

## Modified of Intellectual Capital and Financial Performance: Empirical Evident From Indonesia



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**ABSTRACT:** The study aims to investigate the effect of Intellectual Capital on the Financial Performance of Banking Industries in Indonesia. Based on the data of 47 Banks listed on the Indonesia Capital Market in 2021, by using multiple regression to examine the impact of modified intellectual capital on financial performance. This study uses the purposive sampling method. Intellectual capital is measured by VAIC, RCE, and InnovationCE, and Financial Performance using Return on Assets (ROA). The findings show that CEE and HCE have a positive influence on ROA, but unfortunately, SCE, RCE, and InCE do not affect the ROA. This finding shows that the bank needs to improve its skills in managing intellectual capital, especially related to SCE, RCE, and InCE. The more they manage their intellectual capital efficiency, in order to increase their financial performance.

**KEYWORDS:** Financial Performance, Intellectual Capital, ROA, VAIC<sup>TM</sup>

**JEL Classification:** E22, E24, O34

### 1. INTRODUCTION

Intellectual capital has an important role for companies, especially for companies that use intellectual abilities to carry out their business activities. One of the areas of business using intellectual skills is the banking company. As a bridge for the owner and borrowers, The banking company needs resources to manage its efforts to avoid obstacles, such as bad debts and so on. To avoid that, The banking company prepares skilled and competent labor, technology, and other resources to support its business process. Once the company can manage the resources better, it can make its performance increase easier, especially for intellectual capital. Ulum, 2020 explains that the management of intellectual capital can help the company to achieve the superiority of competition, increase productivity, and also the value of the company market. Some research has been done to see the intellectual capital effect on financial performance, market performance, productivity, or even corporate values. Even though the results have not shown a lot of consistency. Some studies show that intellectual capital had a positive influence on corporate performance, productivity, as well as the value of the company (Harisnawati et al., 2017; Smriti & Das, 2018; Soewarno & Tjahjadi, 2020; Wijayani, n.d.; Xu & Li, 2022; Xu & Wang, 2019). While other studies have shown that intellectual capital has an impact on financial performance, there are several components of intellectual capital such as structural capital, relation capital, and innovation capital that didn't affect the company's performance (Asutay & Ubaidillah, 2023; Aybars & Oner, 2022; Singgih et al., 2022; Singla, 2020; Xu et al., 2022; Xu & Li, 2019; Xu & Liu, 2020).

Most of them used Pulic's model which is known as *Value Added Intellectual Coefficient* (VAIC) as a method to examine the impact of intellectual capital. Some of the researchers modified its models such as Nazari and Herremans & Ulum. In fact, several researchers also made modifications to this measurement model, Nazari and Herremans expanded the components of intellectual capital by dividing the structural capital into customer capital and organizational capital where the organizational capital is re-divided into innovation capital and process capital. The model modified by Nazari and Herremans is known as *the Extended VAIC Model* (Nazari & Herremans, 2007). Ulum made another modification which is known as M-VAIC atau *Modified VAIC* (Ulum et al., 2014). The focus of this research is on added relational capital and innovation capital as a component of intellectual capital. This study aims to examine the

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impact of intellectual capital on The Bank's Financial Performance in Indonesia.

### 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

#### 2.1. Resource-Based Theory (RBT)

Barney, 1991 said that company resources become potential resources when have valuable resources, rare resources, imperfectly imitable resources, and non- substitutability resources. Pulic and Kolakovic also said that each company has unique acknowledgment, skill, value, and solution that can be changed to a value in a market so that optimization management of intellectual capital can increase their productivity, market value, and competitiveness (Ulum, 2020).

#### 2.2. Financial Performance

Sukhemi, (2007) explain that financial performance is a description of the financial situation of the company that is analyzed using the financial ratio. In this ratio, it is analyzed based on the data contained in the financial report so that it can show the situation of the company. One of the financial ratios that can be used to assess financial performance is the profitability ratio. Fahmi, 2017 also said that investors can look forward to company performance when they know about the company's profitability ratio.

#### 2.3. Intellectual Capital

Stewart, (1997) explained that intellectual capital is all things of the companies that can help an enterprise compete in the market. Brooking, (1996) said that intellectual capital is the combination of intangible assets, intellectual property, employees, and infrastructure that allow them to function.

The value-added intellectual coefficient is the intellectual capital measurement model invented by Pulic in 1998, 2000. The research is not focused on the intellectual measurements but rather on the creation of the value that can be given through using intellectual capital. The first step of this model is to calculate the corporate ability to create the value added (VA). The value added can be represented through the formula:

$$VA = Out - In$$

or

$$VA = OP + EC + D + A$$

In this case:

VA = Value Added, Out = Total Income, In = Total Expense, OP = Operating Profit, EC = Employee Cost, D = Depreciation, A = Amortization.

The next step is calculating the efficiency of each component that influences VA. The calculation of each component is using a formula :

##### a. Capital Employee Efficiency (CEE)

$$CEE = VA/CE$$

Where is:

CEE = Capital Employee Efficiency, VA = Value Added, CE = Book Value Asset

##### b. Human Capital Efficiency (HCE) HCE = VA/HC

Where is :

HCE = Human Capital Efficiency, VA = Value Added, HC = Wages Expense

##### c. Structural Capital Efficiency (SCE) SC = VA - HC

Where is:

SC = Structural Capital, VA = Value Added, HC = Wages Expense

Then

$$SCE = SC/VA$$

Where :

SCE = Structural Capital Efficiency, SC = Structural Capital, VA = Value Added

##### d. Relational Capital (RCE) RCE = RC/VA

Where is :

RCE = Relational Capital Efficiency

RC = Marketing Expense, VA = Value Added

##### e. Innovation Capital Efficiency (InCE) InCE = InC/VA

Where is :

InCE = Innovation Capital Efficiency

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$InC = R\&D\ Expense, VA = Value\ Added$

f.  $ICE = HCE + SCE + RCE + InCE$

Where is:

ICE = Intellectual Capital Efficiency, HCE = Human Capital Efficiency, SCE = Structural Capital Efficiency, RCE = Relational Capital Efficiency, InCE = Innovation Capital Efficiency

### Conceptual Framework

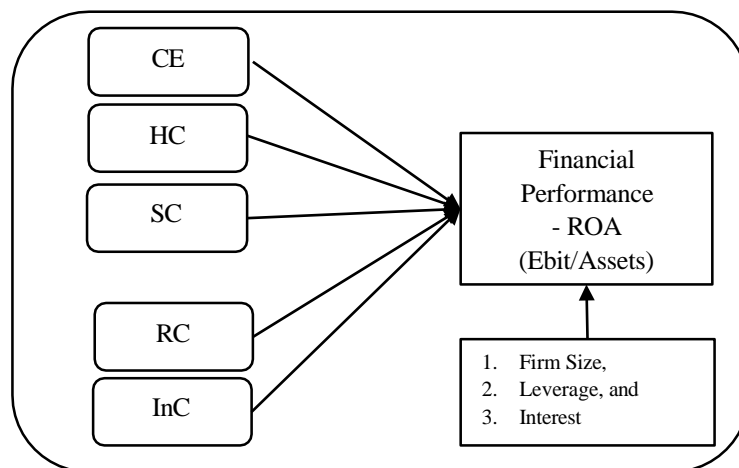


Figure 1: Conceptual Framework

This study is similar to Smriti and Das's research but the difference is this study adds relational capital and innovation capital as a proxy to the components of intellectual capital. The Conceptual Framework of this study is shown in the picture below:

### 2.4. Intellectual Capital and Firm Performance

The previous studies showed various results regarding intellectual capital. Some of the studies explained that intellectual capital has a positive influence on a company's financial performance (Harisnawati et al., 2017; Smriti & Das, 2018; Soewarno & Tjahjadi, 2020; Wijayani, 2017; Xu et al., 2022; Xu & Li, 2022; Xu & Wang, 2019) Wijayani, (2017) also shows that intellectual capital has a positive influence on ROA, EPS, and ROE. Next, Ginesti et al., (2018), shows the results of research on intellectual capital components such as HCE, SCE, and CEE influence ROI and ROA. Besides that Xu & Li, (2022) explained that CEE, HCE, and SCE have an impact on the profitability and productivity of manufacturing companies in China. On the other hand, another researcher also examines the other components of intellectual capital like InCE and RCE. Chelogoi et al., 2019 and Cuevas-Vargas et al., 2021 explained that InCE has a positive impact on financial performance. Iazzolino et al., (2018) and Xu & Li, (2022) explained that Relational Capital (RCE) also has an impact on financial performance. Considering the previous result, The research hypothesis can be formulated as follows:

$H_{a1}$  = Capital Employee Efficiency has a positive impact on firm performance (ROA)  $H_{a2}$  = Human Capital Efficiency has a positive impact on firm performance (ROA)  $H_{a3}$  = Structural Capital Efficiency has a positive impact on firm performance (ROA)  $H_{a4}$  = Relational Capital Efficiency has a positive impact on firm performance (ROA)  $H_{a5}$  = Innovation Capital Efficiency has a positive impact on firm performance (ROA)

### 3. METHOD, DATA, AND ANALYSIS

This study examines the impact of intellectual capital calculated through  $VAIC^{TM}$ , InCE, and RCE, and on Financial Performance use Return on Asset (ROA). This study is quantitative research using secondary data. The data is financial report of a banking industry listed on the Indonesian stock exchange in 2021. The financial reports that will be used are the audited reports that have been published in the period 2018 to the period 2021. Sampling of this study uses purposive sampling where researchers will take sampling based on the bank which has published financial reporting in 2018, 2019, 2020, and 2021. The data analysis is processed by SPSS using multiple regression linear. This study used firm size, leverage, and interest as control variables to reduce the level of bias in the result.

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The regression model of this study is:

1. Model 1 – Without Control Variable

$$ROA = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \epsilon$$

2. Model 2 – With Control Variable

$$ROA = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + C_1 + C_2 + C_3 + \epsilon$$

### 4. RESULT

#### Descriptive Analysis

Table 1 shows the number of valid N data is 152.

**Table 1: Descriptive Statistic**

|                    | N   | Mean   | Min   | Max  | Standard Deviation |
|--------------------|-----|--------|-------|------|--------------------|
| Lag_X1 (CEE)       | 160 | 0.0158 | -0.07 | 0.08 | 0.02263            |
| Lag_X2 (HCE)       | 163 | 1.8655 | -7.16 | 8.53 | 2.47360            |
| Lag_X3 (SCE)       | 165 | 0.4716 | -6.05 | 7.52 | 1.17411            |
| Lag_X4 (RCE)       | 167 | 0.0476 | -2.04 | 7.38 | 0.60412            |
| Lag_X5 (InCE)      | 161 | 0.0089 | -0.38 | 0.40 | 0.06727            |
| Lag_Y (ROA)        | 167 | 0.0042 | -0.20 | 0.12 | 0.03258            |
| Valid N (listwise) | 152 |        |       |      |                    |

Table 1, CEE has an average value of 0.0158, with a minimum negative value of -0.07 and a maximum of 0.08, with a standard deviation above the average. Thus, variations in CEE values show data that is varied and relatively stable. Thus, it is predicted that the CEE value which describes the ability to manage assets in producing VA can influence the company's financial performance. The next description regarding Human Capital Efficiency (HCE) has an average value of 1.8655, with a minimum value of -7.16 with a maximum value of 8.53 and the standard deviation has the highest value compared to other variables in this research. The HCE condition represents the highest variation in data between banking companies. This can illustrate that the role of HCE in company performance has a high contribution. Furthermore, the description of the condition of the SCE variable has an average value of 0.4716, with a minimum value of -6.05 a maximum value of 7.52, and a standard deviation value of 1.17411, illustrating the high variation data between banks. However, in context, the remaining SCE results from VA-HC are component elements of SCE. Therefore, in this research, the SCE component elements can be broken down into RCE with an average value of 0.0476, and InCE with an average of 0.0089, indicating a low value compared to the CEE and HCE variables. Descriptively, the SCE conditions represented through RCE and InCE have low data variations. In detail, the relationship between IC and company performance will be analyzed using multiple regression analysis.

#### Results

Based on the results of multiple regression analysis in model 1, and model 2 which includes control variables shows consistent results, namely that those that influence company performance are CEE and HCE. In this case, CEE influences ROA with a regression coefficient of 0.806 (P=0.000), and HCE influences ROA by 0.192 (p=0.000). Meanwhile, the variables SCE, RCE, and InCE have no effect on company performance. Based on the results of this research analysis, it shows that HCE in contributing to improving company performance must be supported by the productive performance of fixed assets in producing production which can ultimately increase the company's added value. The amount of salaries and wages in increasing the company's added value cannot stand alone, without being supported by the performance of fixed assets in generating sales, for example, the use of ATM fixed assets, the use of digital transaction machines, and the role of other fixed assets can increase the company's added value. These findings are consistent with the research results (Soewarno and Tjahjadi, 2020; Tripathy, Gil-Alana, and Sahoo, 2015; Rosita *et al.*, 2020)

On the other hand, with regard to the banking operating system in Indonesia, SCE which is reflected by RCE which is measured by value added divided by marketing costs and InCE which is measured using research and development costs has not been widely developed in the banking world in Indonesia. Thus, RCE and InCE do not affect company performance. In detail, the

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detailed research results can be shown in Table 2 model 1 and Table 3 model 2 below:

**Table 2: Result of Regression Model 1**

| Variable                  | Regression Coefficient | Standard Errors | P Value  |
|---------------------------|------------------------|-----------------|----------|
| Lag_X <sub>1</sub> (CEE)  | 0.806                  | 0.035           | 0.000*** |
| Lag_X <sub>2</sub> (HCE)  | 0.192                  | 0.000           | 0.000*** |
| Lag_X <sub>3</sub> (SCE)  | 0.016                  | 0.001           | 0.746    |
| Lag_X <sub>4</sub> (RCE)  | 0.012                  | 0.010           | 0.769    |
| Lag_X <sub>5</sub> (InCE) | 0.034                  | 0.011           | 0.328    |
| F                         | 373.488                |                 |          |
| F – sig.                  | 0.000***               |                 |          |
| Adj. R Square             | 0.925                  |                 |          |

\*\*\*, \*\*, \* level of significancy 1%, 5%, 10%

**Table 3: Regression Model 2 entering control variables**

| Variable                  | Regression Coefficient | Standard Errors | P Value  |
|---------------------------|------------------------|-----------------|----------|
| Lag_X <sub>1</sub> (CEE)  | 0.816                  | 0.047           | 0.000*** |
| Lag_X <sub>2</sub> (HCE)  | 0.165                  | 0.000           | 0.000*** |
| Lag_X <sub>3</sub> (SCE)  | 0.000                  | 0.001           | 0.997    |
| Lag_X <sub>4</sub> (RCE)  | -0.001                 | 0.001           | 0.986    |
| Lag_X <sub>5</sub> (InCE) | 0.032                  | 0.011           | 0.347    |
| Lag_Size                  | 0.058                  | 0.000           | 0.025    |
| Lag_Leverage              | 0.010                  | 0.000           | 0.641    |
| Lag_Interest              | -0.025                 | 0.022           | 0.424    |
| F                         | 238.644***             |                 |          |
| F – sig.                  | 0.000                  |                 |          |
| Adj. R Square             | 0.926                  |                 |          |

\*\*\*, \*\*, \* level of significancy 1%, 5%, 10%

Table 1 shows the significant level p on the F-test is  $\leq 0,05$ . It concludes that the research model is suitable for this study. While t-test of this study show that not all of the independent variables have p-values  $\leq 0,05$ . It shows only X<sub>1</sub> and X<sub>2</sub> have p-value

$\leq 0,05$ , while X<sub>3</sub>, X<sub>4</sub>, and X<sub>5</sub> p-value  $> 0,05$ . So in this model, it can be concluded that the variable which has an impact on the dependent variable are X<sub>1</sub> and X<sub>2</sub>. It means H<sub>a1</sub> and H<sub>a2</sub> are accepted. But, because X<sub>3</sub>, X<sub>4</sub>, and X<sub>5</sub> have no impact on dependent, H<sub>a3</sub>, H<sub>a4</sub>, dan H<sub>a5</sub> are rejected.

In regression model 2, the result explains the impact of CEE, HCE, SCE, RCE, and InCE on ROA using the control variable, Size, Sales, and Interest. The result can be seen in the following Table 4.

**Table 4: Regression Model 2**

| Variable                  | Regression Coefficient | Standard Errors | P Value  |
|---------------------------|------------------------|-----------------|----------|
| Lag_X <sub>1</sub> (CEE)  | 0.816                  | 0.047           | 0.000*** |
| Lag_X <sub>2</sub> (HCE)  | 0.165                  | 0.000           | 0.000*** |
| Lag_X <sub>3</sub> (SCE)  | 0.000                  | 0.001           | 0.997    |
| Lag_X <sub>4</sub> (RCE)  | -0.001                 | 0.001           | 0.986    |
| Lag_X <sub>5</sub> (InCE) | 0.032                  | 0.011           | 0.347    |
| Lag_Size                  | 0.058                  | 0.000           | 0.025    |
| Lag_Leverage              | 0.010                  | 0.000           | 0.641    |
| Lag_Interest              | -0.025                 | 0.022           | 0.424    |

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|               |            |
|---------------|------------|
| F             | 238.644*** |
| F – sig.      | 0.000      |
| Adj. R Square | 0.926      |

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\*\*\*, \*\*, \* level of significancy 1%, 5%, 10

The result of this model also shows that significant p-value of the F-test  $\leq 0,05$ . It means that this model is also suitable for this study. For t-test shows that significant p-value of  $X_1$  and  $X_2 \leq 0,05$ , while  $X_3$ ,  $X_4$ , and  $X_5 > 0,05$ . It concluded that  $X_1$  and  $X_2$  have a significant impact on ROA, but unfortunately,  $X_3$ ,  $X_4$ , and  $X_5$  have no impact on ROA. So that  $H_{a1}$ ,  $H_{a2}$  is accepted, but  $H_{a3}$ ,  $H_{a4}$ ,  $H_{a5}$  is rejected. This study shows that the result of regression model 1 is consistent with the result of regression model 2.

### 5. DISCUSSION

The results of the hypothesis show that the variables that influence ROA are CEE and HCE. This result is in line with research conducted by Pulic (2000) which considers that HC is equivalent to Physical Capital and Financial Capital included in CE. This follows the Resource-Based Theory where the theory explains that the knowledge contained in HC allows to increase the effectiveness of the company to get good long-term performance. This shows that the investment spent on CE such as ATM mobile, bank building, operational vehicle, etc., can provide added value to improve company performance. It also shows competency and capability of the human capital especially in the banking sector can give value added to financial performance. These results are in line with research conducted by Ulum et al., 2014, Mohammad & Bujang, 2019, Peković et al., 2020, Xu & Liu, 2020, Xu & Li, 2022 and Asutay & Ubaidillah, 2023 which also show that CE and HC affect ROA. This also explains that the company has been able to manage CE and HC well to provide added value to the company.

Meanwhile, in this study, the SCE, RCE, and InCE variables did not have a significant effect on the ROA variable. This is in line with the explanation conveyed by Pulic, 2000, which explains that SC is the company's capital which has the opposite position from HC. In other words, the greater the influence of HC in providing added value to the company's performance, the smaller the influence of SC involved in providing added value to the company. RC and InC are extensions of the SC component so that conceptually the treatment for RC and InC is equalized with SC. Research conducted by Aybars & Oner, 2022, Xu & Liu, 2020, Mohammad & Bujang, 2019, Singgih et al., 2022, and Asutay & Ubaidillah, 2023 also shows that the components of SC, RC, and InC do not affect ROA.

This indicates that the value of SC, RC, and InC was not too significant in the research year so it gave not too significant results as well. It is indicated that from 2018 to 2021, the company has not optimized the costs of SC, RC, and InC to provide supporting infrastructure and other developments to support company performance. However, it is more about optimizing CE and increasing the competence and knowledge contained in HC to improve company performance.

In other words, it can be concluded that the investments made by the company through CE and HC can provide added value to the company and can improve the performance of the company. Meanwhile, the costs incurred by the company for SC, RC, and InC have not provided added value so they have not been able to affect the performance of the company.

### 6. CONCLUSIONS, LIMITATIONS, AND SUGGESTIONS

#### Conclusions

This research is a study conducted to see the impact of Intellectual Capital on financial performance in banking companies. In this study, intellectual capital is proxied through VAIC<sup>TM</sup> which consists of Capital Employee Efficiency, Human Capital Efficiency, and Structural Capital Efficiency and the addition of proxies, namely Relational Capital Employee and Innovation Capital Employee. Meanwhile, company performance is proxied through Return on Asset (ROA).

From valid data totaling 152 data, the results show that Intellectual Capital has an impact on ROA. When viewed through each component, those that have a significant impact are Capital Employee Efficiency and Human Capital Efficiency. Meanwhile, Structural Capital Efficiency, Relational Capital Efficiency, and Innovation Capital Efficiency do not have a significant impact.

This is in line with the theory developed by Pulic, 2000 where Capital Employee Efficiency plays an important role in providing added value to company performance. Likewise, the added value of Human Capital Efficiency can be considered equivalent to Capital Employee Efficiency. And because Structural Capital Efficiency, Relational Capital Efficiency, and Innovation Capital Efficiency have the opposite position to Human Capital Efficiency, making these three

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components do not add value to company performance. Companies need to manage this Intellectual Capital. Good and optimal intellectual capital management will be able to support the company by providing added value to improve company performance.

### Limitations and Suggestions

The limitation of this study is that there is invalid data so it cannot be included in the study and makes the number of samples decrease even though it still exceeds the minimum number of samples required in this study. The addition of a data period of several years will help researchers to get more accurate results so that the level of data consistency can also be shown better.

It is hoped that the results of this study can be a reference for companies and practitioners in managing their intellectual capital. In addition, the results of this study can also contribute to the development of theories about intellectual capital both in Indonesia and in the world.

For further studies, The researchers can add the number of data periods, another variable as a proxy of intellectual capital and financial performance, and also use them as a moderating variable, to know about the impact of each component of intellectual capital more clearly.

### Authors Contribution

**Corresponding Author:** Harmono, e-mail: [harmono@unmer.ac.id](mailto:harmono@unmer.ac.id) Conceptualization: Harmono, Risa Restu Septania. Data curation: Harmono, Risa Restu Septania. Formal analysis: Harmono. Funding acquisition: Risa Restu Septania, Harmono. Investigation: Harmono, Risa Restu Septania, Parawiyati. Methodology: Harmono, Parawiyati, Risa Restu Septania. Project administration: Risa Restu Septania, Harmono. Resources: Risa Restu Septania, Harmono. Software: Risa Restu Septania, Harmono. Supervision: Harmono, Parawiyati. Validation: Harmono: Writing – original draft: Harmono, Risa Restu Septania. Writing – review & editing: Harmono.

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