

# **The Determinants of Intellectual Capital in Improving Indonesian Transportation Firms' Performance**

*Noorina Hartati, Olivia Idrus*

## **Abstract**

Previous studies that investigate the relationship between intellectual capital and financial performance or market value show conflicting results. Meanwhile, intellectual capital begin to overtake physical capital as the most important assets for firms. consequently, this study aims to analyze the determinants of intellectual capital in enhancing transportation firms' performance. We use transportation firms listed in the Indonesian Stock Exchange (IDX) in 2011-2015. Specifically, based on Oktari et al. (2016), this study aims which factors that determine the ability of intellectual capital in improving firm performance.

We use three independent variables in this study, namely, Value Added Capital Employed (VACA), Value Added Human Capital (VAHU) and Structural Capital Value Added (STVA) as the proxies of intellectual capital that are measured using the Value Added Intellectual Coefficient ( $VAIC^{TM}$ ) model of Pulic (2004). The dependent variables are Return On Assets (ROA) and Return On Equity (ROE) as the proxies of firm performance.

Using multivariate linear regression analysis, we show that VACA (CE), VAHU (HC) and STVA (SC) variables do not affect ROA and ROE as the proxies of firm performance. However, the  $VAIC^{TM}$  variable that combines VACA (CE), VAHU (HC) and STVA (SC) positively affect both ROA and ROE.

Keywords: *Intellectual capital, firm performance, transportation firms*

## **INTRODUCTION**

### **1. Background**

The complex transportation problems in Indonesia need immediate solutions because transportation is the backbone of the national economy. In general, there are three transportation modes: land, sea, and air. Among the three transportation modes, land transportation arguably has the most problems, especially regarding traffic jams in several major cities, such as Jakarta, Makassar, Surabaya, Yogyakarta, Bandung, and others. The inability of the existing roads to accommodate the increasing volume of vehicles is the main cause of traffic jams. The volume of vehicles itself increases because of various reasons, such as increasing income, changing lifestyle, and greater ease of vehicle credit provision. However, the quality of human resources in managing transportation is equally important. Transportation firms need human resources with specific skills in running their operations. These skills qualify intangible assets or, more specifically, Intellectual Capital (IC) to which firms increasingly pay attention. Based on these arguments, this study aims to investigate the IC of transportation firms.

The volume of vehicles kept increasing in 2010-2011 with the annual increase of 9.93%. Motorcycles peaked the list with the average annual increase of 10.54%, closely followed by cars (the annual increase of 8.75%). In contrast, the volume of public vehicles grew only 1.74% annually.

In the advent of ASEAN free market or commonly known as ASEAN Economic Community (AEC), business competition has become increasingly tighter. The increasingly competitive business environment encourages both profit and non-profit (such as universities) organizations to exploit their competitive advantage to survive the competition. As suggested by Widyaningdyah and Aryani (2014), a firm exhibits a competitive advantage when it manages to create economic values that are higher than other firms in the industry.

Stakeholders acknowledge the importance of intellectual capital because intangible assets supersede tangible assets as firms' most important assets (Hartati, 2015). As Sawarjuwono and Kadir (2003) argue, globalization, technological innovation, and increased competition push firms to change the ways they run the businesses. To sustain their businesses, firms should rapidly change the emphasis of their business activities from labor (labor-based business) to knowledge (knowledge-based business).

Intellectual capital is broader than items conventionally reported in financial statements such as goodwill or patent, but also employee competence, customer relationship, innovation, computer and administration system, and ability to utilize technology (Soetedjo dan Mursida, 2014). The creativity of business actors capitalizes intellectual assets to be more important than cash or fixed assets because these assets manage to deliver added values to firms' products and eventually to enhance firm performance. Consequently, firms begin to emphasize on the implementation of employee training than on business expansion, such as land acquisition for the extension of their factories or offices (Hartati, 2015).

For transportation firms, competent and reliable employees are very important to attract potential customers and to ensure the quality of their services. By increasing their customer base, firms will be able to generate profits and eventually to deliver satisfactory returns to their owners. Further, firms manage to continue producing goods or services that suit customers' needs better and market demands. The transportation industry is very important because this industry facilitates the mobility of people and goods. Besides, firms need to have reliable financial statements that represent the actual performance of the firms. Consequently, the measurement of firm performance should be based on criteria developed by firms.

Sustainable firm performance help managers achieve firm objectives. The most pervasive performance measurement metrics are financial ones, such as Return on Assets (ROA). ROA is a ratio that measures the ability of invested capital in total assets to deliver higher profits for firms.

ROA facilitates the measurement of transportation and automotive firms' performance in generating profits by comparing these firms' ROA. Furthermore, ROA aligns managers' interests with shareholders'. Specifically, ROA encourages managers to think and to act similar to shareholders, i.e. by selecting investments that maximize returns and minimize the cost of capital to optimize firm value. The selection of ROA is based on its relevance to firm assets and its relationship with firm performance.

Based on previous studies, we investigate the determining factors of transportation firms' intellectual capital in enhancing firm performance. This study is important because of several reasons. Firstly, there is no existing standard that dictates which items belong to intangible assets that can be managed, measured, and reported (either as mandatory or voluntary disclosure) by firms. Secondly, previous empirical studies do not demonstrate consistent and conclusive results.

Thirdly, to our best knowledge, there are relatively few studies that analyze intellectual capital in the transportation industry. These studies mostly focus on manufacturing and banking firms.

## **LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

### **2.1. Theories that Underly Intellectual Capital**

#### **2.1.1 Resource-based Theory (RBT)**

Resource-based Theory (RBT) suggests that firms will outperform their competitors and exhibit better financial performance by possessing, controlling, and utilizing important and strategic assets, both tangible and intangible ones (Wernerfelt, 1984). This theory is a further development of the Ricardo's Economic Rent and Porter's structure-performance-conduct theories (Barney and Clark 2007). The theory emerges as a response to a strategic question of how a firm outperforms other firms and exhibit sustainable superior performance. Firms that develop their own resources and manage to control these resources are better able to sustain their advantages than firms that acquire or purchase resources from other firms or organizations. A bundle of unique resources that are owned and controlled by firms enable these firms to achieve and sustain their sustainable superior performance. RBT belongs to strategic management theory that argues that firms will exhibit superior performance when they have superior resources (Solikhah, *et al.*, 2010). Thus, based on RBT, it can be concluded that firms' resources affect their performance and eventually enhance firm value.

#### **2.1.2. Stakeholder Theory**

This theory analyzes the relationships between firms and their stakeholders. Based on stakeholder theory, stakeholders expect managers to perform activities that stakeholders consider important and to report the activities to stakeholders (Sholikhah *et al.*, 2010). Stakeholder theory emphasizes the position of stakeholders that is considered powerful. These powerful stakeholder groups are the main basis of firms' decisions to report or to disclose information in financial statements (Ulum *et al.*, 2008). Stakeholder theory indicates that all stakeholders have equal rights to obtain information on firm activities that potentially affect them. Thus, stakeholder theory emphasizes that organizational accountability is more important than economic or financial performance (Deegan, 2004).

### **2.1.3. Legitimacy Theory**

Legitimacy theory assumes that organizations continuously search for ways to ensure the sustainability of their business activities, subject to existing boundaries and norms that apply in society. Organizations aim to ensure that outsiders accept their activities (Deegan, 2004). This theory is based on the argument that holds that there exist social contracts between organizations and their environment in their activities.

### **2.1.4. Signaling Theory**

Signaling theory indicates that organizations strive for providing signals in the form of positive information to their potential investors by disclosing more in their financial statements (Miller dan Whiting, 2005). Organizations then expect that their positive signals generate positive responses from market participants and consequently they achieve competitive advantages that deliver added values to them (Widarjo, 2011).

### **2.1.5. Agency Theory**

Agency theory is related to two potential problems of the agency relationship. The first problem arises when (a) principals' interests are in conflict with agents' and (b) it is costly for principals to verify agents' actual actions (to verify whether agents act for the interests of principals). The second problem deals with risk sharing when principals and agents exhibit different risk preference. The problem lies in the possibility that principals and agents choose different actions because they have a different risk preference (Eisenhardt, 1989).

## **2.2. Definition of Intellectual Capital**

According to Bontis et al. (2000), intellectual capital can be classified into three categories, namely human capital, structural capital, and customer capital. The implementation of intellectual capital is still relatively new, not only in Indonesia but also worldwide. Bontis et al. (2000) aim to measure the effect of intellectual capital (proxied by VAIC™) on stock returns. In the Indonesian context, LQ45 Index facilitates the analysis of actively traded stocks.

According to Bontis et al. (2000), human capital (HC) represents individual knowledge stock of an organization as reflected by its employees. HC is a combination of genetical factor, education, experience and attitude that affect businesses. Structural capital (SC) represents a firm's capital that consists of databases, organizational structure, strategy manual process,

routines, and other assets that enhance firm value higher than its material value. Lastly, customer capital (CC) represents knowledge that attaches to marketing channels and customer relationship.

### **2.3. Value Added Intellectual Coefficient (VAIC<sup>TM</sup>)**

Sawarjuwono and Kadir (2003) hold that the measurement methods of intellectual capital can be categorized into two groups, namely non-monetary and monetary measurements. A well-documented non-monetary measurement is Kaplan and Norton's balanced scorecard while VAIC<sup>TM</sup> of Pulic (1998) is a monetary measurement. Pulic (1998) proposes Value Added Intellectual Coefficient (VAIC<sup>TM</sup>) to provide information on the efficiency of value creation of tangible and intangible assets. VAIC<sup>TM</sup> is considered appropriate to empirically measure IC. The following are several main reasons that support the use of VAIC<sup>TM</sup>. Firstly, VAIC<sup>TM</sup> provides consistent and standard measurement base from standard financial figures available from firms' financial statements (Pulic and Bornemann, 1999). Consequently, this measure is more effective in facilitating international comparative analysis that uses a large number of sample in various industries. Secondly, VAIC<sup>TM</sup> is based on audited data, thus enhancing the objectivity and verifiability of this measure (Pulic, 1998, 2000). VAIC<sup>TM</sup> is an analytical procedure that is designed to facilitate managers, shareholders, and other related stakeholders to effectively monitor and evaluate the efficiency of value added with firms' total resources and each main resource component. Value added is the difference between revenues (OUT) and expenses (IN).

### **2.4. Financial Performance**

According to Yusuf, et.al. (2013), Return on Asset (ROA) is an appropriate proxy for financial performance. ROA measures the ability of firms in generating profits in the past. This measure can be projected into the future to assess firms' ability to generate profits in the future. Additionally, ROA measures firms' profitability by using their total assets after adjusted with expenses to fund the acquisition of these assets (Hanafi dan Halim, 2009).

Using 80 manufacturing firms in 2008-2010 as the sample, Chusnah (2014) demonstrate the positive effects of IC and IC components on firm performance. The study also shows the significant role of strategy in positively moderating the relationship between IC and performance. Yusuf, et. al. (2013) reveal that human capital only positively affects financial performance, but not market value. In contrast, structural capital positively affects market value,

but not financial performance. Besides, physical capital positively affects both market value and financial performance.

Sholikhah, et. al (2010) indicate that intellectual capital positively affects firms' financial performance and growth, but not firms' market value. Ulum (2008) demonstrates that: (1) IC (VAIC<sup>TM</sup>) influence firms' financial performance, (2) IC (VAIC<sup>TM</sup>) affects firms' future financial performance, (3) ROGIG does not have an influence on firms' future financial performance.

Salim and Karyawati (2013) empirically show the relationship between the three intellectual capital components with one or both of the proxies of financial performance (ROE and EPS). Besides, Capital Employed Efficiency has a positive effect on firm profitability (ROE or Return on Equity and EPS as the proxies). Although Human Capital Efficiency (HCE) has a significant effect on ROE, it fails to affect EPS. Structural Capital Efficiency (SCE) also shows inconsistent results. Specifically, SCE significantly affects EPS, but not ROE.

Based on these arguments, the following are our research hypotheses:

H<sub>1</sub>: Capital Employed positively affects ROA

H<sub>2</sub>: Human Capital positively affects ROA

H<sub>3</sub>: Structural Capital positively affects ROA

H<sub>4</sub>: VAIC<sup>TM</sup> positively affects ROA

H<sub>5</sub>: Capital Employed positively affects ROE

H<sub>6</sub>: Human Capital positively affects ROE

H<sub>7</sub>: Structural Capital positively affects ROE

H<sub>8</sub>: VAIC<sup>TM</sup> positively affects ROE

## **RESEARCH METHOD**

### **3.1. Population and Sample**

Our research population is all Indonesian transportation firms that operated in 2011-2015 (five years). Meanwhile, our research sample is Indonesian transportation firms that are listed on the Indonesian Stock Exchange (35 firms).

Our observation period ranges from 2011-2015 (five years). We use secondary data that we generate from the firms' financial statements and primary data from our in-depth, guided

interview. Therefore, this study combines two different research approaches, namely the quantitative (using secondary data) and qualitative (using primary data) methods.

### **3.2. Data Collection Method**

We use both indirect and direct data collection methods. The indirect method uses archival or secondary data from the Indonesian Stock Exchange (IDX) and Indonesian Capital Market Directory (ICMD) years 2011-2015. Meanwhile, the direct method generates primary data from in-depth interviews with several transportation firms. We use a purposive sampling method to select our sample. This method selects a representative sample based on certain criteria. The following are the criteria to select sample:

1. Transportation firm listed from 2011-2015
2. The financial statements of the firm are available for the whole observation period (2011-2015).

### **3.3. Identifikasi Variabel dan Pengukurannya**

#### **3.3.1. Independent Variables**

##### **3.3.1.1. Intellectual Capital**

Following Yusuf, et al. (2013), our independent variables are Value Added Intellectual Coefficient (VAIC<sup>TM</sup>) of Pulic (2004) and its components as the proxies of IC.

The following are the formula to measure VAIC<sup>TM</sup>:

- Output (OUT) – Total sales and other revenues
- Input (IN) – Expenses (excluding employee expenses)
- Value Added (VA) – Difference between Output and Input

$$VA = OUT - IN$$

- Human Capital (HC) – Employee Expenses
- Capital Employed (CE) – Available fund (equity, retained earnings)
- Structural Capital (SC) – VA - HC
- Value Added Capital Employed (VACA) – Ratio between VA and CE that represents the contribution of each CE to the organization's value added.

$$VACA = VA / CE$$



- Value Added Human Capital (VAHU) – Ratio between VA and HC that represents the contribution of each Rupiah invested in HC to the organization’s value added:

$$VAHU = VA / HC$$

- Structural Capital Value Added (STVA) – Ratio between SC and VA. This ratio measures the amount of SC needed to generate one rupiah of VA and indicates the ability of SC in value creation:

$$STVA = SC / VA$$

- Value Added Intellectual Coefficient (VAIC™) – indicates the intellectual capability of an organization. VAIC™ can also be considered as BPI (Business Performance Indicator).

$$VAIC^{\text{TM}} = VACA + VAHU + STVA$$

HC are employee-related expenses (salaries, employee training and development, and professional fee). HCE is a human capital efficiency coefficient. SC stands for structural capital. SCE is structural capital efficiency coefficient. ICE is intellectual capital efficiency coefficient. CE is the book value of net assets. CEE is capital employed efficiency coefficient, and VAIC is value added intellectual coefficient.

### 3.3. 2. Dependent Variable

Referring to Yusuf et. al (2013), our dependent variables are Return On Assets (ROA) and Return On Equity (ROE) as the proxies for firm performance.

**Table 3.1**  
**Research Variables**

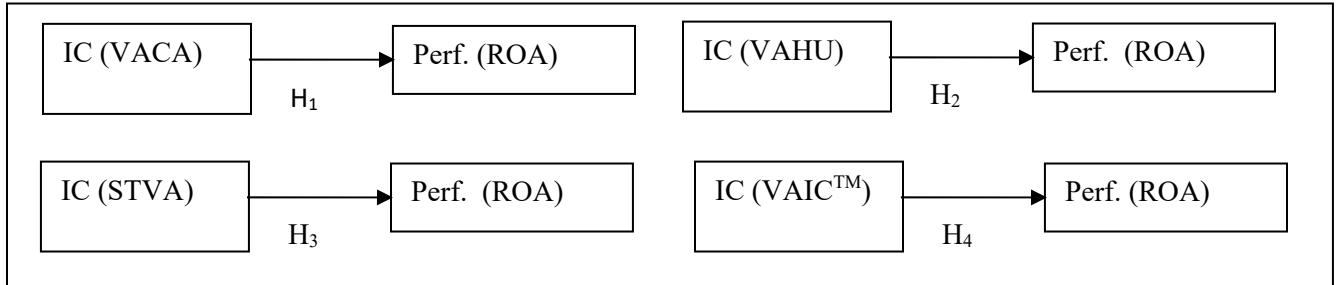
No	Variable	Proxy
1	Independent Variables	IC (VACA, VAHA, STVA, VAIC™)
2	Dependent Variables	Performance (ROA, ROE)

### 3.4. Data Analysis Method

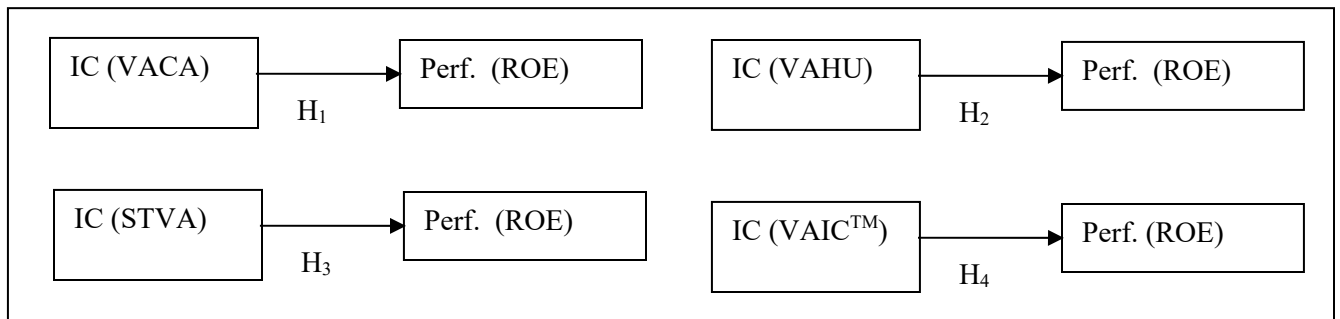
We use multiple linear regression using SPSS vers. 17 software. Before running the regression analysis, we run the classical assumption test for our data, consisting of a normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test.

### 3.5. Research Model

**Figure 3.1  
Research Model I**



**Figure 3.2  
Research Model II**



## RESULTS AND DISCUSSION

### 4.1. Data Collection

#### 4.1.1. Secondary Data

We use transportation firms listed in IDX (TICMI) in 2011-2015 as our research sample. The number of listed transportation firms is 35 firms, resulting in 35 x 5 = 175 firm-year observations.

#### 4.1.2. Primary Data

We interview several key persons regarding IC in land, sea, and air transportation industries. The key persons are HRD managers, drivers, pilots, regulators (the Indonesian ministry of transportation). The total number of interviewees are 21 respondents with the following details:

1. LAND (7 respondent) that consists of Operating Staff of Municipal Transportation Office of South Tangerang City, Damri driver in Bogor, Blue Bird Taxi Driver in Jakarta, Personel Manager of Kosti Taxi in Solo, ICT of Kosti Taxi in Solo, and Blue Bird Taxi in Pontianak.
2. SEA (5 respondents) that consist of: treasury Sub Head (*Kaur*) II of the Directorate General of Sea Transportation, Director of PT Aksar Saputra Lines Ternate, Human Resources and General Staff of PT ASDP Indonesia Ferry (Persero) of Banda Aceh branch office and crew of Holland American Line.
3. AIR (6 respondents) that consist of Flight Feasibility Inspector at DSKU of the Directorate General of Air Transportation, Airport Inspector of the Directorate General of Air Transportation, Garuda captain pilot, CitiLink captain pilot, Head of Services and Operation of the Airport, and Head of Administrative Department.
4. TRAIN (2 respondents) that consist of a staff of Directorate General of Train and train service user.
5. MINISTRY OF TRANSPORTATION (1 respondent), namely Personel Staf of the Secretary-General of the Indonesian Ministry of Transportation.

**Table 4.2**  
**The Percentage of Interview Results**

Question	Land (6)	Sea (5)	Air (6)	Train (1)	Ministry (1)
1/a	Senior High School: 66% Junior High School: 17% No qualification needed: 17%	Bachelor: 40% No qualification needed: 60%	Bachelor: 66% D3: 17% D2: 17%	Bachelor: 100%	Bachelor: 100%
1/b	Compatible: 100%	Compatible: 100%	Compatible: 100%	Compatible: 100%	Compatible: 100%
2	Exists: 83% Does Not Exist: 17%	Exists: 80% Does Not Exist: 20%	Exists: 83% Does Not Exist: 17%	Exists: 100%	Exists: 100%
3/a	Exists: 83% Does Not Exist: 17%	Exists: 100%	Exists: 100%	Exists : 100%	Exists: 100%
3/b	Exists: 100%	Exists: 100%	Exists: 100%	Exists: 100%	Exists: 100%
4	Exists: 83% Does Not Exist: 17%	Exists: 40% Does Not Exist: 60%	Exists: 67% Does Not Exist: 33%	Exists : 100%	Exists : 100%
5	Satisfied: 83%	Satisfied: 80%	Satisfied: 67%	Not Satisfied:	Not Satisfied:

Question	Land (6)	Sea (5)	Air (6)	Train (1)	Ministry (1)
	Not Satisfied: 17%	Not Satisfied: 20%	Not Satisfied: 33%	100%	100%

**Explanation:**

- 1/a : the qualification of employee recruitment
- 1/b : the compatibility of the job description with employee qualification
- 2 : employee training
- 3/a : the existence of target achievement indicators
- 3/b : the presence of monitoring and evaluation systems of employee performance
- 4 : the existence of employee refreshment
- 5 : satisfaction in salary/ bonus/ incentives

**4.2. Descriptive Statistics**

The following are our research variables: (1) independent variables (Intellectual Capital with VAIC<sup>TM</sup> method of Pulic). VAIC<sup>TM</sup> consists of VACA, VAHU, and STVA. VACA is a ratio between VA (Value Added) on CE (Capital Employed). VAHU is the ratio between VA (Value Added) and HC (Human Capital). STVA is a ratio between SC (Structural Capital) and VA (Value Added). VAIC<sup>TM</sup> is the addition of VACA, VAHU, and STVA.; (2) dependent variable (firm performance with ROA and ROE as the proxies).

**4.3. The Results of Hypothesis Testing**

This study uses multivariate linear regression with two models. The first model shows the effect of IC on ROA while the second one indicates the effect of IC on ROE. We use the significance level of 5% for both models.

The first regression model (1) tests the effects of intellectual capital and its components (VACA, VAHU, STVA dan VAIC<sup>TM</sup>) on performance (ROA). Our empirical results show the following. The first hypothesis (1) is rejected, implying that VACA (CE) does not significantly affect ROA ( $t= 0.318 > 0.05$ ). The second hypothesis (2) is also rejected, suggesting that VAHU (IC) does not significantly affect ROA ( $t= 0.571 > 0.05$ ). Further, the third hypothesis (3) is rejected, implying that STVA (SC) does not significantly affect ROA ( $t= 0.754 > 0.05$ ). However, the fourth hypothesis is supported, indicating that VAIC<sup>TM</sup> positively affects ROA ( $t= 0.008 < 0.05$ ).

The second regression model (2) tests the effects of intellectual capital and its components (VACA, VAHU, STVA dan VAIC<sup>TM</sup>) on performance (ROE). Our empirical results

demonstrate the following. Hypothesis one (1) is rejected, implying that VACA (CE) does not significantly affect ROE ( $t = 0.2 > 0.05$ ). Hypothesis two (2) is rejected, suggesting that VAHU (HC) does not have a significant effect on ROE ( $t = 0.37 > 0.05$ ). Hypothesis three (3) is rejected, indicating that

STVA (SC) does not significantly affect ROE ( $t = 0.47 > 0.05$ ). However, hypothesis four (4) is supported, implying that VAIC<sup>TM</sup> positively affects ROE ( $t = 0.002 < 0.05$ ).

## **CONCLUSION AND SUGGESTION**

### **5.1. Conclusion**

This study aims to test whether Intellectual Capital (IC) that consists of VACA (CE), VAHU (HC) and STVA (SC) positively affect ROA and ROE as the proxies of firm performance. Specifically, we test 8 hypotheses using multiple linear regression analysis (t-test).

Our results show that VACA (CE), VAHU (HC) and STVA (SC) variables do not affect both ROA and ROE. However, VAIC<sup>TM</sup> as a combination of VACA (CE), VAHU (HC) and STVA (SC) positively affects both ROA and ROE (p-value = 0.008 and 0.002, respectively). Thus, VAIC<sup>TM</sup> is the best indicator to measure IC (Intellectual Capital). VAIC<sup>TM</sup> is the addition of VACA (CE), VAHU (HC) and STVA (SC). In other words, the stand-alone IC components, namely *Capital Employee (CE)*, *Human Capital (HC)* and *Structural Capital (SC)* are insufficient in affecting firm performance. However, IC is an integrated combination of CE, HC, and SC. Orchestrated efforts to enhance firm performance are needed by emphasizing on employees (HC), capital structure (CE), and organizational structure (SC).

### **5.2. Limitations of the Study**

The following are the limitations of this study.

1. This study has not investigated IC disclosure and firm characteristics as the determinants of IC.
2. This study uses transportation firms in all modes (land, sea, air, and train) and thus is less specific in the analysis.
3. We do not include control variables such as size and leverage.
4. We only use three (3) IC components: Capital Employee (CE), Human Capital (HC) and Structural Capital (SC) while another IC component (Customer Capital or CC) is equally important.

### 5.3. Suggestion

The following are our suggestions for future studies:

1. Focusing on only one (1) subsector, such as land transportation only, to generate a deeper understanding of the research issue.
2. Including other determinants, such as IC disclosure and firm characteristics.
3. Including control variables such as size and leverage.
4. Because it is difficult to conduct the in-depth interview in the train firm, it is then important to ensure the access to the firm by applying for an official permit to interview.
5. Adding the Customer Capital (CC) component because customers are the users of firms' products that potentially exhibit loyalty that eventually enhances firm profitability.

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# CERTIFICATE OF PARTICIPATION



서울대학교  
SEOUL NATIONAL UNIVERSITY

This is to certify that,

**Noorina Hartati and Olivia Idrus**

*“The Determinants of Intellectual Capital in Improving Indonesian Transportation Firms’ Performance”*

has participated the **3RD COMPARATIVE ASIA AFRICA GOVERNMENTAL ACCOUNTING (CAAGA) CONFERENCE 2018**, held in Seoul, South Korea, November 14 - 16, 2018.

**PROF DR CHOI YOUNG CHOOL**  
*Chairman of Conference*

# CERTIFICATE OF APPRECIATION



서울대학교  
SEOUL NATIONAL UNIVERSITY

This is to certify that,

**Noorina Hartati**

as

**Presenter**

at the **3RD COMPARATIVE ASIA AFRICA GOVERNMENTAL ACCOUNTING (CAAGA) CONFERENCE 2018**, held in Seoul, South Korea, November 14 - 16, 2018.



**PROF DR CHOI YOUNG CHOOL**  
*Chairman of Conference*