



**EFFECT OF MODIFIED VALUE ADDED
INTELLECTUAL COEFFICIENT (VAIC) ON
PERFORMANCE & MARKET VALUE OF
MALAYSIAN COMPANIES**

BY

FARAH ILYANI BINTI MOHD FADZLAH

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**Kulliyyah of Economics and Management Sciences
International Islamic University
Malaysia**

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ABSTRACT

This study examines the relationship between intellectual capital and traditional performance of companies in four sectors listed in Bursa Malaysia for the year 2008. The four sectors consist of consumer product, industrial product, technology and trading / services. The relationship is first examined between two dependent variables which are profitability and market value with efficiency of Value Added Intellectual Coefficient (VAIC) measured by three components of a company's relational capital, human capital and structural capital. This study also extends the study on current VAIC and modifies it with the addition of Research and Development (R&D) paradigm as proxy for innovation capital. The relationship is further examined between dependent variables and efficiency of MVAIC which measured by three components of VAIC with additional modification of innovation capital. The analysis indicates that the relationship between dependent and independent variables are varied. Company's IC efficiency can explain profitability but not market value. This study found that the relationships between dependent variables with RDE are negative but not significant, thus additional robustness tests are carried out and supported the expectations that companies which incur R&D expenditure have lower current income and expected to have a higher future income. This study might be useful to management of companies in understanding the components of IC and strive for main IC components in order to compete in knowledge based economy. The results have also documented that the level of capitalised R&D among companies in the industries is small and limited. Thus, the regulators should undertake proactive actions to encourage greater R&D activities among companies.

ملخص البحث

تحاول الدراسة الحالية في اختبار العلاقة بين رأس المال الغير ملموس "رأس المال الفكري" و الاداء التقليدي للشركات المدرجة في سوق الأوراق المالية الماليزية في أربعة قطاعات (قطاع المنتجات الاستهلاكية، قطاع الصناعة، قطاع التكنولوجيا و التجارة\الخدمات) في العام 2008. دراسة هذه العلاقة تمت أولاً بين الربحية و القيمة السوقية كمتغير تابع مع القيمة المضافة لرأس المال الفكري (VAIC)، حيث تم قياس القيمة المضافة بثلاثة مقاييس: رأس المال العائلي للشركة أو ما يسمى برأس المال الزبوني، رأس المال البشري، و رأس المال الهيكلي. في ما يخص رأس المال الفكري (VAIC) هذه الدراسة استخدمت النموذج المعدل (VAIC) لقياسه بإضافة عنصر البحث و التطوير (R&D) كالمقياس لرأس المال الابتكاري. بصورة عامة أظهرت النتائج أن العلاقة بين رأس المال الفكري و الاداء التقليدي للشركات تختلف، بحيث أن كفاءة رأس المال الفكري لها علاقة قوية مع أداء الشركة المتمثل في الربحية و لكن ليس القيمة المضافة. كما أظهرت نتائج هذه الدراسة علاقة عكسية بين كفاءة البحث و التطوير و بين أداء الشركة، و لكن هذه العلاقة ليست قوية إحصائياً. لذلك عمدة هذه الدراسة إلى القيام باختبارات إضافية لتحقق من فرضية أن الشركات التي تتكبد تكاليف أكثر في البحث و التطوير، تحقق ربح أقل حالياً و لكن يُتوقع تحقيق أرباح أكبر في المستقبل. نتائج هذه الدراسة يتوقع أن تساهم في فهم إدارة الشركات في ما يخص عناصر رأس المال الفكري و السعي إلى الوصول إلى العناصر الأساسية لرأس المال الفكري من أجل المنافسة الاقتصادية القائمة على المعرفة. أيضاً أظهرت نتائج هذه الدراسة أن حجم المبالغ المرسلة أو المستثمرة في ما يخص البحث و التطوير محدود و قليل في مختلف القطاعات. لذلك تقترح هذه الدراسة أن تبادر الجهات الحكومية في حث و تشجيع الشركات للاستثمار أكثر في البحث و التطوير.

APPROVAL PAGE

I certify that I have supervised and read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Science in Accounting.

.....
Hafiz Majdi Ab Rashid
Supervisor

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Master of Science in Accounting.

.....
Fatima Abdul Hamid
Examiner

This dissertation was submitted to the Department of Accounting and is accepted as a fulfilment of the requirement for the degree of Master of Science in Accounting.

.....
Suhaiza Ismail
Head, Department of Accounting

This dissertation was submitted to the Kulliyah of Economics and Management Sciences and is accepted as a fulfilment of the requirement for the degree of Master of Science in Accounting.

.....
Khaliq Ahmad
Dean, Kulliyah of Economics and
Management Sciences

DECLARATION

I hereby declare that this dissertation is the result of my own investigations, 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.

Farah Ilyani binti Mohd Fadzliah

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Date

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OF MALAYSIAN COMPANIES**

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.....
Date

*To my parents Haji Mohd Fadzlal bin Ahmad and Hajjah Che Rosnani binti Kamis,
husband and daughter, for all your love and patience.*

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LIST OF ABBREVIATIONS

| | |
|-------|---|
| AFS | : Assurance and Financial Service |
| CEE | : Capital Employed Efficiency |
| EPU | : Economic Planning Unit |
| FRS | : Financial Reporting Standard |
| GAAP | : Generally Accepted Accounting Standard |
| HC | : Human Capital |
| HCE | : Human Capital Efficiency |
| IC | : Intellectual Capital |
| IP | : Intellectual Property |
| IPO | : Initial Public Offering |
| ITA | : Investment Tax Allowance |
| MASB | : Malaysian Accounting Standard Board |
| MB | : Market Value |
| MBA | : Master of Business Administration |
| MIDA | : Malaysian Industrial Development Activities |
| MVAIC | : Modified Value Added Intellectual Coefficient |
| R&D | : Research and Development |
| RDE | : Research Development Expenditure Efficiency |
| ROA | : Return on Asset |
| ROE | : Return on Equity |
| SC | : Structural Capital |
| SCE | : Structural Capital Efficiency |
| UK | : United Kingdom |
| VA | : Value Added |
| VAIC | : Value Added Intellectual Coefficient |

CHAPTER ONE

INTRODUCTION

1.0 INTRODUCTION

This chapter presents the overview of the study and explains the importance of measuring intellectual capital (IC) for the company's future success. Besides, this chapter also discusses on the background and motivations of this study. Subsequently this chapter also discusses on the research questions and objectives of this study.

1.1 BACKGROUND OF THE STUDY

Changes in the knowledge economy towards more competitive environment have led to the differences between the modern approach of value creation and the traditional ways of monitoring performance. Recent developments in the new economy have witnessed that knowledge is increasingly becoming more important. In achieving the aim of the knowledge economy, Malaysia has embarked on a mission to promote knowledge based economy in its "Knowledge-based Economy Master Plan" in 2002. The plan outlines various strategies to assist the transformation of Malaysia into a competitive knowledge based economy. Among the strategies is a greater emphasis to focus on Research and Development (R&D) as a determinant of knowledge generation. Moreover, in a speech by the previous Prime Minister, YAB Dato' Seri Abdullah bin Ahmad Badawi, the mission of the Ninth Malaysia Plan (2006 – 2010) is to raise the country's capacity for knowledge and stronger emphasis is placed to encourage R&D activity in order to increase value added to the existing economic

sector. Thus, large proportion of research incentives have been provided by the government of Malaysia to encourage R&D and innovation in this country.

While Malaysia is currently developing into knowledge based business environment, most Malaysian industries are still using traditional financial accounting and performance measurement methods (Bontis, Keow and Richardson, 2000). Firer and Williams (2003) added that the traditional measure of corporate performance may be unsuitable in the new economic world where competitive advantage is driven by IC. This is because traditional performance measurement concentrates only on the financial aspect of performance but neglects the measurement of multiple dimensions of performance. Thus, traditional performance measurement is unable to capture competitive advantage in the knowledge economy which is driven by IC (Pulic, 1998).

Consequently, there is a need to look into different dimensions in evaluating the business performance by focusing on IC efficiency. The present study explores this issue, empirically by analysing the relationship between commonly used traditional performance measurements and measures of IC efficiency. IC efficiency is referred to as Value Added Intellectual Coefficient (VAIC) developed by Ante Pulic at the Austrian IC Research Centre (Pulic, 1998; Pulic, 2000) and traditional performance measures used in this study are profitability and market value.

The term Intellectual Capital (IC) refers to intellectual resources such as knowledge and information which can lead to better corporate future performance (Roos and Roos, 1997; Mauritsen, Bukh, Larsen and Johansen, 2002; Bontis et al., 1996; Pulic, 2001). Thus, managing the IC of the company is crucial and becomes a management agenda. Increasing attention on the critical role played by IC has resulted into numerous methods of measuring IC being suggested by researchers. Thus, an empirically supported model for measurement of IC is important to justify an effort in

improving the previous proposals. This is due to the fact that each IC measurement model has its own advantages and disadvantages (refer to Section 2.4).

The purpose of this study is to examine intellectual capital (IC) efficiency and its relationship with company performance of Malaysian listed companies for the period of 2008. In addition to the VAIC model developed by Pulic (1998, 2000), this study also takes into consideration the suggestions by Chang (2007), Chen, Cheng and Hwang (2005) and Chang and Hsieh (2011) to broaden the study of current VAIC Model and modifies it with the addition of Research and Development (R&D) expenditure. It is hoped that this study would enhance the literature on the importance of IC being used as an alternative indicator of company performance.

1.2 MOTIVATIONS OF THE STUDY

The main factor that motivated this study is the importance of IC management in the new knowledge based economy. The awareness of IC management has resulted in the development of numerous IC measurement models by academic researchers for capturing and managing knowledge. As academic researchers are aware of the fact that each IC measurement model has its own advantages and disadvantages, VAIC has gained recognition among academic researchers over alternative IC measurement models. The main factor is the easiness of VAIC's calculation in monetary terms by using publicly available data. Furthermore, it also provides an objective and verifiable measure because the calculation of VAIC is primarily based on annually audited information. However, there are also disadvantages of VAIC measurement model as there is no perfect model so far.

One possible reason behind the criticism of the VAIC model is that the measure for structural capital may not be complete as it neglects company's innovative capital (Chen et al., 2005; Chang, 2007; Chang and Hsieh, 2011). Thus, modifying the VAIC with the addition of R&D expenditure is important as it is considered a proxy for innovation capital by past researchers (Bontis, 2004; Roos and Roos, 1997). VAIC measures the total value creation efficiency in the company which consists of the summation of human capital efficiency, capital employed efficiency and structural capital efficiency. Chang (2007) and Chen et al., (2005) believe that the execution of structural capital efficiency is incomplete without R&D paradigm. R&D expenditure not only can influence current profitability and market value but also financial performance of a company by increasing the company's share price (Chan, Martin and Kensinger, 1990; Lev and Sougiannis, 1996; Kamarun, Rohaida, Wan and Ku, 2006). Moreover, effective R&D investment may have effect on company's financial performance and boost the company's profit margin (Chan et al., 1990).

Malaysia is an appealing case to the study on the VAIC and MVAIC measurement model because IC is receiving an increased attention in Malaysia (Bontis et al., 2000). Despite the recognition gained among academic researchers in a related area, Goh (2005) stated that there are very few studies on IC efficiency in Malaysia. The latest study on VAIC measurement model in the Malaysian setting was carried out by Ting and Lean (2009). Therefore, this study is motivated to modify the VAIC measurement model to include R&D expenditure on the selected Malaysian listed companies.

Furthermore, large proportion of research incentives have been provided by the government of Malaysia in order to achieve one of the missions of the Ninth Malaysia Plan (2006 – 2010) which is to focus on R&D activity. For example,

attractive financial incentives such as a large proportion of research grants and tax deduction under the Malaysian Income Tax Act, 1967 were given to companies which undertook R&D activities. Thus, it is tempting to study MVAIC measurement model in Malaysia as the tax incentive and research grants are able to give a lot of savings to the companies and maintain their profitability level (Sougiannis, 1994; Hall and Reenen, 2000).

Furthermore, this study enables companies to have indepth understanding of the composition of IC and strive for the main IC components within their businesses. In other words, this study enables companies to maximise the utilisation of IC as it could be one of the predictors towards company's performance. In addition, this study attempts to provide insight on the extent of measuring IC efficiency by adding the dimension of R&D expenditure, suggesting that R&D expenditure may capture additional information on IC which is omitted from VAIC approach. Furthermore, this study attempts to fill the gaps in the literatures and at the same time contribute in understanding the impact of IC efficiency on Malaysian listed companies.

1.3 OBJECTIVES OF THE STUDY

This study is aimed to examine the relationship between profitability and market value and companies' IC efficiency by using Pulic's VAIC method and MVAIC method. The empirical result from previous literatures indicates that VAIC method has different level of explanatory power for a company's market value and profitability. Therefore, in this study, MVAIC model will be used in order to capture additional information on IC efficiency that is omitted from the Pulic's VAIC approach. R&D expenditure will be used in this study to underline its importance in enhancing the

company's market value and profitability. Therefore, the research objectives of this study are as follows:

RO₁ : To examine the relationship between company performance and intellectual capital efficiency of selected Malaysian listed companies by using VAIC method.

RO₂ : To examine the relationship between company performance and intellectual capital efficiency with the addition of R&D expenditure of selected Malaysian listed companies by using MVAIC method.

RO₃ : To examine whether MVAIC with the addition of R&D expenditure may provide higher explanatory power compared to the VAIC model.

In order to achieve the RO₁, regression and correlation analysis is applied to test the relationship between the variables. The findings will indicate which IC component significantly and positively correlates with dependent variables namely profitability and market value. The first dimension of dependent variables that is used in this study is the company's profitability which refers to the degree to which a company's revenues exceed its cost. Finally, the second dimension is referred to as market value which concentrates on the degree to which a company's market value exceeds its asset. Therefore, the research question derived to answer the RO₁ is :

RQ₁ : Is there any relationship between VAIC and the profitability and market value of selected Malaysian listed companies?

Meanwhile, RO₂ focuses on the MVAIC model as suggested by Chang (2007) to broaden the study of current VAIC model in order to achieve further understanding on IC measurement. In MVAIC model, the addition of research and development expenditure as an independent variable along with 3 components of IC will be used to measure selected Malaysian listed companies' IC efficiency. Regression and

correlation analysis will be used in order to achieve RO₂. Therefore, the research question derived to answer the RO₂ is :

RQ₂ : Is there any relationship between profitability and market value with MVAIC in selected Malaysian listed companies?

Finally, to achieve RO₃, comparison between regression result of both VAIC model and MVAIC model will be carried out in order to find which model has higher significant regression result. In this situation, any model that has higher significant regression result implies higher explanatory power and is able to provide additional information about the relationship between company's performance and company's IC efficiency. Thus, if MVAIC model provides higher significant regression result compared to VAIC model, then MVAIC model will be proposed to be used as a predictor towards company's performance. Therefore, the research question derived to answer the RO₃ is:

RQ₃ : Is MVAIC model able to provide additional information than Pulic's VAIC model?

1.4 SIGNIFICANCE OF THE STUDY

This study enables the Malaysian listed companies in the main board to have more in depth understanding of the components of IC and the VAIC measurement model. Thus, Malaysian companies can apply knowledge management as proposed by the VAIC model to measure a company's IC efficiency in order to compete in the knowledge economy. Furthermore, this study also uses different theories to modify Pulic's VAIC model as proposed by Chang and Hsieh (2011), Chang (2007) and Chen et al., (2005) based on two primary reasons. Firstly, previous researchers argued that

the component of structural capital in VAIC measurement model is incomplete without innovation capital (Chang, 2007; Chen et al., 2005; Chang and Hsieh, 2011). Secondly, the findings by previous researchers who adopted VAIC model in their study are limited and mixed. Therefore, this study proposes to modify VAIC model by the addition of R&D expenditure which is known as company's innovation capital. The new IC component is proposed to clarify the relationship between company performance and R&D.

As such, this study tries to extend and fill the gap in the literature to support the usefulness of MVAIC model by focusing on the Malaysian industries. Malaysia would be an appealing case to study on the usefulness of MVAIC because tax incentive and research grants are given to the company which undertake research activities. Thus, the impact of government incentive will encourage many Malaysian companies to provide publicly available information on R&D activities in their annual report. Hopefully, the outcome of this study can support the usefulness of MVAIC and assist internal and external parties such as investors, supplier and others to assess the company's IC efficiency.

This study will use resource based view theory as developed by Wernerfelt (1984) to investigate the role of intangible asset as strategic resources in knowledge based economy. Resource based view theory provides more understanding about the role of IC in creating corporate value and building sustainable advantage of companies in the Malaysian industry. Thus, this study is hoped to contribute in the development of resource based theory to provide more valuable insight.

The findings of this study also will assist the Malaysian government to make reasonable allocations on tax incentive and research grants to encourage companies actively participate in R&D activities. For example, if finding in this study shows that

the level of long time investment on R&D among Malaysian companies is low, then the government should formulate various financial and non financial incentives such as providing additional R&D grants and infrastructure support to further enhance the R&D activities among companies.

1.5 STRUCTURE OF THE STUDY

The structure of the study would be as follows:

- Chapter 1: **Introduction.** This chapter is the introduction to the study, explains the background and motivations of the study, the research objectives, research questions and the significance of this study.
- Chapter 2: **Literature Review.** This chapter focuses on the literature review on IC concept including definitions of the term and conceptual model. This chapter will also highlight the advantages of VAIC model over alternative IC measurement models. Apart from that, this chapter also discusses the significance of R&D in creating a company's value and to be an additional dimension in MVAIC model.
- Chapter 3: **Intellectual Capital Efficiency: A review of the literature.** This chapter discusses on the literature reviews by researchers who carried out VAIC studies. Review on MVAIC empirical study will also be presented in this chapter. Finally, this chapter presents the review on the usefulness of R&D expenditure as additional proxy for MVAIC
- Chapter 4: **Hypotheses and Research Framework.** This chapter presents the research framework and research methodology used in this study. The hypotheses development that is developed by existing theories and past