The Impact of Intellectual Capital on Financial Performance of Small and Medium-sized Enterprises

O Impacto do Capital Intelectual no Desempenho Financeiro das Pequenas e Médias Empresas

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ABSTRACT

The rapid growth of technologically advanced companies in the knowledge-based economy has driven corporate management to pay more attention to the importance of intellectual capital. Over the last two decades, several Intellectual Capital monetary models have gained in importance, due to the increasing need of firms to administer and control the efficiency of their intangible resources. In this context, the present study is conducted to examine the impact of the value creation efficiency of Intellectual Capital on the financial performance of small and medium-sized enterprises. Through a quantitative approach, this research sample consisted of 23 small and medium-sized enterprises and made use of correlation and multiple regression analysis as methods for treating the ambitioned. The results showed that the value creation efficiency of intellectual capital positively influences corporate financial performance. At last, the inclusion of relational capital efficiency, as well as the relationship examination of Intellectual Capital and other performance measures, are suggestions for future research.

Keywords: intellectual capital; value-added intellectual coefficient; VAIC™; small and medium-sized enterprises; business performance.

RESUMO

O rápido crescimento de empresas tecnologicamente avançadas em uma economia baseada no conhecimento, tem levado a administração corporativa a prestar mais atenção à importância do capital intelectual. Nas últimas duas décadas, vários modelos monetários de Capital Intelectual ganharam importância, devido à necessidade crescente das empresas de administrar e controlar a eficiência de seus recursos intangíveis. Neste contexto, o presente estudo tem como objetivo examinar o impacto da eficiência de criação de valor do Capital Intelectual no desempenho financeiro de pequenas e médias empresas. Por meio de uma abordagem quantitativa, a amostra desta pesquisa foi composta por 23 pequenas e médias empresas e fez uso da correlação e da análise de regressão múltipla como métodos de tratamento dos ambicionados. Os resultados mostraram que a eficiência na criação de valor do capital intelectual influencia positivamente o desempenho financeiro das empresas. Por fim, a inclusão da eficiência do capital relacional, bem como o exame da relação do Capital Intelectual e outras medidas de desempenho, são sugestões para pesquisas futuras.

Palavras-chave: capital intelectual; coeficiente de valor agregado pelo capital intelectual; VAIC™; pequenas e médias empresas; desempenho de negócios.

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1 INTRODUCTION

Knowledge, as "know-how," is developed and exploited, according to the knowledge-based interpretation (Grant, 1996a, 1996b; Kogut & Zander, 1992; Möller et al., 2011; Beattie & Smith, 2013). Subramaniam and Youndt (2005) sustain that a clever employee with tacit knowledge often brings new ideas and knowledge to the organization, through their superior capabilities in opportunity identification. This tacit knowledge, under a development and exploitation stage, produces amalgamations of capabilities that are corporately difficult to observe, isolate, and imitate (Teece et al., 1997; McInerney & Koenig, 2011) as they are socially created and embedded within the organization (Kogut & Zander, 1992).

In fact, a deep change has been perceived in the knowledge economy wherein intellectual resources are gradually shedding light on limitations of the traditional physical and financial resources to be core contributors of value creation (Chen et al., 2005; Ding & Li, 2010). Indeed, company management can no longer only count on physical resources, suggesting that a good use of intellectual resources is considered essential to achieve competitive advantage (Drucker, 1988; Petty & Guthrie, 2000; Suhendah, 2012; Halid et al., 2018). In this scenario, Intellectual Capital may be considered a driver of corporate performance, competitiveness, success, value creation, and financial sustainability (Kogut & Zander, 1992; Bierly & Chakrabarti, 1996; Brennan & Connell, 2000; Bontis & Fitz-enz, 2002; Cronje & Moolman, 2013; Bontis et al., 2015; Xu & Wang, 2018).

In any country, but especially in developing countries, small and medium-sized enterprises are well-thought-out to be the engines of economic growth, employment generation, and poverty reduction (Ayyagari et al., 2007). On the other hand, their difficulties in realizing gains of scale (Patel & Jayaram, 2014; Wales et al., 2013), certainly impose challenges to sustainability and may be the reason why failure rates remain high. However, few authors have devoted themselves to studying the influence of Intellectual Capital on the business financial performance and sustainability of small and medium-sized enterprises (Yaacob et al., 2014).

In this context, the purpose of the present study is to empirically examine, on a sample of 23 small and medium-sized enterprises, whether Intellectual Capital has a positive effect on small and medium-sized enterprises' financial performance, which is proxied by ROA (Return on Asset) and ROE (Return on Equity). The research also takes a broad analytical perspective on Intellectual Capital valuation by using Ante Pulic's Value Added Intellectual Coefficient (VAIC™) method (Pulic, 2000), and it is justified by dedicating itself to contributing to academic and scientific progress, aiming at improving the understanding of the referred research problem through the relationship between scientific theory and empirical market practice.

For its operationalization, this paper is subdivided into subsections. In addition to this introduction (subsection 1), the theoretical foundations (subsection 2) that support the discussion among VAIC™ and the financial performance of small and medium-sized enterprises are presented. In sequence, the methodological procedures that describe the problem statement and the research hypotheses developed for the study (subsection 3) are elucidated so that, subsequently, the analysis of the results (subsection 4) is evidenced by the methods outlined. Then, the final considerations (subsection 5) are made and the references used in the course of this investigation are listed.

2 THEORETICAL BACKGROUND

2.1 Knowledge management in small and medium-sized enterprises

The interaction and relationships between actors encourage the sharing of information and knowledge. It favors the creation and conversion of knowledge and the production of Intellectual Capital which usually leads to a growing process of acquisition of tacit knowledge, useful for building own advantages within companies (Bontis et al., 2000; McInerney & Koenig, 2011). The success of a company can be measured by its capacity to engender Intellectual Capital through the interaction between human (people), structural (infrastructure), and relational (customers/suppliers/collaborators) capital (Novas et al., 2017), using it to generate, transfer and apply knowledge and endorse competitive advantage through innovation.

Moreover, the resource-based theory of the firm suggests that firms can be seen as a unique bundle of dynamic, complex, and intangible resources (Barney, 1991, Roos et al., 2005, Alexandra & Mihaela, 2013). Moreover, it advocates that the sustainable competitive advantage is resultant from the efficient employment of both tangible and intangible resources (Tayles et al., 2006; Velmurugan, 2010; Guthrie et al., 2012; Novas et al., 2017; Abhayawansa et al., 2019). This set of physical and intangible assets is at the core of the firm's competitive advantage (Grant, 1991). In this context, the management of knowledge figures as a key resource for firm value creation (Bontis, 2001; Sveiby, 2000; Sveiby, 2010; Kanchana & Mohan, 2017), and the sustainable growth of a company is grounded on establishing know-how and transforming it into capitalization (Wang, 2011).

According to Wolff & Pett (2006), the success of small and medium-sized enterprises is associated with a clear focus and strong values like independence, flexibility, entrepreneurship, and innovation. Small and medium-sized enterprises work in close contact with customers and suppliers, using a personal form of control and having a long-term view of business relations. On the other hand, they suffer from informal structures, insufficient resources, erratic decision-making, and poor administrative and accounting procedures. In this context, Intellectual Capital is indeed important to small and medium-sized enterprises once it reveals hidden assets that can have a major impact on the profitability and even the core existence of the company in the future (Ngah et al., 2009; Xu & Li, 2019).

2.2 Accounting and Intellectual Capital

As aforementioned, Intellectual Capital plays a crucial role when it comes to increasing a firm's competitiveness and performance (Seetharaman et al., 2002). Unfortunately, traditional accounting practices are considered simplistic and lack embedding accounting rigor to accurately measure Intellectual Capital (Sveiby, 2000). The result of this restriction is a growing divergence between the market and the book values of organizations. In other words, the market estimates the value of companies with high intangible assets (Intellectual Capital) to be significantly higher than the calculated book value (Firer & Williams, 2003; Chen et al., 2005). Therefore, accounting practitioners have devoted much of their efforts to improving models focused on measuring Intellectual Capital that express, in addition to financial statements, the value and continuous benefit of managing intangible assets (Fincham & Roslender, 2003; Tayles et al., 2006; Mårtensson, 2009; Velmurugan, 2010; Andrikopoulos, 2010; Guthrie et al., 2012; Derun, 2013; Novas et al., 2017; La torre et al., 2018; Abhayawansa et al., 2019).

2.3 A systematic literature review on the value-added intellectual coefficient

A systematic review is a tool to evaluate and interpret all researches available relevant to a particular research question, topic area, or phenomenon of interest. Systematic reviews aim to present a fair evaluation of a research topic by using a trustworthy, rigorous, and auditable methodology (Kitchenham, 2004). This study has carried out a systematic literature review, following Kitchenham's guidelines, which covers three phases of a systematic review: planning the review; conducting the review, and reporting the review. Once the procedures were defined, the protocol was applied and the results are described herein (figure 1).

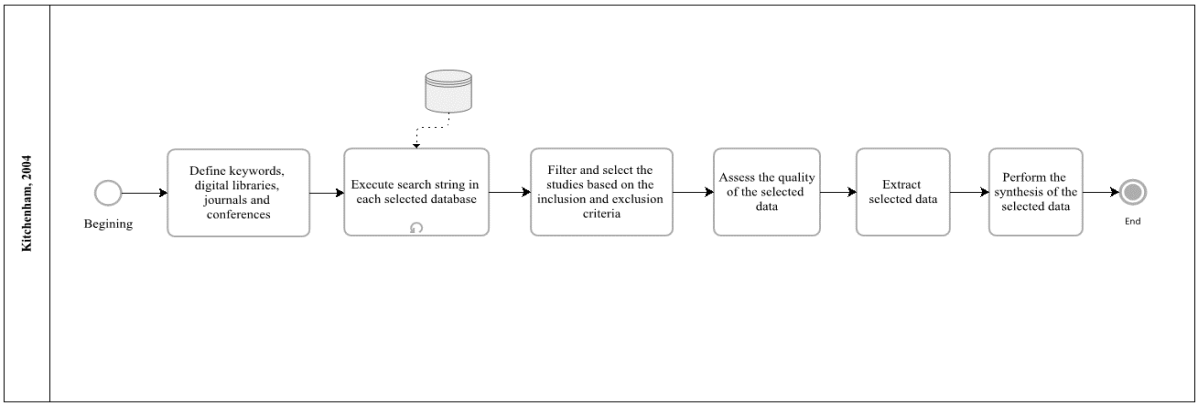

Figure 1. Systematic literature review procedures
Source: Kitchenham (2004).

To register and compile the information, the study made use of StArt software. StArt, version 3.4-64, provided support to the systematic literature review process activities and became a powerful tool to aim at the expected results (chart 1).

Protocol	Description
Main question	What is the relation between value-added intellectual capital coefficient (VAIC) and financial performance in small and medium-sized enterprises?
Data selection	Among databases, indexers, virtual libraries and search tools, the following were selected: IEEEXplore: <http://ieeexplore.ieee.org>; Ebsco: < https://search.ebscohost.com>; ScienceDirect:< https://www.sciencedirect.com>; Wiley Online Library:< https://onlinelibrary.wiley.com>; Scopus Preview:< www.scopus.com.
Study selection criteria - (I) inclusion and (E) exclusion	(I1) Studies that answer the research question; (I2) Studies that present primarily or secondarily good practices, strategies, and successful techniques, related to the objective of this study, and that can be adopted in the identification of this objective;(I3) Papers discussing the relation between value-added intellectual capital and corporate performance; (I4) Papers discussing the technical aspects of value-added intellectual coefficient. (E1) Redundant studies; (E2) Studies that are clearly irrelevant to research, according to the research questions raised; (E3) Studies that have not been published between January/2015 and January/2020; (E4) Studies that do not answer any of the research questions.
Document analysis and criteria application	Out of a total of 3,513 studies obtained in the research, 111 were excluded through criterion (E1), 3,334 through criteria (E2 and E3), and 33 were excluded through criterion (E4). In total, 35 academic articles were selected.

Chart 1. Procedures performed at the systematic literature review
Source: Authors (2021).

2.4 VAIC™ method and financial performance

The present study employs the VAIC™ method since it is recognized as an appropriate approach to measure Intellectual Capital (Chen et al., 2005; Chu et al., 2010; Maditinos et al., 2011; Tan et al., 2007). Among several advantages, VAIC™ generates objective, calculable and quantitative measurements without using subjective grading. The literature on Intellectual Capital measurement and the testing of the relationship between Intellectual Capital and corporate performance shows that the VAIC™ method is a widely used and popular method among academic researchers (Firer & Stainbank, 2003; Tayles et al., 2006; Chu et al., 2010; Clarke et al., 2011; Wang, 2011; Maji & Goswami, 2016; Mondal, 2016; Hartati & Hadiwidjaja, 2019).

Recent literature criticism leveled at the VAIC™ method descends from a misunderstanding of Pulic's original idea (Lazzolino & Laise, 2013). Pulic's VAIC™ method upholds its logical consistency and soundness when it is correctly interpreted as an indicator of the contribution of Intellectual Capital to value creation. Therefore, VAIC™ method mainly measures the efficiency of a firm based on three inputs: physical and financial capital; human capital; and structural capital. The physical and financial capital can be measured and managed and to suit the purpose of this research will be considered as corporate assets produced.

Human capital can be defined as the knowledge, skill, experience, talent, institution, attitude, and effectiveness of employees to improve the firm performance (Chen et al., 2005). And Andriessen (2004) defined structural capital as company culture, working environment, systems, and intellectual property. So, VAIC™ is conceived by capital employed efficiency; human capital efficiency; and structural capital efficiency. The sum of the coefficients results in an unambiguous indicator of the level of efficiency of the organization as a whole (figure 2).

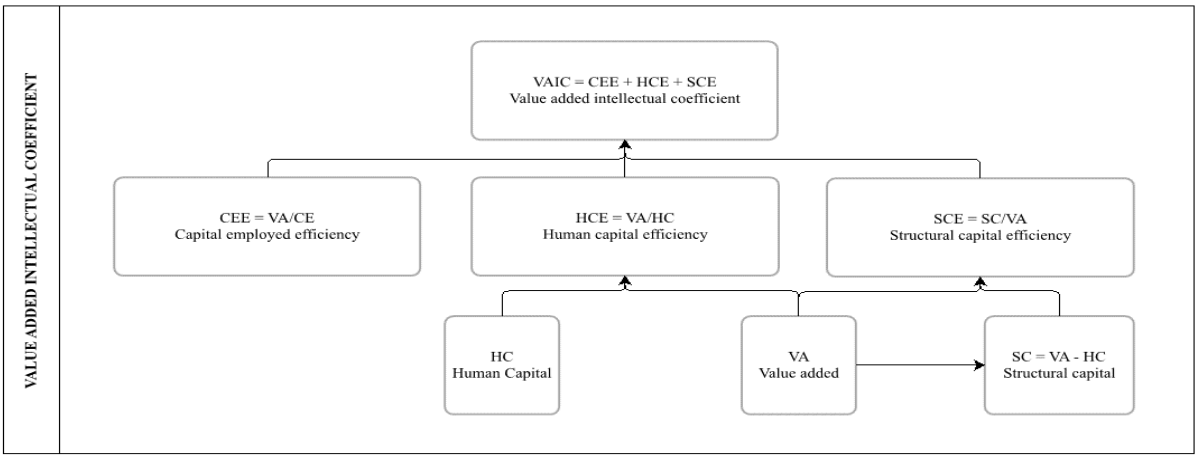

Figure 2. The Value-Added Intellectual Coefficient
Source: Pulic (2000).

Moreover, to examine whether Intellectual Capital has a positive effect on the performance of small and medium-sized enterprises, the research aims to use ROA (Return on Asset) and ROE (Return on Equity) as proxies in the model. ROA is considered to be a measure of the ability of company to generate profits by using its total assets (wealth). It shows the degree to which the revenues of a firm exceed over cost (Firer & Williams, 2003; Chen et al., 2005); and ROE is often referred to as the rate of return on net worth, in other words, refer to the ability of the company to generate profits with its own capital (Yusuf et al., 2013).

3 METHOD AND HYPOTHESIS

The above-mentioned characterize the value of intellectual capital as a representative for a company's financial performance. Then, VAIC™ is, among the monetary models to evaluate the firm's performance, the one that acknowledges significant importance to the contribution of intangibles, knowledge, and learning processes in the value creation (Villalonga, 2004). Therefore, keeping research objectives in observance the study proposes to investigate the relationship between Intellectual Capital and corporate financial performance. Through a quantitative approach, this research made use of correlation analysis and multiple linear regression analysis as statistic methods for treating the ambitioned. VAIC™ model and the accounting ratios ROA and ROE have been used as the dependent and independent variables respectively and its computation can be observed in table 1.

Index	Formula	Description
VAIC™	= CEE + HCE + SCE	= Capital employed efficiency + Human capital efficiency + Structural capital efficiency
CEE	= VA / CE	= Corporate value added / Total assets
SCE	= SC / VA	= Structural capital / Corporate value added
HCE	= VA / HC	= Corporate value added / salaries expenses
SC	= VA - HC	= Value added - salaries expenses
CE	= TA - NL	= Total assets - Net liabilities
HC	= S + LC + B	= Salaries + Social security contribution + benefits
VA	= EBIT + D + A + EC	= Earnings before interest and tax + Depreciation + Amortization + Employee cost
ROA	= Net income/Total assets	= (Total revenues – Total expenses) / (Total liabilities + Owner's equity)
ROE	= Net income/Shareholders' equity	= (Total revenues – Total expenses) / (Total assets -Total liabilities)

Table 1. Computation of VAIC™, ROA, and ROE
Source: Authors, 2021.

Based on the existing literature and the information provided by the firm´s balance sheet, this study proposes a conceptual model (figure 3) to investigate the relationship between Intellectual Capital and financial performance in 23 small and medium-sized enterprises. Through the advertisements of Venugopal and Subha (2015), Maji and Goswami (2016), and Nadeem, Gan and Nguyen (2017), the following hypotheses are presented: there is a positive association between capital employed efficiency (CEE) and corporate performance (CP) variables (H1); there is a positive association between human capital efficiency (HCE) and corporate performance (CP) variables (H2); there is a positive association between structural capital efficiency (SCE) and corporate performance (CP) variables (H3). In line with Mondal (2016) and Hartati and Hadiwidjaja (2019): Intellectual Capital performance (VAIC™) can predict corporate performance (CP) (H4).

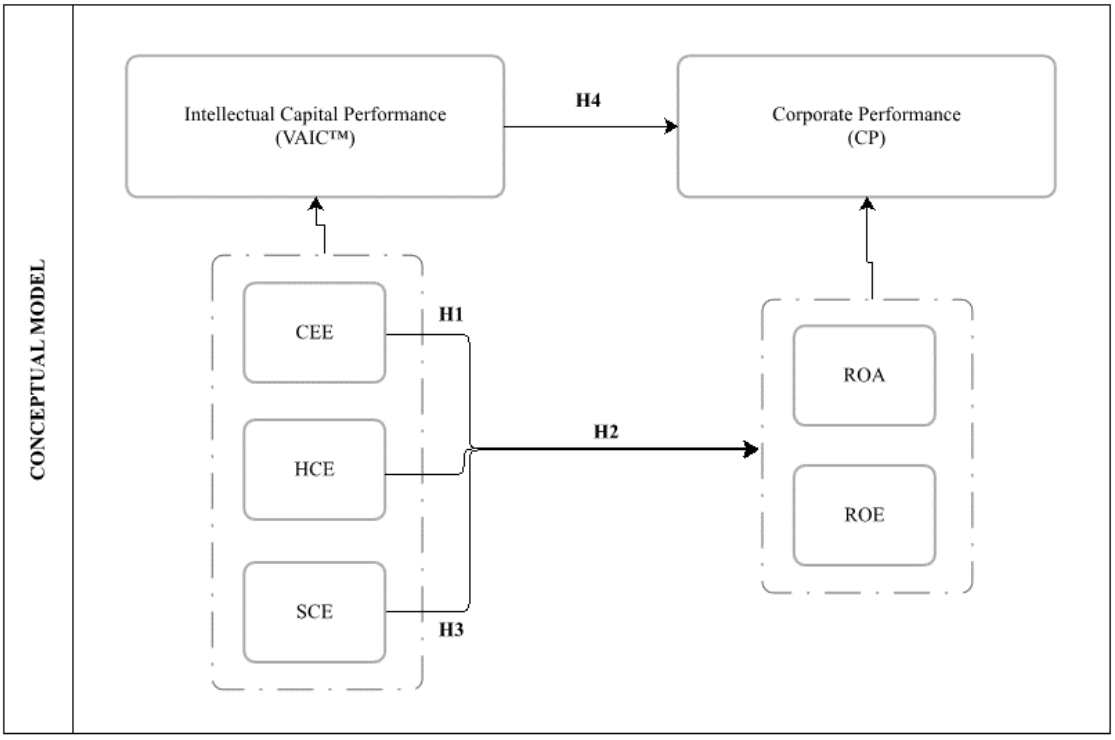

Figure 3. Conceptual model showing hypotheses
Source: Authors, 2021.

The proposed regression analysis examines associative relationships between a dependent metric variable and one or more independent variables (Malhotra & Birks, 2000). It targets to answer the above-stated hypotheses and compare the findings to the ones obtained on several other studies (McDowell et al., 2018; Maji & Goswami, 2016; Venugopal & Subha, 2015; Deep & Narwal, 2014; Komnenic & Pokrajcic, 2012; Zeghal & Maaloul, 2010; Sharabati et al., 2010; Tan et al., 2007). IBM SPSS Statistics 21 was used to perform the regression analysis.

4 RESULTS

The findings (table 2) enable us to put forward some preliminary arguments about the relationship between Intellectual Capital and financial performance.

	VAIC™	ROA	ROE	SCE	HCE	CEE
VAIC™	1.000					
ROA	0.211	1.000				
ROE	0.770*	0.589*	1.000			
SCE	0.362	0.248	0.393	1.000		
HCE	0.977*	0.207	0.796*	0.367	1.000	
CEE	0.207	0.029	-0.050	-0.060	-0.007	1.000

Table 2. Pearson correlation coefficients
Here, * denotes significance at 1% level

The majority of variable pairs demonstrate a significant and positive correlation. SCE (structural capital efficiency) shows a significant positive relationship with ROA (0.248) and ROE (0.393). Likewise, HCE (human capital efficiency) follows the same pattern regarding the relationship between ROA (0.207) and ROE (0.796). This demonstrates that an increase in value creation efficiency by structural and human capital positively affects profitability. CEE (physical capital efficiency) is positively correlated with ROA (0.029) and negatively

correlated to ROE (-0.050), but both can be considered not significant, demonstrating that an increase in value creation efficiency by physical capital would not influence profitability. Thus, hypothesis H1 stands partly accepted while hypotheses H2 and H3 stand fully accepted.

Concerning whether intellectual Capital performance can predict corporate performance (Hypothesis H4), VAIC™ shows a significant positive relationship with ROA (0.211) and ROE (0.770), which may indicate a noteworthy association between intellectual capital efficiency and firms' financial performance. The results are corroborated by the previous findings obtained by other researchers (Maji & Goswami, 2016; Venugopal & Subha, 2015; Deep & Narwal, 2014).

Table 3 shows the regression results for model 1 in which the Intellectual Capital component (VAIC™) was regressed against measures of corporate financial performance (ROA and ROE).

Model	R	R square	Adjusted R square	F-value	Sig.	Durbin-Watson
1	0.825a	0.681	0.650	21.386*	0.000	1.661

Table 3. Panel data regression model 1b
Here, * denotes significance at 5% level
a. Predictors: (Constant), ROE, ROA
b. Dependent variable: VAIC™

The adjusted R square indicates that 65% variance in the dependent variable (VAIC™) is explained by the variance in corporate financial performance (ROA and ROE). When referring to the Durbin Watson statistic test, the model designates independence in the residuals from a statistical regression analysis. Also, the multicollinearity test result reached 0.654, which indicates the absence of multicollinearity problems for the model, since according to Kennedy (1985), only if the correlation among explanatory variables exceeds 0.80, the problem of multicollinearity may arise.

Therefore, the explanatory power of the regression is considered high as well as significant. These findings converge with the ones obtained by and Kehelwalatenna, (2016, p.14), Nadeem, Gan and Nguyen (2017, p.8), and Hartati and Hadiwidjaja (2019, p.204), and suggest that the Intellectual Capital variable is suitable for explaining measures of firm financial performance. Thus, hypothesis H4 stands fully accepted.

5 CONCLUSION

The present study was conducted to examine the impact of the value creation efficiency of intellectual capital on corporate financial performance. The empirical examination is based on the 2019 accounting data of 23 Brazilian small and medium-sized enterprises. Undoubtedly, the research proves that Intellectual Capital can increase the profitability of small and medium-sized enterprises. This conclusion is sustained by the results of testing that Intellectual Capital has a positive effect on profitability (financial performance), measured by return on equity (ROE) and return on assets (ROA). This shows that companies that have greater Intellectual Capital will outcome in higher financial performance.

Moreover, the research provides evidence that human capital and structural capital positively affect firm financial performance, while physical capital doesn't affect firm financial performance, neither positively nor negatively. Also, among VAIC™ variables, HCE is found to be the most significant related to ROE, while SCE is found to be the most significant related to ROA. Considering, ROE and ROA proxied by VAIC™, the correlation results VAIC™-ROE are far more relevant than VAIC™-ROA. Thus, the theoretical perspective of Intellectual Capital is fully confirmed, according to H2, H3, and H4, and partially, according to H1, in the market practice of small and medium-sized companies.

Finally, the academic benefits lie in the fact that an in-depth analysis has been done to understand the impact and predictive ability of intellectual capital on corporate performance. On the other hand, one of the limitations of the VAIC™ model is that it does not separate out relational capital and hence future research can add this important component of Intellectual Capital in the VAIC™ model. Future studies can examine the

relationship of Intellectual Capital to other measures of performance such as sales growth, stock price, and stock returns.

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