

Intellectual Capital Performance of Industrial Product Sector in Malaysia

Mohd Husnin Mat Yusof, Che Wan Khalidawaty Khalid, Rajmi Mustaffa

Faculty of Business Management, Universiti Teknologi MARA, Kuala Terengganu, Malaysia

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ABSTRACT

As Industrial Master Plan 3 is focusing on developing the country into a major trading nation, the continuing growth of the industrial product sector requires particular attention among the industry players to focus on capital allocation. As the sector is the major exporter, its performance is influenced by tangible and intangible elements. This paper examines the intangible element known as intellectual capital (IC) as an essential characteristic of the theory in explaining companies' performance. The 9 year period panel data of 31 listed industrial product sector companies on the Bursa Malaysia'Kuala Lumpur Stock Exchange (KLSE) were selected as they contribute 41.5% of Malaysia gross domestic product (GDP). Using STATA 10, the tests are performed for a period of 2006- 2014. Return on assets is used as a proxy for performance while three variables have been selected in describing the IC which are the Value Added Human Capital (VAHC), Value Added Structural Capital (STVA) and Value Added Capital Employed (VACA). It is found that capital employed and human capital are significantly associated with the companies' performance. In future studies, thorough analysis can be done by adding more companies and more years in capturing the bigger impact of the IC performance which may reveal more robust findings.

KEYWORDS: Intellectual Capital, Performance, Human Capital, KLSE Industrial Product Stocks, Panel Data Analysis.

INTRODUCTION

In 2002, Malaysia introduced knowledge-based Economy Master Plan with the aim to develop a knowledge-based society. It also provides the platform to enhance international competitiveness so as to achieve the objectives of Vision 2020. Human capital has become the core of knowledge-based economy in parallel with grander entrepreneurial skills and technology applied. In order to deliver high value products and services, highly skilled individuals are needed while maintaining competence which required to build consumers' confidence and trust [24]. These skills are essential for businesses which entail to compete domestically over and above globally. Since the independence, the Malaysian economy is simultaneously undergoing a structural transformation from merely depended on agriculture and mining products to one in which manufacturing is the dominant sector. In 1990, total value of Malaysia export stood at RM76.65 billion and increase to RM536.23 billion in 2005. From 2006 onwards, Malaysia is maintaining its tremendous growth. In year 2014, its export recorded RM766.13 billion, an increase by 6.4% or RM46.14 billion as compared to previous years. The major export product consists of electrical and electronic products (33.1%), petroleum products (9.40%), liquefied natural gas (LNG) (8.30%), chemicals and chemical products (6.70%), palm oil (6.20%) and crude petroleum (4.50%). In September 2015, the Industrial Production Index (IPI) increased by 5.1% as compared to the same month of the previous year. The expansion in September 2015 was motivated by constructive growth in every index such as electricity (2.6%), mining (4.4%) and manufacturing (5.6%) as depicted in Figure 1.

Malaysia has proven to become a successful industrialized country experienced rapid development in many significant areas during the late 20th century. The Malaysian government through its Industrial Master Plan (IM3) 2006-2020 is aiming to drive industrialization to higher levels of global competitiveness, through the transformation and innovation of the manufacturing and service sector. Thus, Malaysia's prime minister emphasizes all companies and firms to enhance or implement the intellectual capital (IC) as a competitive weapon in sustaining their competitiveness. In tradition, any company which able to produce at a lower cost for a similar product is regarded as having a competitive advantage. Thus, competitive advantage makes the company enjoying higher profit while maintaining lower cost.

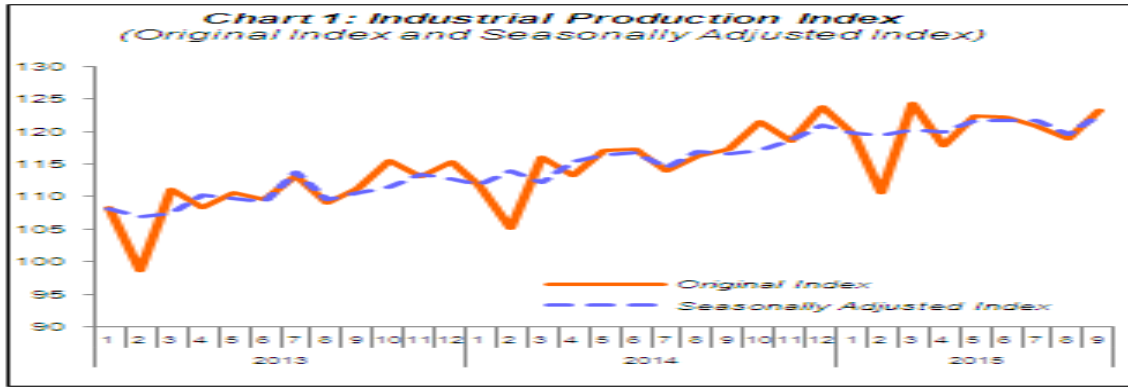


Figure 1: Performance of industrial product index as at September 2015 [23]

According to [15], IC is defined as foundation of competitive advantage which leads to the firm's earning. In [4] establish that by leveraging company is the main reason attributed to corporate success. A study by [1] designated that the elements of the IC were employed by average Malaysian firms in their business models. Previous research has acknowledged the argument on IC as a firm's wealth driver. Several efforts have been made to reflect the values which were impenetrable by traditional accounting to develop an IC disclosure framework. Contrariwise, this matter is still in debate whether different types of companies are prospective in managing IC or not, and if they do, do they view IC as a precarious resource and try to cope it for that reason. Therefore, this study tries to offer the following same intuition to the extent of measuring the IC performance of Industrial Product Sector (IPS) which consists of manufacturing, mining and electricity:

- identify the Malaysian IPS' IC performance
- compare the three IC component's contribution in the Value Added Intellectual Coefficient (VAICTM) model respectively
- examine the IC relationship on the IPS performance

This study will assist the company in understanding the meaning of a variety of IC in more definite and direct recognize the IC's composition and evaluate its tendency developments. In conclusion, by following the AICTM model, the IPS can assess their employee achievements and organization effectiveness via improving the IC for every division and every employee.

In September 2015, Bursa Malaysia has witnessed 260 companies which are categorized under KLSE Industrial Stock Product. Company's assets which are financed by assets and/or equity had been utilized effectively and efficiently in building up sales which simultaneously generating profit. In addition of government initiative and assistance, companies' growth and performance inevitably contributing to this increased export figure. It is inevitable to deny that an industrial product sector is one of the major sectors contributing to Malaysia economy.

The rapidly changing of development and environment in the industrial product sector pose one of the challenges which had an impact towards the factors that influence the companies' performance. The industrial product sector consists of manufacturing, electricity and mining. The companies' performance is influenced by both tangible and intangible elements.

Thus, studies have been conducted to understand whether these factors have a significant relationship towards the company's performance. Our study will focus on the growth of companies which are categorized under Industrial product sector in Malaysia by assessing the intangible factor that is the effectiveness of capital intelligently employed from the period of 2006 until 2014 which involved 31 companies. The development can be motivated or inspired by effective management of its productivity and innovation, which supported by both physical and non-intangible resources namely the IC. Generally, the knowledge of human, structural and relational resources synergize together will make up an IC [1]. IC is just a capital asset consisting of intellectual material. This paper is presented in five segments. The ephemeral overview of the research is the first segment, followed by a literature review in the second segment. This segment will discuss on theoretical upbringing of the research and earlier studies on IC. The third segment will discuss the research methodology, source of data and framework. The interpretation of the finding and discussion will be disclosed in the fourth segment. The conclusion and recommendation for future research will be discussed in the fifth section.

LITERATURE REVIEW

The gap between the financial position of the company and its market valuation denotes the company's worth, composed of non-physical assets, administrative information, customer contentment, product

improvement, employee assurance, copyrights and brands that never appear in the company's financial reports. The engine of corporate development does not rely solely on its tangibles but also on its intangibles such as employees' knowledge, skills, experience, etc. There is no hesitation that successful companies are those that innovate repetitively by utilizing their employees' skills and knowledge and relying on new technologies. The researchers believe these intangible and tangible assets marshalling together, undergo the transmission process and made up what is called IC. An administration's competence to innovate is meticulously tangled to its IC or its capacity to exploit its knowledge possessions [36]. IC management is the most pay attention to from the enterprise's operation in this knowledge era. [40]. In [6], he noticed that beside the ordinary capital as physical assets or monetary term which is characterized on the traditional balance sheet, intellectual capital can also represent the creation of enterprise's value. Intellectual capital also includes copyrights, patents and other forms of intellectual property. It is the summation of the company's innovations, encounters, progressions, interactions, market presence, knowledge, experience and public inspiration [4]. In [16] study of intellectual capital focusing on consultation firms indicates that each employee's capabilities and knowledge can be summarized through intellectual capital which lead to creating wealth and sustaining performance. Moreover, intellectual capital is made of by three non-physical sources of value namely employees' capabilities, managing method of organizations' resources and relationships with their stakeholders [20]. An intellectual capital's earlier study by [7] indicates that the source of sustainable competitive advantage can be demonstrated by intellectual capitals. Earlier studies also prove that the intellectual capital and organizational performance has positive relationship and significantly associated. Academics have regularly described intellectual capital as an important element associate to firm's market value and the cost of replacing its assets [4].

Previous research on intellectual capital has used a VAIC developed by [30] as a measurement of IC's performance. It also came out with a result that indicates the VAIC theory as the method in measuring the efficiency of the intellectual capital and capital employed generating value based on three major components relationship which include capital employed, human capital and structural capital. This is agreed by [34] in investigating the Pulic's VAIC which consists of human capital (HC), structural capital (SC) and physical capital/capital employed (CA) as the effectiveness measure on firms' performance by the use of capital employed and intellectual capital.

HC is defined as an employee's knowledge, skills and experience. It can be referred also as health, motivation, the achievement to the owner in implementing their HC which brings satisfaction and happiness. In [13] refers human capitals as employee's knowledge and experience, beside employee's competencies in creating physical as well as nonphysical assets through knowledge and idea generation. In globalization context, high-class human capital development has become an obligation to the society beside wealth [27].

In [27] stated that structural capital contains the supporting structures which permit the exploitation of intellectual capital in organizations. The structural can include patents, trademarks and database in completing value added successfully such as culture, limpidity and expectation among employees. The firms will continuously enhance the system and products which remain within the enterprise through this capital even though the employees left the company. Structural capital is defined to whatever remains in the firm, even the employee is no longer with the organization. Customer loyalty, network system, organization management process, brand and supplier relation are the few names of structural capital's components.

On the other hand, capital employed can be defined as total capital attached in a firm's current and non-current assets. Normally, this capital is financed either by shareholder equity or net debt or both. These assets which comprise both current and non-current assets are within a manager's direct span of control [27]. Different tools and be applied in measuring firm's performance on both financial and non-financial aspect. The firms may evaluate their performance via different tools especially in the resource allocation process with the hope of efficiency of distribution can be well managed and channelled to appropriate parties [9].

RESEARCH METHODOLOGY

A number of frameworks for measuring and classifying the IC have become an epidemic for researcher nowadays. In [14] classify IC as company's competence and relational resources, while [14] classify IC into structural capital and human capital via its Skandia Value Scheme. In [35] three basic forms of IC are classified such as:

- 1) human capital
- 2) structural capital
- 3) customer capital

Whereas, The European Commission classifies IC the same as above except for customer capital which is replaced by relationship capital [25]. In [20], the researcher has developed the 4-Leaf model which classifies IC into strategic alliance capital, structural capital, customer and most importantly human as a key player. The

latter includes those that derive the monetary values through the use of financial ratio beside the dollar value of IC. Selective list key non-dollar valuation of IC models are shown below:

- Balance Scorecard[22]
- Technology Broker Method [5]
- Skandia IC Report Method [12]
- IC-Index [33]
- Intangible Asset Monitor approach [37]
- Heuristic Frame [17]
- Vital Sign Scorecard [39]
- Ernst & Young Model [2]

The key dollar valuation of IC models are:

- EVA and MVA Model [3]
- Market-to-Book Value Model [33]
- Tobin’s q Method [21]
- Pulic’s VAICTM Model [28, 30]
- Calculated Intangible Value [11]
- Knowledge Capital Earnings Model [19]

This current study applied Pulic’s VAICTM Model [28, 30] to measure the IC efficiency. According to [29], a method which supplies value creation efficiency information of both company’s tangible and intangible assets can be examined by using VAIC which consists of capital employed efficiency, human capital efficiency and structural capital efficiency. Firm’s performance alternatively was hypothesized by considering the Return on Asset (ROA) value. Annual reports from 31 companies categorized as IPS were chosen to be analyzed. Our study will attempt to answer whether the existence of association occurs among these factors towards Industrial product sector companies’ performance.

Research Objectives

- i. To examine the relationship between selected independent variables, Value Added Human Capital Coefficient, (VAHC), Value Added Structural Capital,(STVA) VAHC, Value Added Capital Employed, (VACA) and dependent variable, Return on Assets (ROA).
- ii. To analyze the most significant factor that determines the ROA.

Intellectual Capital, Human Capital, Structural Capital, Capital Employed and Firm’sPerformance

This research uses panel data set which is collected on a yearly basis from year 2006 until 2014. The sample was collected from the Bursa Malaysia portal and the data is based on historical accounting from annual reports.

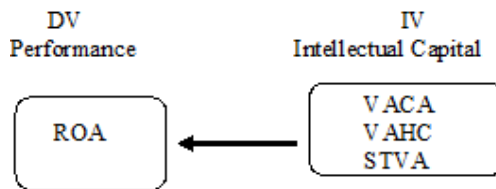


Figure 1: Theoretical framework

ROA is a financial tool in evaluating the effectiveness of company’s assets in generating return or profit. In general, this ratio is being used beside other ratios by investors and potential investors in evaluating a company’s management in spending each RM1 invested in the company’s assets to generate profit. This accounting measure has become the common acceptance in weighing company’s performance. [10].VAICTM model introduced by [30] supports the firm to extend its value creation competence. VAIC technique used firm’s financial statements in calculating the competency coefficient of three categories of capital that are human capital, structural capital and capital employed. In [30] acknowledged that firm’s market value has been created by capital employed including physical, financial and intellectual capital. VAIC of a firm can be calculated by means of following these 5 steps.

Step 1

Calculation of value added (VAit) by all the resources during the ‘t’ period of time.

OUTPUTit = Total income from all products and services sold during the period of t.

INPUT_t = All expenses (except labor, taxation, interest, dividends and depreciation) incurred by the firm for the period of t.

$$VA_{it} = OUTPUT_{it} - INPUT_{it} \quad (1)$$

Theory of stakeholder [30] discloses how value added by a firm during a particular period via a calculation. The theory recommends that everyone has an interest or stake holding in the firm for the reason that what a firm does will affect and be affected to them. The theory urges that a firm activity does have an impact on everyone who has a stake holding in the firm. The interested parties or 'stakeholder' do not confine to only employees, vendors, directors, customers, government but also the community members as a whole. According to [31], firm's value added can be expressed by the following formula through a particular period. The formula is as follows:

$$R = S - B - DP - W - I - D - T \quad (2)$$

where R is retained earnings for the period, S is net sales revenue, B is cost of goods sold plus all expenses (except labor, taxation, interest, dividends and depreciation), W is employees' salaries and wages, I is interest expenses, D is dividend paid to shareholders and T is taxes.

Step 2

The calculation of Value Added Capital Employed Coefficient (VACA_{it})

$$VACA_{it} = VA_{it} / CA_{it} \quad (3)$$

$$CA_{it} = \text{Total Assets} - \text{Intangible Assets at the end of 't' period} \quad (4)$$

VACA_{it} = The value created by one unit of capital employed during the 't' period

Step 3

Calculation of Value Added Human Capital Coefficient (VAHC_{it})

$$VAHC_{it} = VA_{it} / HC_{it} \quad (5)$$

HC_{it} = Investment in Human Capital during the 't' period or total salary and wages including all incentives.

VAHC_{it} = Value added by one unit of Human Capital invested during the period of 't'

Step 4

Calculation of the value added structural capital coefficient (STVA_{it})

$$STVA_{it} = SC_{it} / VA_{it} \quad (6)$$

$$SC_{it} = \text{Structural capital} (VA_{it} - HC_{it}) \quad (7)$$

STVA_{it} = The proportion of total VA accounted by structural capital.

Step 5

Calculation of the value added Intellectual Coefficient (VAIC_{it})

$$VAIC_{it} = VAHC_{it} + VACA_{it} + STVA_{it} \quad (8)$$

VAIC_{it} = Indicate corporate value creation efficiency on firm resources.

Hypothesis

From this study, there are three hypotheses developed in analyzing the relationship of two or more variables before getting the true result. So, these hypotheses will be tested in order to determine the result and compared to predicted result. The hypotheses will be divided into two types of hypotheses which are null hypothesis (H₀) and alternate hypotheses (H₁). The null hypothesis (H₀) acts as no significant relationship between two variables. The null hypothesis (H₀) will be accepted during the result of t-value if it is less than the critical value. Otherwise, the alternate hypothesis (H₁) will be accepted and expressed as a proven of relationship for two variables. Therefore, from the literature reviews the study had come out with three hypotheses as follows:

H1: There is a significant relationship between Human Capital and Performance.

H2: There is a significant relationship between Structural Capital and Performance.

H3: There is a significant relationship between Capital Employed and Performance.

FINDINGS AND DISCUSSION

The data exhibit the result of descriptive statistics, which summarized the variation of the data size.

Table 1: Descriptive statistic

Stats	ROA	VAHC	STVA	VACA
Mean	0.445	10.906	0.333	0.139
Max	1	5.688	1.635	8.334
Min	-2.038	-4.440	-5.991	-9.231
Sd	0.206	1.510	0.754	1.791
Var	1.615	2.281	0.569	3.207

From the table, mean value of performance is 0.445. While for each explanatory variable, human capital, structural capital and capital employed is 10.906, 0.333 and 0.139 respectively. Variance is the indicator to variation of data spread from the performance of distribution of the numbers of observation. The variance will influence the Ordinary Least Square (OLS) regression which is affected by sample size of the study. The result shows structured capital has the smallest value of variance that is 0.569.

Table 2: Statistical problem analysis

	ROA	VAHC	STVA	VACA
ROA	1.000			
VAHC	0.219	1.000		
STVA	0.443	0.034	1.000	
VACA	0.435	0.135	0.175	1.000

The correlation between variables above shows the existence of a positive relationship between return on asset with all of the variables such as human capital, structural capital and also capital employed.

Table 3: Pooled ordinary least square

Source	SS	df	MS			
Model	65.9012243	3	21.9670748	Number of obs =	181	
Residual	228.005025	177	1.28816398	F(3, 177) =	17.05	
Total	293.90625	180	1.6328125	Prob > F =	0.0000	
				R-squared =	0.2242	
				Adj R-squared =	0.2111	
				Root MSE =	1.135	

	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lroa						
lvahc	.3935431	.0839264	4.69	0.000	.227918	.5591682
lstva	-.1341159	.1865837	-0.72	0.473	-.5023308	.234099
lvaca	.2255936	.0482411	4.68	0.000	.1303919	.3207953
_cons	-3.303691	.2692172	-12.27	0.000	-3.834979	-2.772402

The POLS shows the combination of both time series and cross sectional data which has a longer time horizon and more than one entity. The data is significant at the 5% level. We can see from the table that two variables namely VAHC and VACA are significant at the 5% level to the performance, while STVA shows otherwise.

Breusch and Pagan Lagrangian multiplier test for random effect

$$lroa [code, t] = xb + \mu [code] + e [code, t]$$

Table 4: Breusch and Pagan Lagrangian multiplier test

	Var	Sd = sqrt (Var)
lroa	1.632812	1.277816
e	0.3621448	0.6017847
μ	1.587618	1.260007

Test: $Var(\mu) = 0$
 Chi² (1) = 117.58
 Prob > chi² = 0.000

Based on the result from Breusch and Pagan Lagrangian multiplier above, the value of prob<chi² is 0.000 which is less than 0.05 and it is significant. In conclusion, we reject null hypothesis thus the Random Effect Model will be applied.

Table 5: Random effect model

Random-effects GLS regression	Number of obs	=	181
Group variable: code	Number of groups	=	30
R-sq: within = 0.6186	Obs per group: min =		1
between = 0.1819	avg =		6.0
overall = 0.1278	max =		9
Random effects u_i ~ Gaussian	wald chi2(3)	=	232.40
corr(u_i, X) = 0 (assumed)	Prob > chi2	=	0.0000

lroa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
lvahc	.1705499	.0808114	2.11	0.035	.0121625	.3289374
lstva	-.0578096	.1130647	-0.51	0.609	-.2794124	.1637932
lvaca	.778722	.0837489	9.30	0.000	.6145771	.9428669
_cons	-1.601209	.4326337	-3.70	0.000	-2.449155	-.753262
sigma_u	1.260073					
sigma_e	.60178468					
rho	.81426217	(fraction of variance due to u_i)				

The Generalized Least Squares (GLS) regression is applied to cure autocorrelation and heteroskedasticity problems that exist in OLS Regression. The table shows the probability of chi² is less than 0.05. Therefore, the overall model is significant. While, the probability of p>z indicates VAHC and VACA are less than 0.50. Thus, Hausman fixed test will be used.

Table 6: Hausman Effect Model

	Coefficients		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) fixed	(B) .		
lvahc	-.0116208	.1705499	-.1821708	.0466284
lstva	-.0625361	-.0578096	-.0047265	.
lvaca	1.012135	.778722	.2334135	.0604081

b = consistent under Ho and Ha; obtained from xtreg
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(3) &= (b-B)' [(V_b-V_B)^{-1}] (b-B) \\ &= \mathbf{14.31} \\ \text{Prob}>\text{chi2} &= \mathbf{0.0025} \\ &(\text{V}_b\text{-V}_B \text{ is not positive definite}) \end{aligned}$$

Hausman fixed test result is significant at the 5.0% level. Thus, the null hypothesis will be rejected. In conclusion, fixed effect model will be employed.

The data collected has been tested using various techniques in order to come out with the precise result as shown by the p-value of the z-test. From the result, it was similar to the result obtained in POLS earlier. However, the value difference is only small. Two of the explanatory variables namely human capital and capital employed are significant, while structural capital is not significant.

CONCLUSION AND RECOMMENDATIONS

With the globalization of the world, organizations continuously confronted global competition. In building and sustaining their competitive advantage, workforce needs to be viewed as a resource that is critical and strategic beside knowledge and expertise of an organization.

The purpose of this research is to explore the three elements intellectual capital's efficiency in the IPS and their relationships with the company's performance. The study utilizes the data of 31 company annual reports

which were listed on Bursa Malaysia. These companies represent 12% of the total 260 companies in the industrial product sector.

Some other similar study done by [13] from year 2001 to 2003 on Malaysian commercial banks claimed the existence of significant difference between rankings of Malaysian banks according to intellectual capital performance/efficiency which measured via VAICTM and traditional performance, which represented by assets, net profit and shareholders' equity. It was found that Maybank which is the largest bank in terms of assets, net profit and shareholders' equity had a lower intellectual coefficient. However, he found not only for domestic banks but also foreign banks in Malaysia, the performance of human capital is higher than those of structural and physical capital. In short, service sector like financial institutions emphasize the importance of human capital performance.

As the result from the entire tests been employed, 2 variables proved to have an influence on performance of Industrial Product Sector (IPS) companies in Malaysia that are human capital and capital employed. This result is strongly supported by [8, 9, 27, 32, 4] who also indicate the existence of the relationship between IC and the performance of the organization.

In general, it can be concluded that the sample of 31 selected companies observed by IC mechanism using human capital and capital employed in this study which been assessed by the model, resulted in systematic variation in IPS performance. Therefore, it is approved that the IC mechanism such as human capital and capital employed can give impact suitably on maximizing IPS's value performance.

This study suggests that IC linked to companies' productivity growth. IPS which continuously act as the backbone of Malaysia economic prosperity should give more focus on its intangibles so that the IC can prosper well in companies' structure to give effect on companies' performance. As such emphasis by the Prime Minister, this IC can be a comparative weapon to successfully compete locally and globally.

It is recommended to further the analysis in exploring the role of the IC to include market-based performance measure such as market to book ratio and economic value added since this study omits the market-based measurement in determining the performance.

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