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THE IMPLEMENTATION OF GREEN BANKING AND BOPO ON FINANCIAL PERFORMANCE IN BANKING COMPANIES IN INDONESIA

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Abstract
Performance of a banking company can be seen from its profitability level. Banking companies strive to maximize profits in carrying out their business activities. The greater the profitability, the greater the profit. Conversely, if profitability is low, the profit will also be low. The goal points referred to as the Sustainable Development Goals (SDGs) are indicators of the implementation of sustainable business, one of which is in the economic sector. The implementation and disclosure of green banking practices and the calculation of the BOPO ratio in a company can be considered economically efficient if it can save production costs to achieve maximum profit using the panel data method (Random Effect Model/REM). The results of this study indicate that green banking has a positive and significant negative effect on profitability at banks in Indonesia.
Keywords: Green banking, BOPO, Profitability

INTRODUCTION

Performance of a banking company can be gauged by its profitability. Banking companies strive to maximize profits in carrying out their business activities. The urgency of research is crucial. Companies' activities must also consider sustainability. The use of environmentally friendly, efficient technology and the use of resources to reduce carbon emissions is in accordance with the United Nations in January 2015 which has issued the 2030 Agenda for Sustainable Development, with 17 points of objectives called Sustainable Development Goals (SDGs) as indicators of the implementation of sustainable efforts, one of which is in the economic sector. The implementation and disclosure of green banking practices and the calculation of the BOPO ratio in a company can be said to be economically efficient, if it can save production costs to obtain maximum profits.

Green banking, BOPO and profitability are important factors for stakeholders related to sustainability and measuring company performance in running a business to minimize the impact of environmental pollution. The research begins with the existence of the Legitimacy theory which plays a role in directing the thoughts of investors to have a certain opinion about a company, the existence of green banking and BOPO disclosures on the Company's profitability for decision making.sustainability.

The use of environmentally friendly, efficient technology and the use of resources to reducecarbon emissions in accordance with the (United Nation, “The 17 Goals Sustainable Development,” 2022.) which has released the 2030 Agenda for Sustainable Development, with one of the objectives being calledSustainable Development Goals (SDGs) as an indicator of sustainable business implementation, including in the economic sector. In 2022–2024, the Financial Services Authority (OJK) also released the Indonesian Green Taxonomy, a guide to classifying environmentally friendly economic activities. Green banking also known as sustainable banking or

ethical banking, is a banking practice that emphasizes environmental and social responsibility in financial decision making

The method used in this research is quantitative. This quantitative method aims to determine the role of the independent variable on the dependent variable. While the approach used is an associative descriptive approach, according to Sugiyono in Dewi Y.A. Mahale et al. (2017), an associative descriptive approach, namely research that aims to determine the effect or relationship between 2 (two) or more variables.

The population in this study were all State Civil Servants (ASN) at the Regional Library and Archives Service of Banten Province, totalling 69 people. The sample used in this study is saturated, meaning that the entire population is sampled. The data collection technique in this research was carried out using literature study and field studies through interviews, observation and questionnaires. At the same time, the type of data is primary data. The tests carried out are validity, reliability, correlation coefficient and determination both partially and simultaneously and multiple linear regression analysis.

Number of Banks that Publish Sustainability Reports

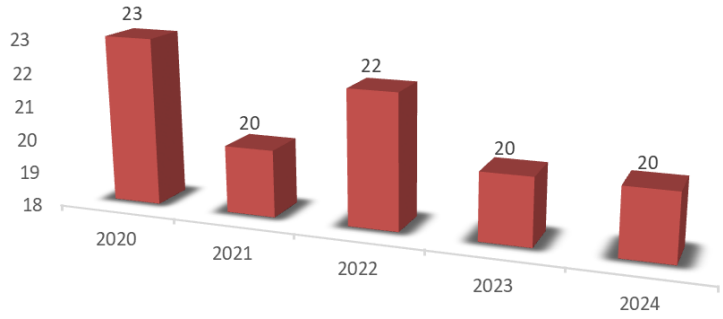

Figure 1 Sustainability Report

The results of the sustainability report recording in Table 1 above show that in 2020, there were 23 banks. In 2021, this number decreased to 20. In 2022, the number began to increase, with 22 banks reporting their sustainability reports again. In 2023-2024, the number decreased to only 20 banks.Sustainable report.

While banking is not a significant contributor to environmental pollution, this does not mean it is exempt from environmental damage. Banking companies negatively impact the environment directly and indirectly. Banking directly impacts the environment through its carbon footprint and resource use during operations, while banks can indirectly impact the environment by providing loans to industries that damage the environment.

Analyzing the positive impact of green banking implementation on the profitability of Commercial Banks listed on the Indonesia Stock and analyzing the negative impact of BOPO on profitability in banking companies listed on the Indonesia Stock Exchange. Stakeholders play a role in directing the thinking of investors to have a certain opinion about a company.

LITERATURE REVIEW

Legitimacy Theory

Wrespatiningsih & Mahyuni (2022) found that this theory describes how companies conduct their activities while complying with existing norms and regulations, thereby achieving a positive image among the surrounding community and stakeholders. Companies will strive to adapt to prevailing norms, thus achieving public acceptance without conflict.

This study aims to analyze green banking and BOPO on profitability in the performance of banking companies in Indonesia. The method used in this study is a quantitative approach with data collection techniques using observation and documentation on the Indonesia Stock Exchange (IDX). One of the goals of the sustainable financial development program (sustainable finance) is to increase corporate profitability by financing environmentally friendly industries. In this study, green banking operations were measured by referring to research conducted by Ramila and Gurusamy (2015).

Green banking

Green banking Meanwhile, green banking policies were measured using the green banking model approach formulated by (Gazi et al., 2024) using a dichotomous scale, a value of 1 will be given if there is green banking reporting and a value of 0 will be given otherwise.

The implementation of green banking is not only about choosing to fund environmentally friendly industries, but also includes small steps that can be taken within the bank. Consists of six main factors indicator seen from (Yaffa Cakra Asmara, 2024):

1. Carbon Emission

   Carbon emissions refer to activities that release greenhouse gases like carbon dioxide and methane into the air, which exacerbate climate change. To reduce these emissions, banking companies can implement low-carbon technologies, such as the use of energy-efficient lighting, efficient electronic equipment, and the use of alternative energy sources.
2. Green rewards

   Green Rewards is an award given to individuals or companies that are committed to environmental sustainability. Companies involved ingreen rewards support the protection of nature and ecosystems through awards, certifications, and other programs focused on ecosystem maintenance.
3. Green building

   Green Building A building designed to be energy-efficient, environmentally friendly, and provide comfort and health for its occupants. It is constructed with minimal impact on the environment and features a design and construction that supports energy efficiency.
4. Reuse/recycle/refurbish

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This concept focuses on recycling waste materials and transforming them into useful new products. The goal is to reduce the use of new raw materials and reduce waste volume, such as reusing used paper by using both sides to reduce the consumption of new paper.

5. Paper Work or Paperless

   Paperless Paperless refers to efforts to reduce paper use in administrative activities, particularly in the banking sector. This reduction in paper use not only conserves natural resources but also helps reduce waste and supports environmental conservation. Technology, such as mobile apps and ATMs, can replace paper in business processes.

6. Green investment

   Green Investment focuses on investments that support natural resource conservation, renewable energy development, and projects that contribute to environmental sustainability, such as clean water and clean air projects. These investments involve the use of environmentally friendly materials, the application of the 4R principles (Reduce, Reuse, Recycle, Recovery), as well as low carbon technology and alternative energy.

The main indicator for assessing a bank's financial performance is profitability. One way to measure a bank's profitability is by looking at its financial performance. Return on Assets (ROA). According to Kasmir, (2018) Return on Assets (ROA is a profitability ratio that measures a company's ability to generate profits over a specific period. This ratio is often used to analyze a company's profits.

METHOD

The population in this study is banking companies listed on the Indonesia Stock Exchange (IDX) from 2022 to 2024, totaling 47 banks.

The sample criteria in this study include:

1. Banking sector companies that are consistently listed on the IDX throughout the 2022–2024 period.
2. Publish annual reports Sustainability which contains complete data on Green Banking Period 2022-2024
3. Provide Annual Report data related to financial performance with calculations of ROA and BOPO components.

The method used for data collection is purposive sampling. To better understand the topic being studied, the research was conducted by conducting a literature study and obtaining data from books, journals, websites, and other sources that are used as references or research guides. Data Analysis Techniques Researchers reviewed previous research and then in this study, the data used is secondary data taken from annual reports and Sustainability reports. Researchers used an analysis method assisted by Eviews 12 software. This study uses panel data. Banking Banking sector companies that

are consistently listed on the IDX throughout the 2022–2024 period. Implementing these indicators, green banking can help banks achieve long-term sustainability, while contributing to environmental preservation.

Green Banking Formula (Hadi et al., 2023):

$$GB = \frac{\text{Total Green Banking}}{\text{Green Banking indicator}} \times 100\%$$

The BOPO ratio has a significant impact on banking performance because it reflects the extent to which a bank can control and reduce its operating costs. The lower the BOPO ratio, the better the bank's financial performance, as the bank is more efficiently managing costs. The formula for measuring BOPO is as follows (Kasmir, 2018)

$$BOPO = \frac{\text{Operating Costs}}{\text{Operating Income}} X\ 100\%$$

Common Effect Model/ Pooled Least Square Estimating panel data with the OLS method. PLS approach in simple terms pooled all-time series data andcross sections. Approach This No notice dimensions individual or time. In this model,there is the assumption that intercept and coefficient regression its value still for every object study and time.Fixed Effect ModelApproach fixed effecttake into account possibility that the researcher facesproblem omitted-variables, which may bringchanges in the time series or cross-sectionintercept.

Fixed effects models add variables to allow for changes in this intercept or sellect to Random Effect Model Approach random effectrepair least square process efficiency by taking into account errors from cross-sectionand time series. The randomeffect modelis a variation from generalized least squares (GLS) estimation.

Panel Data Regression Model

Model Regression method with panel data (Robinson Sihombing, 2022) consists of three approaches, namely CEM (Common Effect Model), FEM (Fixed Effect Model), and REM (Random Effect Model). are used to select the most appropriate model to estimate panel data between the CEM or FEM models.

The selection of the REM regression research model obtained the panel data regression model equation as follows:

$$ROA = 25.68257 + 0.223827\ GB - 0.303691\ BOPO$$

Uji Chow

The Chow test is carried out to determine whether the model used iscommon effect (pooled least square) or fixed effect.The hypotheses used in the Chow test are H0 = Common Effect Model; H1 = Fixed Effect Model. If the probability > 0.05, then H0 is accepted, the approach used is common

effect (pool least squares). Conversely, if the probability < 0.05, then H0 is rejected, and H1 is accepted, meaning the model used is fixed effect.

Hausman Test

The hausman test is used to determine the modelfixed effect or random effect which is more suitable for use in panel data estimation. The hypothesis used is, H0 =Random Effect Model; H1 = Fixed Effect Model. With the decision criteria If the probability value < 0.05 then H0 is rejected which means choosing the modelfixed effect which means the correct estimate for panel data regression is the modelrandom effect.

Uji Lagrange Multipler

LM test is used to determine whether the mode lRandom Effect better than the methodCommon EffectIf the calculated LM value is greater than the critical Chi-Square value, it means that the appropriate model for panel data regression is the modelRandom Effect. Then when the probability value from BP is greater than 0.05 then the correct model to choose is Common Effect Model. The hypothesis formed in the LM test is: H0 =Common Effect Model, H1 = Random Effect Model.

Multicollinearity Test

Multicollinearity testing is performed to determine whether there is a high correlation between independent variables in a multiple linear regression model. To test for multicollinearity, the correlation matrix of the independent variables can be examined. If the correlation is greater than 0.80, multicollinearity is present.

Heteroscedasticity Test

Heteroscedasticity testing is typically used on cross-sectional data rather than time series data. Therefore, heteroscedasticity testing is mandatory for the OLS model, while the GLS method does not require a heteroscedasticity test. The GLS method explicitly accounts for the heterogeneity of the independent variables, resulting in an estimator that meets the BLUE (Best Linear Unbiased Estimator) criteria using the White test analysis. Furthermore, this method prevents heteroscedasticity to ensure unbiased, consistent, and efficient estimates.

Hypothesis Testing

Simultaneous Test (F Test)

The F-test is used to simultaneously test the effect of independent variables on the dependent variable. This test can also be used to verify whether a regression model, based on the decision made

in the F-test, is valid by comparing probability values. If the p-value is ≤ 0.05, then H1 is accepted. Conversely, if the p-value is > 0.05, then H1 is rejected.

Partial Test (T)

The Partial T-test (T-test) is a test that can be used to test the truth or falsity of a hypothesis. The t-test, also known as a partial test, examines how each independent variable individually affects the dependent variable. The t-value test is used to examine the influence of each independent variable on the dependent variable.

Coefficient Test Determination (R2)

The coefficient of determination is a value to measure the independent variable against the rise and fall of the dependent variable. The coefficient of determination is usually symbolized by r 2 and is also expressed in percentage. In other words, the Y variable is explained by the X variable by r 2 % and the rest is explained by other variables. The remaining Y variables are caused by other factors and can also influence them.

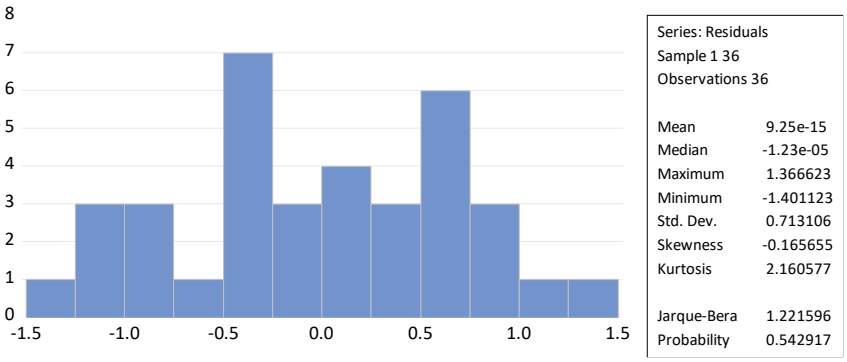

Figure 2 Normality Test Result

Source: Processed data, (2025)

Based on the normality test above showsthat Jarque-Bera'sprobability value is 0.542917, the value is > 0.05 so then can be concluded that the data is normally distributed.

Chow Test

Table 1 Chow Test Result

Effect Test	Statistic	d.f	Prob
Cross-Section F	2.668026	(11.22)	0.0241
Cross-Section Chi Square	30.523206	11	0.0013

Source: Processed data, (2025)

This test will look at the Residual Sum of Square (RSS) value.model Common Effect and Fixed Effect. The guidelines for making decisions on the chow test are:

- Ho is accepted when the probability is ≥ 0.05, then it will be used further common effect.
- Ho is rejected when the probability is < 0.05, then continue with fixed effect

The results of the Chow test show that the probability valuecross-sectionF is 0.0000 < 0.05 then H0 is rejected and H1 is accepted, this means the modelfixed effect better than the common effect model for the data to be tested.

Hausman Test

The Hausman test is used to determine the modelfixed effect or random effect which is more suitable for use in panel data estimation. The hypothesis used is, H0 =Random Effect Model; H1 = Fixed Effect Model. With the decision criteria If the probability value < 0.05 then H0 is rejected which means choosing the modelfixed Effect Model.

Table 2 Hausman Test Result

Test Summery	Chi Sq. Statistic	Chi. Sq d.f	Prob
Cross Section Random	1.475873	2	0.4781

Source: Processed data, (2025)

Based on table 2, the random cross section probability value is 0.04781 > 0.05, so H0 is accepted and H1 is rejected, this means that the appropriate model for this study is regression with a random effect model approach.

LM Test

The LM test is used to determine whether the Random Effect model is better than the random effect method.Common EffectIf the calculated LM value is greater than the critical Chi-Square value, it means that the appropriate model for panel data regression is the Random Effect model. The probability is greater than 0.05, so the appropriate model to choose isCommon Effect Model. test is: H0 =Common Effect Model, H1 =Random Effect Model

Table 3 LM Test Result

	Test Hypothesis		
	Cross Section Random	Time	Both
Breusch-Pagan	3.436199	0.030202	3.466401
	(0.0638)	(0.8620)	(0.0626)

Source: Processed data, (2025)

Multicollinearity Test

Based on the Breusch-Pagan probability value of 0.030202 < 0.05, the estimation model that is suitable for this study israndom effect model. with the Regression model Based on the model selection test carried out, the modelRandom effect which is used in estimating panel data in this study.

Table 4 VIF Test Result

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	22.86685	1526.324	NA
GB	0.105171	5.655005	1.099584
BOPO	0.003594	1472.590	1.099584

Source: processed data, (2025)

The multicollinearity test is the correlation between independent variables. The multicollinearity test is used to determine whether the regression model can find a correlation between variables. The VIF value of the Green Banking and BOPO variables is 1.099584, or less than 10, indicating that the multicollinearity assumption is met, meaning that there is no multicollinearity.

Heteroscedasticity Test

The heteroscedasticity test used in this method is able to produce an estimator that meets the BLUE (Best Linear Unbiased Estimator) criteria. In addition, this method is to prevent heteroscedasticity in order to obtain an estimate that is unbiased, consistent, and efficient by using the test.white.

Table 4 White TEST(Heteroscedasticity)

F. Statistic	0.963711	Prob. F (4,31)	0.4412
Obs *R-Squared	3.981496	Prob. Chi-Square (4)	0.4085
Scaled Explained SS	1.941391	Prob. Chi-Square (4)	0.7465

Source: processed data, (2025)

The White test shows an Obs*R square value of 3.981496 and a Chi square Probability value of 0.4085 which indicates more than a significance level of 0.05, so it can be concluded that there is no heteroscedasticity in the model.random effect This.

Regression Random Effect Model Test

Table 5 Regression Random Effect Model

Variable	Coefficient	Std.Eror	t-statistic	Prob.
C	25.65827	6.202378	4.136845	0.0002
GB	0.223827	0.305746	0.732069	0.4693
BOPO	-0.303691	0.078476	-3.869856	0.0005
Prob.	0.00000			
Adj.R-Square	0.030601			

Source: processed data, (2025)

The constant value at -25.65827 indicates that the variables GB, BOPO have no change or have a constant value, so the value of the Y variable has a value of 25.65827.

- Coefficient regression Variable X1(GB) is 0.223827 which means every
  X1 will influence an increase of Prob. 0.04693
- Coefficient regression Variable X2 (BOPO) is -0.303691 will influence an increase of Prob. 0.0005

Uji T

1) Green Banking

   Based on the results of the panel data regression test, the calculated t value was 0.732069 and the probability value was 0.4693 > 0.05. Therefore, it can be concluded that GB (Green Banking) has

a positive but insignificant effect on banking profitability in Indonesia, so it can be concluded that H1 is accepted.

2) Operating Costs and Operating Income (BOPO)

Based on the results of the panel data regression test, the calculated t value was -3.869856 and the probability value was 0.0005 <0.05. Therefore, it can be concluded that BOPO has a negative and significant effect on banking profitability in Indonesia. Therefore, it can be concluded that H2 is accepted.

Uji F

The Simultaneous Test (F-Test) conducted in the F-test is by comparing probability values. If the p-value is ≤ 0.05, then H1 is accepted. Conversely, if the p-value is > 0.05, then H1 is rejected. Based on Table 6, the regression results using the Random Effect Model method, the Prob value (F-statistic) is 0.000967 < 0.05, so H0 is rejected. Therefore, it can be concluded that

Coefficient of Determination

The results in Table 8 show that the coefficient of determination is 0.343395, or 34.34%. This indicates that the Green Banking and BOPO variables can explain 34.34% of the ROA variable, while the remaining 65.66% is explained by other variables outside this research model.

The Role Impact of Green Banking of Profitability (ROA)

The results of the first hypothesis test showed that green banking had a positive but insignificant effect. Therefore, this study aligns with research by Mustika et al. (2023), which indicates that green banking is a banking effort to prioritize sustainability in conducting business. Green banking focuses on transforming into an environmentally friendly bank in carrying out its operational activities. This means that banks utilize renewable energy, automation, and other measures to minimize the carbon footprint of operational activities. It is suspected that reducing operational costs through the implementation of green banking requires at least one to two years before increasing ROA. This indicates that the implementation of green banking does not increase bank profitability, and that other economic factors contribute to profitability. This contrasts with research by Asfahaliza & Anggraeni (2022) , which found that green banking had a negative but insignificant effect on profitability.

The Role Impact of BOPO of Profitability

The results of the second hypothesis test show that BOPO has a negative and significant effect on ROA. This indicates that banks with a high BOPO ratio tend to have a low ROA ratio. This also indicates that the bank's level of efficiency in carrying out its operations influences the level of profit

it will generate. A high BOPO ratio indicates that the bank has not yet achieved its objectives. This research aligns with Asfahaliza & Anggraeni (2022) and Furqan (2023). A low BOPO ratio indicates a bank's increasingly efficient performance in running its business because it can reduce operational costs and thus generate significant profits. Meanwhile, a high BOPO ratio indicates a bank's inefficiency in running its business, which can incur losses**.**

CONCLUSION

This study can be concluded that the implications used in this panel model are REM (Random Effect Model) on variable data to analyzegreen banking, and BOPO on Banking Profitability in Indonesia for the period 2022–2024. Profitability here uses the ROA ratio for the performance of Indonesian banks. Based on the results of panel data testing using the analysis tooleviews12 that the implementationgreen banking has a positive but insignificant effect on ROA in Indonesian banking. The BOPO variable has a negative but significant effect on ROA in Indonesian banking in 2022-2024. This means that the lower the BOPO value, the greater the profitability of Indonesian banks.

REFERENCES

Anggraini, D., Nita Aryani, D., Budi Prasetyo, I., & Malang Kucecwara, S. (2020). Analisis Implementasi Green Banking Dan Kinerja Keuangan Terhadap Profitabilitas Bank di Indonesia (2016-2019). Https://Journal.Unhas.Ac.Id/Index.Php/Jbmi/Article/View/11264

Asfahaliza, A. N. P., & Anggraeni, P. W. (2022). Pengaruh Penerapan Green Banking Terhadap Profitabilitas Perbankan Di Indonesia Periode 2016-2021. *Contemporary Studies in Economic, Finance and Banking*, 1(2), 298–311. Https://Doi.Org/10.21776/Csefb.2022.01.2.10

Dr. Ondiwa Simon Oluoch, Dr. Fredrick Onyango Aila, & Wicklife Odhiambo Okinda. (2024). Green Banking and Performance of Commercial Banks in Kenya: An Empirical Model Approach. *The International Journal of Business & Management.* Https://Doi.Org/10.24940/Theijbm/2024/V12/I7/Bm2407-015

Fika Ananda, S., & Fasa, M. I. (N.D.). Jicn: Jurnal Intelek Dan Cendikiawan Nusantara Penerapan Prinsip Green Banking Dalam Operasional Bank Muamalat Indonesia Implementation of Green Banking Principles in Operations Bank Muamalat Indonesia. Https://Jicnusantara.Com/Index.Php/Jicn

Gazi, M. A. I., Al Masud, A., Islam, S., Hossain, M. A., Hossain, M. S., & Senathirajah, A. R. B. S. (2024). The Effect of Green Banking Practices on Banks' Sustainability Performance and Green Brand Image: An Empirical Study of An Emerging Economy. *Journal Of Sustainability Research*, 6(4). Https://Doi.Org/10.20900/Jsr20240074

Hadi, M. R., Hasan, M. F., Flayyih, H. H., & Hussein, M. K. (2023). Green Banking: A Literature *Review on Profitability and Sustainability Implications.* Https://Doi.Org/10.55270/Ijebs.V4i2.27

Kasmir. (2018). *Analisa Laporan Keuangan*. Rajawali Pres.

Mustika, S. N., Kristianingsih, K., Tripuspitorini, F. A., & Djuwarsa, T. (2023). Analisis Pengaruh Penerapan Green Banking Dan Efisiensi Biaya Operasional Terhadap Profitabilitas Bank Umum Syariah di Indonesia. Journal Of Applied Islamic Economics and Finance, 3(2), 436–443. Https://Doi.Org/10.35313/Jaief.V3i2.3861

Furqan. (2023). Tesis Determinan Green Credit Dan Pengaruhnya Terhadap Profitabilitas Perbankan Di Indonesia. *Https://Dspace.Uii.Ac.Id/Bitstream/Handle/123456789/48583/20911015.Pdf?Sequence=1&Isallowed=Y*

P. A. D. Mahardika and B. Fitanto, (2023). Pengaruh Green Banking Terhadap Kinerja Keuangan Perbankan di Indonesia (Periode Tahun 2018-2022), *Contemporary Studies in Economic, Finance and Banking*, Vol. Volume 2, No. No 4, Pp. 659-672.

Robinson Sihombing, P. (2022). Aplikasi Eviews Untuk Statistisi Pemula Penulis: Penrith: Pt Dewangga Energi Internasional. *Dewangga Publishing.* Www.Dewanggapublishing. Com

T. Hastuti and R. K. A. Kusumadewi, (2023). Pengaruh Green Banking Terhadap Nilai Perusahaan: Peran Pemediasi Efisiensi Bank, Reviu Akuntansi Dan Bisnis Indonesia, Vol. Vol. 7, No. No. 2, Desember, Pp. 380-393.

United Nation, "The 17 Goals Sustainable Development," 2022. (2024). Https://Sdgs.Un.Org/Goals.

Yaffa Cakra Asmara, M. (2024). Pengaruh Green Banking Dan Efisiensi Biaya Operasional Terhadap Profitabilitas Perbankan Di Indonesia. *Ekuilnomi: Jurnal Ekonomi Pembangunan*, 6(3), 2614–7181. Https://Doi.Org/10.36985/9j5vjy17