0.0291 (0.53)
R-Sq	0.3456	0.8368
F-stat	-	79.73
Sig F-stat	-	0.0000
Wald Chi-Sq	48.70	-
p-value	0.0000	-

Notes: Notes: Number of observation is 78. The sign ***, **, * denotes the correlation significant level at 0.01, 0.05 and 0.1 respectively. The figures in the parentheses are the t-statistics. NA is not applicable.

CONCLUSION

This study aimed to investigate the impact of intellectual capital and its components on profitability of listed SMEs during 2017 to 2019. The

MVAIC method was used as a proxy for intellectual capital performance and its components. It was observed from the empirical findings that intellectual capital contributed positively towards profitability. Among the four components of the MVAIC, CEE and HCE were the greatest contributors to SMEs' profitability.

The findings of the study may provide several practical suggestions to stakeholders for better financial decision making and utilization of intellectual capital and its components and implications for researchers. Since intellectual capital is contributing to SMEs profitability, managers should increase awareness on the significance of intellectual capital and invest reasonably in the components. In addition, to further strengthen HCE of SMEs, managers need to provide continuous support through training so that employees' skills, knowledge, capabilities can be further improved. SCE was found to have a significant but negative influence on profitability. This may draw the attention of management over immediate proper utilization of internal resources such as creating a conducive working environment, corporate culture, invest in patent along with investment on the research and development to bring more innovation in services and products of the SMEs. To achieve this, SMEs need to work closely with the government. In addition, considering the importance of SMEs and the multiplier effects they have on the Malaysian economy, the government may consider providing tax incentives to spur more research and development activities among SMEs. With regard to RCE, the result showed an insignificant association with ROA. RCE was computed by dividing relational capital over value-added, representing the ratio of profit that SMEs make per unit of marketing cost. The insignificant association could imply that the marketing or advertisement strategies of SMEs did not reach its targeted customers. Theories such as organizational learning theory recognizes the process of continuous learning inside and outside the organization. The theory asserts the dynamic nature of the environment which requires firms to establish and maintain a relationship with customers. Linking this theory with relational capital of the firm, enhancing relationship through customers satisfaction and loyalty may contribute positively to the profitability of SMEs.

The study has some limitations which provide avenues for future research. This study, for instance, was not able to consider the presence of endogeneity in the analysis due to a small sample size (n=78). Therefore,

over time, future studies may consider addressing the issue of endogeneity by employing the system generalized method of moments (SGMM), so that the dynamic nature of the relationship can be further examined. Another limitation of the study is the concentration on SMEs in Malaysia and overlooking the input of SMEs from other countries. Thus, future studies could be extended to a comparative analyses of SMEs across countries.

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