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Does bank efficiency mediate the effect of intellectual capital on banking profitability in Indonesia?

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Abstract

This study aims to obtain empirical evidence regarding the role of bank efficiency in mediating the relationship between intellectual capital and profitability. The population in this study is the conventional banking sector which is listed on the Indonesia Stock Exchange from 2018 to 2022. Sampling was carried out by purposive sampling with a total sample of 115 observations. The analysis technique in this study uses SPSS (Statistical Package for the Social Sciences). The results of the analysis provide evidence that intellectual capital has a positive effect on banking profitability, intellectual capital has a positive effect on the efficiency of banking sector companies, bank efficiency has a positive effect on the profitability of banking sector companies, and bank efficiency mediates partially (complementary partial mediation) on the effect of intellectual capital on banking profitability.

Keywords: Intellectual Capital; Bank Efficiency; Profitability; Efficiency; Bank Sector

1. Introduction

The role of banking in a country is so vital that management must pay attention to banking performance. Banks have become one of the fastest growing industries and the high and optimistic growth rate of banking assets occurs from year to year (Lu and Swisher, 2020). The ability of banks to carry out their role in determining the economy depends on efficient and effective bank management.

Problems that occur in banking companies will have an impact on the economy of a country. The growth of the banking market share is so high and followed by the increasing number of banking companies that will increase competition between banks. Management must work optimally so that banks are always healthy and profitable so that banks can develop and grow strong and be able to meet the needs of the community (Suhartono and Azizah, 2017).

Management requires increasing assets and capital, managing credit, and managing liquidity in order to improve company performance. High banking market strength will reduce the risk of bankruptcy, increase capital ratios, and benefit the stability of the financial system in general (Yusgiantoro, 2019). Bank health shows how well the bank's financial performance in operational activities. Bank financial performance can be analyzed from the banking profitability ratio.

Profitability is measured using the return on asset (ROA) ratio. The reason ROA was chosen as a performance measure is because ROA is used to measure the ability of bank management to earn overall profits. Baskoro (2014) explained the results that ROA measures the bank's ability to earn profits and overall efficiency, this ratio proved significant. Banks that have a large ROA reflect that the level of profit achieved by the bank is large and shows the bank's ability to use assets (Dendawijaya, 2003).

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Good banking financial performance must be supported by sufficient capital, not only physical capital but also intellectual capital. Intellectual capital (IC) is intangible capital and resources such as experience, knowledge, management philosophy, products, systems, and human resources that support the creation of corporate value (Stewart T.A., 1997). Intellectual capital is the total value of a company that describes the company's intangible assets derived from three pillars, namely human, structural and customer capital. Companies that have high intellectual capital will increase the return and value of the company. Intellectual capital is the main factor that can increase the value of a company because the greater the value of intellectual capital, the company will innovate more than other companies so as to create value added for the company. Measuring intellectual capital can use the value added intellectual capital (VAIC) model.

IC is a set of dynamic resources that create a competitive advantage for the company to improve its performance (Xu and Wang, 2018). Investment in intellectual capital by banks has been shown to increase bank productivity (Oppong et al, 2019). Structural capital efficiency (SCE) and relational capital efficiency (RCE) are important value drivers in achieving high performance in Islamic banks, but human capital efficiency (HCE) has a negative effect on bank performance (Rehman et al, 2022).

Research on the relationship between intellectual capital and corporate profitability was conducted by Ousama and Fatima (2015), and Umami (2017) produced empirical evidence that intellectual capital has a positive effect on the company's financial performance. Intellectual capital is one of the main factors of banking performance (Hamdan, 2018). Research conducted by Pal and Soriya (2012) and Rosafitri (2017) shows the opposite result that intellectual capital has no significant effect on company profitability.

Bank efficiency refers to how well the bank utilizes its resources to generate revenue and profits. Bank efficiency can be measured by assessing the effectiveness of bank operations in generating profits relative to its costs. Higher efficiency can lead to better profits that can benefit both the bank and its shareholders. Bank efficiency can be improved by finding ways to optimize expenses such as improving business processes, lowering production costs, or in other words increasing efficiency in operational processes.

Efficiency is often used as one of the main tools in measuring company performance (Andhyka, 2017). A low level of efficiency is an indication of bankruptcy of a bank so knowing the level of efficiency of a bank is important (Berger and Humprey, 1993). The presence of more employees with higher education levels in a bank can increase the level of efficiency (Partovi and Matousek, 2018).

Bank efficiency is measured by BOPO, which is the ratio between operating expenses and operating income. Efficiency can be defined and explained as the distance between the existence and quality of optimal inputs and achievable outputs (Coelli and Perelman, 1999). Research on BOPO has been conducted several times but there are still gaps in research results as shown by the results of research conducted by Prasetyo and Darmayanti (2015), Wibowo and Syaichu (2016) which state that operational efficiency as measured by BOPO has a negative effect on profitability. Parawouw's research results (2014) state that BOPO turns out to have a significant positive effect on the profitability of bank asset quality. BOPO is a significant indicator of bankruptcy signals and can affect efficiency and stability (Partovi and Matousek, 2018).

The ability to produce maximum output with existing inputs is a measure of expected performance. Related to the urgency of efficiency analysis in the banking sector, referring to Muljawan et. al. (2014), it is stated that banking competitiveness can be reflected in the level of operational efficiency. When efficiency measurement is carried out, banks are faced with the condition of how to get the optimal level of output with the existing level of input, or get the minimum level of input with a certain level of output. With the identification of input and output allocation, it can be further analyzed to see the cause of inefficiency (Mansyur, 2012).

Resource Based Theory is very appropriate to explain research on intellectual capital (IC), especially in the context of the relationship with banking profitability. Intangible assets of the company in the IC perspective are classified into three main categories: human capital, structural capital, and customer capital (Bontis, 1998). Pulic (2000) states that every company has unique knowledge, skills, values and solutions (intangible resources) that can be transformed into value in the market. Management of intangible resources can help companies to achieve competitive advantage, increase productivity and market value (Ulum, 2017: 28).

Resources Based Theory shows that the resources owned by an entity are heterogeneous with each other. These resources can become an entity's competitive advantage if the entity can obtain, maintain, and manage them. Resources Based Theory was developed by Barney (1991) and this theory has the assumption that an entity is said to be successful if the resources that become a competitive advantage create added value that is not easily imitated by other entities.

Resources Based Theory was pioneered by Penrose (1959) who argued that company resources are heterogeneous, the productivity of company resources will create a unique character for each company. Resources Based Theory is an idea in the theory of strategic management and corporate competitive advantage which states that the superior resources of the company can help the company achieve success (Solikhah et. al., 2010). Resource Based Theory (RBT) views intellectual capital and physical and financial capital as strategic resources because companies gain competitive advantage and superior performance through the acquisition and efficient use of these strategic resources (Zeghal and Maaloul, 2010).

Banking sector companies in their operations manage large amounts of money, so that intellectual capital and skills are needed and require efficiency in operational processes to produce good and consistent profitability. There are inconsistencies or gaps in the results of previous studies that have been described in the background above. Gaps in previous research encourage researchers to conduct more in-depth research on this topic.

2. Literature review and hypothesis development

Intellectual capital (IC) has a very important and strategic role in the company to measure the human resources in it. IC is an intangible asset that is very important in the information and knowledge era because intellectual capital refers to the knowledge and abilities possessed by a social collectivity, such as an organisation, intellectual or professional community. Stewart (1997) says that IC is intellectual material including knowledge, information, intellectual property, and experience that can be used to create wealth. This can be explained through the resource-based theory that is often used by researchers in explaining the relationship between intellectual capital and corporate profitability. Resources are very important for the survival of the company, both tangible and intangible. The resources owned by the company will support the growth of the company and will affect the profit or profit earned by the company.

Research conducted by Rosida and Aisyah (2021) shows that intellectual capital has a positive and significant effect on the profitability of state-owned Islamic banks in 2015-2020. Studies conducted by Smriti and Das (2018), expand the understanding of IC that intellectual capital has a positive effect on the profitability of companies in India that are included in the COSPI index. The results found in the research of William et. al., (2019) show that human capital efficiency shows a positive effect on financial performance. MVAIC (Modified Value-Added Intellectual Coefficient) significantly and positively determines company performance (Faruq et.al., 2023). The results of research conducted by Cahyani, et.al., (2015) show that Intellectual capital (IC) has a significant effect on the profitability of manufacturing companies listed on the Indonesia Stock Exchange (IDX). Based on the description above, the hypotheses that can be formulated in this study are as follows.

- H1: Intellectual capital has a positive effect on banking profitability

Based on Resource Based Theory, company resources include all assets, capabilities, organizational processes, company attributes, information, knowledge, and so on controlled by the company that allows the company to develop and implement strategies to increase the efficiency and effectiveness of the company. Intellectual capital includes company resources that are intangible and can affect the company's operational processes. Intellectual capital partially affects bank efficiency (Supatmin, 2020). Umami (2017) states that intellectual capital and company efficiency are two interrelated variables. The study conducted by Wang et.al., (2014) found that Intellectual capital plays an important role in performance, both in cost efficiency and revenue efficiency. Based on the description above, the hypothesis that can be formulated in this study is as follows.

- H2. Intellectual Capital has a positive effect on bank efficiency

Companies that can achieve efficiency will have greater opportunities to create profits. A low BOPO illustrates a company that operates more efficiently. In theory, it is stated that a high BOPO value in a bank indicates the greater the company's operating costs and the bank's efficiency is not achieved. Simultaneously BOPO and LDR have a significant effect on ROA of BUMN Banks (Pondaag et. al., 2022). The relationship between BOPO and ROA shows a negative relationship, meaning that any increase in BOPO will be followed by a decrease in Return on Assets.

The results of previous research by Yogi and Ramantha (2013) and Harun (2016) show that the BOPO ratio has a negative effect on bank ROA. The more efficient a bank is in running its business, which is indicated by operating income that is greater than operating costs or a low BOPO value, the ROA will increase (Masdupi, 2014). Research conducted by Rendiana (2015) shows that there is a positive relationship for the relationship between efficiency and Return on

Asset in banking. Operational efficiency affects financial performance as measured using the ROA ratio (Pinninti et. al., 2022). Based on the description above, the hypothesis that can be formulated in this study is as follows.

- H3: Bank efficiency has a positive effect on banking profitability

Resource Based Theory is a theory that describes a company can achieve competitive advantage by relying on resources so that it can direct the company to be sustainable continuously (Barney, 1986). Company resources help companies increase the efficiency and effectiveness of company operations thereby increasing profitability. Companies that can manage resources and carry out efficient operational activities are expected to produce high levels of profitability (Putri and Gunawan, 2019). Research conducted by Astari (2020) shows that intellectual capital (IC) affects the company's financial performance. Empirical studies find evidence that IC is a significant factor in production, performance, and organizational efficiency (Aslam et al., 2018; Jetmiko, 2018). Intellectual capital is related to the company's ability to create, apply, and measure intangible resources to create value that can be used to improve the company's practical growth and financial performance (Castro et. al., 2021).

- H4: Bank efficiency can mediate the effect of intellectual capital on banking profitability

3. Methods

This research was conducted in the conventional banking sector in Indonesia which has been listed on the Indonesia Stock Exchange (IDX). Listed banking companies routinely provide financial statement data that can be accessed or can be downloaded through the official IDX website through the website www.idx.co.id. The data used is data for 5 years starting from 2018 to 2022. The period 2018-2022 is used as an observation year with the consideration that it can provide the latest picture of banking performance.

The population in this study are banking companies in Indonesia that have been listed on the IDX (Indonesia Stock Exchange). The sample in this study was based on a non-probability sampling approach using purposive sampling technique.The criteria used in selecting samples for this study are conventional banking companies listed on the Indonesia stock exchange and publishing financial reports during the period 2018 to 2022.

The data analysis technique used in this research is Path Analysis using the Statistical Product and Service Solution (SPSS) program. This technique is used to see the effect of intellectual capital on banking profitability with bank efficiency as a mediating variable.

4. Results and discussion

4.1. Path Coefficient

Hypothesis testing in this study uses a path coefficient model or path analysis. Hypothesis testing path analysis using the SPSS (Statistical Package for Social Science) program.

Table 1 Path Coefficient I

Model		Standardized Coefficients	t	Sig.
		Beta		
1	(Constant)		89.050	0.000
	VAIC	-0.090	-25.077	0.000

Secondary Data, 2023

Table 2 Path Coefficient II

Model		Standardized Coefficients		
		Beta	t	Sig.
1	(Constant)		6.086	0.000
	VAIC	0.355	4.500	0.000
	BOPO	-0.591	-7.494	0.000

Secondary Data, 2023

- Direct effect (DE) test

The effect of VAIC variable on BOPO partially, as well as the effect of VAIC and BOPO variables on ROA partially seen from the beta value or Standardized Coefficient are as follows.

  - The effect of VAIC variable on BOPO.
    VAIC on BOPO = -0.090.
  - The effect of VAIC variable on ROA.
    VAIC on ROA = 0.355.
  - The effect of the BOPO variable on ROA.
    BOPO on ROA = -0.591.

- Indirect effect (IE)

The effect of VAIC variable on ROA through BOPO is calculated in the following way.

$$X \rightarrow Y1 \rightarrow Y2 = (-0{,}909 \times -0{,}591) = 0{,}537$$

- Total effect

$$\text{Total effect} = \text{direct effect} + \text{indirect effect}$$

$$= -0{,}909 + 0{,}355 - 0{,}591 + 0{,}537$$

$$= -0{,}608$$

- Calculation of path coefficient

$$e_1 = \sqrt{1 - 0{,}825}$$

$$= \sqrt{0{,}175}$$

$$= 0{,}418$$

$$e_2 = \sqrt{1 - 0{,}857}$$

$$= \sqrt{0{,}143}$$

$$= 0{,}378$$

Test Coefficient of Determination (R2)

The formula used is as follows.

$$R_m^2 = 1 - e_1^2\, e_2^2$$

$$= 1 - 0{,}418^2 0{,}378^2$$

$$= 1 - 0{,}175.0{,}143$$

$$= 1 - 0{,}025$$

$$= 0{,}975$$

The model validation check shows a value of 0.975. This means that the effect of VAIC and BOPO on ROA is 97.5 percent, while 2.5 percent is explained by other factors.

4.2. F-Test

Table 3 F Test Results

No	Equation	F	Sig.
1	$Y_1 = \alpha + \beta_1 X_1 + \varepsilon$	628.835	0.000
2	$Y_2 = \alpha + \beta_1 X_1 + \beta_2 Y_1 + \varepsilon$	394.346	0.000

Secondary Data, 2023

The F test results show that both equations have a significance value less than 0.05. So it can be stated that both equations have met the requirements of model fit.

4.3. t-test

Table 4 t test

No	Hypothesis	Regression Coefficient	t_{value}	Sig.
1	VAIC on ROA	0.003	4.500	0.000
2	VAIC on BOPO	-0.121	-25.077	0.000
3	BOPO on ROA	-0.040	-7.494	0.000

Secondary Data, 2023

4.4. VAIC on ROA

The test results show that the regression coefficient is positive with a t-value of 4,500 with a significance of 0.000. The significance value that is less than 0.05 indicates that there is a significant positive effect of VAIC on ROA. So an increase in VAIC will encourage an increase in ROA. Hypothesis one (H1) states that intellectual capital has a positive effect on banking profitability. The results of this study are supported by several previous studies, namely research conducted by Rosida and Aisyah (2021) showing that intellectual capital has a positive and significant effect on the profitability of state-owned Islamic banks in 2015-2020. Studies conducted by Smriti and Das (2018) which expand the understanding of IC that intellectual capital has a positive effect on the profitability of companies in India that are included in the COSPI index. The results found in the research of William et. al., (2019) show that human capital efficiency shows a positive effect on financial performance. MVAIC (Modified Value-Added Intellectual Coefficient) significantly and positively determines company performance Faruq et.al., (2023). The results of research conducted by Cahyani, et.al., (2015) show that Intellectual capital (IC) has a significant effect on the profitability of manufacturing companies listed on the Indonesia Stock Exchange (IDX).

4.5. VAIC on BOPO

The test results show that the regression coefficient is negative with a t-value value of -25.077 with a significance of 0.000. The significance value that is less than 0.05 indicates that there is a significant negative effect of VAIC on BOPO. So an increase in VAIC will encourage a decrease in BOPO. The lower BOPO indicates that bank efficiency is increasing. Hypothesis two (H2) states that intellectual capital has a positive effect on bank efficiency. The research results above are in line with several previous studies including research from Supatmin (2020) which states that intellectual capital partially affects bank efficiency. Umami (2017) states that intellectual capital and company efficiency are two interrelated variables. Research conducted by Adesina (2019) provides evidence that Intellectual capital has a positive effect on bank efficiency. The study conducted by Wang et.al., (2014) found that Intellectual capital plays an important role in performance, both in cost efficiency and revenue efficiency.

4.6. BOPO on ROA

The test results show that the regression coefficient is negative with a t-value value of -7.494 with a significance of 0.000. The significance value that is less than 0.05 indicates that there is a significant negative effect of BOPO on ROA. So an increase in BOPO will encourage a decrease in ROA and vice versa. The decreasing BOPO indicates that bank efficiency is increasing. Hypothesis three (H3) states that bank efficiency has a positive effect on banking profitability. The results of the above study are in accordance with previous research conducted by Yogi and Ramantha (2013) and Harun (2016) which shows that the BOPO ratio has a negative effect on bank ROA. The more efficient a bank is in running its business, which is indicated by operating income that is greater than operating costs or a low BOPO value, the ROA will increase (Masdupi, 2014). Research conducted by Rendiana (2015) shows that there is a positive relationship for the relationship between efficiency and Return on Asset in banking. Operational efficiency affects financial performance as measured using the ROA ratio (Pinninti et. al., 2022). Simultaneously BOPO and LDR have a significant effect on ROA of BUMN Banks (Pondaag et. al., 2022).

4.7. Sobel Test

The Sobel test is used to determine whether the mediating variable can affect the relationship between the independent variable and the dependent variable or not. The calculation used is as follows.

$$= \frac{-0{,}121.-0{,}040}{\sqrt{(-0{,}040^2 0{,}005^2)+(-0{,}121^2\ 0{,}005^2)+(0{,}005^2 0{,}005^2)}}$$

$$= \frac{0.00487}{\sqrt{0{,}000000038+0{,}00000042+0{,}0000000007}}$$

$$= \frac{0{,}00487}{\sqrt{0{,}00000046}}$$

$$= \frac{0{,}00487}{0{,}00068}$$

$$= 7.180$$

The test results show the Z value is 7.810. This value is greater than 1.96, so it can be stated that BOPO mediates the effect of VAIC on ROA. Hypothesis four (H4) states that bank efficiency is able to mediate the effect of intellectual capital on banking profitability. Barney (1991) states that in the RBT perspective, firm resources include all assets, capabilities, organizational processes, company attributes, information, knowledge, and others controlled by the company that allows the company to understand and implement strategies to improve the efficiency and effectiveness of the company and will ultimately increase the profitability of the company. The results showed that the hypothesis was accepted and in line with the theory which states that companies that can manage resources or intellectual capital optimally, as well as carry out efficient operational activities are expected to produce high levels of profitability and performance (Putri and Gunawan, 2019). Empirical studies find evidence that IC is a significant factor in production, performance, and organizational efficiency (Aslam et al., 2018; Jetmiko, 2018). Intellectual capital is related to the company's ability to create, apply, and measure intangible resources to create value that can be used to improve the company's practical growth and financial performance (Castro et. al., 2021).

5. Conclusion

The research conducted is in accordance with and supports the Resources Based Theory (RBT) theory. According to RBT, companies will gain competitive advantage and superior performance through the utilization of strategic asset resources that are important for competitive advantage and superior financial performance (Wernerfelt, 1984; Barney, 1991). Both tangible and intangible assets are perceived as potential strategic assets. The theoretical implication in this study is that intellectual capital can affect bank efficiency, with management paying attention to the assets owned by the company, both capitals employed, human capital and structural capital which are then maximized for productivity and efficiency of the company which will provide better financial performance or profitability of the company.

This research can be used as a reference for companies to business strategies, have sensitivity to environmental developments that can affect the company's business, have broad insights and strategic thinking skills. Managing the resources owned efficiently and economically results in the company obtaining high profitability and intellectual capital will show that the company has a competitive advantage over competitors. This research can be used as a reference for investors to make decisions to invest in a company. Investors can get an overview of the company's financial performance by paying attention to intellectual capital, efficiency, and profitability.

Research Limitations

- The sample in this study only uses conventional banking companies listed on the Indonesia Stock Exchange for the period 2018-2022. Therefore, the results of this study cannot be generalized to the Islamic banking company sector or other company sectors on the Indonesia Stock Exchange.
- This study calculates intellectual capital using the VAIC method so that it is not known which value added has the greatest influence on profitability among Human Capital, Capital Employed, and Structured Capital.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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