INTELLECTUAL CAPITAL EFFICIENCY AND FIRM PERFORMANCE OF LISTED COMPANIES IN MALAYSIA

BY

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ABSTRACT

The objective of this study is to extend empirical evidence on the effect of intellectual capital efficiency (ICe) on firm performance in listed companies on main market and Access, Certainty, Efficiency (ACE) market in Malaysia. The study does so by using a refined Pulic model in comparison to the original Pulic model. Furthermore, it examines the difference in effect of ICe on firm performance of listed companies in high ICe sectors compared to low ICe sectors. Moreover, this study investigates the role of human capital efficiency (HCe) in the direct and indirect relationships between ICe components and firm performance of Malaysian listed companies. This study referred to Resource-based view (RBV) and knowledge-based view (KBV) as theories in developing the hypotheses to be tested. The basis for the calculation of ICe and its components is Pulic's VAIC, while market capitalisation (MC), Earning Per Share (EPS), return on assets (ROA) and return on equity (ROE) are used as indicators of firm performance (FP). The sample of the study is 261 companies listed on Bursa Malaysia's main and ACE markets. Data were collected from the annual reports of these companies for the year 2018. Regressions were used to test the direct and indirect associations between ICe and its components with FP. The findings of this study indicated that the refined model, generally provided higher explanatory power than the original Pulic model, except for MC. Therefore, it was worthwhile to run subsequent test using the refined model. The results showed that ICe is significantly associated with FP, even with the inclusion of CEe. HCe is the most significant determinant of FP amongst the components of ICe. These results applied to the listed companies in Malaysia, including the ACE market. Moreover, some differences were found in the significance levels of the ICe components' coefficients in their association with FP when the high ICe sector companies were compared with their low ICe sector counterparts. Furthermore, and most importantly, HCe was found to mediate between SCe and FP, as well as could potentially be a mediator between RCe and FP in the future. Hence, the components of ICe not only have a direct association with FP but indirect associations as well. Extensions of this study in relation to the refined Pulic model, and HCe as a mediator variable should be beneficial to future researchers. Then, the findings of this study could be of interest to the companies itself, whether they are on the main market or ACE market, and whether they are in high ICe sectors or even in low ICe sectors. These Malaysian listed companies should be particularly interested to know that HCe is a key driver of FP, even more significant than physical and financial capital (CEe) and it also seems to act as an intermediary between the other IC components, particularly SCe, and FP.

ملخص البحث

تهدف هذه الدراسة إلى تقديم دليل تجريبي أشمل على أثر كفاءة رأس المال الفكري على أداء الشركات المسجلة في كل من السوق الرئيسي، وما يُعرف بسوق (أيه.سي.إي.ACE) أو السوق غير الرئيسي، في ماليزيا. ولتحقيق هذا الهدف تسعى الدراسة إلى استخدام نسخة معدلة من نموذج (بوليك–Pulic) مقارنة بنموذج (بوليك–Pulic) الأصلي، وذلك للوقوف على ما إذا كان النموذج المعدل أفضل في سياق ماليزيا. علاوةً على ذلك، تسعى هذه الدراسة إلى الوقوف على الفرق في تأثير كفاءة رأس المال الفكري على أداء كلٍّ من: الشركات المسجلة في السوق الماليزي ذات المستوى المرتفع في رأس المال الفكري، مقارنة بالشركات ذات المستوى المنخفض في رأس المال الفكري. كما تسعى هذه الدراسة إلى التحقيق في دور كفاءة رأس المال البشري في العلاقات المباشرة وغير المباشرة بين كفاءة رأس المال الفكري، وأداء الشركات المسجلة في السوق الماليزية. توظف هذه الدراسة وجهة نظر الشركات القائمة على الموارد، ووجهة نظر الشركات القائمة على المعلومات، كنظريتين معتمدتين في عملية تطوير الفرضيات. وقد تم استخدام نموذج "بوليك" لمُعامل القيمة المضافة لرأس المال الفكري، لقياس كفاءة رأس المال الفكري، بينما تم استخدام كلٍّ من: القيمة السوقية، والربح الأساسي للسهم، والعائد على الأصول، والعائد على حقوق المساهمين، كمؤشر على أداء الشركة. تتكون عينة هذه الدراسة من (261) شركة مدرجة في البورصة الماليزية، في كلٍّ من السوق الماليزي الرئيسي، وما يعرف بسوق (أيه.سي.إي.ACE) أو السوق غير الرئيسي. كما أن البيانات التي تم جمعها عن هذه الشركات، مصدرها التقارير السنوية للعام (2018م) لتلك الشركات. تم استخدام معامل الارتباط لقياس العلاقة المباشرة وغير المباشرة بين عناصر رأس المال الفكري، وأداء الشركات. وقد أظهرت نتائج الدراسة أن نموذج "بوليك" المعدل قد أعطى –بشكل عام– نتائج أفضل من نموذج "بوليك" الأصلي، ما عدا فيما يتعلق بالقيمة السوقية. وبالتالي، فإن نموذج "بوليك" المعدل يكون مناسبًا، بحيث يمكن استخدامه في التحليلات المطلوبة. كما أظهرت النتائج أن هناك علاقة إيجابية قوية بين عناصر رأس المال الفكري، وأداء الشركات. وأن كفاءة رأس المال البشري، كانت أكثر عناصر كفاءة رأس المال الفكري تأثيرًا على أداء الشركات. وهذه النتائج تنطبق على كلٍّ من شركات السوق الماليزي الرئيسية، والسوق غير الرئيسية أو ما يُعرف بـ(أيه.سي.إي.ACE). علاوةً على ذلك، أظهرت النتائج أن هناك اختلافًا ما بين القطاعات ذات المستوى المرتفع في رأس المال الفكري، مقارنة بالقطاعات ذات المستوى المنخفض في رأس المال الفكري، وذلك من حيث تأثير عناصر كفاءة رأس المال الفكري، على أداء الشركات. ومن النتائج المهمة التي ظهرت، أن كفاءة رأس المال البشري، تُعتبر عاملًا وسيطًا بين رأس المال الهيكلي، وأداء الشركات، كما يمكن أن تكون وسيطًا محتملًا بين كفاءة رأس مال الموارد، وأداء الشركات. وبالتالي، فإن عناصر كفاءة رأس المال الفكري، ليس لها فقط علاقة مباشره بأداء الشركات، بل ولها كذلك علاقة غير مباشرة به. يأمل الباحث أن تكون امتدادات هذه الدراسة، وخاصة فيما يتعلق بنموذج "بوليك" المعدل، وكفاءة رأس المال البشري كمتغير وسيط، مفيدة للدراسات المستقبلية. كما يأمل أن تفيد نتائج هذه الدراسة الشركات سواء أكانت تلك الشركات في السوق الرئيسي، أو ما يُعرف بسوق (أيه.سي.إي.ACE) أو السوق غير الرئيسي. وسواء أكانت شركات ذات مستوى مرتفع في رأس المال الفكري، أو ذات مستوى منخفض. ينبغي أن تدرك الشركات الماليزية المسجلة أن كفاءة رأس المال البشري، هي المحرك الأساسي لأداء الشركات، حتى أنها أكثر أهمية من رأس المال الاقتصادي أو المادي، ويبدو أنها تعمل أيضًا كوسيط بين المكونات الأخرى لرأس المال الفكري، وخاصة كفاءة رأس المال الهيكلي، وأداء الشركات. يأمل الباحث أن تكون نتائج هذه الدراسة لبنة في الأدبيات القائمة في هذا الموضوع، وخاصة في سياق ماليزيا. كما يأمل أن تقدم هذه الدراسه فهمًا أشمل للشركات، ولمشرعي القانون، فيما يتعلق بدور كفاءة رأس المال الفكري في ماليزيا.

APPROVAL PAGE

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DECLARATION

I hereby declare that this dissertation is the result of my own investigation, except where otherwise stated. I also declare that it has not been previously or concurrently submitted as a whole for any other degrees at IIUM or other institutions.

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Signature……...……. Date …….…….

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This dissertation is dedicated to my beloved parents

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATONS

A	Amortization and depreciation of the company
ACE	Access, Certainty, Efficiency
ATO	Assets turnover
BSC	Balanced scored card
BSE	Bucharest Stock Exchange
BV	Book value
CEe	Capital employed efficiency
CSS	Corporate Social Sustainability
DC	Dynamic capability
DEA	Data envelopment analaysis
EBITDA	Profit before interest, taxes, depreciation and amortization
EC	Employment cost of the company
EDS	EBSCo Discovery Service
EVA	Economic value added
FGLS	Feasible generalised least square
FiP	Financial performance
FrP	Firm performance
FSB	Federal statutory bodies
FSize	Firm size
FV	Firm value
GCI	The Global Competitiveness Index
GMM	Generalized Method of Moments
GNP	Gross national product
GS	Growth of annual sales
HC	Human capital
HCe	Human capital efficiency coefficient
IASC	International Accounting Standards Committee
IAS	International Accounting Standard
IAM	Intangible Assets monitor
IC	Intellectual Capital
ICD	Intellectual capital disclosure
ICe	Intellectual capital efficiency
IFRS	International Financial Reporting Standards
IR 4.0	Industrial Revolution 4.0
IPO	Initial public offering
KBC	knowledge-based capital
KBV	Knowledge-based view
Lev	Firm leverage
MASB	Malaysian Accounting Standards Board
MB	Market to book value
MC	Market capitalisation
MESDAQ	Malaysian Exchange of Securities Dealing and Automated Quotation
MFRS	Malaysian Financial Reporting Standards
MVAIC	Modifiied Value Added Intellectual Coefficient
MV	Market value
ns	Not significant
OI/S	Operating income to total sales

OP	Operating profit of the company
PLCs	public listed companies
RBV	Resource-based view
RC	Relational capital
RCe	Relational capital efficiency
ROA	Return on assets
ROE	Return on equity
ROCE	Return of capital equity
ROS	Registry of Societies
SDG	sustainability development goals
SC	Structural capital
SCe	Structural capital efficiency
SPAC	Special Purpose Acquisition Company
SPSS	Statistical Package for the Social Science
STVA	Structural capital value added
TT&M	Technology and Telecommunications & Media
UK	United Kingdom
US	United States of America
VA	Total value added created by company
VACA	Value added capital employed
VAIC	Value Added Intellectual Coefficient
VAHU	Value added human capital
VIF	Variance inflation factors
VRIO	Valuable, rare, inimitable, organized
(+)	Significant positive association
(-)	Significant negative association
//	Relationship

CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

Entering the second decade of the 21st Century, as economies strengthen their knowledge-base, the business environment is increasingly complex, uncertain and highly competitive (Obeidat et al., 2016; Iqbal et al., 2019). The developed countries set the trend in global competition by capitalising on advancements such as automation and robotics, smart technologies, as well as artificial intelligence, whilst promoting data sharing and digitization. Therefore, in this rapidly evolving business environment with technological advancements, companies must adapt for survival. Consequently, companies have increased reliance on intangibles like intellectual capital (IC), instead of merely investing in tangible assets. Such investments in intangibles are also taking place in developing countries, including Malaysia, in order for companies in these countries to remain competitive in the global market.

Historically, physical assets were considered the main source of generating value to the firm. This idea has changed, because recently, IC has become greater than tangible assets. According to Inkinen (2015), the researchers at the World Bank reported that IC capital accounts for 77% of the total wealth (natural capital, produced capital and IC capital) globally. Hence, in today's economy of revolutionary technological transitions, the dynamics of firm value creation are shifting from companies' reliance on physical and financial resources to IC.

According to Peteraf (1993), IC is a set of designs which are difficult for other corporations to copy. IC in corporations includes corporate culture, leadership, patent,

copyrights, trade secrets and relationship with customers (Andriessen, 2004). As IC is difficult to replicate by other companies, it is considered as a critical resource that would give a company competitive advantage, consequently sustain the company's future performance and survival as well as generate firm value (Roos & Ross, 1997; Bontis, 2001; Forte, Tucker, Matonti & Nicolo, 2017; Razafindrambinina & Anggreni, 2017; Khalique et al., 2020; Ting et al., 2020).

The importance of this critical resource is not only accepted in developed countries, but also in developing countries like Malaysia. In fact, authorities in Malaysia established an intellectual property division in the Ministry of Domestic Trade and Consumer Affairs Malaysia in 1990. Part of the responsibilities of this division is to develop IC. They enacted many acts related to IC such as Patents Act 1983, Industrial Designs Act 1996, and Intellectual Property Corporation of Malaysia Act 2002. Furthermore, Malaysia implemented the Malaysian Financial Reporting Standards (MFRS) 138 on intangibles in 2006 (Shukor, Ibrahim & Nor, 2009). These efforts by Malaysian authorities would not only promote IC, but should also assist in improving the reporting of these assets by Malaysian companies.

In order to determine and report on IC in companies, it should be measured reliably. However, there is considerable difficulty in defining IC, and subsequently measuring it (Guthrie, Ricceri & Dumay, 2012; Nimtrakoon, 2015; Ting et al., 2020). Thus, IC still remains, substantially, a hidden value that is insufficiently captured in the financial statements (Forte et al., 2017). Nevertheless, several studies (Pulic, 1998; Riahi-Belkaoui, 2003; Kim & Taylor, 2014; Scafarto, Ricci & Scafarto, 2016) have tried to overcome the difficulty of measuring IC by attempting to capture it in various ways.

In measuring IC, a decidedly broad approach is to determine the difference between market value of the firm and the book value of net assets (Radjenovic & Krstic, 2017). It must be noted that there is a difference between measuring IC and measuring the efficiency of IC. Intangible capital (IC) is the resource, hence an asset to a company in generating strategic future benefits, whereas intellectual capital efficiency (ICe) is the value created by IC. It can be said that ICe is an extension of IC to measure the efficient use of IC. A more common approach to measure ICe is by using Pulic's (1998) value added intellectual coefficient (VAIC) (Ting et al., 2020). This method measures the efficiency of value added by a firm. It includes three types of inputs which are human capital efficiency, structural capital efficiency and capital employed efficiency.

Moreover, it must be noted that ICe differs from IC as Pulic asserts, "similar to Taylor's system of manual work IC efficiency is introduced providing a base for productivity increase of knowledge workers" (Pulic, 2008, pp. 12-13). In other words, ICe by Pulic measures the newly created value per monetary unit invested in each resource. The higher the ICe value of an organisation, the more is the value added created by overall resources of that organisation (Pulic, 2004). However, it should be noted that Pulic's VAIC was introduced two decades ago. There have been several developments in accounting over these two decades, particularly the issuance of International Financial Reporting Standards (IFRS) by the International Accounting Standards Board. Due to these new standards, more disclosure is provided in the financial reports, which could enable a better calculation of VAIC. Such disclosure would not have been available in the annual reports when Pulic first introduced VAIC.

In line with the accounting developments as mentioned above, Malaysia has converged fully with the International Financial Reporting Standards (IFRS) in the

Malaysian Financial Reporting Standards (MFRS) in 2012 (Eddine, 2017). Thus, the calculations of VAIC and ICe could also be refined in the context of Malaysia as in other countries. Although the original Pulic is still relevant and is still used by many studies, there is a continual need to improve on the measurements in relation to IC (Guthrie, Ricceri & Dumay, 2012) as well as ICe. This need for refinement of ICe is further elaborated in the problem statement below.

Moreover, in terms of evaluating IC efficiency, specifically in the context of Malaysia, the Bursa Malaysia has two markets, the main market and the Access, Certainty, Efficiency (ACE) market. Since numerous high-technology firms are also listed on the ACE market, this secondary market has to also be considered in evaluating IC efficiency of Malaysian companies. Such a consideration is particularly important because of the advancements in the technology in the business sector, including in Malaysian companies. As global competition migrates towards high-technology based businesses, Malaysian companies in the ACE market become equally vital in terms of maintaining the economy and performing at an international level.

Also, prior literature (Edvinsson & Sullivan, (1996); Engstrom, Westnes & Westnes, 2003; Tayles, Pike & Sofian, 2007; Dadashinasab & Sofian, 2014; Bontis, Janosevic & Dzenopoljac, 2015), has stated that companies may be in sectors that rely considerably on IC, hence known as high IC sectors, whereas others are in sectors that have minimal utilisation of IC, thus low IC sectors. However, having these resources does not necessarily mean that they are used efficiently. This study specifically focuses on efficient utilisation of IC, therefore distinguishes the sectors into high ICe and low ICe sectors. High ICe sectors are sectors where IC is used more efficiently compared to the low ICe sectors, where IC is used less efficiently. This distinction is

made from prior studies because although the sector may be a high IC sector, it need not be a high ICe sector. Naturally, higher ICe (not more IC) is expected to lead to better firm performance.

Furthermore, as Malaysia is a developing country, there is high reliance on HC, as found by previous studies (Goh, 2005; Ousama & Fatima, 2015; Dee et al., 2019). However, as Malaysia gradually embraces high-technology businesses, it is logical to expect that HCe may no longer be the main driver of firm performance in Malaysian companies, and perhaps SCe may start to take the lead. Moreover, as the business environment become more complex, so does the association between various resources within the company to create synergy, subsequently enhancing financial performance, including firm value. Therefore, it would be amiss to only consider direct association between company resources, in particular the efficient usage of HC, SC and RC. Therefore, indirect relationships should also be considered to attain a better understanding of the effect of these relationships on firm performance.

In brief, the main issues of this study have been introduced in this section. These issues are: (i) the possibility of refining Pulic's (1998) VAIC in measuring IC efficiency. (ii) The consideration of including the ACE market along with the main market in evaluating IC efficiency of listed companies in Malaysia. (iii) The distinction between companies in the high ICe sectors from those in the low ICe sectors in determining the outcome of IC efficiency in these listed companies. (iv) The potential indirect association between the efficiencies of the components of IC to effect financial performance and firm value of listed companies in Malaysia. After introducing these main issues, the next section proceeds with the problem statement.

1.1 PROBLEM STATEMENT

The stability and growth of most economies are supported by the sustainability and success of the companies operating in that country. Specifically, the Malaysian economy is largely dependent on the performance and survival of its companies. However, in today's global business environment, the Malaysian companies not only have to compete regionally, but globally. Thus, Malaysian companies have to strive to keep competitive even with companies in developed countries, which are noticeably more technologically advanced.

According to the Global Competitiveness Index (GCI) published for the year 2017-2018 by the World Economic Forum, Malaysia ranks 23rd out of 137 countries, with a score of 5.17 out of seven. Although, the global competitiveness of Malaysia seems promising, further efforts must be made so as not to lose the country's position to competing developing economies. Nevertheless, the uniqueness of Malaysian companies would be in their intangible components, instead of the physical assets that are generally readily available to companies in other countries. Therefore, it is natural that the Malaysian government would implement regulation and measures to develop these intangible resources, including IC. Malaysia needs to focus more on technologies, skills and efficient use of IC to sustain companies' performance and ultimately produce economic growth.

The Malaysian government has planned to indicate investments towards IC, as this resource is crucial to remain globally competitive and attract investors. If the efficient use of IC significantly influences firm performance, over and above the efficient use of tangibles, Malaysian companies would have to consider shifting prioritising of resource efficiency from tangibles to IC.

Based on the above, it has to be stressed that it is the efficient use of the resource, in this case IC, by companies that is of particular importance and not merely having the resource. Subsequently, the ability of IC efficiency (ICe) of companies to enhance financial performance and firm value has to be evaluated. Asiaei et al. (2020) mentioned that evaluating firm success in today's competitive environment is important for managers and investors. This is because the former proxies (profitability) the ability of a company to be competitive, whereas the latter (Market Capitalisation) is an indication of a company's potential to attract investors. Although there are prior studies in Malaysia that investigate ICe on firm performance, certain limitations could hinder a better and more contemporary understanding of the association between the two. These limitations will be discussed in sequence below.

Firstly, Pulic's original measure of VAIC has been widely adopted by numerous studies (Al-Musalli & Ku Ismail, 2014; Svanadze & Kowalewska, 2015; Ozkan, Cakan & Kayacan, 2016; Ginesti, Caldarelli & Zampella, 2018; Zulkifli, Shukor & Rahman, 2018; Chowdhury, Rana & Azim, 2019; Soewarno & Tjahjadi, 2020). Although the measure may still be useful today, it is undeniable that the original measure of VAIC by Pulic (1998) is more than two decades old, hence there may be a need to update the measures, if possible. The reason is that Pulic (1998) measured VAIC using the figures that are reported in the financial statements. Over the years, due to the development in accounting standards, there has been an increase in the information made available in the financial statements. Therefore, there is a possibility of refining the measure of VAIC and subsequently the measure of ICe. Refinement to the original Pulic's VAIC can, mainly, be made in two forms: (i) by adding items to the calculation of HCe as well as RCe, as more items are now disclosed in the financial statements due to improvements in regulatory requirements

as mentioned above; and (ii) by including relational capital efficiency (RCe) in the VAIC equation. As in any intellectual field of study, initially rudimentary measures and methods may be used when there are limited alternatives. However, as the field of study advances, more refined measures and methods are developed to enable a more accurate understanding of that field of research. Similarly, Pulic (1998) utilised the information that was available to him at that time to calculate VAIC, however now that more information is available in the financial statements, it would remiss if this information were not utilised to calculate a more refined measure of ICe. More accurate reflection of economic reality may only be obtained if the required measures are refined, as much as possible.

Secondly, on August 3, 2009, Bursa Malaysia's Main and Second Boards were renamed and unified as the main market, while the MESDAQ market was renamed as the ACE market. This reorganisation of markets was to ensure greater efficiency and competitiveness of Malaysian listed companies (NACRA Organising Committee, 2010). Generally, studies tend to focus on the main market as the majority of the listed companies in Malaysia are in that market, and basically the main market is where the market leaders are. However, in the context of IC, as the ACE market comprises considerably of high-technology companies, it would be conceivable that ICe would be as crucial in the ACE market, if not more so, compared to the main market. In fact, even the market's name, "access, certainty, efficiency" has included "efficiency" as one of its qualities. Thus, in researching ICe in Malaysian listed companies, neglecting companies from the ACE market could mean that companies with substantial ICe could be left out of the sample being studied. Consequently, there may be a lack of representation and generalisability to the population of listed Malaysian companies.