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## The impact of intellectual capital on companies' performances: A study based on MAKE Award Winners and non-MAKE Award winner companies

LI Zhicheng<sup>a</sup>, CHEN Zhuoer<sup>a</sup>, LUI Trevor Tin Shing<sup>a</sup>, Dr. CHU Samuel Kai Wah<sup>a</sup> \*

<sup>a</sup>Faculty of Education, The University of Hong Kong, Pok Fu Lam Road, Hong Kong

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### Abstract

Organizations believe that obtaining a knowledge management award will not only promote their brands but also enhance their business performance. However, this may or may not be the case as there is no definitive evidence that winning such an award would improve an organization's business performance. The purpose of this study is to explore whether companies that have received the Most Admired Knowledge Enterprise (MAKE) Award boast a better business performance than those that did not get the award (non-MAKE winner companies).

This research involves a quantitative analysis of business performance conducted based on the data collected from fifty-nine previous MAKE winners and fifty-nine comparable non-MAKE winner companies according to their market capitalization to identify similarities and differences. This study is limited by its small sample size and the difficulty of identifying the comparable companies as many award winning companies already receive world-class recognition.

Based on the data analysis, capital efficiency (CEE) shows much higher explanatory power in the regression among MAKE award winners than their counterparts. Human capital efficiency (HCE) and value added intellectual capital (VAIC) are negatively correlated with ATO in non-MAKE winner companies. However, such correlation is not found in MAKE-award winners. Further implications are discussed in this paper.

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\* Corresponding author. Tel.: +852-2241-5894; fax: +852-2241-5894.  
*E-mail address:* [samchu@hku.hk](mailto:samchu@hku.hk)

## 1. Introduction

An increasing number of companies put more emphasis on their intangible assets as they are regarded as a company's core competencies, as well as the main source of competitive advantage, in today's business context. In the literature, various models and methods have been built to measure one of the components of such intangible assets – intellectual capital (IC). However, a universally acceptable measure is still absent (Leon, 2012). As IC is hard to be quantified, traditional methods may not be suitable<sup>53,2</sup>. Among the IC-measuring models developed, the Value Added Intellectual Coefficient (VAIC) model created by Public in 2000, is one of the most widely adopted, thanks to its ease of calculation and objectiveness<sup>8,18</sup>.

Meanwhile, in order to “identify organizations which are outperforming their peers by above average growth in intellectual capital and wealth creation”, Teleos and The KNOW Network established the Global Most Admired Knowledge Enterprises (MAKE) research program in 1998 (MAKE, 2015). It has become an effective award system on the regional, national and global levels.

### 1.1. Problem statement

Thomas Stewart (1998, p.56), a pioneer in the field of intangible assets, defined IC as “intellectual material - knowledge, information, intellectual property, experience - that can be put to use to create wealth”. Today, IC plays an increasingly crucial role in knowledge management and a growing number of scholars and practitioners concentrate on both practical and theoretical aspects of IC due to its increasing significance in survival and growth of corporations<sup>2</sup>.

However, a universally acceptable measure of IC is still absent and there is no definite conclusion about the association between IC and companies' performance. Thus it raises a problem whether those companies which win MAKE award perform better than Non-MAKE award companies.

Based on previous studies, this study will employ four accounting ratios: market valuation (MB), profitability (ROA), return on equity (ROE) and productivity (ATO) as the four proxies of corporate business performance to dig out the potential relationship between intellectual capital and performance. The analysis will be carried out in the context of listed MAKE award recipients and their comparable non-MAKE award recipients.

### 1.2. Purpose of this study

This study aims to empirically gauge the impact of IC as measured by VAIC and its components on business performance in the context of selected listed MAKE-award winners and their comparable Non-MAKE recipient counterparts from 2009 to 2014. Besides, by comparing the IC utilization between MAKE award corporations and non-MAKE recipient counterparts, this study will try to examine the relationship between VAIC and the four proxies of business performance. Moreover, the value of IC components and how synergies contribute in the value creation process will be explored in this paper.

### 1.3. Significance of the study

This paper provides a further empirical evidence about the IC utilization of MAKE winners and the non-MAKE award corporations, which may inspire some insights for the KNOW Network. In addition, it could provide empirical evidence of the dependability and reliability of using VAIC as an IC-measuring model to testify the performance of both IC management and utilization of an organization.

## 2. Literature review

There has not been a great deal of research conducted on the validity of the MAKE Award, though examining the results of the preexisting studies could prove valuable. This study provides empirical evidence of the dependability and reliability of using VAIC as an IC-measuring model to testify the performance of both IC management and

utilization of an organization. This part reviews the definition of IC and its qualitative and quantitative measurements. Then we review and discuss the VAIC model and its shortcomings and performance.

### 2.1. Intellectual capital

Along with the advancement of technology, the world is entering into the Information Era where knowledge is now recognized as the driver of productivity and economic growth while information, technology, and learning have taken a vital role in the establishment of a knowledge-based economy (OECD, 1996). Under this situation, the concept of Intellectual Capital (IC), which was often undervalued by companies before has started to play an increasingly important part in the business world recently.

As an important concept, however, the framework, management method and even definition of IC vary in different research. For instance, the term 'IC' is not fixed and sometimes used interchangeably with 'intangible assets', 'intellectual assets' and 'knowledge assets'<sup>14</sup>. Although it is generally agreed that IC refers to a series of intangible resources of an organization which can be used to create value for the company<sup>1,41,42,47</sup>, the content of IC remains different. Various models were designed based on different points of view of the scholars and were used to demonstrate the components of IC and the relationship between these elements for further explanations and investigation. These frameworks differ since the focus and assumptions behind are not the same. For instance, the model put forward by Sullivan (Sullivan, 1998) was considered as a model which mainly stressed on human resources<sup>22</sup> whereas Carlucci<sup>6</sup> focuses more on maintaining companies' competitive advantages<sup>6</sup>.

Although there have been many IC models introduced recently, it can be observed that all these models consist of three common core elements namely 'Human Capital', 'Structural Capital' and 'Customer Capital'. 'Human Capital' refers to the ability, knowledge, skills of every individual such as one's commodity, leveraged and proprietary skills, 'Structural Capital' refers to the capability and competency of the organization in gathering knowledge such as strategy, systems, and culture, and 'Customer Capital' refers to the tie between the company and its target customer such as customers' loyalty<sup>14</sup>. In the light of these capitals or assets, administrators would be in a better position to identify the capacities of individuals or the company as a whole and formulate appropriate plans and strategies to cater for the needs of customers. Senior came up with the notion of intellectual capital in 1836 and held the view that intellectual capital includes the knowledge and skills owned by individuals. Edvinsson and Malone<sup>16</sup> claimed that human capital (HC) and structural capital (SC) are different from intellectual capital. Stewart<sup>45</sup> divided IC into three basic forms: HC, SC and customer capital (CC). Leliaert et al.<sup>28</sup> in 2003 proposed a 4- Leaf Model and added the strategic alliance capital (SA) alongside. Marr and Moustaghfir<sup>31</sup> utilized a systematic review process and provided a three-dimensional model--component parts of the construct; role IC will take in an organization; and disciplinary perspective, to define IC.

### 2.2. Measurement of IC

Though there are various methods for measuring IC, a universally acknowledged measure is still absent. There are several researchers have categorized the methods of IC measurements by a different way. For instance, Sveiby (2010)<sup>50</sup> has categorized forty-two methodologies for valuing intangible assets into four groups: direct IC methods, Return-on-assets method, market capitalization methods and scorecard methods. And in this paper, we separated them into qualitative and quantitative methods.

#### 2.2.1. Qualitative measures

Kaplan and Norton (1998) proposed the balanced scorecard (BSC) model to measure organizational performance. As BSC is a comprehensive method to measure the overall performance of the company, it is not specific enough on measuring IC. The Skandia IC report was developed to use 112 metrics to measure the five specific topics--financial, customer, human, process and renewal and development. However, this report does not consider the monetary value of IC. Roos et al.<sup>41</sup> further studied Skandia's metrics and clarified some interpretations about what each metric might represent an organization, yet the study is rather context-specific. Joia (2000) developed a new formula and claimed that  $IC = HC + Innovation\ Capital + Process\ Capital + Relationship\ Capital$ . A Three-step

model to measure IC was proposed by Kannan and Aulbur<sup>24</sup> in which the three steps are: identification and awareness, systems and output measures, and outcome measures of tangible financial returns.

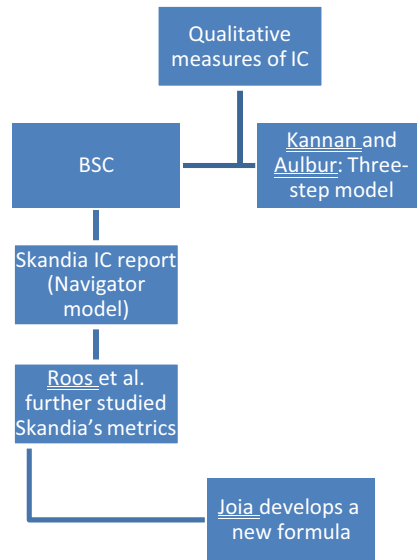


Fig. 1. Qualitative measurements.

### 2.2.2. Quantitative measures

Stem Stewart used Economic value added (EVA) to measure the comprehensive performance. However, as EVA concentrates on maximizing incremental earnings over capital costs, which may imply that there are no specific measures of intangible assets.

Stewart and Edvinsson<sup>45,15</sup> assumed that the value of IC depends on the differences between the book value and the market value of the firm. However, the value of IC may fluctuate dramatically due to the variation of shares price.

Luthy used Tobin's Q to measure IC. Tobin's Q is essentially the same as the market-to-book ratio except that it uses replacement cost of tangible assets rather than book value of tangible assets in the calculation. Under these circumstances, IC will be affected by the stock price.

Pulic<sup>40</sup> used the "Value Added Intellectual Coefficient" (VAIC) to measure IC and believed that the company's ability to create value is a crucial factor to measure the value of IC. Lev and Feng's methodology was based on the concept of "production function". However, this model requires the earnings of firms in the calculations.

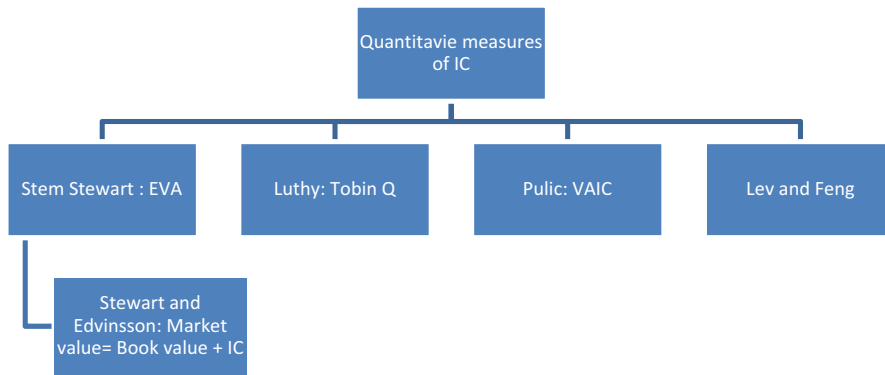


Fig. 2. Quantitative measures.

### 2.3. VAIC model and limitations

Pulic<sup>40</sup> firstly came up with the notion of VAIC in 2000. As one of the promising approaches, VAIC has been widely used not only for academic purposes but also in the business context<sup>8,18</sup>.

#### 2.3.1. The VAIC model

VAIC consists of three elements: human capital efficiency (HCE), structural capital efficiency (SCE) and capital efficiency (CEE)<sup>40</sup>. Within the context of VAIC, these components help organizations to interpret the value added process. An organization with high VAIC indicates a high-level of value creation.

Measuring different firms under various contexts was impossible before the VAIC approach emerged. The VAIC model is broadly used as its calculation is simple and all necessary information could be easily obtained in companies' financial reports. Moreover, the approach is standardized and consistent so that comparing different companies from various sectors becomes possible<sup>43</sup>.

#### 2.3.2. Limitations of the VAIC model

One of the limitations of the VAIC model is the impact of negative values which the model is incapable of handle. Furthermore, the VAIC model could not depict the interaction between the three components in the value creation process<sup>25</sup>. In addition, as the utilization of capital differs from different sectors, comparing capital intensive and non-capital intensive industries is not reasonable<sup>46</sup>.

In order to overcome these limitations, Iazzolino<sup>20</sup> offered the idea to measure IC by combining EVA and VAIC as EVA corresponds to the shareholders' side and VAIC corresponds to the stakeholders' side. However, as the structure of company could fluctuate dramatically and the exact amount of investment is hard to determine, it does not substitute the VAIC model.

### 2.4. IC and business performance

Investigating the correlation between IC and business performance measured by VAIC and the performance indicators ROA and ATO in South African companies, Firer and Williams<sup>18</sup> found that physical and financial capital play pivotal roles in corporate business performance. During 1992-2002, Chen<sup>10</sup> observed 4254 listed companies and found that IC is positively associated with a market value. This is supported by Shiu's research which shares similar findings with Firer and Williams<sup>18</sup>.

A study on the impact of IC on business performance was conducted by Chan<sup>8,9</sup> based on the listed companies of the Hang Seng Index from 2001 to 2005. The results showed that there is no correlation between IC and financial

performance. Similar research was carried out by Chu (2011), who used data from all listed companies of Hang Seng Index in Hong Kong from 2001-2009 to observe the association between VAIC and profitability. Chu claimed that VAIC and profitability are positively correlated.

In the United Kingdom, Zeghal and Maaloul<sup>53</sup> observed 300 UK firms in 2005 to study the impact of IC on financial performance. VAIC model was also applied in the banking sector in Austria<sup>40</sup>, Japan<sup>32</sup>, Thailand and Malaysia. However, as the circumstances of these banks vary greatly, the correlation between IC and performance indicators needs further study.

### 3. Methodology

This paper employed a quantitative method, regression models, to identify a potential correlation between IC and business performance. IC is measured by VAIC and business performance is represented by its four proxies: MB, ROA, ROE, and ATO. Several regression models are designed to determine the association between VAIC and four proxies and the potential relationship between the components of VAIC and the four indicators.

#### 3.1. Sample selection

Fifty-nine listed MAKE award companies and 59 comparable non-MAKE award recipient counterparts (118 in total) composed the sample size of this paper. The 59 listed MAKE award companies were selected according to the following criteria:

- Financial data publicly available from 2009-2014 (company listed before 2009);
- Could be compared with a non-MAKE award recipient counterpart with similar market capitalization in the same industrial sector.
- The 59 comparable non-MAKE award recipient counterparts were selected according to the following criteria:
- Financial data publicly available from 2009-2015 (company listed before 2009);
- Could be compared with a MAKE award company with similar market capitalization in the same industrial sector.
- There are three limitations of the above criteria:
- As market capitalization varies from industry to industry, a consistent standard range of market capitalization for selecting the counterpart companies is not possible.
- Shares of market capitalization fluctuate frequently so the compatibility of counterpart companies could change.

Selecting counterparts' criteria for comparison mainly relies on the similar sector and market capitalization which may not be objective enough. Some other factors such as earning before interests and taxes (EBIT) or the number of employees would be added for consideration. However, as the comparable data is hard to be attained, this paper does not include such criteria.

#### 3.2. Research questions and hypothesis

Three research questions were developed to identify the association between IC (measured by VAIC) and business performance (measured by the four proxies) in MAKE award companies and their comparable non-MAKE award recipient counterparts.

Research questions:

Q1. Do MAKE award winners exhibit higher VAIC than non-MAKE award recipients?

Q2. Do MAKE award winners exhibit better performance than non-MAKE award recipients?

Q3. Which IC components are associated with four proxies of performance as measured by MB, ROA, ROE and ATO in MAKE award recipients and non-MAKE award recipients?

Based on the research questions, three research hypotheses are raised.

Research Hypothesis:

Companies with higher VAIC may indicate that they are efficient in using IC<sup>40</sup>. Therefore, H1. MAKE award winners have higher VAIC than non-MAKE award counterparts.

Along with the previous studies, which show different opinions about the relationship between IC components and corporate business performance<sup>8,9</sup>, this paper assumes that there could be potential associations between IC and performances.

H2a. MAKE award winners with higher VAIC generate higher MB, ROA, ROE, and ATO.

H2b. Non-MAKE award winners with higher VAIC generate higher MB, ROA, ROE, and ATO.

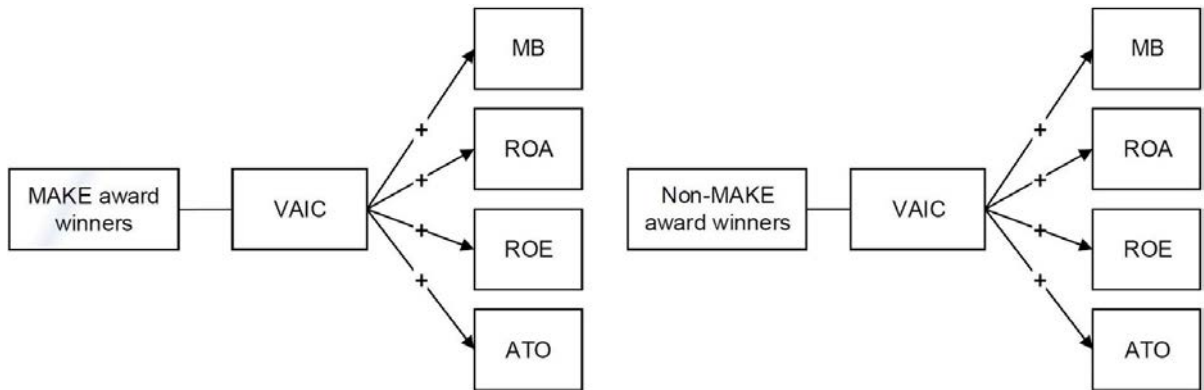


Fig. 3. Hypothesis 2.

VAIC is composited with HCE, SCE, and CEE. ICE is the sum of HCE and SC<sup>40</sup>. It is reasonable to investigate which components may affect the performance.

H3a.HCE is positively associated with MB, ROA, ROE, and ATO in MAKE award winners.

H3b.SCE is positively associated with MB, ROA, ROE, and ATO in MAKE award winners.

H3c.CEE is positively associated with MB, ROA, ROE, and ATO in MAKE award winners.

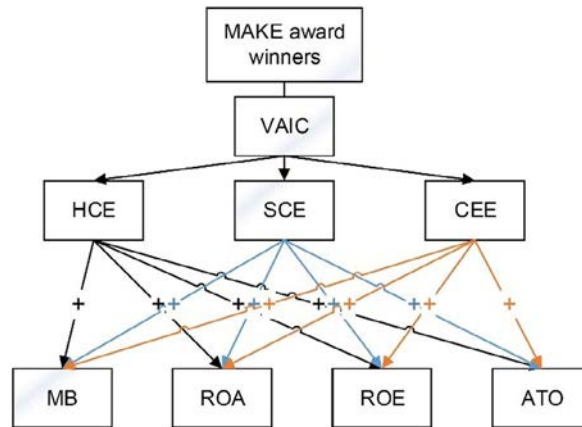


Fig. 4. Hypothesis 3.

H4a.HCE is positively associated with MB, ROA, ROE, and ATO in non-MAKE award winners.  
 H4b.SCE is positively associated with MB, ROA, ROE, and ATO in non-MAKE award winners.  
 H4c.CEE is positively associated with MB, ROA, ROE, and ATO in non-MAKE award winners.

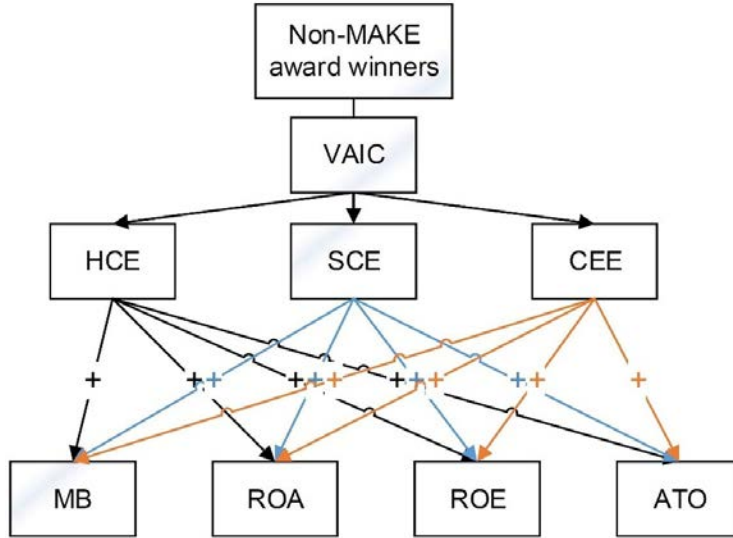


Fig. 5. Hypothesis 4.

H5a.ICE is positively associated with MB, ROA, ROE, and ATO in MAKE award winners.  
 H5b.ICE is positively associated with MB, ROA, ROE, and ATO in non-MAKE award winners.

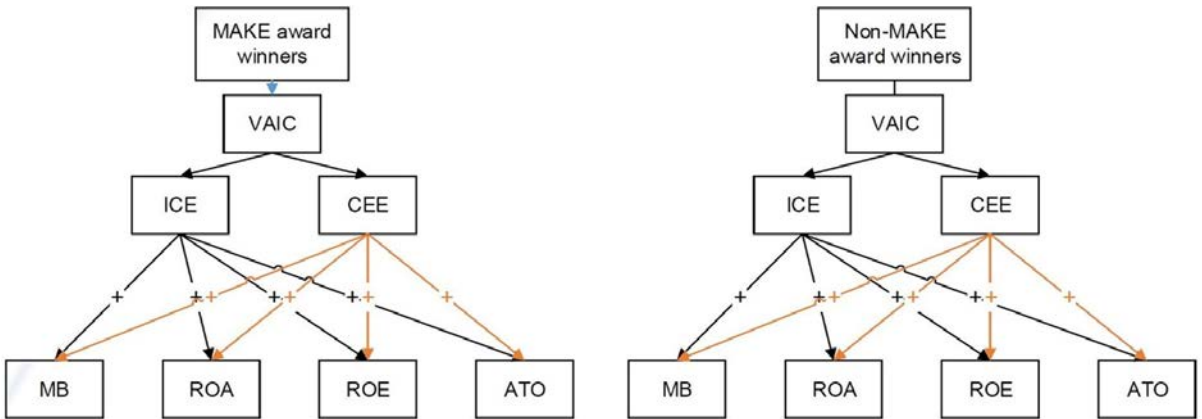


Fig. 6. Hypothesis 5.



### 3.3. Data collection and analysis

Data is collected from the 118 listed companies’ annual financial reports from 2009-2015. All of the data are collected from financial annual reports in uniform and traceable. The data are proved to be valid and reliable. After collecting the raw data, the values will be calculated strictly from the equations which will be clarified later. Then those values will be inputted into the models to run the analysis. The total of twelve regression models are developed to examine the association between VAIC and its components with the four proxies.

Table 1. Regression models.

Model	Regression Equation
1	$MB_i = \beta_1 VAIC + \beta_2 FSIZE_i + \beta_3 DEBT_i + \mu_i$
2	$ROA_i = \beta_1 VAIC + \beta_2 FSIZE_i + \beta_3 DEBT_i + \mu_i$
3	$ROE_i = \beta_1 VAIC + \beta_2 FSIZE_i + \beta_3 DEBT_i + \mu_i$
4	$ATO_i = \beta_1 VAIC + \beta_2 FSIZE_i + \beta_3 DEBT_i + \mu_i$
5	$MB_i = \beta_1 HCE_i + \beta_2 SCE_i + \beta_3 CEE_i + \beta_4 FSIZE_i + \beta_5 DEBT_i + \mu_i$
6	$ROA_i = \beta_1 HCE_i + \beta_2 SCE_i + \beta_3 CEE_i + \beta_4 FSIZE_i + \beta_5 DEBT_i + \mu_i$
7	$ROE_i = \beta_1 HCE_i + \beta_2 SCE_i + \beta_3 CEE_i + \beta_4 FSIZE_i + \beta_5 DEBT_i + \mu_i$
8	$ATO_i = \beta_1 HCE_i + \beta_2 SCE_i + \beta_3 CEE_i + \beta_4 FSIZE_i + \beta_5 DEBT_i + \mu_i$
9	$MB_i = \beta_1 ICE_i + \beta_2 CEE_i + \beta_3 FSIZE_i + \beta_4 DEBT_i + \mu$
10	$ROA_i = \beta_1 ICE_i + \beta_2 CEE_i + \beta_3 FSIZE_i + \beta_4 DEBT_i + \mu$
11	$ROE_i = \beta_1 ICE_i + \beta_2 CEE_i + \beta_3 FSIZE_i + \beta_4 DEBT_i + \mu$
12	$ATO_i = \beta_1 ICE_i + \beta_2 CEE_i + \beta_3 FSIZE_i + \beta_4 DEBT_i + \mu$

Note. In these models, firm size (FSIZE) and firm leverage (DEBT) are controlled. Models 1 to 4 is designed to test the hypotheses H2a to H2b. Models 5 to 8 are designed to test the hypotheses H3a to H4c. Models 9 to 12 are designed to test the hypotheses H5a to H5b.

#### 3.3.1. Variables

- Dependent variables

The four proxies serve as the dependent variables: dimensions of profitability (ROA), productivity (ATO), market valuation (MB) and return on equity (ROE) of a company’s business performance<sup>8,13</sup>.

- Independent variables

The independent variables are HCE, SCE, and CEE. According to Public<sup>40</sup>, the values of the independent variables could be calculated from financial reports as follows:

Step 1. Identifying a company’s value creation competence. VA=revenue-cost of products-operational cost-employee cost  
 Step 2. Calculating HCE, SCE, and CEE

$$HCE = VA / \text{total employee costs} \quad SCE = (VA - \text{total employee costs}) / VA$$

$$CEE = VA / \text{book value of physical and financial assets} \quad ICE = HCE + SCE$$

Step 3. Calculating VAIC VAIC=HCE+SCE+CEE

$$VAIC = HCE + SCE + CEE$$

- Control variables

The two control variables are firm size (FSIZE) and firm leverage (DEBT).

Table 2. Variables.

Variable	Type	Dimension	Computation
MB	Dependent variable	Market valuation	MB = market capitalization/ equity (Chu et al., 2011)
ROA	Dependent variable	Profitability	ROA= Net income (NI) / book value of assets (Firer, 2003)
ROE	Dependent variable	Return on equity	ROE= NI / book value of equity (Chan, 2009)
ATO	Dependent variable	Productivity	ATO= Total revenue/ total book value of assets (Chan, 2009)
HCE	Independent variable	Human capital efficiency	HCE= VA/ total employee costs (Public, 2000)
SCE	Independent variable	Structure capital efficiency	SCE= (VA-total employee costs)/ VA (Public, 2000)
ICE	Independent variable	Intellectual capital efficiency	ICE = HCE + SCE = VA/ total employee costs + (VA-total employee costs)/ VA (Public, 2000)
CEE	Independent variable	Capital efficiency	CEE= VA / book value of physical and financial assets (Public, 2000)
VAIC	Independent variable	Value added by intellectual capital	VAIC=HCE+SCE+CEE (Public, 2000)
FSIZE	Control variable	Company size	Market capitalization
DEBT	Control variable	Leverage	Total debt

### 3.4. Results

#### 3.4.1. MAKE award companies

R Square tells how much of the variance in the dependent variable is explained by the model<sup>36</sup>. From the analysis, the R square in each model is not significantly large. It may hint that those models do not perfectly match the associations between different indicators. Though it could not be a respectable value, it explains the relationship to some extents. It proves that those components will exert influence on the performance.

In addition, some positive correlations are detected. CEE is proved to be positively associated with ROA, ROE, and ATO. SCE is positively associated with ROA and ROE. Because the Sig. values of them are less than 0.005, which indicates the variables is making a significant unique contribution to the prediction of the dependent variable<sup>36</sup>.

Though HCE is irrelevant with all four proxies, the p-value between HCE and ROE is slightly higher than the required p-value. It may indicate HCE could make a contribution to the prediction of ROE, through the effect maybe not significant.

Table 3. Summary of regression model on MAKE award companies.

Model	Independent variables	Dependent variables	R square	Results		Conclusion
					P-value	
1	VAIC	MB	0.064	VAIC: 0.423		Irrelevant.
2	VAIC	ROA	0.011	VAIC: 0.707		Irrelevant.
3	VAIC	ROE	0.022	VAIC: 0.14		Irrelevant.
4	VAIC	ATO	0.049	VAIC: 0.409		Irrelevant.
5	SCE, CEE, HCE	MB	0.069	SCE:0.355;CEE:0.428; HCE:0.743		Irrelevant.
6	SCE, CEE, HCE	ROA	0.193	SCE:0.00001;CEE:0.00001; HCE:0.054		Both SCE and CEE are positively associated with ROA.
7	SCE, CEE, HCE	ROE	0.100	SCE:0.000257;CEE:0.00001;H CE:0.009		Both SCE and CEE are positively associated with ROE.
8	SCE, CEE, HCE	ATO	0.165	SCE:0.044;CEE:0.0004; HCE:0.186		CEE is positively associated with ATO.
9	CEE, ICE	MB	0.067	ICE:0.455; CEE:0.319		Irrelevant.
10	CEE, ICE	ROA	0.141	ICE:0.982; CEE:0.00003		CEE is positively associated with ROA.
11	CEE, ICE	ROE	0.068	ICE:0.196; CEE:0.00003		CEE is positively associated with ROE.
12	CEE, ICE	ATO	0.156	ICE:0.599; CEE:0.00002		CEE is positively associated with ATO.

3.4.2. Non-MAKE award companies

Though the values of R square in different models are not at a high level among Non-MAKE companies, they are higher than MAKE award companies, which may indicate that those models work better in Non-MAKE companies.

From model 1-4, it shows that VAIC is negatively associated with ATO. However, contrary to the previous assumption, the relationship is negative rather than positive.

From model 5-8, the results indicate that SCE, CEE are positively correlated with ROA. CEE is positively associated with ATO. HCE is negatively correlated with ATO.

In the model 9-12, CEE is proved to be positively correlated with ATO and ROA as well. Moreover, ICE inserts negative impact on ATO.

Table 4. Summary of regression model on non MAKE award companies.

Mode l	Independent variables	Dependent variables	R square	Results		Conclusion
					P-value	
1	VAIC	MB	0.037	VAIC: 0.938		Irrelevant.
2	VAIC	ROA	0.109	VAIC: 0.190		Irrelevant.
3	VAIC	ROE	0.034	VAIC: 0.398		Irrelevant.
4	VAIC	ATO	0.114	VAIC: 0.000		VAIC is negatively related ATO
5	SCE, CEE, HCE	MB	0.041	SCE:0.219;CEE:0.729; HCE:0.493		Irrelevant.
6	SCE, CEE, HCE	ROA	0.261	SCE:0.00001;CEE:0.00001; HCE:0.032		SCE & CEE are positively related to ROA
7	SCE, CEE, HCE	ROE	0.038	SCE:0.272;CEE:0.0972;HCE:0.626		Irrelevant.
8	SCE, CEE, HCE	ATO	0.242	SCE:0.485; CEE:0.0000; HCE:0.000		CEE is positively related to ATO and HCE is negatively related to ATO
9	CEE, ICE	MB	0.037	ICE:0.887; CEE:0.716		Irrelevant.
10	CEE, ICE	ROA	0.218	ICE:0.962; CEE:0.000		CEE is positively related to ROA
11	CEE, ICE	ROE	0.035	ICE:0.269; CEE:0.469		Irrelevant.
12	CEE, ICE	ATO	0.241	ICE:0.000; CEE:0.000		CEE is positively related to ATO and ICE is negatively related to ATO

### 3.5. Limitations

One of the potential limitations is that VAIC model has its own shortcomings and may not be the best model to measure IC. As the correlation between IC and performance could be not linear, the regression models which are generated in this paper may be not suitable and need to be further tested.

## 4. Discussion

Among MAKE award companies, CEE is proved to be positively correlated with ROA, ROE, and ATO. This finding is consistent with Chu et al.'s research, which shows that the components of VAIC demonstrate a much higher explanatory power in predicting business performance than aggregated VAIC and CEE is the strongest predictor amongst them.

The positive relationship may indicate that MAKE award companies are efficient in managing their capital so that they could create substantial value. As CEE mostly refers to the financial assets<sup>40</sup>, a proper use of financial assets will improve the efficiency of assets turnover (ATO), which will finally increase the net income and lead to higher ROA and ROE. Corporate should focus more on managing financial assets because CEE is the strongest predictor among all indicators.

In addition, SCE is found to be positively correlated with ROE and ROA. As a symbol of structure efficiency, SCE is assumed to be associated with ATO. However, by analysis, a higher SCE leads to higher ROA and ROE rather than ATO. It may indicate that controlling human cost does not improve the efficiency of assets turnover. Instead, it will improve the ROA and ROE by reducing the cost. Thus when a corporate aims at improving the efficiency of using assets, it needs to consider taking more financial assets, which will improve ATO, rather than simply controlling personnel cost.

In Non-MAKE award companies, the higher R square may indicate that IC could insert higher influence on the performance than MAKE-award companies. This assumption is coordinated with the law of diminishing marginal utility. To those MAKE award companies, they have been in a high level of IC so that the utility of IC won't be as the same as those Non-MAKE award companies, which are at the primary level and could be easily affected.

The findings of CEE and SCE are the same in MAKE award companies. Thus paying more attention to CEE is also useful for Non-MAKE companies. However, VAIC and ICE are found to be negatively associated with ATO. It indicates that in Non-MAKE award companies, the higher IC, the lower asset turnover. However, no similar relationship is found in MAKE award companies. This may suggest there is inefficiency in managing IC among Non-MAKE award companies so that it reduces the rate of asset turnover.

Based on the above-mentioned findings, we propose some suggestions for both MAKE award companies and Non-MAKE award companies to consider:

For both kinds of companies, they may need to focus on improving CEE by managing financial assets efficiently. For Non-MAKE companies, it may be better for them to consider the efficiency of IC and control human cost. Simply pouring down money on intangible assets or human cost does not ensure a higher return for those companies.

From this point of view, some merge or combination activities should be discussed because it will induce unnecessary intellectual capital such as goodwill. That capital may reduce the rate of asset turnover.

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## Appendix A. Glossary

Table 5. Glossary.

Concept	Definition
ATO	Asset Turn Over (Productivity)
BSC	Balanced Score Card Model
CC	Customer Capital
CEE	Capital Efficiency
DEBT	Firm Leverage
EBIT	Earnings Before Interest and Taxes
EVA	Economic Value Added
FSIZE	Company Size
HC	Human Capital
HCE	Human Capital Efficiency
IC	Intellectual Capital
ICE	Intellectual Capital Efficiency
MAKE	Most Admired Knowledge Enterprise
MB	Market Valuation
Non-MAKE	Non Most Admired Knowledge Enterprise
ROA	Return on Assets (Profitability)
ROE	Return on Equity
R Square	Regression Square
SC	Structural Capital
SCE	Structural Capital Efficiency