

**The Effect of Digital Transaction Growth, Firm Size, and Liquidity on  
Banking Profitability on the IDX (2021-2024)**

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DOI: [10.46821/equity.v6i2.837](https://doi.org/10.46821/equity.v6i2.837)

**ABSTRAK**

*Penelitian ini mengkaji pengaruh pertumbuhan transaksi digital, ukuran perusahaan, dan likuiditas terhadap profitabilitas perbankan yang terdaftar di Bursa Efek Indonesia periode 2021–2024. Pesatnya digitalisasi sektor keuangan serta adanya perbedaan hasil riset terdahulu melatarbelakangi studi ini. Melalui pendekatan kuantitatif dengan regresi linear berganda terhadap sepuluh bank sampel, ditemukan bahwa secara parsial hanya pertumbuhan transaksi digital yang memiliki pengaruh positif signifikan terhadap laba. Secara simultan, ketiga variabel terbukti memengaruhi profitabilitas secara nyata. Pertumbuhan transaksi digital muncul sebagai faktor paling dominan dalam mendorong kinerja keuangan perusahaan. Manajemen perbankan disarankan untuk terus memperkuat infrastruktur layanan digital guna mengoptimalkan keuntungan di masa depan.*

*Kata Kunci: Likuiditas, Perbankan, Pertumbuhan Transaksi Digital, Profitabilitas, Ukuran Perusahaan*

**ABSTRACT**

*This study examines the effect of digital transaction growth, firm size, and liquidity on the profitability of banking companies listed on the Indonesia Stock Exchange for the 2021–2024 period. The rapid digitalization of the financial sector and inconsistencies in prior research findings drive this investigation. Using a quantitative approach with multiple linear regression on ten sample banks, the results indicate that only digital transaction growth significantly influences profitability partially. Simultaneously, all variables significantly affect financial performance. Digital transaction growth emerges as the most dominant factor in driving profits. Banks are advised to strengthen their digital service infrastructure to optimize future earnings.*

*Keywords: Banking, Digital Transaction Growth, Firm Size, Liquidity, Profitability*

## INTRODUCTION

The rapid development of information technology has driven a major transformation in the banking industry, especially through the increasing use of digital transaction services (Coryanata et al., 2023). The digitalization of the payment system has changed the pattern of customer interaction with banks from conventional transactions to electronic-based transactions (Arinta & Widyastuti, 2024). These changes not only affect how services are provided but also impact cost structures, operational efficiency, and banks' revenue potential (Stefanelli et al., 2022). The increase in digital transaction activity is expected to expand service access and increase the frequency of banking product usage. However, technology implementation also requires infrastructure investment and new operational costs, so its effect on financial performance is not necessarily uniform across banks (Hakizimana et al., 2023).

A bank's financial performance is generally assessed through profitability, as this indicates how well the bank can generate profits from all its sources of funds (Harahap, 2018). One commonly used measure is Return on Assets (ROA), which shows how effectively management manages assets to generate profits (Astuti et al., 2021). The higher the ROA, the more efficient the institution is in utilizing its assets to obtain profits. Therefore, it is important to examine the factors that influence ROA to understand the overall performance of banks (Ganefi et al., 2024).

Theoretically, profitability is influenced by the company's internal characteristics. Firm size reflects resource capacity, market power, and risk management capability, so large-scale companies tend to have better profit stability (Hartono, 2012; Riau et al., 2023). In addition, liquidity also plays an important role because it relates to the bank's ability to distribute funds optimally without neglecting short-term obligations (Harsono, 2024). In the banking industry, liquidity is often measured using the Loan to Deposit Ratio, which shows the balance between loans disbursed and funds collected (Kasmir, 2012). Proper liquidity management allows banks to obtain optimal interest income while maintaining operational stability.

On the other hand, digital transaction growth is a new factor that is expected to affect bank profitability (Linawati et al., 2023). The increasing use of digital services reflects the intensity of customer activity and the opportunity to increase service-based revenue (Nguyen et al., 2023). However, this relationship is not consistent because the operational efficiency gained can be offset by technology and system development costs (Dehnert, 2020).

Previous research on the effect of digitalization on banking profitability has shown varying results. Research by Lazuardi et al. (2023) found that digital banking positively affects profitability because it can increase operational efficiency and expand service reach. However, research by Haryono & Widiyanti (2023) found that the digital banking index has a negative and significant effect on

ROA, indicating that increasing digital facilities does not necessarily increase asset profits if the related costs have not been fully monetized.

Similarly, with firm size and liquidity variables. Andayani & Purbawangsa (2019) found that firm size positively affects company value, while Hartono & Nurvitasari (2023) found that liquidity does not significantly affect bank profitability. Kirana & Waluyo (2022) found that LDR has a positive and significant effect on ROA. The inconsistency of these research results indicates a research gap that needs to be further investigated, especially in the post pandemic period which reflects the recovery conditions and acceleration of banking digitalization in Indonesia.

This research has several elements of novelty. First, the research was conducted in the post-pandemic period (2021-2024) which reflects the acceleration of banking digitalization in Indonesia. Second, this study focuses on large banking companies (assets  $\geq$  Rp50 trillion) that have significant digital transaction activity. Third, this study uses dominant variable analysis to identify the most influential factor on profitability in the digital era.

Based on the explanation above, a comprehensive study is needed to evaluate the effect of digital transaction growth, firm size, and liquidity on bank profitability. This research will not only analyze the impact of each variable separately but also their combined impact, as well as identify the most significant factors affecting bank financial performance. Thus, the purpose of this study is to investigate the effect of digital transaction growth, firm size, and liquidity on bank profitability, assessed through Return on Assets (ROA) of banks listed on the Indonesia Stock Exchange for the 2021 to 2024 period.

## RESEARCH METHOD

### Research Location and Time

This research was conducted from November 2025 to January 2026. The research data is secondary data obtained from the annual financial reports of banking companies published through the Indonesia Stock Exchange (IDX) and the official websites of each bank as supporting sources.

### Research Approach

This study applies quantitative methods to evaluate the effect of digital transaction growth, firm size, and liquidity on bank profits, measured through Return on Assets (ROA). The quantitative method was chosen because it provides an opportunity to analyze the relationship between variables with numerical data.

### Population, Sample, and Sampling Technique

The research population is all banking companies listed on the Indonesia Stock Exchange for the 2021-2024 period, totaling 46 banks. The sampling technique used purposive sampling with the criteria: (1) banks listed consecutively during the research period, and (2) having a minimum total asset of Rp50 trillion.

**Table 1.** Sampling Criteria

| No | Criteria                                              | Number |
|----|-------------------------------------------------------|--------|
| 1  | Banks listed on the IDX in 2021-2024                  | 46     |
| 2  | Banks that did not publish complete financial reports | (0)    |
| 3  | Banks with total assets < Rp50 trillion               | (36)   |
|    | Total Research Sample                                 | 10     |
|    | Total Research Sample (10 x 4 years)                  | 40     |

Source: Data Processed, 2026

**Table 2.** Operational Definition and Variable Measurement

| No | Variable                        | Variable Definition                                                                                                     | Variable Measurement                                |
|----|---------------------------------|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| 1  | Profitability (Y)               | ROA: description of the level of contribution of company assets in generating net profit (Astuti et al., 2021)          | Return On Assets = Net Income / Total Assets × 100% |
| 2  | Digital Transaction Growth (X1) | Digital Transaction Growth is the increase in the number and intensity of digital payment usage (Maharani et al., 2022) | Digital Transaction Value (Annual Report)           |
| 3  | Firm Size (X2)                  | Firm size is the size of the company measured by total assets ((Hartono, 2012):14)                                      | Firm Size = Ln (Total Assets)                       |
| 4  | Liquidity (X3)                  | Liquidity is the company's ability to meet its short-term obligations (Kasmir, 2014)                                    | LDR = (Total Loans / DPK) × 100%                    |

Source: Data Processed, 2026

Based on these criteria, 10 banks were obtained as research samples with a total of 40 observations. The selection of large-asset banks was carried out so that the company characteristics are relatively homogeneous and the bank's digital activities are more representative.

### Data Analysis Technique

The analytical method applied is multiple linear regression to evaluate the effect of digital transaction growth, firm size, and liquidity on bank profitability. Before conducting regression analysis, classical assumption tests were performed including normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test. Hypothesis testing was conducted using partial test (t-test), simultaneous test (F-test), and dominance test to find the variable that has the most significant impact on ROA.

## RESULTS AND DISCUSSION

### Descriptive Statistics Test Results

Descriptive statistics are used to describe the characteristics of research data before hypothesis testing. This analysis shows the distribution of minimum, maximum, mean, and standard deviation values of each variable. Based on 40 observations, digital transaction growth has a minimum value of 95.00 and a maximum of 7100.00 with an average of 1500.25 and a standard deviation of 1964.71, indicating that the level of digital adoption among banks varies greatly. The firm size variable has a minimum value of 18.90 and a maximum of 21.61 with an average of 20.11 and a standard deviation of 0.91, indicating that the bank sizes in the sample are relatively homogeneous. Furthermore, liquidity (LDR) is in the range of 60.79–98.78 with an average of 84.14 and a standard deviation of 8.97, indicating that the bank's liquidity conditions are still within safe limits. Meanwhile, profitability (ROA) has a minimum value of 0.64 and a maximum of 3.78 with an average of 1.90 and a standard deviation of 0.78. This shows that all banks were able to generate positive profits although the level of asset utilization efficiency varied.

### Normality Test

The test produced a test statistic of 0.106 and Asymp. Sig. (2-tailed) of 0.200. With a significance value exceeding 0.05 ( $0.200 > 0.05$ ), the residuals are proven to be normally distributed, so the normality assumption in the regression model is met.

**Table 3.** Descriptive Statistics Test Results

| Variable                   | N  | Minimum | Maximum | Mean      | Std. Deviation |
|----------------------------|----|---------|---------|-----------|----------------|
| Digital Transaction Growth | 40 | 95.00   | 7100.00 | 1500.2500 | 1964.70882     |
| Firm Size                  | 40 | 18.90   | 21.61   | 20.1130   | .90891         |
| LDR                        | 40 | 60.79   | 98.78   | 84.1425   | 8.96822        |
| ROA                        | 40 | .64     | 3.78    | 1.8965    | .78302         |
| Valid N (listwise)         | 40 |         |         |           |                |

Source: Data Processed, 2026

**Table 4.** Normality Test Results

|                          | Unstandardized Residual                                |
|--------------------------|--------------------------------------------------------|
| N                        | 40                                                     |
| Normal Parameters        | Mean: 0.0000000<br>Std. Deviation: 0.45398718          |
| Most Extreme Differences | Absolute: 0.106<br>Positive: 0.080<br>Negative: -0.106 |
| Test Statistic           | 0.106                                                  |
| Asymp. Sig. (2-tailed)   | 0.200                                                  |

Source: Data Processed, 2026

**Multicollinearity Test**

The test results show the Tolerance values of each variable are 0.351; 0.370; and 0.852 ( $> 0.10$ ) and VIF values of 2.845; 2.704; and 1.174 ( $< 10$ ). Thus, the regression model does not experience multicollinearity symptoms.

**Heteroscedasticity Test**

Based on the scatterplot graph, the points are randomly scattered above and below the zero axis and do not form a specific pattern. This indicates that there is no heteroscedasticity, so the homoscedasticity assumption is met.

**Autocorrelation Test**

The Runs Test results show Asymp. Sig. (2-tailed) of 0.078. This significance value is greater than  $\alpha = 0.05$  ( $0.078 > 0.05$ ), so it can be concluded that there is no autocorrelation in the residual regression model. Thus, the residual independence assumption is met.

**Table 5.** Multicollinearity Test Results

| Variable                   | Tolerance | VIF   |
|----------------------------|-----------|-------|
| Digital Transaction Growth | 0.351     | 2.845 |
| Firm Size                  | 0.370     | 2.704 |
| LDR                        | 0.852     | 1.174 |

Source: Data Processed, 2026

**Table 6.** Autocorrelation Test Results

|                         | Unstandardized Residual |
|-------------------------|-------------------------|
| Test Value              | 0.02112                 |
| Cases $<$ Test Value    | 20                      |
| Cases $\geq$ Test Value | 20                      |
| Total Cases             | 40                      |
| Number of Runs          | 15                      |
| Z                       | -1.762                  |
| Asymp. Sig. (2-tailed)  | 0.078                   |

Source: Data Processed, 2026

**Table 7.** Multiple Linear Regression Analysis Results

| Model                      | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig.  |
|----------------------------|-----------------------------|------------|---------------------------|--------|-------|
|                            | B                           | Std. Error | Beta                      |        |       |
| (Constant)                 | 0.987                       | 2.542      |                           | 0.389  | 0.700 |
| Digital Transaction Growth | 0.0003                      | 0.0001     | 0.743                     | 4.556  | 0.000 |
| Firm Size                  | 0.055                       | 0.137      | 0.064                     | 0.400  | 0.692 |
| LDR                        | -0.008                      | 0.009      | -0.086                    | -0.826 | 0.414 |

Source: Data Processed, 2026

**Table 8.** Coefficient of Determination Results

| Model | R     | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------|----------|-------------------|----------------------------|
| 1     | 0.815 | 0.664    | 0.636             | 0.47252                    |

Source: Data Processed, 2026

**Table 9.** t-Test Results (Partial)

| Variable                   | t-count | t-table | Sig.  | Conclusion      |
|----------------------------|---------|---------|-------|-----------------|
| Digital Transaction Growth | 4.556   | 2.028   | 0.000 | Significant     |
| Firm Size                  | 0.400   | 2.028   | 0.692 | Not Significant |
| LDR                        | -0.826  | 2.028   | 0.414 | Not Significant |

Source: Data Processed, 2026

**Multiple Linear Regression Analysis**

Based on the data processing results, the regression equation is obtained as follows:

$$Y = 0.987 + 0.0003X_1 + 0.055X_2 - 0.008X_3 + e$$

The description of the regression coefficients is as follows:

- The constant of 0.987 indicates that if the independent variables are considered constant, the ROA value will be 0.987.
- Digital Transaction Growth ( $X_1$ ) of 0.0003 with a positive direction indicates that if digital transaction growth increases, it will be followed by an increase in ROA of 0.0003 assuming other independent variables are constant.
- Firm Size ( $X_2$ ) of 0.055 with a positive direction indicates that if firm size increases, it will be followed by an increase in ROA of 0.055 assuming other independent variables are constant.
- LDR ( $X_3$ ) of -0.008 with a negative direction indicates that if LDR increases, it will be followed by a decrease in ROA of -0.008 assuming other independent variables are constant.

**Coefficient of Determination ( $R^2$ )**

Based on the test results, the R Square value is 0.664, which indicates that 66.4% of the variation or fluctuation in ROA values is influenced by the variables digital transaction growth, firm size, and LDR simultaneously. Meanwhile, the remaining 33.6% is explained by other factors outside the research model. For more accurate results in multiple linear regression, the researcher uses the Adjusted R Square value of 0.636, which indicates that 63.6% of ROA variation can be explained by the three independent variables.

**t-Test (Partial)**

The t-test results show the effect of each variable individually:

- Digital Transaction Growth: Has t-count 4.556 > t-table 2.028 and Sig. = 0.000 < 0.05. This means that this variable has a positive and significant effect on ROA.

- b. Firm Size: Has t-count  $0.400 < t\text{-table } 2.028$  and  $\text{Sig.} = 0.692 > 0.05$ . This means that this variable does not have a significant effect on ROA.
- c. LDR: Has t-count  $-0.826 < t\text{-table } 2.028$  and  $\text{Sig.} = 0.414 > 0.05$ . This means that this variable does not have a significant effect on ROA.

### F-Test (Simultaneous)

From the ANOVA table, the F-count value is  $23.697 > F\text{-table } 2.87$  with a significance (Sig.) of  $0.000 < 0.05$ . Thus, the variables digital transaction growth, firm size, and LDR simultaneously have a significant effect on ROA in this regression model.

### Dominant Variable Test

Based on the table, the digital transaction growth variable has a Beta value of 0.743, which is the highest value compared to other variables. Thus, digital transaction growth is the variable that provides the most dominant influence on ROA.

## DISCUSSION

### The Effect of Digital Transaction Growth on Profitability

Based on the statistical test results, digital transaction growth has a positive and significant effect on Profitability (ROA) with t-count  $4.556 > t\text{-table } 2.028$  and  $\text{Sig. } 0.000 < 0.05$ . This indicates that the higher the growth of digital transactions of a bank, the higher the company's ability to generate profits. The increase in transaction volume through digital services shows that banks are able to provide easy access for customers to conduct transactions without space and time limits. This convenience and time efficiency not only helps customers but also increases bank profits through commission income or transaction fees (fee-based income).

**Table 10.** F-Test Results (Simultaneous)

| Model      | Sum of Squares | df | Mean Square | F      | Sig.  |
|------------|----------------|----|-------------|--------|-------|
| Regression | 15.873         | 3  | 5.291       | 23.697 | 0.000 |
| Residual   | 8.038          | 36 | 0.223       |        |       |
| Total      | 23.912         | 39 |             |        |       |

Source: Data Processed, 2026

**Table 11.** Dominant Variable Test Results

| Variable                   | Standardized Coefficients Beta | Rank |
|----------------------------|--------------------------------|------|
| Digital Transaction Growth | 0.743                          | 1    |
| Firm Size                  | 0.064                          | 2    |
| LDR                        | -0.086                         | 3    |

Source: Data Processed, 2026

This phenomenon is clearly reflected in the performance of one of the research samples, namely PT Bank Mandiri (Persero) Tbk. Based on the 2022 Annual Report, Bank Mandiri recorded that the increase in active users of digital applications contributed significantly to non-interest income. Fee-based income from the New Livin' application reached Rp1,737 billion as of December 31, 2022, or grew about 24.3% compared to the previous year (Bank Mandiri (Persero) Tbk, 2022; Komara & Utami, 2024).

The results of this study are in line with research conducted by Atasyadila & Muchlis (2024) which showed that the digital banking variable proxied through the frequency of mobile banking and internet banking transactions has a positive effect on bank profitability. This is because increased digital transactions can increase non-interest income and create efficiency in bank operational costs.

### **The Effect of Firm Size on Profitability**

Based on the statistical test results, firm size does not have a significant effect on Profitability (ROA) with  $t\text{-count } 0.400 < t\text{-table } 2.028$  and  $\text{Sig. } 0.692 > 0.05$ . This indicates that the size of total assets owned by a bank does not directly guarantee an increase in profits. Banks with large assets are often faced with higher operational costs, large infrastructure maintenance burdens, and more complex management complexity, so operational efficiency can actually decrease.

The results of this study are in line with research conducted by Harsono (2024) which found that bank size is not the main determinant in achieving financial performance (ROA) during the observation period. This reinforces the finding that in the 2021-2022 period, banking was more influenced by digital efficiency and risk management factors rather than just asset size.

### **The Effect of Liquidity on Profitability**

Based on the statistical test results, LDR does not have a significant effect on Profitability (ROA) with  $t\text{-count } -0.826 < t\text{-table } 2.028$  and  $\text{Sig. } 0.414 > 0.05$ . This indicates that the level of credit distribution ratio (LDR) is not the main determinant in profit generation during the research period. This condition can occur because in the 2021-2022 period, banks tended to be very selective in distributing credit to minimize the risk of bad loans post-pandemic. Although third-party funds (DPK) are channeled into credit, if the interest income generated is unable to cover operational costs and risk reserves, then an increase in LDR will not be able to significantly increase ROA.

The results of this study are in line with research conducted by Rahmansyah et al. (2022) which found that Loan to Deposit Ratio (LDR) does not have a significant effect on Return on Asset (ROA). This indicates that the bank's ability to distribute credit does not always guarantee an increase in net profit directly if not accompanied by strict risk management.

**The Simultaneous Effect of Digital Transaction Growth, Firm Size, and Liquidity on Profitability**

Based on the F-test results, the significance value is  $0.000 < 0.05$ , and the F-count value is  $23.697 > F\text{-table } 2.87$ . Thus, it can be concluded that digital transaction growth, firm size, and liquidity simultaneously have a positive and significant effect on Profitability (ROA).

This result shows that banking profitability does not only depend on one factor but is the result of the synergy between digital transaction acceleration, efficient firm size management, and appropriate credit distribution (LDR) regulation to have a positive impact on company profit growth. This result is supported by research from Rachmawati & Pimada (2024) which explains that the combination of digitalization aspects and internal bank factors is an important unity in determining a bank's profit performance.

**Digital Transaction Growth as the Dominant Variable on Profitability**

Based on the Standardized Coefficients Beta values, the Digital Transaction Growth variable has a value of 0.743, which is the highest value compared to Firm Size (0.064) and LDR (-0.086). This indicates that the contribution of digital transactions to profitability is much greater and more significant compared to other internal bank factors.

This finding is in line with the research results of Al-Fairus & Fadli (2024) which revealed that in the midst of current banking competition, digital services are no longer just a complement but have become the main engine for maximizing profits. Banks that are able to accelerate their digital transaction growth will be more efficient in reaching customers and reducing costs, thus having a direct impact on increasing ROA. Therefore, banking management needs to make digitalization a top priority in their business strategy to remain competitive in the modern market.

**CONCLUSION**

Based on the results of the analysis and discussion that has been conducted, the following conclusions can be drawn: 1) Partially: Digital Transaction Growth (X1) has a positive and significant effect on Profitability (ROA) in banking companies listed on the Indonesia Stock Exchange in 2021-2024 ( $t\text{-count } 4.556 > t\text{-table } 2.028$ ; Sig.  $0.000 < 0.05$ ). Meanwhile, Firm Size (X2) and LDR (X3) do not have a significant effect on Profitability (ROA). 2) Simultaneously: digital transaction growth, firm size, and liquidity simultaneously have a positive and significant effect on Profitability (ROA) with F-count  $23.697 > F\text{-table } 2.87$  and Sig.  $0.000 < 0.05$ . 3) Dominant Variable: Digital Transaction Growth is the most dominant variable in influencing Profitability (ROA) with a Standardized Coefficients Beta value of 0.743, which is the highest value compared to other variables.

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