



An Analysis of the Effect of the Intellectual Capital on Corporate Performance in Listed Companies in Sri Lanka

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ABSTRACT

Intellectual Capital has come to play an important role in the process of value creation of firms. Several theories support the disclosure requirements and research studies across the world have proved the relationship between Intellectual capital and corporate performance. It is very much important to make aware of different stakeholders to identify and use these different intellectual resources to reach to sustainable competitive advantage. The main purpose of this study is to measure the intellectual capital on corporate performance of the top 50 listed companies using the Value-Added Intellectual Coefficient (VAIC) model with the stakeholder theory and observe intellectual capital and its impact on corporate performance in different sectors. Using panel data, the study analyzes the empirical relationship of VAIC and its components on corporate performance. The results of the study reveal the existence of positive relationship between the variables. Further, the study analyzed the impact of VAIC and its components on corporate financial returns. The empirical results reveal those components have a substantive positive correlation with corporate performance. And it tested the perception of stakeholders related to intellectual capital on corporate performance using accountants and managers with the independent sample t-test and Mann-Whitney test. There were no significant differences in perception of stakeholders of the top 50 listed companies in relation to the IC and corporate performance due to the non-parametric tests carried out.

Keywords: *Intellectual Capital, Corporate Performance, Capital Employed Efficiency, Human Capital Efficiency, Structural Capital Efficiency, Return on Assets, Return on Equity*

1. Introduction

1.1 Background and Justification

In the new knowledge-based economic environment, intangibles play a vital role as a base for sustainable competitive advantage in business companies (Bontis 2004; Kamath, 2014; Yu-Shan Chen 2007). Therefore, it is not reasonable only to consider tangible resources to value corporate performance. Intellectual capital (IC) creates values as an intangible on corporate performance to gain a competitive advantage for stakeholders in changing technology. Hence the conventional, historical accounting methods are not sufficient for valuing IC. It is needed in-depth, comprehensive studies for IC for the benefit of companies.

A growing literature has developed in the last decade around the subject of IC, the latter representing an important source of value for companies (Celenza and Rossi, 2014). The measurement of IC is both difficult and expensive due to information collection, processing, and dissemination costs (Revsine et al., 1999 as cited by Bontis, 2001). Although a large number of IC measurement methods have been developed (Abeys eker, 2002; Choon et al., 2000; Chen et al., 2005; Guthrie et al., 1999; Olsson, 2001) few of these methods provide opportunities for empirically linking the value of IC to a firm's performance (Bontis, 2001). Thus, in this research, the effect of intellectual capital on the corporate performance of listed companies in Sri Lanka was studied using Value Added Intellectual Coefficient (VAIC) model which was developed by Pulic in 1998 (Pulic, 1998).

Since management information systems, accounting principles and standards do not allow for a full recognition and disclosure of a wide range of intangibles (acquired or internally produced), many academics and professionals have stated in recent years that management, investment, and credit decisions made based on financial statements that do not reflect the intangible determinants of corporate value, may result in significant economic losses both for firms and for their suppliers of goods, services or capital (Intellectual Capital Report, 2002).

In the new economic era, where intellectual capital assets are increasingly recognized as the pivotal driving force behind wealth creation, an important empirical question remains and the rise of the new economy is principally driven by information and knowledge and it is attributed to the increased prominence of intellectual capital (Firer and Stainbank, 2003). This is of particular importance in emerging economies that often have borrowed long-held financial models from developed economies, but are striving to strengthen their intellectual capital base to increase economic development (Firer and Williams, 2003).

Although the term IC has been widely used for research in the developed world, there are very few studies in the context of emerging economies, and studies on the implications of IC for specific industries also need to be addressed (Kamath, 2008). According to Abeysekara (2007), a relatively small number of researches can be found with regard to developing nations such as Sri Lanka, etc. Kehelwalatenna and Gunaratne (2010) identified in reviewing the small number of researches carried out in Sri Lanka on IC, the researchers have mainly concentrated on the IC reporting aspect, and no attention has been paid to the benefits that IC can generate to the Sri Lankan firms, and how investors respond to the performance of IC.

Since IC is contextually different due to social, political, cultural, and technological factors, currently available research on IC in Sri Lankan context is almost restricted to the IC disclosures. Therefore, a study that grounds other than the IC disclosures in the context of Sri Lanka is timely needed. Therefore, the study of Kehelwalatenna and Gunaratne (2010) as the only published study in the Sri Lankan context focuses on studying whether IC is efficiently utilized by the financial services sector and manufacturing sector of listed firms in Sri Lanka to their advantage in creating value. Kehelwalatenna and Gunaratne (2010) said that future researchers would find a broader platform to initiate their research on the theme by lifting the self-imposed limitations of the current study. In this respect, as a way out to generalizing issues, the potential studies can be carried out as a full market-wide study in the Sri Lankan context. So that it would provide a better external validity. Therefore, the primary objective of this research study is to investigate empirically the effect of intellectual capital on the corporate performance of listed companies in Sri Lanka.

1.2 Problem statement/ study problem

In the new economic era, where intellectual capital assets are increasingly recognized as the pivotal driving force behind wealth creation, an important empirical question remains and the rise of the new economy is principally driven by information and knowledge and it is attributed to the increased prominence of intellectual capital (Firer and Stainbank, 2003). Now IC is considered as an important factor in determining the success of a company. Roslender & Fincham, (2001) said accountants know that the IC is present within the business being, in many cases, the key source for the sustained creation of value.

Previous research shows that measuring IC is challenging because of changing organizational environments, industry specific characteristics, data availability, and the "new" economy (Bontis, 1998). In response to these inadequacies companies have developed monitoring systems for IC. Several models have been devised to measure intangible resources. These have been used as internal accounting instruments as well as external disclosure tools. At the time IC was being recognized as a determining factor in the success of a company, and the consolidation of a new concept regarding businesses was taking place (Pedrini, 2007).

The idea that the shareholders' interests are the only legitimate aim of a company's activities (Friedman, 1962, 1970), gave way to the urgent need, in running a company, to pay attention to the expectations of all those influenced, directly or indirectly by the company's activity: the stakeholder theory (Carroll, 1989; Clarkson, 1995; Donaldson and Preston, 1995 as cited by Pedrini, 2007; Freeman, 1984).

Investigations that focus on the "how" are after the year 1990s in nature and deal mainly with the process of measuring and managing the intellectual capital that has already been identified and situated in the context of the firm. High quality work progresses on both fronts concurrently. However, forays into the "how" seem more likely to further the discipline in the short term. The development of better, more refined, multi-dimensional tools will inevitably lead to a broader acceptance of the viability of its measurement and management. Both Sveiby's intangible assets monitor and Kaplan and Norton's balanced scorecard are excellent tools, but each represents a first attempt at solving the problem of visually representing (in numbers or other means) the IC of a specific organization (Petty James Guthrie, 2000).

Acknowledging that the backgrounds of today's intellectual capital movement lie in practice is an important reminder of the desirability for researchers to keep their work focused and relevant to business practice. Business researchers and practitioners alike often regret the lack of correspondence between what researchers do and what businesses would like to know (or need to know) (Petty James Guthrie, 2000).

Proper management and maintenance of intangibles or intellectual capital is very vital part on business organization as there is no trade-off between capital invested on intellectual capital and return incurred from that because there is problem in assessing true value intellectual capital to calculate true worth (Vashishtha, 2012).

And more importantly investment on intangibles should not be treated as expense; it should be treated as investment and due attention should be paid to the proper maintenance of intellectual capital (Vashishtha, 2012).

There is a need for further exploratory studies involving fieldwork to provide a more detailed appreciation of the issues involved in the measurement and management of knowledge-based intangibles.

Thus, although the term IC has been widely used for research in the developed and developing economies, further aspects of IC which have not yet been considered to the corporate performance in different sector of listed companies in Sri Lanka is also need to be addressed.

So, primary objective of this research study is to investigate the effect of IC and its components on corporate performance of listed companies in Sri Lanka where an organization drives to the sustainable competitive advantage.

The research problem can be stated as follows.

How IC and its components effects on corporate performance of listed companies in Sri Lanka?

2. Theoretical BACKGROUND

2.1 Stakeholder Theory and Intellectual Capital

Stakeholder Theory, first introduced by **R. Edward Freeman** in 1984, emphasizes that organizations should focus on creating value not just for shareholders, but for all **stakeholders**—groups or individuals who can affect or are affected by the organization's actions (Freeman, 1984). This broader perspective suggests that an organization's long-term success depends on managing relationships and addressing the interests of various stakeholders, including employees, customers, suppliers, communities, and regulators.

On the other hand, **Intellectual Capital (IC)** refers to the intangible assets of an organization that contribute to its value creation, such as knowledge, skills, and relationships. IC is typically categorized into three main components:

- **Human Capital:** The skills, expertise, and knowledge of employees.
- **Structural Capital:** The systems, processes, culture, and infrastructure within the organization that support its activities.
- **Relational Capital:** The value generated from the organization's relationships with external stakeholders (such as customers, suppliers, and partners).

The Link Between Stakeholder Theory and Intellectual Capital

Stakeholder Theory and Intellectual Capital intersect in the way organizations leverage their intangible assets to create value for various stakeholders. Here's how the different components of IC align with the principles of Stakeholder Theory:

Human Capital and Stakeholders

- **Employee Engagement:** Human capital, which includes the knowledge, skills, and capabilities of employees, plays a crucial role in an organization's ability to meet the needs of its stakeholders (Bontis, 1998). Stakeholder theory recognizes employees as key stakeholders, and investing in human capital can improve organizational performance and strengthen employee relationships. For example, companies that focus on employee development, motivation, and retention tend to have more satisfied, loyal, and productive employees (Bontis, 1998; Edvinsson & Malone, 1997).
- **Retention and Knowledge Sharing:** From a stakeholder perspective, organizations should invest in retaining human capital through training and fostering a positive work environment (Bontis, 2000). High employee turnover can lead to a loss of critical knowledge, so a strong focus on human capital retention is essential. This aligns with Stakeholder Theory, which emphasizes the importance of long-term relationships with all stakeholders, including employees.

Structural Capital and Stakeholders

- **Organizational Systems and Processes:** Structural capital refers to the organization's internal systems, processes, and culture that support its operations. In the context of Stakeholder Theory, strong structural capital allows a company to more effectively meet the needs of its stakeholders. For example, having efficient systems for customer service or robust quality control processes can ensure that the company delivers value to customers and other stakeholders (Edvinsson & Malone, 1997).
- **Knowledge Management:** Effective knowledge management systems, a part of structural capital, help organizations retain and utilize the knowledge of their employees, enhancing their ability to serve stakeholders. According to **Bontis** (1997), managing structural capital ensures that organizational knowledge and innovations are not lost when individual employees leave, thus safeguarding long-term stakeholder value.

Relational Capital and Stakeholders

- **External Relationships:** Relational capital is the value an organization creates through its relationships with external stakeholders, such as customers, suppliers, and communities. Stakeholder Theory underscores the importance of building strong, mutually beneficial relationships with these groups. For example, a company that develops strong relationships with customers through excellent customer service or loyalty programs can increase customer satisfaction and retention (Bontis, 1998).
- **Reputation and Brand Loyalty:** Strong relational capital, including a positive corporate reputation and brand loyalty, directly impacts a company's ability to engage with and satisfy its stakeholders. A company that maintains transparent, ethical, and socially responsible practices is more likely to foster trust and goodwill among external stakeholders, particularly customers and the broader community (Freeman, 1984; Nahapiet & Ghoshal, 1998).

In conclusion, **Stakeholder Theory** and **Intellectual Capital** are deeply intertwined in the way organizations manage their intangible assets to create value for all stakeholders. By effectively managing **human, structural, and relational capital**, organizations can build stronger relationships with their stakeholders, foster innovation, and ensure long-term success. Stakeholder Theory encourages organizations to recognize the importance of all stakeholders—not just shareholders—and to use their intellectual capital as a strategic resource to meet the diverse needs of these groups.

By aligning the management of intellectual capital with the principles of Stakeholder Theory, companies can drive sustainable, inclusive growth and create lasting value for both their internal and external stakeholders.

2.2 Intellectual Capital

The following definitions by a variety of researchers summarize as cited by Bontis (2000) some of the highlights of this field;

Author(s)	Definition/Concept of IC	Key Points
Bontis (1996)	IC is elusive, but once discovered, it can provide a competitive advantage.	IC is a hidden resource that, when effectively utilized, can enhance an organization's ability to compete and win.
Brooking (1996)	IC is the combination of intangible assets: market, intellectual property, human-centered, and infrastructure.	IC includes intangible assets that enable the company to function, categorized into four main areas: market, intellectual property, human, and infrastructure assets.
Roos et al. (1997)	IC includes non-financial assets (trademarks, patents, brands) and the knowledge of employees.	IC consists of intangible assets not visible on the balance sheet, like intellectual property and employee knowledge.
Stewart (1997)	IC is knowledge, information, intellectual property, and experience used to create wealth.	IC is collective brainpower and useful knowledge, essential for creating wealth and long-term value for the company.
Bontis (1998)	IC is the pursuit of using knowledge (the finished product) versus information (raw material).	The focus is on the effective use of knowledge (versus raw information) as a driver for organizational success.
Olve et al. (1999)	IC is an element of a company's market value and premium.	IC is seen as a significant factor in a company's market value, contributing to its premium in the marketplace.

A firm's intellectual capital, in a broad sense, is comprised of **human capital** and **structural capital** (Bontis, 1996, as cited in Bontis, 2000). **Human capital** refers to the knowledge, skills, competence, commitment, motivation, and loyalty of employees (Bontis, 2000). While human capital is recognized as a core driver of intellectual capital, a distinctive feature of human capital is its transient nature—it may dissipate when employees leave the organization (Bontis, 2000). In contrast, **structural capital** encompasses the systems, processes, culture, and infrastructure within the organization that remain in place even after employees exit (Bontis, 1996, as cited in Bontis, 2000).

In contrast, structural capital belongs to firms, including innovative capital, relational capital, organizational infrastructure, etc. Recognizing the value of intellectual capital is consistent with the theory of stakeholder view (Donaldson and Preston, 1995 as cited by Bontis, 2000), which maintains that stakeholder relationships include all forms of relationship of the company with its stakeholders, e.g. employees, customers, suppliers, and residents of the community. Given the growing gap between the market and book values of firms, an investigation into how to measure firms' intellectual capital and whether the capital market is efficient with intellectual capital has drawn broad research interest.

Using a three-dimensional conceptualization of intellectual capital i.e., human capital, structural capital, and customer capital, this research also seeks to add research and development in the intellectual capital-firm performance nexus where the performance of the firm was measured using proxies of return on assets. The research also looks into the ability of firms having higher intellectual capital to respond to the market and economic changes and that whether such firms perform better in comparison to other firms or not. Using survey methodology, the study confirms a better management accounting infrastructure of the firm having higher intellectual capital capabilities. The evidence provided by the research also indicates that firms which are driven by intellectual capital are better able to respond to the changes in the external environment and also have better performance than firms having a lower intellectual capital profile.

A number of studies in a range of countries investigate the relationship between VAIC and performance (Firer and Williams, 2003; Chen et al., 2005; Shiu, 2006a, b; Tan et al., 2007; Chan, 2009a, b; Ting and Lean, 2009; Zeghal and Maaloul, 2010; Maditinos et al., 2011). A very strong association between business performance and IC has generally been found. Examples of such findings include; Perrin (2000) who found that certain human capital, structural capital and relational capital dimensions were each positively associated with business performance, whereas Sharabati et al. (2010) and Cabrita and Bontis (2008) found that only relational capital and structural capital had a positive impact on firm performance. Alternatively, Novas et al. (2012), Jardon and Martos (2009) and Ordonez de Pablos (2002) reported that structural capital alone had a positive and significant relationship with firm performance, while Mention and Bontis (2013) came to the same conclusion for human capital.

The scanned literature reveals various conceptualizations of intellectual capital and its impact on the competitive advantage and organizational performance. However, relative significance of its components is found to be different in different contexts. Researchers such as Hernandez and Noruzi

(2010), Sharabati et al. (2010) and Curado and Bontis (2007) opined that intellectual capital is newly emerging concept and there is need to theoretically develop the concept of intellectual capital.

Bontis, Keow and Richardson (2000) provided evidence with regard to impact of intellectual capital on firm performance in both manufacturing and service sector of Malaysia. The study constructed a theoretical model which proposed the causal link between all three dimensions of intellectual capital i.e. human capital, structural capital and customer capital. The model proposes the direction of causation from human capital to structural capital and customer capital and from customer capital to structural capital and in the last structural capital is proposed to cause firm performance which was measured using various financial and industry related measures. By conducting survey, the study, the study confirms that human capital is more important with regard to the structural efficiency of business in the manufacturing sector as compared to services. Apart from that customer capital was also found to have a significant impact on the structural capital with in both industries i.e. services and manufacturing and in the last development of the structural domain of any business which is caused by development of human and customer capital is found to have significant association with the performance of the firm in both of the industry types.

Cohen and Kaimenakis (2007) sought to investigate the relationship between intellectual capital and corporate performance in Greek SMEs which are operating in service sector and are knowledge intensive. The study built structural model which sought to investigate the impact of human capital on organizational and customer capital and impact of organizational capital on customer capital. The study further categorized intellectual assets into categories of hard, soft and functional assets and proposed a direct impact of these three types of intellectual assets on firm performance which was measured through after-tax profits and sales per employee of the company. The results of the survey conducted, indicated a direct impact of human capital on organizational as well as on customer capital. Moreover, hard intellectual asset measure was found related significantly with profits of the company, while functional intellectual asset measure was found significant in relation to the sales measure of performance. The soft intellectual asset measure however, was found insignificant with regard to performance of the SMEs in Greece.

Kehelwalatenna and Gunaratne (2010) empirically analyzed the impact of intellectual capital on firm performance and investor response for manufacturing firms and financial sector firms in Sri Lanka. Intellectual capital was measured using Pulic's VAIC model by considering dimensions of human capital, structural capital and capital employed, while performance was measured using return on equity (ROE) and holding period return (HPR) and investor response was measured using market to book (M/B) ratio. The results indicated that intellectual capital is significantly associated with the variables of firm performance and investor response in both manufacturing firms and financial sector firms.

In anticipation of the increasing interest of the researchers with regard to the measurement and value of intellectual capital, Veltri (2009) provided meta-analysis as to provide a synthesis of development relating to the intellectual capital and firm performance. The study put forwards that the research on the intellectual capital has significantly increased after development of VAIC model as this model make measurement of constructs related to intellectual capital with the help of published accounting data. The author argued about the mediating role of VAIC complements between intellectual capital and financial performance and indicated towards the inconsistency with regard to the measures that were used by previous studies to quantify intellectual capital and varying proxies used to measure financial performance. The moderating effect of human capital with regard to relationship between intellectual capital and firm performance is quite evident in the literature. Moreover, there was another problem relating to duality of measurement as some authors measured firm performance with proxies like Economic Value Added (EVA), Tobin's Q, Market to Book (M/B) ratio and others used these as proxy of intellectual capital. The Meta-analysis overall indicate that there is considerable theoretical as well as empirical work to be done in the domain of intellectual capital and its impact on the performance of the firm.

Emadzadeh et al. (2013) provided evidence with regard to the impact of intellectual capital in firm performance in automobile sector of Iran using survey approach. Intellectual capital was measured using three dimensions of human capital, structural capital and relational capital while firm performance was measured using four performance dimensions as proposed by the Balanced Scorecard performance measurement framework i.e. learning & growth of employees, internal business processes, customer satisfaction and financial performance. The study found a significant and positive impact of intellectual capital as a whole on all four dimensions of organizational performance.

Chang (2007) empirically elaborated the value of intellectual capital for IT firms in Taiwan. His study in this regard proposed that IT firms in Taiwan have the ability to transform their intangibles to high value-added products or services. The study modified VAIC model as proposed by Pulic (2000) by including innovative capital (as measured by research and development expenses) and protective capital (as measured by intellectual property assets such like patents, copy rights, trademarks etc.) along with the traditional VAIC dimensions.

Muhammad and Ismail (2009) explored the impact of intellectual capital efficiency on the performance of financial sector firm of Malaysia. By using VAIC to measure intellectual capital efficiency and ROA along with profitability to measure performance, the study documents a strong and positive impact of intellectual capital efficiency on the financial performance of the financial sector of Malaysia. Moreover, it was also found that with in financial sector banking sector of Malaysia relies more heavily on the intellectual capital efficiency, which is followed by insurance sector and brokerage firms in a subsequent manner. Wang (2011) also tried to investigate the impact of the intellectual capital on the performance of the firms in Taiwan.

3. RESEARCH OBJECTIVE, METHODOLOGY AND DATA

3.1 Research Objectives

Main Objective

The main objective of the study is to analyze the effect of IC on the corporate performance of listed companies in Sri Lanka.

Specific Objectives

- 1) To investigate the relationship between IC and the corporate performance of listed companies in Sri Lanka
- 2) To identify the impact of Value Added Capital Employed (VACE) IC to the corporate performance of listed companies in Sri Lanka
- 3) To identify the impact of Value Added Human Capital (VAHC) IC to the corporate performance of listed companies in Sri Lanka
- 4) To identify the impact of Value Added Structural Capital (VASC) IC to the corporate performance of listed companies in Sri Lanka
- 5) To identify the perceptions among stakeholders to measure IC on the corporate performance of listed companies in Sri Lanka

3.2 Research design

To achieve the first two objectives of the study, a content and panel data analysis of annual reports were carried out using the top 50 listed firms out of 295 companies in the Colombo Stock Exchange by the market capitalization for the period of four years from 2016/2017 to 2018/2019 to analyze the effect of IC on corporate performance.

The study used top market capitalization companies to identify the perceptions among stakeholders to measure IC on corporate performance. It was selected only the accountants who are responsible to prepare and present financial statements of these companies and the managers who involve in operational activities to identify their views on intellectual capital. In order to collect related data on the perception among these stakeholders, a self-administered questionnaire was provided.

The information sources of this research are based on, especially annual reports of top listed companies, articles published in specialized accounting and economic reviews, specialized books relevant to the reference field, legislative acts, official documents, press releases, and other documents issued by various national and international bodies such as International Accounting Standard Board (IASB), International Federation of Accountants (IFAC), Financial Accounting Standards Board (FASB) from the field of accounting.

3.3 Sampling techniques

The research area may be positioned in the field of accounting research and based on the positivistic paradigm and a quantitative approach was used.

There are a number of methods for measuring the IC performance of different sectors of the economy. Chen (2009) has identified 34 methods for evaluating IC performance and he categorized them into five basic and generic approaches 1) Direct IC measurement. 2) Market Capitalization Approach. 3) Scoreboard Approach. 4) Economic Value-Added approach and 5) Value Added Intellectual Coefficient (VAIC™). The Value-Added Intellectual Coefficient (VAIC™) is a very important and latest methodology for measuring the IC on performance. This approach is developed by Ante Pulic (1997, 1998, 2001, and 2002) in the Austrian IC Research Centre. Kehelwalatenna and Gunaratne (2010) had also used the Pulic's Value Added Intellectual Coefficient (VAIC) in their study to measure the IC according to the stakeholder theory. So, in the current study, it was used the VAIC approach with the Stakeholder theory.

In addition, a cross-sectional analytical design, panel data analysis, content analysis, and hypothesis testing were used in carrying out the study.

3.4 Conceptual Framework

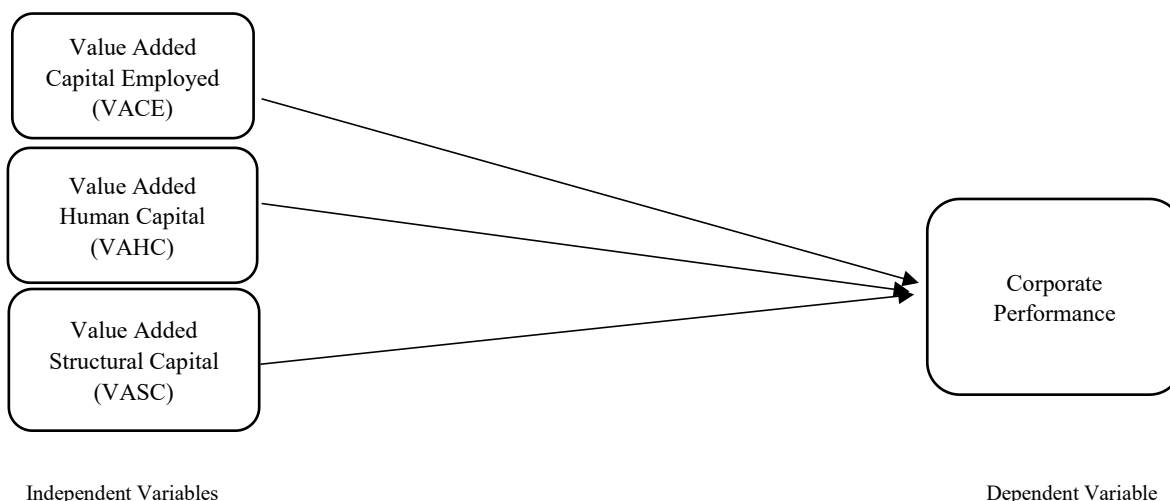


Figure 01: Conceptual Framework

3.5 Definition of the Variables

Pulic (2000a, b) depicted firms' market value as created by capital employed and intellectual capital, which consists of human capital and structural capital. He proposed the VAIC method to provide information about the value creation efficiency of tangible and intangible assets within a company. Instead of valuing the intellectual capital of a firm, the VAIC method mainly measures the efficiency of firms' three types of inputs: physical and financial capital, human capital, and structural capital, namely the Value-Added Capital Employed (VACE), the Value Added Human Capital (VAHC), and the Value Added Structural Capital (VASC). The sum of the three measures is the value of VAIC. Higher VAIC value suggests better management utilization of companies' value creation potential.

This study it is used Pulic's VAIC model to measure the IC on corporate performance. The following concepts and measures have been identified as a means for testing the hypotheses.

Table 01: Operationalization of Variables

Variables	Calculation	Measure	Type
ROA	Net operating profit divided by total assets	Corporate Performance/Profitability	Dependent
ROE	Net operating profit divided by shareholders' equity	Corporate Performance/Profitability	Dependent
VACE	Value added divided by capital employed	Value Added of Capital Employed	Independent
VAHC	Value added divided by human capital	Value-Added Human Capital	Independent
VASC	Structural capital divided by value-added	Value-Added Structural Capital	Independent
VAIC	VACE+VAHC+VASC	Value Added Intellectual Co-efficient	Independent

Dependent variable

Return on Assets (ROA) is the ratio of pre-tax income divided by average total assets as reported in the annual report. ROA is a comparison of net income over total assets. Investor and potential investors use this ratio to evaluate how well a company's leadership and how much a profit a company generated for each RM1 in assets. This accounting measure of performance is generally accepted as a valid measure of overall company performance (Core et al 1999). The ROA provides information about the value added to the company that lead to better performance of that company.

The relationship between **Return on Equity (ROE)** and **Intellectual Capital (IC)** is a significant area of research in corporate finance and management. Intellectual capital, which encompasses human capital, structural capital, and relational capital, is a critical intangible asset that influences a firm's performance and, consequently, its ROE. Studies (e.g., Bontis et al., 2000; Chen et al., 2004) show a positive relationship between intellectual capital and financial performance indicators, including ROE. Companies that prioritize intellectual capital investments typically outperform their peers in terms of profitability and shareholder returns.

Independent variables

Value added intellectual coefficient (VAIC) model introduced by Pulic (1998) enables the firm to measure its value creation efficiency (Pulic, 2001). VAIC method used financial statements of a firm to calculate the efficiency coefficient on three types of capital that is human capital, structure capital and capital employed. Pulic (2001) identified that firms' market value has been created by capital employed including physical and financial and intellectual capital.

Calculation of Value-Added Intellectual Coefficient (VAIC)

$$VAIC = VACE + VAHC + VASC$$

Value Added Capital Employed Coefficient (VACE)

Value Added Human Capital Coefficient (VAHC)

value added structural capital coefficient (VASC)

Value added (VA) = Operating profit + Employee costs + Depreciation + Amortization Value Added

Intellectual Capital Efficiency (ICE) = CEE+ HCE + SCE

Capital Employed Efficiency (CEE) = VA/ CE

Human Capital Efficiency (HCE) = VA/ HC

Structural Capital Efficiency (SCE) = VA/SC

3.6 Methods of data collection

Content analysis used in carrying out the study to check relationship and impact of VAIC with ROA and ROE. A questionnaire was designed with the support of prior literature to analyze the perception of stakeholders.

3.7 Description of data analysis

SPSS statistical software package used for quantitative data analysis.

- Pearson correlation analysis was used for assessment of the inter-relationships among quantitative variables, and Statistical significance was considered at p-value <0.05.
- Some statistical techniques, such as descriptive analysis, univariate analysis and multiple/partial regression analysis was used when necessary.
- The appropriate non-parametric statistical tests of Mann Whitney/ Kruskal-Wallis H test was used to test perception of stakeholder groups.

3.8 Hypothesis

Five research hypotheses are developed to facilitate the analysis.

1. To investigate the relationship between IC and the corporate performance of listed companies in Sri Lanka

Hypothesis 1 (H1):

There is a significant positive relationship between Intellectual Capital (IC) and the corporate performance of listed companies in Sri Lanka.

2. To identify the impact of Value Added Capital Employed (VACE) IC on the corporate performance of listed companies in Sri Lanka

Hypothesis 2 (H2):

The Value Added Capital Employed (VACE) component of Intellectual Capital positively impacts the corporate performance of listed companies in Sri Lanka.

3. To identify the impact of Value Added Human Capital (VAHC) IC on the corporate performance of listed companies in Sri Lanka

Hypothesis 3 (H3):

The Value Added Human Capital (VAHC) component of Intellectual Capital positively impacts the corporate performance of listed companies in Sri Lanka.

4. To identify the impact of Value Added Structural Capital (VASC) IC on the corporate performance of listed companies in Sri Lanka

Hypothesis 4 (H4):

The Value Added Structural Capital (VASC) component of Intellectual Capital positively impacts the corporate performance of listed companies in Sri Lanka.

5. To identify the perceptions among stakeholders to measure IC on the corporate performance of listed companies in Sri Lanka

Hypothesis 5 (H5):

There is a positive relationship between stakeholders' perceptions of Intellectual Capital (IC) and the corporate performance of listed companies in Sri Lanka.

4. DATA ANALYSIS AND RESULTS

This section shows the results of how intellectual capital affects corporate performance of listed companies in Sri Lanka. Based on the data collected from top 50 companies' annual reports as listed by Colombo Stock Exchange for the year 2016 to 2019. This section also reports on the relationship between intellectual capital and corporate performance. Therefore, this part of the research will discuss firstly on the summary statistics of the raw data that are used in the estimating equations. This is followed by discussion on correlation between the variables. The discussion followed by identifying the significant impact of intellectual capital towards listed companies' performance in Sri Lanka. Finally, discussion on results obtained from the intellectual capital–corporate performance relationships in top 50 listed companies are examined. Next discusses the correlation of the variables utilized

in the estimating equations. Based on results, the number of population (N) is represented by 200 with a total of 50 companies multiply by 4 years (2016-2019). By using at least 5 percent level of significance, only five relationships that have 1 percent level of significance and one relationship that have 5 percent level of significance.

- There is very high positive relationship between ROA and ROE with correlation 0.948
- There is moderate positive relationship between VACE and ROE with correlation 0.740
- There is positive lower relationship between ROA and VACE with correlation 0.463
- There is positive lower relationship between VAHC and ROE with correlation 0.378
- There is positive higher relationship between VAHC and VACE with correlation 0.755
- There is positive lowest relationship between VASC and VAHC with correlation 0.210

In general, it is observed that all the variables correlate significantly among themselves. Most of the variables are related to each other. Therefore, it can be said that, this correlation estimates offers logical approach to subsequent analysis of the data. In overall, this objective is strongly supported by Sàenz (2005), Cabrita and Vaz (2006), Bontis et al, (2000), Riahi-Belkaoui (2003) as well as Chen et al, (2004) who also indicates that there is a relationship between intellectual capital with the Corporate performance of an organization.

This research involves a major analysis namely the intellectual capital–corporate performance relationship, which comprised the discussion, based on overall multiple regression models of VACE, VAHC, and VASC variables on corporate performance variables. In order to measure variables in explaining the Corporate performance of the companies, the data have been split into two groups represented by ROA and ROE. Table 2 represents a summarization of the regression analysis from ROA and ROE perspectives.

Table-2: Summarization of the regression analysis

MODEL 1:
Model 1a: Regression Model with ROA
$ROA = -7.189 + 867.003VACA - 2.509VAHC$
Model 1b: Regression Model with ROE
$ROE = -25.461 + 2336.442VACA - 4.158VAHC$

Based on Table 3, the R-square for ROA is 35.4 percent. This signifies that 35.4 percent of the total variations were explained by the changes in VACA, VAHC, and STVA. In contrast, the R-square of ROE is equal to 46.8 percent. This shows that 46.8 percent of total variations were explained by the changes in VACE, VAHC, and VASC. Therefore, any changes in VACE, VAHC, and VASC will result in different effects on the ROA and ROE R square.

Table-3: R-Square of the regression analysis

The Estimated Model				
DV	VACA (X1)	VAHC (X2)	STVA (X3)	R-Square
ROA	867.003	-2.509	-	35.4%
ROE	2336.442	-4.158	-	46.8%

Based on the test of regression in Table 2 and Table 3, the VACE and VAHC variables have the same significant positive impact on ROA and ROE. However, the VASC variable does not give a significant impact on ROA and ROE since the p-value of analysis is greater than 0.05 level of significance. This is because, most of the top 50 listed companies pay less attention on its intangible assets such as patents, trademarks and databases as a source that contribute towards firm performance. This is due to lack of awareness on the importance of structured capital as an indicator in measuring firm performance.

Consequently, the result of this study shows no significant impact on VASC on corporate performance in Sri Lanka. Given that there is one variable that gives a significant impact on ROA and ROE, the test of regression is considered significant for both ROA and ROE. Overall, by looking at the summarization of Table 2, 1 unit increase in VACA will increase 867.003 ROA at a 1 percent level of significance while other variables are constant. Meanwhile, for ROE, an increase in VACA will increase 2336.442 return ROE at a 1 percent level of significance while other variables are constant. It appears that there is a positive relationship between VACA and company performance. This indicates that the listed companies really focused on the its capital employed such as the advancement of technology to achieve greater performance.

However, one unit increase in VAHC will result in a decrease of 2.509 in ROA at 1 percent level of significance while other variables are constant. As for ROE, a 1 unit increase in VAHC will decrease about 4.158 at a 5 percent level of significant while other variables are constant. It shows that there is

an inverse relationship between VAHC and company performance. In other words, companies should reduce their human capital in order to achieve a higher corporate performance.

Independent Sample T-Test and Mann Whitney Test

In comparing the perception of stakeholders, the awareness of variables namely ROE, ROA, VACE, VAHC and VASC on corporate performance, the independent sample t-test and Mann Whitney test have been conducted. For the performance components, which are ROA and ROE, the results show no significant difference on perception between two groups of stakeholders relating to the intellectual capital at 5 percent level of significant. Meanwhile, for the intellectual capital components, only two variables are significant at five percent level of significance. The two components are VACE and VAHC. Both VACE and VAHC are significant since the t-values are -4.787 and -6.976 which are less than -1.99. However, for STVA, there is no significant difference since t-value is greater than -1.99. Since both VACE and VAHC have significant differences, it shows that there is probably a different perception for both accountants and managers of the top 50 listed companies on corporate performance. Both groups perceived that there is a significant impact of these intellectual capital on corporate performance.

5. Conclusion

In conclusion, this study provides strong evidence supporting the positive relationship between intellectual capital and corporate performance, consistent with previous research (Bontis et al., 2000; Cabrita and Vaz, 2006; Chen et al., 2004; Riahi-Belkaoui, 2003; Sàenz, 2005). The findings highlight the critical roles of human capital and structural capital in driving organizational success and sustainable competitive advantage. Variations in intellectual capital mechanisms across companies contribute to systematic differences in performance, emphasizing the strategic importance of leveraging intellectual resources effectively.

Additionally, stakeholder perceptions validate the significant impact of intellectual capital, particularly in top-listed companies. By employing a self-administered questionnaire, this study offers fresh insights into a relatively underexplored area in existing literature. These results underscore the need for organizations to prioritize intellectual capital as a key factor in enhancing performance and achieving long-term sustainability.

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