MEASURES THAT MATTER: AN EMPIRICAL INVESTIGATION OF INTELLECTUAL CAPITAL AND FINANCIAL PERFORMANCE IN CONVENTIONAL BANKING COMPANIES

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Abstract

This study aims to determine the influence of intellectual capital of the conventional banking industry in Indonesia on financial performance for the 2020 - 2023 period. This study analyzes the performance of intellectual capital using the A-VAIC method which has three indicators, namely Human Capital Efficiency (HCE), Innovation Capital Efficiency (INVCE), and Capital Employed Efficiency (CEE) as independent variables. Financial performance in this study was measured using Return On Asset (ROA) as a dependent variable. This study is a descriptive quantitative research, with secondary data sources obtained from the annual financial statements of the conventional banking industry listed on the Indonesia Stock Exchange and accessible through www.idx.co.id. This study examined the influence of banking intellectual capital for 4 years with a sample of 64 financial statement data. Data analysis uses multiple regression analysis with the help of Eviews software. The results of the analysis showed that HCE had a positive and significant effect on ROA, and INVCE had a negative and significant effect on ROA, while CEE had no effect on ROA.

Keywords: *Intellectual Capital, Financial Performance, Conventional Banking Companies.*

INTRODUCTION

The development of the business world is increasingly advanced in line with technological advances, economic capabilities, education, and science. This dynamic fosters enthusiasm among business people to increase competitiveness in an effort to maintain business prosperity which is a challenge in global competition. Efforts aimed at strengthening competitiveness change the business paradigm from comparative advantage to competitive advantage which is in accordance with the principle of going concern for the company. Competitive advantage in this competitive era is increasingly associated with investment in intangible knowledge resources (Asyikin & Boedi, 2023; Xu & Li, 2022). These resources are known as intellectual capital (IC) which has the potential to create added value for the prosperity of the company(Cenciarelli et al., 2018; Dalwai & Mohammadi, 2020). The added value of intellectual capital is the most valuable strategic resource that positively affects the stability of a company's financial performance (Putri et al., 2023).

Since the advent of the knowledge-based economy, banks have been considered highly innovative and balanced organizations in utilizing human resources and technology (Halim et al., 2021). Conventional banking companies need professional human resources in a sustainable manner at an adequate cost so as to realize the sustainable growth of conventional banking companies while maintaining the bank at a healthy level. Bank Indonesia through SK DIR BI No.31/310/KEP/DIR concerning the Provision of Funds for Human Resource Development of Commercial Banks dated 31 March 1999, hereinafter referred to as SK DIR BI Human Resource Development, regulates the obligation of banks to provide education funds to develop skills and improve knowledge. The education funds

that need to be provided by the bank according to the above provisions are 5% of the budget for human resources costs. With these funding practices, banking companies have transformed the process of value creation through investments in human resources, research and development and information technology (Pangestu & Muharam, 2023). Efficient use of intellectual capital allows banks to develop quality financial products and services and establish close intimacy with customers, thus having a positive impact on financial performance (Barak & Sharma, 2024).

Several studies support that intellectual capital includes human capital, structural capital, and relational capital (Bontis et al., 2018). Intellectual capital consists of human capital is the knowledge of individuals represented by employees, structural capital is knowledge in the field of organization including organizational processes, strategies, databases and other activities that are higher than the recorded value while relational capital or customer capital is knowledge related to external parties of the company, including customers (Soewarno & Tjahjadi, 2020).

The A-VAIC method measures financial-based intellectual capital that is able to assess the efficiency of intellectual capital in all industries by calculating 3 (three) components, namely Human Capital Efficiency (HCE), Innovation Capital Efficiency (INVCE), and Capital Employed Efficiency (CEE). The AVAIC™ model is often used in research, including in the banking industry, conducted by Bayraktaroglu et al., (2019) which informs that the financial industry, especially banking, is one of the 4 (four) industrial sectors that are intellectual capital-intensive research on banking company management to measure the efficiency of intellectual capital (Nadeem et al., 2018).

The research gap with several previous studies, the impact analysis of intellectual capital has been carried out using several calculation methods including using the VAIC, AVAIC, and Modified-VAIC (M-VAIC) methods on management capabilities in the banking industry in improving financial performance. However, there has been no recent research on the influence of intellectual capital represented by the education fund ratio, especially using the A-VAIC method with the components of Human Capital Efficiency (HCE), Innovation Capital Efficiency (INVCE) and Capital Employed Efficiency (CEE) on financial performance represented by the Return on Assets (ROA) ratio in the conventional banking industry in Indonesia during the 2020-2023 period.

This research was conducted because there is still a *research gap* and a scarcity of literature that analyzes the impact of intellectual capital on the financial performance of banks in Indonesia, especially in the 2020-2023 period. The relationship between intellectual capital and financial performance is still a debate between researchers. Results of Research conducted by Bontis et al., (2018), Nadeem et al., (2018) and Xu et al., (2023) shows that intellectual capital has a strong influence on financial performance. This study will test the effectiveness of the regulation of the education fund budget regulator of 5% of the human resource cost budget by enforcing one size fits all for all conventional banking companies. Therefore, the researcher is interested in conducting further research on the influence of intellectual capital on financial performance in conventional banking companies for the 2020-2023 period.

LITERATURE REVIEW

Intellectual Capital (IC)

Ahmed et al. (2020) states that intellectual capital leads to knowledge, experience, skills and expertise that cannot be replicated that give companies a competitive advantage in the market. Pulic (2004) stated that intellectual capital has 3 components, namely Human Capital Efficiency, Structural Capital Efficiency and Capital Employed Efficiency. Meanwhile Ulum et al. (2014) develop the intellectual capital component into 4 components by adding Relational Capital Efficiency (RCE) which estimates the accuracy of intellectual capital performance. The development of intellectual capital components continues to be carried out until it has 3 (three) new components, including Human Capital Efficiency (HCE) as knowledge owned by employees, Innovation Capital Efficiency (INVCE) as innovation in the company and Capital Employed Efficiency (CEE) as available funds/equity (Nadeem et al., 2018).

AVAIC^TM

Pulic (2004) developing the AVAIC^TM method that is able to describe the process of intellectual capital bringing influence in the company. This method has attracted the attention of various researchers to assess and measure intellectual capital by relating it to the financial performance of a company. The AVAIC^TM model is a financial-based intellectual capital measurement model that is able to assess the efficiency of intellectual capital across industries. The AVAIC model in calculating intellectual capital consists of 3 (three components), including:

- Human Capital Efficiency (HCE)

  Calculate HCE by comparing Value Added (VA) with Human Capital (HC) which is proxied by labor costs. This relationship is able to estimate the ability of HC to improve the company's financial performance by making HC one of the indicators of human resource quality. Researchers Aritonang & Muharam (2016) identifying the higher the HCE value means the better the company is at using human resources to create VA value.

- Innovation Capital Efficiency (INVCE)

  Calculate INVCE by comparing VA to INVC. To get INVC, do the calculation of VA minus the HC value (Aritonang & Muharam, 2012). INVC covers all education and training costs in the company. Researchers Aritonang & Muharam (2016) identifying the higher the INVCE value means the higher the contribution of education and training costs in creating VA value.

- Capital Employed Efficiency (CEE)

  Calculate CEE by comparing VA to CE. Pulic (2004) formulating that if CE can generate higher profits than competitors, then the company has successfully taken advantage of CE. The higher the CEE level, the more efficient the company will be in using its physical capital to increase profits (Aritonang & Muharam, 2016).

Return On Assets (ROA)

According to Putri et al. (2023), ROA is a ratio that is calculated to show the bank's ability to earn profits. ROA (Return On Asset) is able to show the ability of banks to obtain profits on optimal asset use.

ROA is a marker to reflect the company's financial performance by calculating net profit divided by total assets. Financial performance is better if the ROA value is high. ROA is a measure of how well a company utilizes all of its company assets. Return on assets (ROA) is related to the amount of the company's revenue, the amount of income tax burden and total assets, both its own assets and rental assets outside the company.

Conventional Banking Industry in Indonesia

Banking is an important aspect in supporting national economic development. Based on Law No. 10 of 1998, it is explained that a conventional bank is a bank that in carrying out its business activities is not bound by a principle. The main activity is to collect funds from the community and redistribute them to fund users or business actors, besides that commercial banks also provide various financial service products such as deposits, current accounts, and term savings (Quezada et al., 2025)

In seeking profits, banks use conventional principles which include two methods, namely, setting interest rates as prices for deposit products such as savings, current accounts and deposits. The second method is for other financial services, banks apply various fees in a certain nominal or percentage or known as Fee Based (Quezada et al., 2025). Conventional banking operational activities are not bound to one principle so that many people are more interested in using conventional bank services because they are considered more profitable (Komalasari & Wirman, 2021). When compared to Islamic banks that have a profit-sharing principle, because in Islam the law of giving interest on credit is intolerable because the law is usury, and riba is haram.

Financial Report

Financial Statements can provide an overview and results that have been achieved by the entity concerned. According to Palupy et al., (2022) It states that financial statements can provide information about the condition of the entity during a certain period which will later be used for evaluation and appropriate decision-making by interested parties. Internally, financial statements are used for various purposes. The data contained in financial statements can be material for analyzing the financial performance of an entity. The results of this analysis will be very useful for the employees of the entity concerned because this entity is where the brand works and receives salaries in the long run.

Bank Financial Ratios

According to Kasmir, (2018) Financial ratios are an activity of comparing numbers in financial statements. Financial ratios are an important aspect of financial analysis. According to Ginting, (2021) Financial ratio analysis is the most commonly used analysis method because it provides a relative measure of a company's operations. The calculation of

the bank's financial ratio will be different from the calculation of the financial ratio of a non-bank company. Banking is a company that provides financial services and relies on the trust of the public in managing its funds. The most common difference lies in the type of ratio used, in the world of banking the risk faced is much greater than in other companies so that some ratios are devoted to paying attention to the risk borne by the bank.

THEORETICAL FRAMEWORK

A research framework is a conceptual model that describes interrelated theories from various elements that have been identified as important issues in a research topic. As shown in figure 1, the independent variables consist of HCE, INVCE, and CEE, while the dependent variables include ROA. The analysis of the relationship between independent and dependent variables will be carried out to evaluate the financial performance of conventional banking companies in Indonesia for the 2020-2023 period.

Figure 1. Research Framework
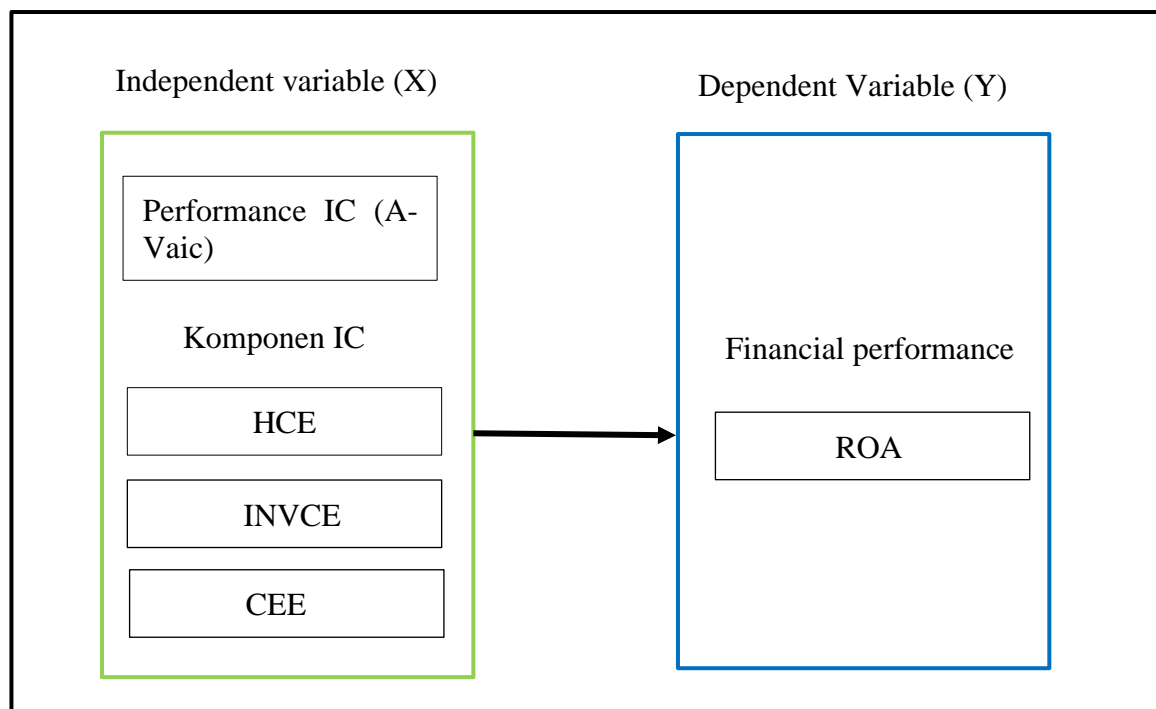
Source: Researcher, 2024

Based on figure 1 above, the researcher can formulate the following hypothesis:
H1: HCE has a significant positive effect on ROA
H2: INVCE has a significant positive effect on ROA
H3: CEE has a significant positive effect on ROA

METHOD

Types and Data Sources

The type of data in this study uses secondary data in the form of annual reports of conventional banking companies and data collection is known from www.idx.co.id or browsing the company's website.

Population & Sample

The research collected population data on 47 conventional banking companies listed on the Indonesia Stock Exchange from 2020 to 2023. The 4-year data collection period was chosen to analogize the company's performance during that time and receive the latest data.

Samples are an important part of the population (Sugiyono, 2017). This research applies a sample withdrawal method in the form of *purposive sampling*, which is sample withdrawal based on criteria. A total of 64 financial data of conventional banking companies were selected and have met several sampling criteria. The researcher proposed that the sample criteria include:

Table 1. Research Sample Criteria

No	Information	Sum
	Banking companies listed on the IDX for the 2020-2023 period	47
1	Banking companies that do not publish Annual and Annual Reports on the IDX for the 2020-2023 period	9
2	Banking companies that are not conventional banks, the implementation principles are based on sharia principles	4
3	Banking companies that suffered losses for the period of 2020 - 2023	10
4	Banking companies that do not provide complete data according to the required variables	8
	Number of company samples	16
	Number of company samples x 4 (2020-2023)	64

Source: Researcher, 2024

Variable Measurement & Operational Definition

The independent or independent variables with the X symbol used in this study are HCE, INVCE, and CEE which are calculated using the A-VAIC method developed by Nadeem et al. (2018).

Value added (VA), in this study, the value added of conventional banking companies, is the result of the sum of net income (NI), labor cost (LC), interest (I), taxes (T), depreciation and amortization (DP), and research and development (RD).

$$VA = NI + LC + I + T + DP + RD$$

Nadeem et al. (2018) Nadeem et al. (2018)

$$A\text{-}VAIC = HCE + INVCE + CEE$$

Human Capital Efficiency (X1), HC in this study is proxied by labor costs, where the calculation is by comparing the value of VA to HC (Pulic, 2004; Soewarno & Tjahjadi, 2020; Ulum et al., 2014).

$$HCE = \frac{VA}{HC}$$

Innovation Capital Efficiency (X2), INVC in this study is calculated through research and development costs which are included in education costs and training costs, where the calculation is by comparing the value of VA to INVC.

$$INVCE = \frac{VA}{INVC}$$

Capital Employed Efficiency (X3), CEE in this study by comparing the value of VA to CE. CE is the total amount of capital used by conventional banking companies (Pulic, 2004).

$$CEE = \frac{VA}{CE}$$

The dependent variable or bound to the Y symbol used in this study is ROA.

ROA (Y) in this study uses the formula:

$$ROA = \frac{Laba\ Operasi}{Total\ Aset} \times 100\%$$

Analysis Techniques

The data analysis technique used in this study is Multiple Regression Analysis including panel data regression analysis using descriptive statistical tests, classical assumption tests, multiple analysis, and F tests, determination coefficient tests and T tests. In this study, the media of statistical analysis in hypothesis testing used Eviews software.

$$Yit = \alpha + \beta_1 X_1 + \beta_2 X2 + \beta_3 X3 + ….. + e_{it}$$

Where:

it = I indicates conventional banking, and t indicates sampling time

Y = Variabel depend

a = Konstanta

β = Regression coefficient

X = Independent variable

e = Error

$$Yit = \alpha + \beta_1 X_1 + \beta_2 X2 + \beta_3 X3 + e$$

Where:

Y = ROA

a = Konstanta

β1 – β3 = Regression coefficient

X1 = HCE

X2 = INVCE

X3 = SCE

E = Error

RESULTS AND DISCUSSION
Descriptive Statistics of the Conventional Bank Industry

This descriptive statistical test is used to find out the maximum value, minimum value, average value, and standard deviation value. This test uses a sample of 64 samples from 16 conventional banking industries. The independent variables used are intellectual capital indicators consisting of HCE, INVCE, and CEE. The dependent variable used is ROA. The following are the results of the descriptive statistical test analysis:

Table 2. Descriptive Statistical Test Results

Variable	Data	Mean	Maximum	Minimum	Standard Deviation
ROA	64	132.23	346.00	7.00	87.74
HCE	64	43251.83	76487.00	22112.00	12668.36
INVCE	64	216.49	817.15	5.54	153.13
CEE	64	4591.18	10255.00	1944.00	2027.51

Based on table 2 above, it can be analyzed as follows:
a. ROA
There are 64 observation data for this variable. The mean value is 132.23 with the highest value (maximum) being 346.00, the lowest value (minimum) is 7.00, the standard deviation of ROA is 87.74.
b. HCE
The mean value is 43251.83 with the highest value (maximum) being 76487.00, the lowest value (minimum) is 22112.00, and the standard deviation of HCE is 12668.36.
c. INVCE
The mean value is 216.49 with the highest value (maximum) being 817.15, the lowest value (minimum) being 5.54, and the standard deviation of INVCE is 153.13.
d. CEE
The mean value is 4591.18 with the highest value (maximum) being 10255.00. The lowest value (minimum) is 1944.00, and the standard deviation of CEE is 2027.51.

Data Analysis Results

Eviews software is a way to process the panel data in this study. For the first step, the researcher selects the best model by testing on three estimation models, namely the Chow Test, the Hausman Test, and the Breusch Pagan-Lagrange Multiplier Test. The Chow Test to choose the best model between CEM or FEM, the Hausman Test to choose the best model between FEM or REM, and lastly the BPLM Test to choose the best model between REM or CEM.

The results of the ROA test with the Chow Test, Hausman Test, and BPLM Test obtained the best model is the FEM model as listed in table 3.

Table 3. Best Model Testing Results

Testing	Hypothesis	Probability Value	Result
Uji Chow	• Prob. >0.05 selected CEM model • Prob. <0.05 selected FEM model	0,0000	FEM
Uji Hausman	• Prob. >0,05 terpilih model REM • Prob. <0,05 terpilih model FEM	0,4953	FEM

1. **Classical Asumption Test**

The selection of the FEM model is only conducted in the test of multicollinearity and heteroscedasticity with the test results listed in table 4.

Table 4. Classic Assumption Test Results

Classical Assumption Test	Correlation Coefficient Value	Result
Multicollinearity	• HCE against INVCE: 0.3472 • HCE against CEE: 0.4620 • INVCE against CEE: 0.0962	• Correlation coefficient <0.85 • There is no multicollinearity
Heteroskedastisitas	• Prob F: 0.0000 • Prob Chi-Square: 0.0000	• Prob. Value <0.05 • There is heteroscedasticity

Based on table 4, information can be obtained, including:

a. The results of the multicollinearity test stated that the correlation coefficient value was < 0.85 which means that there was no strong relationship or correlation between the dependent variables. This shows that the regression model does not have multicollinearity, so the data of this study meets the assumption of multicollinearity.

b. The occurrence of heteroscedasticity in the model, then correction is required. One way to make corrections is to calculate White Heteroskedasticity, Consistent Variance and Standard Error. The correction has corrected the error standard value so that the resulting model can be used immediately (Pangestu & Muharam, 2023).

Table 5. FEM Model Regression Results

Variable	Coefficient	Probability
Constant	120.0339	0.0043
HCE	0.0023	0.0403
INVCE	-0.1629	0.0089
CEE	-0.0120	0.1195

Based on table 5 above, the results of the multiple regression equation can be calculated as follows:

$$ROA = 120.0339 + 0.0023*HCE - 0.1629*INVCE - 0.0120*CEE$$

The description of the regression results above is as follows:

a. The constant value of the regression result above is 120.0339. This can be interpreted that if the values of HCE, INVCE, and CEE are fixed, there will be an increase in ROA of 120.0339.

b. The coefficient value of the HCE variable is 0.0023. This can be interpreted that the HCE variable has a positive effect on ROA. The significance value is 0.0403. This means that the HCE variable has a significance value of $0.0403 < 0.05$ which means that HCE has a significant positive effect on ROA.

c. The value of the coefficient of the INVCE variable is - 0.1629. This can be interpreted that the INVCE variable has a negative effect on ROA. The significance value is 0.0089. This means that the INVCE variable has a significance value of $0.0089 < 0.05$ which means that INVCE has a significant negative effect on ROA.

d. The coefficient value of the CEE variable is -0.0120. This can be interpreted that the INVCE variable has a negative effect on ROA. The significance value is 0.1195. This means that the CEE variable has a significance value of $0.1195 > 0.05$ which means that INVCE has no effect on ROA.

2. Model Reliability Test (F Test)

The FEM data panel model test results in an F test value with an F-statistic value of 16.8697 and a probability of $0.0000 < 0.05$. This means that all independent variables consisting of HCE, INVCE, and CEE together have a significant effect on ROA.

3. Determination Coefficient Test (R^2)

The FEM data panel model test produced a determination coefficient (R^2) value of 0.8193 or 81.93%. This can be interpreted that the influence of independent variables, namely HCE, INVCE, and CEE together affects the dependent variable, namely ROA with a percentage of 81.93%.

HCE Discussion on ROA

Based on the results of the hypothesis test analysis on the HCE independent variable, it can be known that the significance value is $0.0403 < 0.05$. If the significance value is less than 0.05, then H_1 is accepted, the first hypothesis in this study is that HCE is accepted as having a significant positive effect on the financial performance proxied with ROA. This means that the ROA value will increase along with the increase in the HCE value. This applies conversely, if HCE decreases, the ROA value will also decrease.

Regarding the concept of intellectual capital, the conventional banking industry is able to generate a competitive advantage by showing good financial performance that has been proxied using ROA which is able to reflect the high profits of the conventional banking industry. Research shows that the higher the HCE level, the more efficient and high the

utilization of human resources in the involvement of industrial processes in conventional banking.

ROA shows the company's ability to generate high quality after-tax profits from the optimal use of assets owned. In addition, ROA will also be able to measure financial performance in generating profits that can then be projected for the next period. This ratio can help the conventional banking industry that has carried out accounting practices well, can measure the efficiency of using intangible assets such as intellectual capital such as HCE, so that the industry can be compared with other similar companies. This is able to help management to accelerate the company's development strategy through intellectual capital.

In line with the research conducted by Bontis et al. (2018); Xu & Li, (2022) ; Gao et al. (2024) which stated that HCE had a positive and significant effect on ROA.

INVCE discussion on ROA

Based on the results of the analysis of the hypothesis test on the independent INVCE variable, it can be known that the significance value is 0.0089 < 0.05. If the significance value is less than 0.05 but the INVCE has a coefficient value of - 0.1629, it means that it has a negative influence. So H_1 was rejected, the second hypothesis in this study was rejected. INVCE has a significant negative effect on the financial performance proxied with ROA. This means that if the INVCE value increases, this will make a decrease in the ROA value as financial performance. This applies conversely, if the INVCE decreases, the ROA value will increase.

Regarding the concept of intellectual capital, INVCE in this study is proxied using education and training costs. The conventional banking industry has an INVCE value that is able to affect financial performance. However, the INVCE rate actually has a negative influence where it is possible that the conventional banking industry that budgets for education and training costs is considered to reduce profitability. In addition, the cost of education and training may be too low so that it is not able to offset the VA score in the INVCE calculation. The low use of education and training costs in reflecting the performance of intellectual capital causes employees to be less efficient and effective in managing resources.

In line with previous research which stated that INVCE had a significant negative effect on ROA (Chatterjee et al., 2022; Pangestu & Muharam, 2023; Putri et al., 2023; Soewarno & Tjahjadi, 2020).

CEE discussion on ROA

Based on the results of the analysis of the hypothesis test on the independent CEE variable, it can be seen that the significance value is 0.1195 > 0.05. If the significance value is greater than 0.05, then H_1 is rejected, the third hypothesis in this study is rejected. CEE has no effect on the financial performance of the proxied with ROA.

Regarding the concept of intellectual capital, CEE in this study is proxied using the entire amount of conventional banking industry capital. The larger or smaller the capital will not make the ROA of the conventional banking industry increase or decrease. Based on

the analysis data, the management of banking capital, which is its own capital, has not been managed efficiently as an intangible investment in supporting the performance of intellectual capital. If capital management can be more optimal, it will be able to generate greater added value in the calculation of CEE.

In line with previous research that states that CEE has a significant negative effect on ROA (Alves et al., 2021; Campos et al., 2022; Ulum et al., 2014; Vrontis et al., 2021).

CLOSING
Conclusion

This study was conducted to determine the influence of intellectual capital consisting of Human Capital Efficiency (HCE), Innovation Capital Efficiency (INVCE), and Capital Employed Efficiency (CEE) on financial performance measured using Return On Assets (ROA) in the conventional banking industry in Indonesia during the period 2020 – 2023. The results of this study are as follows:

a. The Human Capital Efficiency (HCE) component of intellectual capital has a positive and significant influence on Return On Assets (ROA) as an indicator of financial performance. The higher the HCE value, the higher the bank's ROA value. Intellectual capital through HCE has proven to be critical to the financial performance of the conventional banking industry as a source of innovation and a key driver of value creation and sustainable corporate development.

b. The Innovation Capital Efficiency (INVCE) component of intellectual capital has a negative and significant influence on Return On Assets (ROA) as an indicator of financial performance. The conventional banking industry has an INVCE value that is able to affect financial performance. However, the INVCE rate actually has a negative influence where it is possible that the conventional banking industry that budgets for education and training costs is considered to reduce profitability. In addition, the cost of education and training may be too low so that it is not able to offset the VA score in the INVCE calculation. The low use of education and training costs in reflecting the performance of intellectual capital causes employees to be less efficient and effective in managing resources.

c. The Capital Employed Efficiency (CEE) component of intellectual capital has no effect on Return On Assets (ROA) as an indicator of financial performance. The larger or smaller the capital will not make the ROA of the conventional banking industry increase or decrease. Based on the analysis data, the management of banking capital, which is its own capital, has not been managed efficiently as an intangible investment in supporting the performance of intellectual capital. If capital management can be more optimal, it will be able to generate greater added value in the calculation of CEE. Banks need to increase their capital in accordance with applicable regulations.

d. The results of data processing prove that the independent variables, namely HCE, INVCE, and CEE as a whole, are able to explain the ROA of 81.93% as reflected in the R^2 value of 0.8193.

Suggestions

For the next researcher, it is suggested to increase the span of the research year period, expand the population to become a financial company so that not only banks are researched but also companies in the insurance sector. In addition, the addition of other indicators is also needed to strengthen the relationship between intellectual capital and financial performance. This is expected to support existing research theories so that the results obtained are better.

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