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BANK PERFORMANCE: THE EFFECT OF DIGITAL BANKING AND GREEN FINANCING WITH RISK MANAGEMENT AS MODERATING VARIABLE

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ABSTRACT:

In the wake of globalization and the COVID-19 pandemic, the banking sector has faced unprecedented challenges, driving the need for rapid digital transformation and sustainable financial practices. In Indonesia, digital banking has emerged as a critical factor in enhancing operational efficiency and meeting evolving consumer demands, while green financing has gained prominence as part of the global push towards sustainability. This study investigates the impact of digital banking and green financing on bank performance, with risk management as a moderating variable. The primary objective is to provide empirical insights into how these factors interact to influence financial outcomes in Indonesian banks. Utilizing a quantitative research approach, the study analyzes data from banks listed on the Indonesia Stock Exchange (IDX) from 2019 to 2023. Preliminary findings indicate that digital banking have a positive and significant effect, while green financing has a negative significant effect to bank performance. This study also finds empirical evidence of positive significant effect from moderating role of risk management to bank performance. Indonesian banks are need to have a balanced approach that integrates digital innovation with sustainable financing, supported by a proper risk management to thrive in an increasingly competitive and environmentally-conscious market.

Keywords: *Digital Banking, Green Financing, Bank Performance, Risk Management*

1. Introduction

After the Covid-19 era which affected almost all countries, it is important to rapidly change to respond to the current needs to maintain the business. Consequently, the tight competition amidst globalization and a pandemic has obliged businesses to transition their operational approach, shifting from resource-centric models to those knowledge-based models (Marsintauli et al., 2023). The increase of competition in the business landscape is also encouraging management to prioritize two decisive aspects: excellence and values (Wahyuni et al., 2023). Evaluating performance becomes imperative for companies, including those in the banking industry. In the United State of America, digital banking generated more revenue for banks compared to emerging economies due to a high information technology infrastructure (Bousrih, 2023).

The Indonesian banking sector is one of the main characters of the national economy and has witnessed rapid evolution driven by digital innovation and changing consumer demands (Siraj et al., 2024). This transformation is particularly essential given Indonesia's growing financial market, where digital banking is expected to play an increasingly significant role. Otoritas Jasa Keuangan (Financial Services Authority) underscores this trend, emphasizing the need for digital agility in enhancing banking competitiveness and resilience (OJK, 2023). According to OJK, there are at least two significant potential positive impacts from the digital transformation undertaken by banks. First, it increases banking accessibility, allowing more people to access financial services. Second, it boosts the competitiveness of Indonesian banks. Digital

banking makes banking more accessible to the public and enhances the efficiency of banking operations, which in turn promotes economic activity and growth. Statistically, according to information provided by Bank Indonesia (BI), the total value of digital banking transactions across the country in August 2023 amounted to approximately IDR 5.1 quadrillion, as reported in BI's data. This signifies a 1.3% rise from July 2023 and a notable 11.9% increase compared to the corresponding period in the preceding year. Comprehensively, based on OJK and Indonesian Bank data, statistical data of digital banking transactions recorded as follows.

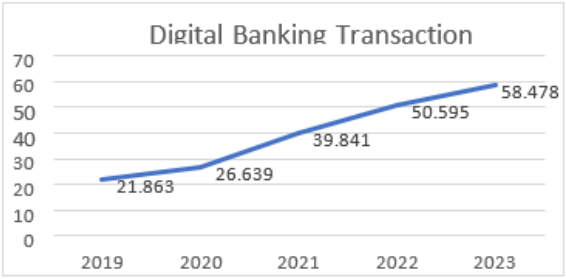

Figure 1.1 Digital Banking Transaction Graph
Source: Otoritas Jasa Keuangan, Indonesian Bank (2021-2024)

The chart displays the growth of digital banking transactions from 2019 to 2023. In 2019, the number of transactions was 21.86 million, which saw a steady increase each year. By 2020, it grew to 26.639 million, and in 2021, it further increased to 39.841 million. The upward trend continued in 2022, with transactions reaching 50.595 million, and peaked at 58.478 million in 2023. A study conducted by Yusgiantoro et al. (2018) finds the balancing act between a bank operational efficiency and its ability to effectively reach and serve a broader market when it comes to the impact of digital banking technology adoption (DBTA). Another study found that the digitization process negatively affects the performance metrics of banks, particularly in terms of return on assets and return on equity (Huong et al., 2022). On the other hand, studies have found that digitalization in the banking sector has a positive impact through bank performance (Do & Pham., 2022; Madugba et al., 2021).

Additionally, previous research suggests that companies with a stronger commitment to Corporate Social Responsibility tend to have better financial outcomes (Waworuntu et al., 2014). One of the trends in financial development involves financing private and public green investments and integrating financial systems core components that impact green investments, such as green bonds and green funds (Mangwa & Jagongo, 2022). Green finance has emerged as a critical component of sustainable economic development, aiming to promote environmental protection, eradicate poverty, and enhance overall welfare while ensuring the preservation of ecosystems (Yin et al., 2020). Green finance is seen as an important tool in driving the transition towards a low-carbon economy and promoting sustainable development practices across different sectors of the economy (Afridi et al., 2021). Green credit policies can drive banks to seek new green customers, helping them explore new markets. The green lending market in China, encouraged by the government, provides opportunities for banks to select environmentally responsible customers for lending, potentially leading to higher profits and strengthening green lending behavior (Yin et al., 2020).

Meanwhile, previous studies still indicate different effect that green financing and green banking has given to bank performance. Studies by Chowdhury (2023) found that green finance in Bangladesh had a positive effect on return on assets but a significant positive impact on return on equity, net interest margin, and net nonperforming loans to total loan ratio. This indicates that green finance can improve a bank profitability and financial performance. Research conducted by Zhang (2018) also demonstrates a positive correlation between green credit and the financial performance of banks. By offering green financing options, banks can attract environmentally conscious customers and businesses looking to invest in sustainable projects (Afridi et al., 2021). This can lead to an increase in business opportunities and revenue for the bank. In contrast, A study conducted by Yin et al. (2020) indicated that there is a significant negative relationship between the green credit ratio (GCR) and banks performance through banks risk. It occurs because green projects typically have longer investment return periods that can increase financial risk for banks. Additionally, these projects often have extended payback periods that not align with the short-term financial goals of many investors (Idris et al., 2024).

The implementation of digital banking, however carrying several risks such as financial risks, performance losses, and privacy risks (Chotitumtara, 2023). Saputra et al. (2023) indicates the maximum potential loss

from digital banking transactions for IDR 144,35 billion with a 95% confidence level. Banking companies need to provide reserve funds that can cover these potential losses. If banks cannot provide these reserve funds, it is feared that a collapse will occur (Saputra et al., 2022). Banking companies also need to implementing advanced security protocols and continuous monitoring to mitigate cybersecurity risks associated with digital banking (Cele & Kwenda, 2024).

Risk management in banking is important to uphold financial stability, comply with regulations, and protect the interests of stakeholders (Greuning & Bratanovic, 2020). It involves the identification, evaluation, and alleviation of diverse risks— including operational, credit, liquidity, and reputational risks—with the aim of minimizing their influence on the financial performance and reputation of the bank. Competent risk management procedures can enhance a bank value by cutting costs and boosting revenues, thereby influencing its financial performance (Tamakloe et al., 2023). The connection between risk management and bank performance has been thoroughly examined, and certain studies indicate a favorable effect of risk management on bank performance.

This study aims to gain empirical evidence for the influence of digital banking and green financing on bank performance moderated by risk management. The novelty of this research lies in the sampling, which was taken from banks listed on the Indonesia Stock Exchange during the 2019-2023 period. No prior studies have examined the effects of digital banking and green financing, moderated by risk management with the same population. By analyzing the relationship between digital banking, green financing, risk management, and financial performance, banks can gain insights into the effectiveness of their digitalization and sustainable program in enhancing performance. Furthermore, this study will be conducted in quantitative methods, studying the banking population in Indonesia that has been listed in Indonesia Stock Exchange (IDX).

2. Literature Review

Resource-Based Theory

Resource-Based Theory (RBT), also referred to as the resource-based view, employs a resource-centric perspective to examine competitive advantage. Initially introduced by Wernerfelt (1984) in an article titled "A resource-based view of the firm," this theory integrates the concepts of Selznick (1957) and Penrose (1959) regarding the "definition of the firm as a system of productive resources." (Ulum, 2017). According to this theory, organizations can achieve superior performance by effectively acquiring, developing, and utilizing valuable, rare, inimitable, and non-substitutable (VRIN) resources and capabilities (Barney, 1991). Digital banking enables banks to differentiate themselves from competitors, enhance customer experience, and potentially generate higher profitability (Wirdiyanti, 2023). Similarly, green financing initiatives, such as lending to environmentally sustainable projects or promoting sustainable business practices, can help banks establish a competitive advantage by aligning with stakeholder expectations for environmental sustainability and corporate social responsibility (Yin et al., 2020).

Stakeholder Theory

Stakeholder theory is a framework that emphasizes the interests of multiple constituencies influenced by business operations, including employees, suppliers, local communities, and creditors. Stakeholder theory, first introduced by R. Edward Freeman in the 1980s, proposed that organizations should consider and balance the interests of various stakeholders, including shareholders, customers, employees, regulators, and society at large in their decision-making processes (Dmitryev & Freeman, 2021; Donaldson & Preston, 1995). This theory recognizes that organizations have responsibilities towards multiple stakeholder groups and that addressing their interests can contribute to long-term success and sustainability. In the banking sector, digital banking initiatives can impact customer experience, convenience, and satisfaction, which are important considerations for banks as customers are key stakeholders. Green financing initiatives, such as lending to environmentally sustainable projects or promoting sustainable business practices, can align with the interests of stakeholders who prioritize environmental sustainability and corporate social responsibility. Additionally, effective risk management practices are vital for addressing the concerns of stakeholders, such as regulators and shareholders, who are interested in ensuring the long-term viability and stability of the bank (Sathye et al., 2020).

Digital Banking

Based on the Financial Services Authority Regulation (POJK) Number 12/POJK.03/2018, digital banking services are defined as banking services delivered through electronic media developed by optimizing the

use of customer data. In this regulation, OJK classifies several types of digital banking services, which include internet banking, mobile banking, sms banking, and phone banking

Green Finance

Green finance described as elements of the financial system dedicated to green investments, including entities like the Green Climate Fund and financial tools such as green bonds and structured green funds, along with their distinct legal, economic, and institutional frameworks (Lindenberg, 2014). Green finance refers to financial products and services that support environmentally sustainable projects and initiatives, involving directing credit and investments to sectors and businesses that promote sustainability, energy efficiency, and environmental protection (Yin et al., 2020).

Risk Management

Risks are generally defined as uncertainties that could lead to unfavorable changes in profitability or cause financial losses (Bessis, 2011). Risk management is the process involving the systematic process of recognizing, evaluating, and prioritizing risks within an organization (Hopkin, 2018). Crouhy et al. (2014) described risk management as an essential component of effective management practices and strong corporate governance. Subsequently, it involves coordinating and utilizing available resources to reduce and control the likelihood or mitigate the impact of adverse events that could hinder the realization of the business's established goals and objectives.

Bank Performance

Bank performance refers to the assessment of a bank overall effectiveness and efficiency in achieving its objectives and goals (Rusydiana & Sanrego, 2018). According to Bank Indonesia, “bank performance" generally refers to a bank effectiveness and efficiency in managing its resources to achieve financial stability and profitability. The performance of a bank can be assessed through aspects of profitability, liquidity, and credit.

Hypothesis Development

The adoption of digital banking practices can enhance operational efficiency, reduce costs, and improve customer experience (Anggraeni et al., 2021). A study conducted by Gat, Abdurrahman, and Waworuntu (2017) finds that with the information technology service, it is expected to enhance greater confidence and allow consumers to experience the benefits and advantages of the service. Similarly, a Study by *Otoritas Jasa Keuangan* (OJK) (2018) finds that digital banking adoption has a significant impact on banks' efficiency. Digital banking adoption, which involves the integration of technology into banking services, has been found to positively impact bank performance by increasing efficiency and reducing operational costs (Chairana, 2023). However, the adoption of digital banking also introduces new risks that need to be managed effectively to ensure the stability and security of the bank operations.

By engaging in green financing initiatives, banks are able to tap into emerging market opportunities, enhance their reputation and brand image, and potentially attract environmentally conscious customers and investors (Zhang et al., 2020). A study by Adeyemi et al. (2024) finds that green loans and the other green financing instruments used by the bank in Nigeria have a positive and significant impact on bank performance. On the other hand, financing green projects often requires significant upfront investments and long-term commitments. These projects may not provide immediate financial returns, leading to potential liquidity constraints for banks (Song et al., 2024). The influence of green financing on bank performance is a topic of significant interest in the financial sector, particularly in the context of risk management. Studies have shown that green financing can have both positive and negative effects on bank performance, depending on various factors such as the type of green financing, the level of risk involved, and the bank overall risk management strategy. Even with a great Risk Management framework, the complexity of these risk profiles can lead to underestimation or mismanagement of risks (Chen & Zhao., 2022).

Therefore, the hypothesis of this study are as follows.

H1: Digital banking has positive and significant effect on banks performance

H2: Green financing has negative and significant effect on banks performance

H3: Digital banking has positive and significant effect on banks performance moderated by risk management

H4: Green financing has negative significant effect on banks performance moderated by risk management

3. Research Method

This study uses a quantitative method with primary objectives to assess the individual effects of digital banking and green financing on bank performance and examine the moderating role of risk management in

the relationship between digital banking and green financing towards bank performance. Population of this study is public and private banks in Indonesia that have been listed in Indonesia Stock Exchange for the period of 2019-2023. The data source used is secondary data from financial reports and annual reports of banking companies listed on (IDX) taken from the official website www.idx.co.id. This study is using a purposive sampling method with several criteria. In this study, data analysis is performed using panel data analysis with Eviews ver.20 tools. Panel data is a combination of time series and cross-sectional data.

Variable Measurement

To measure each variable, this study uses measurements of each variable as follows.

Table 1. Variable Measurement

Variable	**Proxy**
Digital Banking	Digital banking adoption rate: Electronic report implementation, mobile banking, internet banking, digital products (digital bank) (Isa et al., 2021; Yusgiantoro et al., 2019)
Green financing	Green lending ratio = Green credit / Total Credit (Abbas & Sabah, 2024; Zhang et al., 2020)
Bank Performance	Average of Return on Assets (ROA) and Return on Equity (Nguyen et al.,(2023); Rahman et al., 2022)
Risk Management	Non-Performing Loan (NPL) Ratio, Liquidity Ratio and National Indicator Standar (Moez & Abdelheq, 2020)

4. Results and Discussion

The sample determination in this study was carried out using the purposive sampling method, which applies criteria designed to obtain the required sample. Using this method, 35 banks were selected as the research sample, resulting in 175 sample data points containing information relevant to the research variables.

Descriptive statistics analysis

Table 2. Descriptive Statistic Test Result

	BANK_PERFORMANCE	DIGITAL_BANKING	GREEN_FINANCING	RISK_MANAGEMENT
Mean	0.034815	3.685714	28.99250	0.643022
Median	0.034800	4.000000	37.69025	0.584029
Maximum	0.175300	4.000000	41.95000	10.79187
Minimum	-0.709900	2.000000	2.59269	0.100000
Std. Dev.	0.069973	0.605123	25.17367	0.790443
Skewness	-7.022409	-1.755611	-1.525241	12.21241
Kurtosis	75.29736	4.857598	4.457071	157.1087

Source: Eviews 12 Output

The Bank Performance variable has a minimum value of -0.709900 and a maximum value of 0.175300. The mean of Bank Performance is 0.034815 with a standard deviation of 0.069973. The standard deviation being relatively close to the mean indicates a moderate dispersion of data within this variable. The Digital Banking variable has a mean value of 3.685714, with a standard deviation of 0.605123. The minimum value recorded is 2.000000, while the maximum value is 4.000000. The Green Financing variable shows a minimum value of 2.59269 and a maximum value of 41.95000. Furthermore, the mean of Green Financing is 28.99250, with a standard deviation of 25.17367. Meanwhile, Risk Management variable has a minimum value of 0.100000 and a maximum value of 10.79187. The mean value of Risk Management is 0.643022, with a standard deviation of 0.790443.

Estimation Model Test

In the determination of estimation mode test, this study runs 3 test including chow test, hausman test, and Lagrange Multiplier test.

Table 3. Estimation Model Test Result

Test	P-Value	Result
Chow Test	0.0000	Fixed Effect Model is more suitable than Common Effect Model
Hausman Test	0.0041	Fixed Effect Model is more suitable than Random Effect Model
Lagrange Multiplier Test	0.0000	Random Effect Model is more suitable than Common Effect Model

Source: Eviews 12 Output

After conducting these tests, the data is more suitable using fixed effect model rather than common or random effect model.

Classical Assumption Test

The classical assumption test result described as the table below.

Table 4. Classical Assumption Test Result

	Measurement	Threshold	Result
Normality Test	Skewness & Kurtosis Probability Value	Prob. > α (0,05)	Skewness= 0.837289 Kurtosis= 0.144636
Multicollinearity Test	Tolerance value between variables	Tolerance Value < 0.9	Each Variable has tolerance value below 0.9
Heteroskedasticity Test	Harvey Test (Probability Chi-Square)	Prob. > α (0,05)	Prob. Chi-Square = 0.6340
Variance Inflation Factor (VIF)	Centered VIF Value	Centered VIF < 10	Digital Banking = 1.043928 Green Financing = 1.028811 Risk Management = 1.014996

Source: Eviews 12 Output

After conducting the classical assumption test, the data is proven to be Normally distributed, have no multicollinearity issues, and free from heteroskedasticity.

Hypothesis test

The hypothesis testing was performed using EViews 12 software, and the results are detailed below.Table

Table 5. Regression Test Model 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DIGITAL_BANKING	0.060337	0.011865	5.085281	0.0000
GREEN_FINANCING	-0.000559	0.000263	-2.129512	0.0350
C	-0.141223	0.045528	-3.101901	0.0023

Source: Eviews 12 Output

The table above shows the result of a regression test for the effect of digital banking and green financing as an independent variable through banking performance as a dependent variable. The result could be interpreted as the equation below.

$BP = -0.141223 + 0.060337DBit - 0.000559GFit + e$

To assess the impact of risk management as a moderating variable, a regression analysis of the second model, which includes risk management as an independent variable, needs to be conducted. The results of this analysis are presented in the table below.

Table 6. Regression Test Model 2

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.175118	0.051317	-3.422612	0.4122
DIGITAL_BANKING	0.037144	0.019008	4.585497	0.0202
GREEN_FINANCING	-0.001317	0.000379	-3.475281	0.0585
RISK_MANAGEMENT	-0.228034	0.057015	-4.000026	0.0152
DIGITAL_BANKING*RISK_MANAGEMENT	0.043654	0.045861	3.132596	0.0429
GREEN_FINANCING*RISK_MANAGEMENT	-0.000365	0.000780	-3.032051	0.0405

Source: Eviews 12 Output

Table 6 shows the results of the moderation regression analysis that has been conducted. These results can be written in the following regression equation.

BP=−0.175118+0.037144$DBit$−0.001317$GFit$+0.043654($DBit$∗$RMit$)−0.00365($GFit$∗$RMit$)+e

Goodness of Fit Model

F-statistic test

Table 7. F-Statistic Test Result

Prob(F-Statistic)
0.000000

Source: Eviews 12 Output

The F-Statistic test result shows the probability (F-Statistic) value is 0.000000, which is smaller than α (0.05). This indicates that simultaneously, the variables digital banking, green financing, and risk management have a significant influence on the dependent variable.

T-Statistic

Statistical t testing is used to assess the partial influence of independent variables on dependent variables. The assessment is carried out by looking at the value of probability and significance.

Table 8. T-statistic Result

Variable	*Coefficient*	*Std. Error*	*t-statistic*	*Prob.*
C	-0.135226	0.043033	-3.142379	0.0021
DB	0.062488	0.011220	5.569210	0.0001
GF	-0.000527	0.000248	-2.123085	0.0355
DBRM	0.043654	0.045861	3.132596	0.0429
GFRM	-0.000365	0.000780	-3.032051	0.0405

Source: Eviews 12 Output

The coefficient for the Digital Banking variable is 0.062488 with a standard error of 0.011220. The t-statistic of 5.569210 and the highly significant p-value of 0.0001. In contrast, Green Financing (GF) has a coefficient of -0.000527 with a standard error of 0.000248. The t-statistic of -2.123085 and a p-value of 0.0355. The moderating effect of Risk Management through Digital Banking (DBRM) has a coefficient of 0.043654 and a standard error of 0.045861. With a t-statistic of 3.132596 and a p-value of 0.0429 represent a significant effect. Meanwhile the moderating effect of Risk Management through Green Financing shows a coefficient of -0.000365 with a standard error of 0.000780. The t-statistic of -3.032051 and a p-value of 0.0405.

Discussion

The effect of Digital Banking on Bank Performance

The regression analysis indicates that Digital Banking (DB) has a significant positive effect on bank performance. The coefficient for Digital Banking is 0.062488, with a t-statistic of 5.569210 and a p-value of 0.0001, demonstrating a highly significant relationship at the 1% level. Thus, the H1 of this study is accepted, as banks increase their digital banking activities, there is a corresponding and substantial improvement in their performance. This study result is in line with the previous research from Makumba & Phiri (2023); Nguyen et al. (2022) and Wadesango et al. (2020) which state that digital banking has been shown to improve bank profitability by enabling banks to cover costs and turn a profit quickly. The

automation of services such as online fund transfers, mobile banking, and automated customer service (e.g., chatbots) reduces operational bottlenecks and improves customer satisfaction, which is directly linked to better financial performance (Weber & Neimann, 2020). Digital banking platforms offer customers 24/7 access to banking services, which significantly enhances customer engagement and satisfaction.

The effect of Green Financing on Bank Performance

The regression analysis result in table 4.16 shows that Green Financing (GF) has a statistically significant but negative effect on bank performance, with a coefficient of -0.000527, a t-statistic of -2.123085, and a p-value of 0.0355. The result is accepting the H2 of this study, which means that Green Financing activities have a negative significant effect on banking performance.

Green Financing often involves investments in environmentally sustainable projects, which may have higher initial costs and longer payback periods compared to traditional financing. If investors perceive green financing as riskier or less profitable in the short term, it can lead to cautious investment strategies that prioritize financial stability over aggressive growth (Andreas et al., 2018). This cautious approach might limit the bank ability to take on more green projects. Another study conducted by Bai et al. (2021) finds evidence that upfront costs associated with green projects, such as renewable energy infrastructure or eco-friendly technologies can strain a bank short-term financial performance. Zhou et al. (2021) find that Green Financing programs in the banking sector require investments in specialized reporting and monitoring systems to ensure that financed projects meet regulatory requirements.

The effect of Digital Banking on Bank Performance moderated by Risk Management

The regression analysis result in table 4.16 shows that the interaction term (DBRM) has a positive coefficient of 0.043654, with a t-statistic of 3.132596 and a p-value of 0.0429. Therefore, the H3 of this study is accepted, Risk Management (RM) significantly moderates the relationship between Digital Banking (DB) and bank performance. Banks with strong risk management practices are more likely to retain customers and positively affect the bank performance (Nguyen et al., 2022). Effective Risk Management practices help banks to leverage digital banking technologies while minimizing associated risks, such as cybersecurity threats and operational risks. Advanced risk management frameworks for digital banking platforms support banks to identify and mitigate risk more effectively (Tian et al., 2023).

When digital banking practices are accompanied by a strong risk management practice, the creditworthiness assessment will be more accurate and decrease the credit risk (Lee and Chen, 2022). Digital banking increases bank exposure to regulatory inspection, particularly concerning data privacy and financial crimes. Wang et al. (2022) find that proper risk management practices positively affect banks to navigate the complex regulatory landscape, ensuring compliance and operational resilience.

The effect of Green Financing on Bank Performance moderated by Risk Management

The regression test result shows the interaction between Green Financing (GF) and Risk Management (RM) have a negative coefficient of -0.000365, with a t-statistic of -3.032051 and a p-value of 0.0405, means that the risk management significantly moderate the effect of green financing to bank performance. Thus, the H4 of this study is accepted. Green Financing typically involves funding projects aimed at promoting environmental sustainability, such as renewable energy, energy efficiency improvements, and pollution control. Effective risk management is critically needed to accurately address these risks and make informed lending decisions. Zhao and Wu (2021) stated that banks with strong risk management practices are better equipped to evaluate the long-term viability of green projects. Green projects often involve a mix of financial, environmental, and social risks. Even with a great Risk Management framework, the complexity of these risk profiles can lead to underestimation or mismanagement of risks (Chen et al., 2022). As a result, banks might face unforeseen losses. Moreover, Green Financing carries reputational risks, particularly if projects fail to meet environmental standards or if banks are perceived as engaging in greenwashing. The risk of being perceived as engaging in greenwashing, where a bank promotes itself as environmentally friendly while engaging in practices that are not sustainable carrying significant reputational threats (Peterskri et al., 2022). This perception can arise from the lack of transparency regarding the environmental impact of financed projects. Banks should establish stringent criteria for selecting green projects to ensure that the projects align with recognized environmental standards and contribute positively to sustainability goals (Peterski et al., 2022). Regular sustainability disclosures also can recover concerns about greenwashing and demonstrate the bank commitment to sustainable development (Liu & Wu, 2023). However, the potential for reputational damage if a project underperforms or fails to meet environmental

targets remains a significant concern (Tang & Zhang, 2022). Banks should engage with stakeholders, including investors, customers, and regulatory bodies, can provide valuable feedback and enhance the bank reputation (Afifah et al., 2023). While Green Financing might negatively impact short-term performance, it lays the groundwork for long-term growth (Liu & Zhou, 2022).

5. Conclusion and Implications

This study was conducted to investigate the influence of digital banking and green financing on bank performance, with risk management as a moderating variable, in banks listed on the Indonesia Stock Exchange (IDX) from 2019-2023. The research aimed to provide empirical evidence on how these variables interact and affect the overall performance of banks. Based on the results of statistical tests using panel data regression analysis, digital banking has proven to have a significant positive effect on bank performance, green financing has a negative significant effect on bank performance, risk management also proven to have significant moderating effect for the relationship between digital banking and bank performance, and risk management moderates the effect of green financing on bank performance.

This study contributes to the existing literature by providing insights into the effects of digital banking and green financing on bank performance, and the moderating role of risk management. This study has several limitations. This study focuses only on banks listed on the Indonesia Stock Exchange, which may not be fully representative of the broader banking sector. This study only used secondary data from 2019-2023, it limits the ability to account for long-term trends in digital banking and green financing.

Future studies could incorporate other moderating variables, such as corporate governance or market competition, to gain a deeper understanding of their effects on bank performance. Future research also may expand the sample to include banks from different sectors, both within and outside Indonesia for more comprehensive results. Researchers may also consider exploring the long-term impacts of green financing on bank performance to capture wider regarding the sustainability benefits.

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