



The Effect of Liquidity, Efficiency and Mobile Banking on Banking Financial Performance at PT Bank Central Asia (Bca) for the 2015 – 2024 Period

Kharisma Yuniar^{1*}, Anum Nuryani^{2*}

Pamulang University

Corresponding Author: Kharisma Yuniar kharismaynrtr@gmail.com

ARTICLE INFO

Keywords: Liquidity, Efficiency, Mobile Banking, Financial Performance

Received : 4 July

Revised : 20 August

Accepted: 20 September

©2026 Yuniar, Nuryani: This is an open-access article distributed under the terms of the [Creative Commons Atribusi 4.0 Internasional](https://creativecommons.org/licenses/by/4.0/).



ABSTRACT

This study aims to determine the effect of liquidity, efficiency, and mobile banking on the financial performance of PT Bank Central Asia Tbk during 2015–2024. Financial performance is measured by Return on Assets (ROA), while liquidity, efficiency, and mobile banking are measured by Loan to Deposit Ratio (LDR), Operating Expenses to Operating Income (BOPO), and mobile banking transactions. This quantitative study uses secondary data obtained from BCA's annual reports for 2015–2024 during period. Data were analyzed using descriptive statistics, classical assumption tests, multiple linear regression, t-test, F-test, and coefficient of determination. The results show that LDR and mobile banking have a positive and significant effect on ROA, while BOPO has no significant effect. Simultaneously, all three variables significantly affect ROA

INTRODUCTION

The banking industry is one of the strategic sectors that plays an important role in maintaining financial system stability and supporting national economic growth. As intermediary institutions, banks collect funds from the public and redistribute them in the form of loans and various other financial services. Therefore, financial performance is an important aspect that needs to be considered because it reflects the bank's ability to manage resources effectively and efficiently to generate profits. Banks with good financial performance generally demonstrate better capabilities in managing assets and carrying out their operational activities. One commonly used indicator to measure banking financial performance is Return on Assets (ROA), which indicates the bank's ability to generate profit based on its assets.

PT Bank Central Asia Tbk (BCA) is one of the largest private banks in Indonesia, playing an important role in the national banking industry while continuing to develop digital-based banking services. In carrying out its operational activities, a bank's financial performance can be influenced by various factors, including its ability to manage liquidity, operational efficiency, and the development of digital services. In this study, liquidity is proxied by Loan to Deposit Ratio (LDR), efficiency is proxied by Operating Expenses to Operating Income (BOPO), while the development of digital services is proxied by mobile banking. These three factors are expected to be related to financial performance, which is proxied by Return on Assets (ROA).

The main phenomenon examined in this study is the change in the financial performance of PT Bank Central Asia Tbk during the 2015–2024 period. The data show that Loan to Deposit Ratio (LDR), Operating Expenses to Operating Income (BOPO), mobile banking, and Return on Assets (ROA) experienced changes from year to year, as presented in the following table.

Table 1. Average Values of the Research Variables of PT Bank Central Asia

Year	Liquidity	Efficiency	Mobile Banking	Banking Financial Performance
2015	81,92	45,35	591.000.000	3,03
2016	78,52	43,47	786.000.000	3,05
2017	80,47	44,21	1.161.000.000	3,11
2018	85,41	43,87	1.932.000.000	3,13
2019	84,16	42,92	3.848.000.000	3,11
2020	69,00	39,87	6.321.000.000	2,52
2021	64,08	38,62	10.109.000.000	2,56
2022	67,07	37,13	15.205.000.000	3,10
2023	73,55	37,52	25.600.000.000	3,46
2024	81,32	35,14	31.600.000.000	3,78

Source: BCA Annual Reports, 2015 – 2024

Based on Table 1.1, BCA's ROA fluctuated during the 2015–2024 period, decreasing in 2020 and subsequently increasing to its highest value in 2024. Meanwhile, LDR and BOPO also experienced changes from year to year, while mobile banking transactions showed a significant increase. However, changes in LDR, BOPO, and mobile banking were not always followed by changes in ROA in the same direction. This condition indicates a phenomenon that needs to be examined further to identify the factors influencing BCA's financial performance. Previous studies have also shown inconsistent results. Nafisha Oktaviani Lutfi et al. (2021) found that LDR had a significant effect on ROA, whereas Murdiyanto (2020) and Pondaag et al. (2022) found that LDR had no significant effect. Regarding BOPO, Murdiyanto (2020) found a negative and significant effect on ROA, while Pondaag et al. (2022) found no significant effect. Tangiduk et al. (2024) found that mobile banking had a positive effect on ROA, whereas Safitri et al. (2025) found no significant effect. These differences indicate a research gap that forms the basis for examining the effect of liquidity, efficiency, and mobile banking on the financial performance of PT Bank Central Asia Tbk during the 2015–2024 period.

LITERATURE REVIEW

Financial Performance

According to Kasmir (2019), financial performance reflects the company's ability to manage its financial resources and achieve its financial objectives. Financial performance can be measured using several financial ratios, one of which is Return on Assets (ROA). ROA is used to measure the company's ability to generate profit from the assets it owns. In this study, ROA is used as an indicator of the financial performance of PT Bank Central Asia Tbk.

Liquidity

According to Kasmir (2019), A ratio called liquidity is used to assess a company's capacity to pay its short-term debts on time. Liquidity reflects the company's ability to manage its current assets and short-term liabilities. In banking, liquidity can be measured using the Loan to Deposit Ratio (LDR), which describes the ability of a bank to distribute funds obtained from third parties into loans.

Previous research by Nafisha Oktaviani Lutfi et al. (2021) found that LDR has a significant effect on ROA. However, Murdiyanto (2020) and Pondaag et al. (2022) found that LDR has no significant effect on ROA. Based on these findings:
H1: Liquidity has a significant effect on the financial performance of PT Bank Central Asia Tbk.

Efficiency

According to Hery (2021), efficiency refers to the ability of a company to utilize its resources economically and effectively to achieve optimal results. In banking, operational efficiency can be measured using Operating Expenses to Operating Income (BOPO). A lower BOPO ratio indicates that the bank is more efficient in managing its operating expenses relative to its operating income. Research conducted by Murdiyanto (2020) found that BOPO has a negative and significant effect on ROA. Meanwhile, Pondaag et al. (2022) found that BOPO has

no significant effect on ROA. Based on the theoretical explanation and previous research, the hypothesis is formulated as follows:

H2: Efficiency has a significant effect on the financial performance of PT Bank Central Asia Tbk.

Mobile Banking

According to Otoritas Jasa Keuangan (2021), mobile banking is a digital banking service that enables customers to conduct banking transactions through mobile devices. The development of mobile banking can facilitate transactions, improve service efficiency, and provide convenience for customers. The increasing number of mobile banking transactions may also support banking activities and contribute to financial performance.

Research by Tangiduk et al. (2024) found that mobile banking has a positive effect on ROA. However, Safitri et al. (2025) found that mobile banking has no significant effect on ROA. Based on the theoretical explanation and previous research, the hypothesis is formulated as follows:

H3: Mobile Banking has a positive and significant effect on the financial performance of PT Bank Central Asia Tbk.

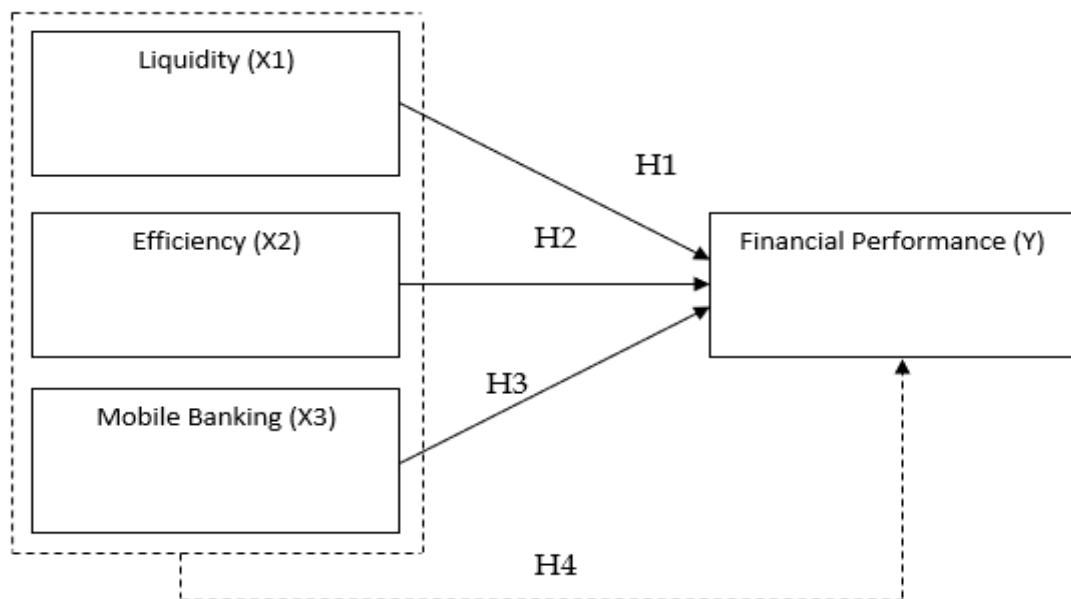


Figure 1. Conceptual Framework

METHODOLOGY

This study uses a quantitative method with a causal associative approach. The study examines the effect of liquidity, efficiency, and mobile banking on the financial performance of PT Bank Central Asia (BCA) during 2015–2024. The data are secondary annual data obtained from BCA's annual reports. The independent variables are liquidity, measured by LDR; efficiency, measured by BOPO; and mobile banking, measured by the number of mobile banking transactions. The dependent variable is financial performance, measured by ROA.

Data processing was conducted using IBM SPSS Statistics version 26. The analysis included descriptive statistics, normality, multicollinearity, heteroscedasticity, and autocorrelation tests, followed by multiple linear regression. Hypothesis testing used the partial t-test, simultaneous F-test, and coefficient of determination.

The regression equation is:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon.$$

Y = Return on Assets (ROA)\

A = Constant

$\beta_1, \beta_2, \beta_3$ = Regression Coefficients

X_1 = Liquidity (LDR)

X_2 = Efficiency (BOPO)

X_3 = Mobile Banking

ε = Error term

RESULTS

1. Descriptive Statics

Statistical analysis is used to describe the variables in this study and can indicate the maximum, minimum, and mean values, as well as the standard deviation, for each variable.

Table 2 Desscriptive Statics

Variabel	N	Minimum	Maximum	Mean	Std. Deviation
LDR	10	64.08	85.41	76.5500	7.59110
BOPO	10	35.14	45.35	40.8100	3.57861
Mobile_Banking	10	20.20	24.44	22.3060	1.52883
ROA	10	2.52	5.78	3.0850	.36912
Valid N (listwise)	10				

Regarding descriptive statistics, the liquidity variable—measured by the Loan-to-Deposit Ratio (LDR)—shows a minimum value of 64.08, a maximum of 85.41, a mean of 76.55, and a standard deviation of 7.59, indicating relatively stable liquidity. Efficiency—measured by the ratio of Operating Expenses to Operating Income (BOPO)—shows a minimum of 35.14, a maximum of 45.35, a mean of 40.81, and a standard deviation of 3.58, indicating good operational efficiency. Mobile banking metrics show a minimum of 20.20, a maximum of 24.18, a mean of 22.22, and a standard deviation of 1.45, indicating increased usage with relatively low variation. Meanwhile, banking financial

performance – measured by Return on Assets (ROA) – shows a minimum of 2.52, a maximum of 3.78, a mean of 3.09, and a standard deviation of 0.37, indicating relatively stable financial performance throughout the study period.

2. Classical Assumption Test

A. Normality Test

Table 3. Normality Test

Model	Statistic	df	Sig.
Shapiro-Wilk	0.895	10	0.192

a. Lilliefors Significance Correction

Based on the Shapiro-Wilk normality test, a Sig. value of 0.192 was obtained, which is greater than 0.05. Since this value exceeds 0.05, the residuals can be considered normally distributed, and the normality assumption of the research model has been met.

B. Autocorrelation Test

Table 4. Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.860	.740	.611	.23026	.739

a. Predictors: (Constant), MB, LDR, BOPO

b. Dependent Variable: ROA

Based on the Durbin-Watson autocorrelation test, a DW value of 0.739 was obtained, with dL = 0.525 and dU = 2.016. Since the DW value falls between dL and dU ($0.525 < 0.739 < 2.016$), the test result lies in the "no decision" region. Consequently, a follow-up Runs Test was conducted to determine the presence or absence of autocorrelation in the regression model.

Table 5. Runs – Test

Runs Test	Unstandardized Residual
Test Valuea	-.02749
Cases < Test Value	5
Cases ≥ Test Value	5
Total Cases	10
Number of Runs	4
Z	-1.006
Asymp. Sig. (2-tailed)	.314

a. Median

Based on the Runs Test, the Asymp. Sig. (2-tailed) value was found to be 0.314, which is greater than 0.05. This indicates that the residuals are random and there is no evidence of autocorrelation. Thus, the regression model satisfies the autocorrelation assumption and is suitable for further analysis.

C. Multicollinearity Test

Table 6. Multicollinearity Test

Model	Tolerance	VIF
LDR	.757	1.321
BOPO	.657	1.522
Mobile_Banking	.564	1.773

a. Dependent Variable: ROA

The multicollinearity test results indicate that all independent variables have Tolerance values greater than 0.10 and VIF values less than 10. LDR has a Tolerance of 0.757 and a VIF of 1.321; BOPO has a Tolerance of 0.657 and a VIF of 1.522; while mobile banking has a Tolerance of 0.564 and a VIF of 1.773. Thus, the regression model shows no signs of multicollinearity.

D. Heteroskedasticity Test

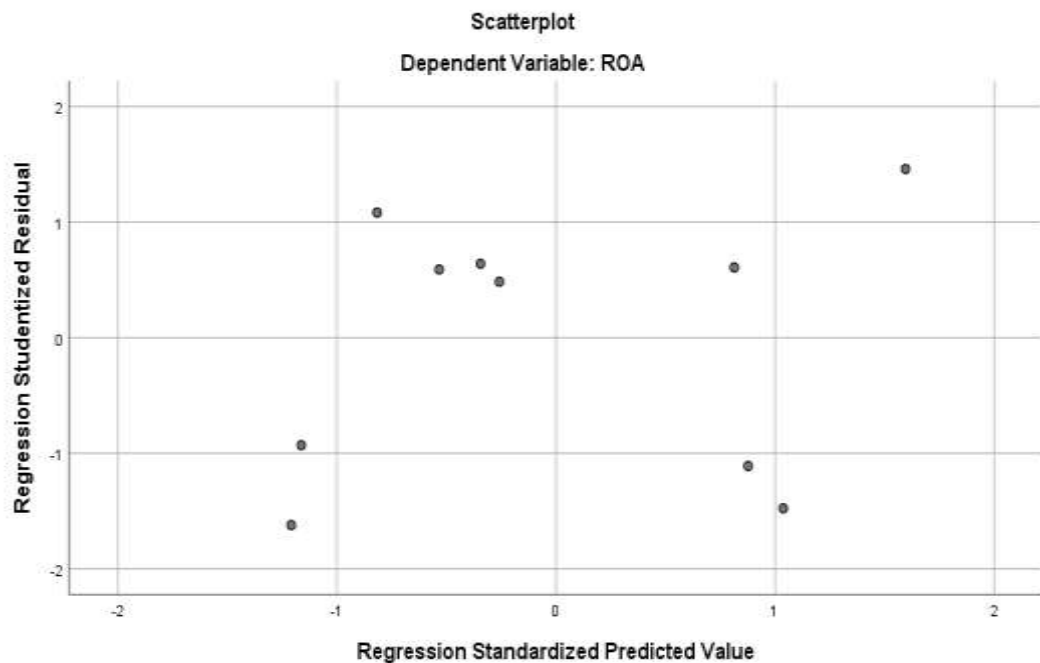


Figure 2. Heteroskedasticity Test

Testing for heteroskedasticity using a scatterplot shows that the regression model has met the classical assumptions and does not experience heteroskedasticity; the residual points are randomly scattered above and below zero without any specific pattern.

3. Multiple Linear Regression Test

Multiple regression analysis is a statistical method used to measure the influence of more than one independent variable on a single dependent variable. Its objective is to determine the extent to which each independent variable (liquidity, efficiency, and mobile banking) contributes to explaining changes in the dependent variable (financial performance).

Table 7. Multiple Linear Regression Test

Model	B	Std. Error	Beta	t	Sig.
(Constant)	-5.155	2.172		-2.373	.055
LDR	.043	.012	.888	3.713	.010
BOPO	.006	.009	.172	.670	.528
Mobile_Banking	.212	.068	.858	3.099	.021

a. Dependent Variable: ROA

The formula $ROA = -5.155 + 0.043LDR + 0.006BOPO + 0.212MB$ was derived from the multiple linear regression analysis. The constant of -5.155 represents the ROA value when all independent variables are zero. The coefficients for LDR (0.043), BOPO (0.006), and MB (0.212) indicate a positive relationship with ROA. This means that increases in LDR, BOPO, and Mobile Banking tend to be accompanied by an increase in ROA, assuming other variables remain constant. Mobile Banking has the largest coefficient, thereby making the greatest contribution to changes in ROA within the research model.

4. Hypothesis Testing

A. T-Test Results (Partial)

Table 8. T-Test Results (Partial)

Coefficients ^a					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-5.155	2.172		-2.373	.055
LDR	.043	.012	.888	3.713	.010
BOPO	.006	.009	.172	.670	.528
Mobile_Banking	.212	.068	.858	3.099	.021

a. Dependent Variable: ROA

Based on the t-test results, liquidity—proxied by the Loan-to-Deposit Ratio (LDR)—has a positive and significant effect on Return on Assets (ROA), with a calculated t-value of 3.713 and a significance level of 0.010. This indicates that increasing the distribution of funds through loans boosts interest income and profitability, consistent with the findings of Kasmir (2019).

On the other hand, with a computed t-value of 0.670 and a significance level of 0.528, the BOPO ratio (operating expenses to operating income) has no discernible impact on ROA. According to the study of Pondaag et al. (2022), this implies that BCA's profitability has not been directly impacted by operational efficiency.

With a computed t-value of 3.099 and a significance level of 0.021, mobile banking was found to have a favorable and significant impact on ROA. Utilizing digital services improves client access, transaction activity, and service efficiency, which may boost income and profitability.

With a computed F-value of 5.703 and a significance level of 0.034, LDR, BOPO, and mobile banking all significantly affect ROA concurrently. When taken as a whole, these three variables account for 61.1% of the variation in ROA (Adjusted $R^2 = 0.611$), with factors outside the research model accounting for the remaining portion.

B. F-test (Simultaneous)

Table 9. F-Test (Simultaneous)

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.907	3	.302	5.703	.034 ^b
	Residual	.318	6	.053		
	Total	1.225	9			
a. Dependent Variable: ROA						
b. Predictors: (Constant), <i>LDR</i> , <i>BOPO</i> , <i>Mobile_Banking</i>						

The F-test was used to determine the simultaneous effect of LDR, BOPO, and Mobile Banking on ROA. The results show a calculated F-value of 5.703 and a table F-value of 4.76, with a significance level of 0.034. Since the calculated F-value exceeds the table F-value ($5.703 > 4.76$) and the significance level is below 0.05 ($0.034 < 0.05$), H_0 is rejected and H_4 is accepted. This indicates that these three variables simultaneously have a significant effect on the ROA of PT Bank Central Asia (BCA) for the 2015–2024 period and are capable of explaining changes in BCA's financial performance during the study period.

5. Coefficient of Determination Test

Table 10. Coefficient of Determination Test

Model Summary ^b				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.860 ^a	.740	.611	.23026
a. Predictors: (Constant), LDR, BOPO, Mobile_Banking				
b. Dependent Variable: ROA				

LDR, BOPO, and mobile banking together account for 61.1% of the variation in ROA, according to the coefficient of determination test's Adjusted R-squared value of 0.611. Factors beyond the study model, such as CAR, NPL, NIM, business size, loan growth, and economic conditions, have an impact on the remaining 38.9%. As a result, this regression model works well to explain how BCA's financial performance changed between 2015 and 2024.

DISCUSSION

Based on the t-test, the Loan-to-Deposit Ratio (LDR) has a positive and significant influence on Return on Assets (ROA), with a calculated t-value of 3.713 and a significance value of 0.010 (< 0.05); this indicates that increasing the disbursement of funds as loans can boost interest income and bank profitability, consistent with the findings of Kasmir (2019). Meanwhile, the BOPO ratio (operating expenses to operating income) does not have a significant effect on ROA, with a calculated t-value of 0.670 and a significance value of 0.528 (> 0.05); this suggests that changes in operational efficiency do not significantly impact ROA, likely because BCA successfully maintained efficiency and optimized other revenue sources. Mobile banking has a positive and significant influence on ROA, with a calculated t-value of 3.099 and a significance value of 0.021 (< 0.05), demonstrating that the expansion of digital services drives efficiency, transaction activity, and transaction-based revenue, all of which support profitability.

According to the F-test results, mobile banking, BOPO, and LDR all significantly affect ROA at the same time, with a computed F-value of 5.703 and a significance value of 0.034 (< 0.05). These three variables account for 61.1% of the variation in ROA, with factors outside the model accounting for the remaining 38.9%, according to the Adjusted R-squared value of 0.611.

Therefore, variations in BCA's financial performance between 2015 and 2024 can be explained by a combination of liquidity, efficiency, and the growth of digital services.

CONCLUSIONS AND RECOMMENDATIONS

The study concludes that LDR has a positive and significant effect on ROA, BOPO has no significant effect on ROA, and Mobile Banking has a positive and significant effect on ROA. Simultaneously, LDR, BOPO, and Mobile Banking significantly affect ROA. These findings indicate that liquidity management and digital banking development are important factors in BCA's financial performance during 2015–2024.

Based on these findings, BCA is recommended to maintain prudent liquidity management, continue developing mobile banking services, and improve operational efficiency so that efficiency improvements can contribute more directly to profitability.

FURTHER STUDY

Future research may include additional variables that were not examined in this study, such as Capital Adequacy Ratio (CAR), Non-Performing Loan (NPL), Net Interest Margin (NIM), company size, credit growth, and macroeconomic conditions. Future studies may also use a longer observation period, compare several banks, or employ different measures of digital banking development to obtain broader evidence regarding the determinants of banking financial performance.

ACKNOWLEDGMENT

The author wishes to express gratitude to Universitas Pamulang, the academic supervisor, and all parties who provided guidance, direction, support, and assistance during the conduct of the research and the preparation of this article. The author also extends thanks to everyone who contributed to the completion of this study.

REFERENCES

- Bank Indonesia. (2026). Sistem Pembayaran. <https://www.bi.go.id> (Diakses 3 Juli 2026)
- Hery. (2021). Analisis detail dan mendalam atas data kuantitatif laporan keuangan. Gava Media.
- Kasmir. (2019). Pengantar Manajemen Keuangan: Edisi Kedua. Prenada Media. <https://books.google.co.id/books?id=IW9ADwAAQBAJ>
- Lutfi, N. O., Setiawan, I., & Pakpahan, R. (2021). Pengaruh LDR dan BOPO terhadap ROA Pada Bank Umum yang Terdaftar di BEI Tahun 2010-2020. 2(1), 73-80.
- Murdiyanto, A. (2020). PENGARUH LOAN TO DEPOSIT RATIO (LDR), CAPITAL ADEQUACY RATIO (CAR), NET INTEREST MARGIN (NIM) DAN BIAYA OPERASIONAL DIBANDING PENDAPATAN OPERASIONAL (BOPO) TERHADAP RETURN ON ASSET (ROA) (Studi Bank Umum Konvensional tahun 2013 -2019). 9(1), 1-12.
- Otoritas Jasa Keuangan. (2026). Perbankan Digital. <https://www.ojk.go.id> (Diakses 3 Juli 2026)
- Pondaag, E. M., Rate, P. V., Tulung, J. E., Efisiensi, P., Bopo, O., Likuiditas, D. A. N., Terhadap, L. D. R., Manajemen, J., Ekonomi, F., Ratulangi, U. S., Pondaag, E. M., Rate, P. V., & Tulung, J. E. (2022). PERFORMA PERBANKAN (ROA) PADA BANK BUMN PERIODE TAHUN 2012-2019 THE INFLUENCE OF OPERATIONAL EFFICIENCY (BOPO) AND LIQUIDITY (LDR) ON BANKING PERFORMANCE (ROA) OF STATE-OWNED COMPANY BANKS IN THE PERIOD OF Jurnal EMBA Vol . 10 No . 1 Januari 2022 , Hal . 724-734. 10(1), 724-734.

Safitri. (2025). THE INFLUENCE OF MOBILE BANKING USAGE AND CREDIT RISK ON THE FINANCIAL PERFORMANCE OF BANKING COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE (IDX) FOR THE 2021 - 2024 PERIOD
PENGARUH PENGGUNAAN MOBILE BANKING DAN RISIKO KREDIT TERHADAP KINERJA KEUANGA. 8.