

Sustainable Banking Disclosure and Bank Efficiency: Intellectual Capital as a Moderation Variable

Ahmad Waluya Jati ^{1*}, Masiyah Kholmi ², and Wardatul Jannah³

Faculty of Economic and Business, University of Muhammadiyah Malang

Corresponding Author: Ahmad Waluya Jati ahmadwaluyajati@gmail.com

ARTICLE INFO

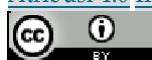
Keywords: Bank Efficiency, Intellectual Capital, Sustainable Banking Disclosure

Received : 14 , June

Revised : 28, June

Accepted: 29, July

©2024 Jati, Kholmi, Jannah : This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](#).



ABSTRACT

The purpose of this research is to examine how sustainable banking transparency affects bank efficiency and the moderating effect of intellectual capital. The research sample consists of banks that were listed on the Indonesia Stock Exchange in 2020–2022. Disclosure in sustainable banking is measured by content analysis. The bank efficiency value was obtained using the Data Envelopment Analysis (DEA) method. The research approach makes use of panel data regression. Ninety observations were gathered between 2020 and 2022 using the purposive sample approach. The study's conclusions show that information about sustainable banking has little bearing on bank efficiency. Intellectual capital can strengthen the link between bank efficiency and sustainable banking disclosure.

INTRODUCTION

Banking has a very important role because it provides financial resources for individuals, businesses, and governments to expand businesses, increase economic growth, and contribute to the overall welfare of society. Therefore, bank performance is something that is highlighted by stakeholders (Shah et al., 2019). Indonesian banking efficiency is one of the important factors influencing economic growth and the country's financial stability. Bank performance can be said to be good if the bank is efficient in achieving goals with minimal costs. Indonesian banking efficiency is still relatively low when compared with other ASEAN countries. This is proven by research conducted by Chan et al., (2015), which compared the level of banking technical efficiency between ASEAN countries, including Indonesia, in the 1998–2012 period. The results of this research show that Indonesia has the lowest technical efficiency.

During the COVID-19 pandemic, it hit the Indonesian economy. Indonesia experienced another recession in 2020 after the last one occurred in 1998. The financial services and insurance sector includes banking companies. According to the Central Statistics Agency (BPS), the financial services and insurance sectors experienced minus 10.3% on an annual basis in the second quarter of 2020. Even though conditions have relatively improved, the road to recovery in the banking sector is still steep. Rating agency S&P Global Ratings even revised Indonesia's long-term debt outlook, from "stable" to "negative." This means that Indonesia now has a high risk profile and low creditworthiness. Growth in banking industry share prices has fluctuated from year to year, tending to decline. In 2020, the performance of banking industry shares represented by the Infobank15 index decreased by 5% compared to 2020 (Iswara, 2021).

Banks are not only required to be responsible for their company's performance, but they must also be accountable to the community and the environment around them. The direct impact of banking activities is relatively lower than that of other sectors, but the indirect impact resulting from bank financing needs to be taken into consideration (Bukhari et al., 2020). Bank financing can be a driver of industrial growth because it can help companies obtain the financial resources needed to expand their businesses and increase production capacity. Bank loans have the potential to stimulate industrial expansion, even in unethical sectors that may lead to social and environmental issues if the wrong businesses are not awarded bank cash. Therefore, it is necessary to implement sustainable banking reform (sustainable banking) to minimise funding for industries that damage the environment and harm society.

With the publication of Bank Indonesia Regulation (PBI) Number 14/15/PBI/2012, which requires banks to include an evaluation of debtors' environmental management efforts as a requirement for financing, sustainable banking practices were first introduced in Indonesia. Financial Services Authority rule (POJK) number 51 of 2017 concerning sustainable finance is the most recent rule pertaining to sustainable banking. The sustainable finance principles set forth in this law must be followed by Financial Services

Institutions, Issuers, and Public Companies in order to develop a sustainable economy, maintain social justice, and improve environmental quality. This guideline requires banks to be the first parties to implement sustainable finance concepts, particularly BUKU 3, BUKU 4, and international banks.

In light of the above mentioned context, the research's problem formulation is:

1. Does sustainable banking disclosure have a positive effect on banking efficiency?
2. Does intellectual capital strengthen sustainable banking disclosure and banking efficiency?

Based on the problem formulation that has been explained, the objectives of this research are:

1. Test and analyse the effect of sustainable banking disclosure on banking efficiency.
2. Test and analyse the influence of intellectual capital in moderating the influence of sustainable banking disclosure on banking efficiency.

THEORETICAL REVIEW

Based on stakeholder theory, organisations that have good relationships with their stakeholders will have a good impact on improving performance (Waddock & Graves, 1997). This is because sustainable banking is a bank activity that can maintain relationships between stakeholders by providing benefits to various stakeholders. Sustainable banking activities are not only responsible for shareholders but also for society and the environment. The International Finance Corporation (IFC) revealed that banks obtain several benefits by incorporating sustainability aspects into their business strategies and practices, namely a better reputation and investor trust. Some other benefits of implementing sustainable finance are reduced operating costs, reduced financial risk, increased efficiency, improved public image, and increased customer trust. The benefits of implementing sustainable banking activities will increase bank performance and achievements.

Research on the relationship between bank performance and social responsibility has shown conflicting findings. In Weber's (2005) research study looked at how bank sustainability performance affected financial performance. On the other hand, Forgione et al. (2020) discovered in their research that corporate social responsibility negatively impacted bank efficiency in 22 nations' major commercial banks. Consistent with the findings of a study conducted in 22 countries by Esteban-Sanchez et al. (2017), corporate social performance was found to have no bearing on bank financial performance (ROA and ROE). As a moderating variable, media pressure is included in this analysis because the results are still not consistent. Intellectual capital management is one of the components or strategies for increasing investor trust in firms (Asare et al., 2017). Increasing investor trust can give businesses a competitive edge in luring new investors (Bollen et al., 2005). Because it pertains to the group's capacity to create, disseminate, and use information

inside the organisation, intellectual capital's competitive advantage influences performance results (Bontis et al., 2000).

Adesina (2019) found that a company's capacity to optimise return on investment by making efficient use of its human resources is one component that contributes to intellectual capital. Apart from human resources, there exists a favourable correlation between the successful utilisation of a business's capital and its return on investment. The relationship between intellectual capital and business success has been explained in a number of ways, and research findings supporting this relationship suggest that it influences investor confidence and ultimately boosts the company's profitability. One of the factors that makes competitive organisations more attractive to investors is the availability of information regarding intellectual capital (Bollen et al., 2005).

This study closes a number of gaps in earlier research. First, most research (e.g., Weber, 2005; Siueia et al., 2019; Esteban-Sanchez et al., 2017) uses bank performance measurements with univariate analysis of ROA, ROE, and NPL. The role of banks as intermediary organisations entails several inputs and outputs in their business activities, making it impossible to compare a bank's efficiency to that of other banks directly using ratios as a performance measuring tool. As a result, employing multiple inputs and outputs to measure bank performance, Data Envelope Analysis (DEA) is a suitable technique.

Second, new rules pertaining to sustainable banking have been developed in Indonesia, requiring banks to apply sustainable finance and report on it through sustainability reporting by the year 2019. It is essential to examine the benefits of sustainable banking for bank efficiency. This study will provide an overview of the effect of sustainable banking on bank efficiency in developing countries, with a focus on Indonesia. Third, Weber's (2017) research is cited in the examination of sustainable banking disclosure to ensure compliance with Indonesian rules on sustainable banking. Fourth, a moderating variable is used in this study to examine how intellectual capital contributes to the strengthening of the link between bank efficiency and sustainable banking.

There are several motivations for conducting this research, namely the existence of regulations that encourage banks to implement sustainable banking, which mandate that banks execute business plans, risk management techniques, and commercial operations that can take social and environmental factors into account. Second, researchers are interested in researching the banking sector because banks are the first parties required to implement and report sustainable financial activities based on POJK 51, and banks have an important role in providing the funding needed for the growth of an industry. The implementation of sustainable banking is considered a win-win solution between banks and companies to help reduce risks between both parties and increase efficiency.

Stakeholder theory, according to Edward Freeman, is a concept that states that companies are not only responsible to shareholders or capital owners but also to various parties who have interests or are stakeholders in the company, such as employees, customers, suppliers, society, and the environment. According to Freeman & Reed (1983), organisations should consider the

interests of various stakeholders in making decisions, not just the interests of shareholders. This concept holds that stakeholders have equal rights to influence the organisation and obtain benefits from its existence.

According to Spence's (1972) explanation of signal theory, the signal sender, or the owner of the information, attempts to convey pertinent details that the recipient can use. After that, the recipient will adjust their behaviour based on how they understand the indications given by the organisation (owner of the information). According to signalling theory, companies would provide information in the annual report in an effort to inform or persuade potential investors (Whiting & Miller, 2008). According to Leland and Pyle (1977), firm executives with superior knowledge of their company will have an incentive to share this information with potential investors. This way, the company can enhance its worth by voluntary reporting that appears in its annual report.

The idea of "sustainable banking" first surfaced in the 2000s. This idea considers the three previously mentioned facets of banking – social, ethical, and green – within a context of governance, the environment, and social dynamics that promote sustainable development. Banks that implement the sustainable banking concept integrate socially and environmentally responsible banking practices in all aspects of their business, including risk management, investment, and lending (Weber, 2017).

Scott et al. (2005) categorise efficiency into two techniques, namely technical efficiency techniques and price efficiency techniques. Technical efficiency techniques refer to a bank's ability to use inputs or resources efficiently to produce maximum output or results. Meanwhile, price efficiency techniques relate to the bank's ability to manage its operational costs so that it can offer products and services at competitive prices. In this case, banks must be able to minimise product production and distribution costs as well as optimise marketing strategies in order to offer prices that suit market needs.

Customer capital, structural capital, and human capital are the three main concepts of intellectual capital that academics have often recognised, according to Bontis et al. (2000). Human resource capital is made up of employees' abilities and knowledge; structural capital is made up of things like patents, copyrights, and other legal protections; relational capital is made up of connections with suppliers, customers, and other stakeholders. Value-added intellectual coefficient (VAIC) is a method suggested by Pulic (1998) to quantify the competitive advantage of intellectual capital as an intangible asset. Value added capital employed (VACA), value added human capital (VAHU), and structure capital value added (STVA) make up the three components of the value added index of capital (VAIC).

Numerous research papers have looked at the relationship between social and environmental responsibility and bank performance, including Nollet et al. (2016), Weber (2017), Esteban-Sanchez et al. (2017), Maqbool & Zameer (2018), Buallay (2019), Siueia et al. (2019), and Weber & Chowdury (2020). Nonetheless, the majority measure bank performance using univariate analysis, namely ratios like ROA, ROE, and NPL. Because earnings management and systemic financial market conditions are thought to have an impact on bank

performance, efficiency-based performance evaluation is the most appropriate way to assess bank performance (Forgione et al., 2020). There are several disadvantages to using univariate analysis to evaluate bank performance.

Previous studies by Sardo et al. (2018) in Portuguese, Kumar (2013) in the US, Asare et al. (2017) in Ghana, and Rehman et al. (2021) in Istanbul examined the effect of intellectual capital on bank efficiency. The results of the study shed light on the favourable correlation between intellectual capital and bank efficiency. This illustrates the effectiveness of the business's capital allocation and return on investment, in addition to its return on investment and human resource management. This capital information is useful to investors.

METHODOLOGY

The variable that is the primary focus of the researcher or the primary variable that is relevant to the investigation is known as the dependent variable (Sekaran & Bougie, 2019). The efficiency of banks is the dependent variable in this study. This study employs Data Envelopment Analysis (DEA), a non-parametric technique, to measure banking efficiency. Data Envelopment approach (DEA) is an approach that may measure the Decision Making Unit (DMU) simultaneously with many inputs and outputs without requiring specific production function assumptions (Coelli et al., 1998).

Research is carried out by the decision-making unit, which is also referred to as the decision-making unit (UPK) in DEA. DMU is the organisation in charge of converting input into output, and its efficacy will be evaluated. In this study, the Decision Making entity (DMU) is a distinct bank entity. The fundamental idea of Data Envelopment Analysis (DEA) is variable return to scale (VRS). The variable return to scale (VRS) assumption was selected since not all of the banks that are the focus of the study operate at an ideal scale. The efficiency score is calculated by analysing the data with MaxDEA software.

With constraints: $\min \theta \lambda \theta$,

$$-y_i + Y\lambda \geq 0,$$

$$\theta x_i - X\lambda \geq 0,$$

$$N\lambda = 1$$

This research uses the sustainable banking disclosure index (SBDI). The approach used to measure sustainable banking is content analysis. Content analysis can measure the level of sustainable banking activities. Content analysis is a better approach to processing, analysing, examining, interpreting, and sorting various types of content data, and allows the separation of sustainable banking disclosures for each different bank (Dyduch & Krasodomska, 2017). Banking is given a score of 1 if sustainable banking items are reported in the annual report, a score of 2 if sustainable banking items are disclosed qualitatively and quantitatively, and a score of 0 if they are not reported. A higher SBDI value indicates a higher level of sustainable banking

activity because this value captures a lot of emerging information related to sustainable banking activities. This is done to minimise the element of subjectivity.

The formula used is as follows:

$$SBDI_{it} = \sum SSB_{it}$$

Value Added Intellectual Capital, or VAICTM, was developed by Pulic (1998) and is a method used to measure intellectual capital as an independent variable. Since Pulic's (1998) VAIC measurement serves as the foundation for the development of further intellectual capital metrics, it is utilised. Human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) make up the three parts of VAIC. The bigger the added value to the business and the higher the VAIC value, the more effectively the capital is employed. Utilise the following formula to get the VAIC:

$$VAIC = HCE + SCE + CEE$$

To calculate VAIC, a company must first calculate the company's ability to create added value (VA) for its stakeholders (Clarke et al., 2011). This VA is the difference between output and input. Output represents net sales revenues, and input includes all costs included in profits on revenue or sales items except labour costs, which are considered value for creating the entity (Tan et al., 2007).

The formula is as follows:

$$VA = S - B = NI + T + DP + I + W$$

Data analysis technique

Multiple regression analysis and descriptive statistics are the data analysis techniques employed in this study. Two levels of analysis were applied in this study. The first step is to use MaxDEA, a DEA programme, to calculate technical efficiency. Researchers first establish preset DMU, input, and output data before testing bank efficiency. Next, put it into a table and run the model data created by the variable return to scale (VRS) method using an input-oriented methodology. following the acquisition of efficiency data. Using media pressure as a moderating variable, multiple regression analysis is performed in the second stage to ascertain the impact of sustainable banking on bank efficiency.

Panel data is an examination of a set of cross-sectional data observed over time. Researchers use panel data because of the resulting benefits, namely that panel data can control individual heterogeneity, offers more informative data, more variability, less collinearity among dependent variables, greater degrees of freedom and more efficiency in estimation, and reduces bias resulting from aggregation over companies or individuals.

Data Analysis Model

There are two multiple regression equations that become data analysis models in hypothesis testing.

Equation 1

$$EB_{it} = \alpha + \beta_1 SBDI_{it} + \varepsilon$$

Equation 2

$$EB_{it} = \alpha + \beta_2 SBDI_{it} + \beta_3 SBDI_{it} * MI_{it} + \varepsilon$$

Estimation of Panel Data Regression Models

According to Widarjono (2018), there are three models in panel data regression to estimate model parameters, namely.

1. Common Effect Model
2. Fixed Effect Model
3. Random Effect Model

Selection of Panel Data Regression Estimation Techniques

In the panel data regression model estimation technique, there are three techniques used, namely the common effect model, fixed effect model, and random effect model. Estimation techniques for selecting panel data regression are the Chow test, Hausman test, and Lagrange multiplier test (Widarjono, 2018).

1. Chow Test
2. Lagrange Multiplier (LM) Test
3. Hausman test

Descriptive Statistical Analysis

Descriptive statistics provide an explanation of whether the data is good or not, which is indicated by a mean value that is greater than the standard deviation. There is also a description of the maximum, minimum, and range of data, which is useful for making it easier to understand the variables used in research.

Hypothesis testing

Goodness of Fit Test (F Test)

The model's viability is assessed using the goodness-of-fit test. The significance level for this test was set at 5%. The regression model is deemed viable if the F-statistic, or significant probability value, is less than 0.05. The regression model is not viable if the significant probability value (F-statistic) is greater than 0.05.

Coefficient of Determination (R2)

The degree to which dependent variables with values between zero and one may be explained by the model can be ascertained by testing the coefficient of determination (R2). A close to one R2 result suggests that the independent factors may anticipate variations in the dependent variable, whereas a tiny

and near-zero R² result suggests that the independent variables have extremely limited ability to explain the dependent variable (Ghozali & Ratmono, 2013).

RESULTS AND DISCUSSION

The banking population that was listed on the Indonesia Stock Exchange (BEI) between 2020 and 2022 is the subject of this study. Purposive sampling, which is the process of selecting samples from the population based on preset criteria, provides the basis for the sample used in this study. Researchers have established four criteria. The following table displays the quantity of research samples for 2020-2022:

Purposive Sampling Results Table

Description	
Banks listed on the Indonesian Stock Exchange (IDX)	43
Banks listed on the Indonesia Stock Exchange (IDX) and not delisted in the 2020-2022 period	(0)
Banks that publish annual reports and sustainability reports in the 2020-2022 period	(9)
Banks that do not have negative profits	(4)
Company sample based on purposive sampling of	30
Number of observations for 3 years (30 x 3 years)	90

Source: Processed Data (2023)

Based on the criteria used in the sample selection procedure, a total sample of 30 companies was obtained with a total of 90 observations over 3 years, namely the 2020-2022 period.

Bank Efficiency Analysis Results based on Data Envelopment Analysis

In this research, bank efficiency is measured using a non-parametric method, namely data Envelopment Analysis (DEA). The assumption used in Data Envelopment Analysis (DEA) is variable Return to Scale (VRS) which is input-oriented. A bank is said to be technically efficient if it has an efficiency score of 1 or 100%. However, if the efficiency score is below 100%, then the bank is considered inefficient.

Table of Bank Efficiency Scores in 2020-2022

	2020	2021	2022
Number of DMUs	30	30	30
Number of efficient DMUs	4	5	7
Inefficient number of DMUs	26	25	23
% Efficient Bank	13%	17%	23%

Average efficiency value	0.541	0.625	0.784
Lowest efficiency value	0.415	0.257	0.651
DMU with the lowest efficiency	Bank Mega	Bank Mega	Bank Mega

The aforementioned table indicates a rise in the quantity of efficient banks between 2020 and 2023. Only four efficient banks existed in 2020, the lowest number ever, and seven efficient banks existed in 2018, the largest number to date. In all, 16 out of 90 observations in 2020–2023 were efficient banks. These efficient banks set the standard for other banks that are not yet efficient by identifying the efficient frontier or best practice.

Selection of Panel Data Models

Model selection is necessary in panel data research to ensure that the findings are impartial. Three models are utilised to pick the research model: the random effect model, the fixed effect model, and the OLS (common) method model. Meanwhile, there are three model estimation methods that can be used to establish the research model: the Hausman test, the Lagrange multiplier test, and the Chow test (F statistical test).

Test chow

The goal of the Chow test is to identify the optimal model between the fixed effect and common effect models. Here is how the hypothesis is put forth:

H0: Common Effect Model

Ha: Fixed Effect Model

The significance level (α) used in this research is 0.05, or 5%. If the test results show that the F-test or chi square probability is significant ($p\text{-value} < 5\%$), then H0 is rejected so that the appropriate model is the fixed effect model. The following are the results of the chow test in this study :

Chow Test Results Table

Effect Test	Prob.
Model 1 Cross-section F	0.000
Model 2 Cross-section F	0.000

Source: Processed Data (2023)

Based on the table above, the F test probability value for both models is smaller than the specified level of significance (α) ($0.000 < 0.05$), so H0 is rejected, so the more appropriate model to use in research is the fixed effect model. To ensure that the fixed effect model is the best model for research, a Hausman test needs to be carried out.

Hausman test

The best model between the fixed effect and random effect models is determined using the Hausman test. Here is how the hypothesis is put forth:

H0: Random Effect Model

Ha: Fixed Effect Model

Table of Hausman Test Results

Test Summary	Prob.
Model 1 Cross-section random	0.045
Model 2 Cross-section random	0.254

In this study, the significance level (α) was set at 0.05, or 5%. The random cross-section model 1's probability value is 0.045, as indicated by the Hausman test results table. Since this number is less than α ($0.045 < 0.05$), H0 is rejected, and the fixed effect model in model 1 is the one that should be used. The random cross-section model 2's probability value in model 2 is 0.254. Since model 2's probability value is larger than α ($0.254 > 0.05$), H0 is accepted, and the random effect model can be applied to model 2. Furthermore, in model 2, the Lagrange Multiplier (LM) test will be carried out, while in model 1 the Lagrange Multiplier (LM) test will not be carried out because the results of the best model are consistent, namely the fixed effect model.

Lagrange Multiplier (LM) Test

The Lagrange Multiplier (LM) test was carried out to determine the appropriate model between the common effect and random effect models. The Lagrange Multiplier (LM) test has the following hypothesis:

H0: Common Effect Model

Ha: Random Effect Model

Table of Lagrange Multiplier (LM) Test Results

Null (no rand. Effect) Alternative	Prob.
Model 2 Breusch-Pagan	0.000

Source: Processed Data (2023)

If the Breusch-Pagan probability value is <0.05 , then Ha is accepted. This means that the appropriate research model is a random effect. The table above explains that the Breusch-Pagan probability value shows a value of 0.000, so the best research model is the random effect model.

Results of Panel Data Regression Analysis

The following are the results of hypothesis testing using the F test, the coefficient of determination, and the t test.

F-Statistic Test

The model's viability is assessed using the F statistical test, which is run at a significance threshold of 5%. A regression model is deemed viable if the probability significance value (F-Statistic) is less than 0.05. Conversely, if the F-Statistic is more than 0.05, the regression model is deemed impractical. The test findings for the two models in this study are as follows:

Table of F-Statistic Test Results

	Prob (F statistic)
Pengujian Langsung	0.000
Pengujian dengan Moderasi	0.000

Source: Processed Data (2023)

Direct evaluation of how sustainable banking transparency affects bank productivity. The regression model is deemed practicable based on the F test results for direct testing, which provide a probability value of 0.000 with a value <0.05 , indicating significance. The impact of sustainable banking disclosure on bank efficiency is examined through testing with moderation, using intellectual capital as a moderating variable. Based on the F test results for testing with moderation, which yield a significant probability value of $0.000 < 0.05$, the regression model is considered viable.

Coefficient of Determination (R2)

The ability of the model to explain the variation of the dependent variable is shown by the coefficient of determination (R2). The value of the coefficient of determination ranges from zero to one. A low R2 value indicates a very limited ability of the independent variables to explain changes in the dependent variable. When the independent variables yield nearly all of the information required to forecast changes in the dependent variable, the value is close to unity.

	Adjusted R-Squared
Direct Testing	0.654
Testing with Moderation	0.457

Source: Processed Data (2023)

Based on this table, the first model has an adjusted R2 value of 0.654. This shows that sustainable banking disclosure can explain bank efficiency by 65.4%, while 34.6% is explained by other variables outside the research model. The second model by adding the moderating variable intellectual, shows an adjusted R2 value of 0.457. This shows that 45.7% of bank efficiency can be explained by sustainable banking disclosure, while 54.3% is explained by other variables outside the research model.

Tstatistic test

Model 1			
Variable	Coefficient	Prob.	Information
C	0.658	0.000	
SBDI	0.008	0.457	H ₁ rejected
Model 2			
Variable	Coefficient	Prob.	Keterangan
C	0.875	0.000	
SBDI	0.054	0.075	
SBDI*MI	0.010	0.030	H ₁ accepted

Source: Processed Data (2023)

Based on the table above, the decisions taken for each hypothesis are as follows :
The Impact of Disclosure in Sustainable Banking on Bank Efficiency

The initial hypothesis (H1) to be examined is the notion that increased openness in sustainable banking leads to increased bank efficiency. The regression output findings show a coefficient value of 0.008 at a probability level of 0.457. Sustainable banking openness affects bank efficiency, as evidenced by the likelihood value being smaller than 0.05. Consequently, hypothesis H1 is refuted.

The impact of sustainable banking disclosure on bank efficiency, controlling for intellectual capital

The second hypothesis (H2) states that intellectual capital improves the relationship between bank efficiency and sustainable banking transparency. Regression analysis yielded a probability of 0.030 and a coefficient value of 0.010 as findings. It is found that intellectual capital attenuates the association between sustainable banking disclosure and bank efficiency, with a probability value less than 0.05. The moderating effect of intellectual capital strengthens the relationship between sustainable banking disclosure and bank efficiency, as seen by the coefficient value of 0.010, which is greater than 0.008 (prior to moderation). A positive coefficient value indicates that the relationship between bank efficiency and disclosure of sustainable banking, intellectual capital moderation, and moderation is positive. As a result, hypothesis H2 is accepted.

Discussion of Hypothesis Test Results

The Effect of Sustainable Banking Disclosure on Bank Efficiency

The findings of the study indicate that the sustainable banking disclosure report has little bearing on the effectiveness of banks. This shows that banks that implement sustainable banking do not increase their efficiency. This result contradicts the stakeholder theory that organisations that can manage good relationships with all stakeholders through sustainable banking activities can improve organisational performance.

Several reasons are the triggers why the empirical results of the relationship between sustainable banking and bank efficiency have no effect. First, during the research period, banks in Indonesia had not fully implemented sustainable banking. This is because 2020–2022 is the period of the COVID-19

pandemic and post-COVID-19 pandemic recovery, so banking efficiency has decreased significantly. This decline occurred in income from collecting funds and disbursing financing, while banking operational financing still had to be spent, this led to banks not yet fully implementing sustainable banking.

The second cause is that the implementation of social and environmental responsibilities in Indonesia is still dominated by charity/donation activities. Charity activities are only short term and are not carried out on an ongoing basis, so they do not affect bank efficiency. In Indonesia, social responsibility practices are carried out only to positively influence the perceptions of stakeholders without actually making real changes in the company's activity strategy, so that social responsibility actions are considered mere image actions. This is certainly not in accordance with the concept of sustainable banking, which implements integrated social, environmental, and corporate governance activities in business activities.

Social and environmental responsibility only boosts bank efficiency in affluent nations; in emerging nations, social responsibility has no effect on business efficiency, according to research by Belasri et al. (2020). The findings of this study contradict those of Weber's (2017) research, which indicates that bank sustainability performance improves financial performance (ROA and ROE). According to Buallay's research (2019), bank performance is significantly improved by sustainability reports.

Bank Efficiency Affected by Sustainable Banking Disclosure, with Intellectual Capital Acting as a Moderating Factor

The results of the study show that intellectual capital can act as a moderator in the relationship between sustainable banking transparency and bank efficiency. Intellectual capital can strengthen the link between sustainable banking transparency and bank efficiency. The results of the study align with the signal theory, which posits that banks could employ intellectual capital as a strategy to alert investors to their shortcomings and motivate them to try improving management. The value of the information the bank presents increases with improved bank administration. Banks that receive pressure to provide information regarding company management will strengthen the bank's actions to implement sustainable banking which will have an impact on the bank's performance. Intellectual capital can influence stakeholder perceptions about the company based on the signals it by the company. This makes companies more likely to commit to improving social and environmental responsibility performance, which has an impact on company performance.

The results of this research are in line with research by Rehman et al., (2021) and Adesina,(2019), which shows that intellectual capital can moderate the relationship between social responsibility and bank efficiency. The higher the pressure from external parties on the company, the more management tends to be involved in disclosing social and environmental responsibility by improving the company's internal management better, this can have implications for improving financial performance.

CONCLUSION AND RECOMMENDATIONS

The aim of this research is to examine the relationship between bank efficiency and sustainable banking transparency, as well as the moderating role of intellectual capital. This study uses ninety bank observations that were listed on the Indonesia Stock Exchange (BEI) between 2020 and 2022. According to the first study's findings, bank efficiency is unaffected by sustainable banking transparency. This is due to the fact that throughout the research period, Indonesian banks engaged in more transient charitable and donation endeavours, which had no bearing on the performance, particularly the efficiency, of the banks.

These results also provide evidence that intellectual capital can strengthen the influence of sustainable banking disclosure on bank efficiency. Intellectual capital can be used as a strategy to attract investors' attention to bank performance so that the bank will try to improve its management. Intellectual capital can influence stakeholder perceptions about the company based on the signals it gives. This makes companies more likely to commit to improving social and environmental responsibility performance, which has an impact on company performance.

FURTHER STUDY

Subjectivity exists in this study's evaluation of sustainable banking disclosure. Future research can assess sustainable banking disclosure together with research assistants so as to minimize subjectivity.

REFERENCES

Adesina, K. S. (2019). Bank technical, allocative and cost efficiencies in Africa: The influence of intellectual capital. *North American Journal of Economics and Finance*, 48(February), 419–433. <https://doi.org/10.1016/j.najef.2019.03.009>

Asare, N., Alhassan, A. L., Asamoah, M. E., & Ntow-Gyamfi, M. (2017). Intellectual capital and profitability in an emerging insurance market. *Journal of Economic and Administrative Sciences*, 33(1), 2–19. <https://doi.org/10.1108/jeas-06-2016-0016>

Belasri, S., Gomes, M., & Pijourlet, G. (2020). Corporate social responsibility and bank efficiency. *Journal of Multinational Financial Management*, 54, 100612. <https://doi.org/10.1016/j.mulfin.2020.100612>

Bollen, L., Vergauwen, P., & Schnieders, S. (2005). Linking intellectual capital and intellectual property to company performance. *Management Decision*, 43(9), 1161–1185. <https://doi.org/10.1108/00251740510626254>

Bontis, N., William Chua Chong, K., & Richardson, S. (2000a). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, 1(1), 85–100. <https://doi.org/10.1108/14691930010324188>

Bontis, N., William Chua Chong, K., & Richardson, S. (2000b). Intellectual capital and business performance in Malaysian industries. *Journal of Intellectual Capital*, 1(1), 85–100.

<https://doi.org/10.1108/14691930010324188>

Buallay, A. (2019). Management of Environmental Quality: An International Journal Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Management of Environmental Quality: An International Journal*, 30(1), 98–115.

Bukhari, Hashim, & Amran. (2020). Green Banking: a road map for adoption. *International Journal of Ethics and Systems*, 36(3), 371–385. <https://doi.org/https://doi.org/10.1108/IJOES-11-2019-0177>

Chan, S. G., Koh, E. H. Y., Zainir, F., & Yong, C. C. (2015a). Market structure, institutional framework and bank efficiency in ASEAN 5. *Journal of Economics and Business*, 82, 84–112. <https://doi.org/10.1016/j.jeconbus.2015.07.002>

Chan, S. G., Koh, E. H. Y., Zainir, F., & Yong, C. C. (2015b). Market structure, institutional framework and bank efficiency in ASEAN 5. *Journal of Economics and Business*, 82, 84–112. <https://doi.org/10.1016/j.jeconbus.2015.07.002>

Clarke, M., Seng, D., & Whiting, R. H. (2011). Intellectual capital and firm performance in Australia. *Jpurnal of Intellectual Capital*, 12(4), 505–530. <https://doi.org/10.1108/14691931111181706>

Coelli, T., Rao, D. S. P., & Battese, G. E. (1998). Additional Topics on Data Envelopment Analysis. *An Introduction to Efficiency and Productivity Analysis*, 161–181. https://doi.org/10.1007/978-1-4615-5493-6_7

Dyduch, J., & Krasodomska, J. (2017). Determinants of corporate social responsibility disclosure: An empirical study of Polish listed companies. *Sustainability (Switzerland)*, 9(11). <https://doi.org/10.3390/su9111934>

Esteban-Sanchez, P., de la Cuesta-Gonzalez, M., & Paredes-Gazquez, J. D. (2017). Corporate social performance and its relation with corporate financial performance: International evidence in the banking industry. *Journal of Cleaner Production*, 162, 1102–1110. <https://doi.org/10.1016/j.jclepro.2017.06.127>

Forgione, A. F., Laguir, I., & Staglianò, R. (2020). Effect of corporate social responsibility scores on bank efficiency: The moderating role of institutional context. *Corporate Social Responsibility and Environmental Management*, 27(5), 2094–2106. <https://doi.org/10.1002/csr.1950>

Freeman, R. E., & Reed, D. L. (1983). Stockholders and stakeholders: a new perspective on corporate governance. *African Journal of Microbiology Research*, 25(3), 88–106. <https://doi.org/10.5897/ajmr2014.7057>

Ghozali, I., & Ratmono, D. (2013). *Analisis Multivariat dan Ekonometrika Teori, Konsep dan Aplikasi dengan Eviews 8*. Badfan Penerbit Universitas Diponegoro.

Iswara, M. anthony. (2021). Menilik Kondisi Perbankan tatkala Pandemi Menerjang. *Tirto.Id*. <https://tirto.id/menilik-kondisi-perbankan-tatkala-pandemi-menerjang-f9F4>

Kumar, G. (2013). Voluntary disclosures of intangibles information by U.S.-listed Asian companies. *Journal of International Accounting, Auditing and Taxation*, 22(2), 109–118.

<https://doi.org/10.1016/j.intaccaudtax.2013.07.002>

Leland, H. E., & Pyle, D. H. (1977). Informational Asymmetries, Financial Structure, and Financial Intermediation. *The Journal of Finance*, 32(2), 371-387.

Maqbool, S., & Zameer, M. N. (2018). Corporate social responsibility and financial performance: An empirical analysis of Indian banks. *Future Business Journal*, 4(1), 84-93. <https://doi.org/10.1016/j.fbj.2017.12.002>

Nollet, J., Filis, G., & Mitrokostas, E. (2016). Corporate social responsibility and financial performance: A non-linear and disaggregated approach. *Economic Modelling*, 52, 400-407. <https://doi.org/10.1016/j.economod.2015.09.019>

Pulic, A. (1998). measuring the performance of intellectual potential in knowledge economy. Presented in 1998 at the 2nd McMaster World Congress on Measuring and Managing Intellectual Capital by the Austrian Team for Intellectual Potential.

Rehman, A. U., Aslam, E., & Iqbal, A. (2021). Borsa _ Istanbul Review Intellectual capital efficiency and bank performance: Evidence from islamic banks. *Borsa Istanbul Review*. <https://doi.org/10.1016/j.bir.2021.02.004>

Sardo, F., Serrasqueiro, Z., & Alves, H. (2018). On the relationship between intellectual capital and financial performance: A panel data analysis on SME hotels. *International Journal of Hospitality Management*, 75(July 2017), 67-74. <https://doi.org/10.1016/j.ijhm.2018.03.001>

Scott, W. R., Smith, K. G., & Hitt, M. A. (2005). Institutional theory : contributing to a theoretical research program chapter prepared for great minds in management : the process of theory. *Great Minds in Management: The Process of Theory Development*, February, 460-485.

Sekaran, U., & Bougie, R. (2019). Metode Penelitian untuk bisnis.

Shah, A. A., Wu, D., & Korotkov, V. (2019). Are sustainable banks efficient and productive? A data envelopment analysis and the Malmquist productivity index analysis. *Sustainability* (Switzerland), 11(8). <https://doi.org/10.3390/su11082398>

Siueia, T. T., Wang, J., & Deladem, T. G. (2019). Corporate Social Responsibility and financial performance: A comparative study in the Sub-Saharan Africa banking sector. *Journal of Cleaner Production*, 226, 658-668. <https://doi.org/10.1016/j.jclepro.2019.04.027>

Spence, M. (1972). Job Market Signaling. *The Quarterly Journal of Economics*, 87(3), 355-374.

Tan, H. P., Plowman, D., & Hancock, P. (2007). Intellectual capital and financial returns of companies. *Journal of Intellectual Capital*, 8(1), 76-95. <https://doi.org/10.1108/14691930710715079>

Waddock, S. A., & Graves, S. B. (1997). The CSP - CFP link. *Strategic Management Journal*, 18(4), 5-31.

Weber, O. (2005). Sustainability benchmarking of European banks and financial service organizations. *Corporate Social Responsibility and Environmental Management*, 12(2), 73-87. <https://doi.org/10.1002/csr.77>

Weber, O. (2017). Corporate sustainability and financial performance of Chinese banks. *Sustainability Accounting, Management and Policy Journal*, 8(3), 358–385. <https://doi.org/10.1108/SAMPJ-09-2016-0066>

Weber, O., & Chowdury, R. K. (2020). Corporate sustainability in bangladeshi banks: Proactive or reactive ethical behavior? *Sustainability (Switzerland)*, 12(19), 1–18. <https://doi.org/10.3390/su1219799>

Whiting, R. H., & Miller, J. C. (2008). Voluntary disclosure of intellectual capital in New Zealand annual reports and the “hidden value.” *Journal of Human Resource Costing & Accounting*, 12(1), 26–50. <https://doi.org/10.1108/14013380810872725>

Widarjono, A. (2018). *Ekonometrika : pengantar dan aplikasinya disertai panduan eviews / penulis*. UPP STIM YKPN.