



# The Interplay of Digital Maturity, Financial Performance, and Stock Returns in Indonesian Publicly Listed Banks

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**ABSTRACT:** Indonesia's banking sector is undergoing a digital transformation driven by Industry 4.0. This study examines how digital maturity and financial performance, measured by Return on Assets (ROA) and Net Interest Margin (NIM), influence the stock performance of publicly traded Indonesian banks. Employing a quantitative approach, this study measures digital maturity by analyzing the frequency of technology-related terms in annual reports using NVivo software. Panel data regression with EViews software is then used to assess the impacts of digital maturity, ROA, and NIM on stock performance. The study reveals a positive and statistically significant relationship between ROA and stock returns, while digital maturity and NIM do not exhibit statistically significant effects. These findings suggest that investors prioritize financial strength and efficient asset management over digital activities when evaluating bank performance. The study concludes that digital maturity alone does not significantly influence stock returns, highlighting the need for banks to effectively translate digital initiatives into tangible financial benefits and clearly communicate these outcomes to investors. This research contributes to the existing body of knowledge on digital transformation and financial performance in the banking sector, offering valuable insights for investors and bank management decision making.

**KEYWORDS:** Digital Maturity, Financial Performance, Indonesian Banks, Stock Returns.

## 1. INTRODUCTION

The Fourth Industrial Revolution, also known as Industry 4.0, has ushered in an era of rapid technological advancements, profoundly impacting various sectors, including banking. This revolution emphasizes the integration of digital technologies into traditional processes, enhancing operational efficiency, innovation, and customer satisfaction. The banking sector, in particular, faces significant pressure to adapt to these changes to maintain competitiveness and meet evolving customer expectations.

In Indonesia, the banking sector has experienced a notable shift towards digitalization. With over 200 million internet users, the potential for digital banking growth is substantial. This study aims to explore how digital maturity, along with traditional financial performance metrics such as Return on Assets (ROA) and Net Interest Margin (NIM), influences the stock returns of publicly listed banks in Indonesia. Understanding these relationships is crucial for stakeholders, including investors, policymakers, and bank managers, to make informed decisions in the digital era.

### 1.1. Research Background

Industry 4.0 represents a transformative approach to industrial production and processes through the integration of advanced digital technologies. This transformation has significantly impacted the banking sector by reshaping business models, introducing new technologies, and bolstering security measures. The increasing digitalization of the economy has compelled banks to reassess their traditional business approaches. This underscores the urgency for swift and efficient adaptations in the banking sector to cater to client needs while providing secure, convenient, and interconnected services, particularly for the Generation Z clientele (Balakrishna et al., 2023).

### 1.2. Problem Identification

While the Indonesian banking sector is actively engaging in the process of digital transformation, the influence of this transition on stock performance, particularly in the Indonesian setting, is an area of research that has not been extensively explored. Various studies have examined the correlation between digital transformation and firm performance, albeit often within broader geographical scopes or concentrating on different industries (Cao et al., 2021; Chen et al., 2023).



## 2. LITERATURE REVIEW

### 2.1. Digital Maturity

Digital maturity refers to the extent to which an organization has integrated digital technologies into its operations. It encompasses various aspects, including digital strategy, culture, capabilities, and technological infrastructure. Higher digital maturity indicates a bank's ability to leverage digital technologies to enhance customer experiences, streamline operations, and innovate product offerings.

Studies on digital maturity highlight its positive impact on organizational performance. For instance, Verhoef et al. (2021) found that digital maturity enhances operational efficiency, customer satisfaction, and financial performance. Similarly, Kane et al. (2015) emphasized that digitally mature organizations are better positioned to respond to market changes and innovate effectively.

### 2.2. Financial Performance Metrics

Financial performance metrics such as ROA and NIM are critical indicators of a bank's profitability and operational efficiency. ROA measures a bank's ability to generate profit from its assets, reflecting management efficiency. Higher ROA is associated with better financial health and investor confidence.

NIM, on the other hand, measures the difference between interest income generated and interest paid out, relative to the bank's interest-earning assets. A higher NIM indicates better management of interest-related activities, leading to increased profitability. Studies have shown mixed results regarding the impact of NIM on stock returns, with some suggesting a positive relationship (Rahmi et al., 2022) and others indicating no significant effect (Firmansyah, 2022).

## 3. METHODOLOGY

### 3.1. Research Design

This study employs a quantitative research methodology, utilizing panel data from 13 banks listed on the IDX over a five-year period (2019-2023). The research design follows a structured approach, beginning with the identification of research questions, data collection, variable operationalization, and data analysis.

### 3.2. Research Population and Sample

The research population consists of all banks listed on the IDX. Using purposive sampling, 13 banks were selected based on specific criteria: they must be listed between 2019 and 2023 and belong to Kelompok Bank Berdasarkan Modal Inti (KBMI) 3 or 4, indicating substantial core capital. This ensures the inclusion of banks with significant resources for digital transformation initiatives. The companies included in the sample are: PT BANK RAKYAT INDONESIA (PERSERO) Tbk, PT BANK MANDIRI (PERSERO) Tbk, PT BANK NEGARA INDONESIA (PERSERO) Tbk, PT BANK CENTRAL ASIA Tbk, PT BANK TABUNGAN NEGARA (PERSERO) Tbk, PT BANK DANAMON INDONESIA Tbk, PT BANK PERMATA Tbk, PT BANK MAYBANK INDONESIA Tbk, PT PAN INDONESIA BANK Tbk, PT BANK CIMB NIAGA Tbk, PT BANK OCBC NISP Tbk, PT BANK MEGA Tbk, PT BANK BTPN Tbk.

### 3.3. Data Collection

Data were collected from annual reports and financial statements available on the IDX and bank websites. Digital maturity was assessed through textual analysis of these reports, focusing on the frequency and context of digital-related terms. These raw word counts are then divided using terciles based methods to reduce noise (Eremina et al., 2019; Chen & Srinivasan, 2020). Financial performance metrics (ROA and NIM) were obtained from the financial statements.

### 3.4. Variables and Measurement

- Digital Maturity: Measured using a digital maturity index derived from textual analysis of annual reports, categorizing banks into different maturity levels based on the presence of digital-related terms.
- Return on Assets (ROA): Calculated as net income divided by total assets.
- Net Interest Margin (NIM): Calculated as the difference between interest income and interest expenses, relative to interest-earning assets.
- Stock Returns: Calculated as the annual percentage change in stock prices.
- Control Variables: Non-Performing Loans (NPL), Capital Adequacy Ratio (CAR), and Gross Domestic Product (GDP).



**3.5. Data Analysis**

NVivo 14 will be utilized for digital maturity measurement to analyze the text queries of annual reports. NVivo 14 aids in identifying and quantifying keywords pertaining to digital maturity, this method ensures a comprehensive and unbiased data collection process. Keywords are sourced from previous study done by Eremina et al. (2019) consisting of six main keywords. After this, panel data regression models were employed using Eviews 13 to analyze the relationships between digital maturity, financial performance metrics, and stock returns. The models controlled for potential confounding variables (NPL, CAR, GDP) to isolate the effects of the main variables of interest.

**4. RESULTS**

**4.1. Descriptive Statistics**

The descriptive statistics provide an overview of the key variables, including their means, standard deviations, and ranges. The analysis reveals variability in digital maturity levels, financial performance metrics, and stock returns among the sampled banks. Table 1 provides a summary of the descriptive statistics for the key variables.

**Table 1. Descriptive Statistics of Key Variables**

Variables	N	Mean	Median	Max	Min	SD
SR	65	0.08	0.04	1.14	-0.61	0.30
DIGITAL	65	2	2	3	1	0.79
ROA	65	0.02	0.01	0.04	0.001	0.009
NIM	65	0.05	0.04	0.08	0.03	0.01
NPL	65	0.01	0.008	0.04	0.002	0.007
CAR	65	0.24	0.24	0.38	0.16	0.04
GDP	65	1.21E+12	1.19E+12	1.37E+12	1.06E+12	1.18E+11

**4.2. Regression Analysis**

The analysis reveals insights into factors affecting bank stock returns. Profitability stands out as a key driver. Banks with higher return on assets (ROA) tend to have significantly higher stock returns, suggesting investors favor financially strong institutions. However, the model didn't find a statistically significant relationship between a bank's reported level of digital activity and its stock return. This warrants further investigation to understand how digital transformation might influence bank performance in the long run.

Variables such as net interest margin (NIM), non-performing loan ratio (NPL), capital adequacy ratio (CAR), and national economic output (GDP) also yielded insignificant effects on stock return. Although these factors may not have statistically significant effects on stock returns in this particular model, they could be relevant under different circumstances or with further research.

These results suggest that profitability is a key driver of bank stock returns in this model. The lack of a clear association with digital maturity highlights the need for further research on the impact of digitalization in the banking sector. It's also important to acknowledge that other factors not included in the model may influence stock returns.

**Table 2. Regression Results**

Variables	Stock Return (SR)			
	Coefficient	Std. Error	t-statistic	Prob
Constant	-0.260412	0.409075	-0.636587	0.5269
<b>Inde pendent Variable</b>				
DIGITAL	-0.055095	0.043212	-1.274982	0.2074
ROA	9.423379	4.379312	2.151795	0.0356



NIM	-4.800698	3.998391	-1.200658	0.2348
<b>Control Variable</b>				
NPL	-2.750058	7.833859	-0.351048	0.7268
CAR	0.999239	1.28746	0.776132	0.4408
GDP	2.39E-13	2.75E-13	0.868308	0.3888
<b>Statistic</b>				
R Squared	0.192682			
Adjusted R-Squared	0.109166			
F-Statistic	2.307130			
Prob (F-Statistic)	0.045819			

Table 3. Summary of Result Discussion

Independent Variables	Expected Effect on Stock Return	Result of This Study
Digital Maturity ( <i>Digital</i> )	Significant Positive	Insignificant
Return on Asset (ROA)	Significant Positive	Significant Positive
Net Interest Margin (NIM)	Significant Positive	Insignificant

## 5. DISCUSSION

### 5.1. Digital Maturity and Stock Returns

Regression analysis results show an insignificant relationship between bank digital maturity and stock return. This suggests that investors may not directly reward banks based solely on reported digital activities. Potential reasons include the time lag between digital investments and financial outcomes, the limitations of digital maturity scores in capturing true digital impact, and the influence of external factors on stock prices. Further research is needed to fully understand the complex interplay between digital maturity and financial performance in the banking sector.

### 5.2. ROA and Stock Returns

The significant positive effect of ROA on stock returns underscores the importance of efficient asset management in driving profitability and investor confidence. Banks with higher ROA demonstrate better utilization of their assets to generate profits, which is rewarded by the market through higher stock prices. This finding is consistent with previous research by Fama & French (2015), which highlighted the predictive power of profitability measures on stock returns.

### 5.3. NIM and Stock Returns

Regression analysis found an insignificant relationship between a bank's net interest margin (NIM) and its stock return. This contrasts with some studies finding a positive relationship between NIM and stock returns. However, this result aligns with research suggesting that while NIM is a crucial operational metric, investors may prioritize profitability measures like ROA and ROE, which more directly reflect a bank's overall financial health and growth potential.

## 6. CONCLUSION

The analysis revealed that digital maturity does not have a significant effect on stock returns of publicly listed banks in Indonesia. Digital maturity, measured based on word frequency of digital activities, may not fully capture the effectiveness of a bank's digital transformation efforts. Additionally, the relatively short time period examined may not fully capture the long-term impact of digital transformation on stock returns. Other factors, such as economic conditions, regulatory environment, and bank-specific characteristics, could also influence stock returns. Profitability was assessed using ROA, a common metric employed in financial analysis. Through this study, it is found that return on assets have a positive significant effect on the stock returns of publicly listed banks in Indonesia. This suggests that investors prioritize financial strength and efficient asset management when evaluating Indonesian banks. In terms of NIM, it does not have a positive significant effect on stock return. This implies that investors perceive



other metrics, such as profitability as measured by ROA, as a more comprehensive indicator of a bank's overall performance and future growth potential. Lastly, other control variables like NPL, CAR, and GDP did not show statistically significant relationships with stock returns in this model.

## 6.1. RECOMMENDATIONS

While digital activity was explored, investor focus lies on a bank's financial health. The study emphasizes the importance for banks to translate digital initiatives into concrete financial benefits like improved customer engagement or efficiency gains. Clear communication of these outcomes is crucial for attracting investors.

Regulators play a crucial role in ensuring the successful digital transformation of the banking sector. Given the findings that digital maturity alone does not significantly influence stock returns, regulators should focus on creating a balanced framework that encourages innovation while ensuring financial stability. Developing comprehensive digital guidelines that outline best practices for digital transformation, including data security, customer privacy, and the use of emerging technologies such as AI and blockchain, can help banks implement digital strategies effectively and securely (Banna & Alam, 2021). Additionally, promoting transparency and accountability by requiring banks to provide detailed reports on their digital initiatives and tangible financial outcomes can assist investors in making informed decisions and holding banks accountable for their digital transformation efforts (Arner et al., 2016).

Encouraging collaboration between banks, fintech companies, and technology providers through initiatives like regulatory sandboxes allows new financial products and services to be tested in a controlled environment, fostering innovation and cooperation. Furthermore, as banks adopt new digital technologies, regulators must monitor potential risks such as cyber threats, operational disruptions, and systemic risks. Establishing a robust risk management framework can mitigate these risks and ensure the stability of the financial system. By implementing these recommendations, regulators can help banks translate their digital initiatives into concrete financial benefits, ultimately enhancing the overall stability and efficiency of the banking sector.

Investors, on the other hand, should delve deeper into a bank's digital strategy and its impact. Simply relying on reported digital activity is insufficient. A data-driven approach with measurable outcomes for both banks and investors is key to unlocking the full potential of digital transformation in the Indonesian banking sector.

## 6.2. FUTURE RESEARCH DIRECTIONS

This study lays the groundwork for future exploration of the intricate link between digital transformation and Indonesian bank performance. While limitations exist, they present exciting opportunities for further research. One key area for advancement is refining how we measure digital maturity. The current method, based on reported digital activities, offers a quantifiable metric, but may not capture the true depth of a bank's digital transformation. Future research could delve into more comprehensive measures, assessing the types of digital technologies adopted and their impact on customer engagement, operational efficiency, and revenue generation. Additionally, the study's limited timeframe restricts our ability to fully understand the long-term influence of digital transformation on stock returns. Future research with a broader timeframe could provide deeper insights. Finally, this study examined a specific set of variables. The influence of external factors and bank-specific characteristics warrants further investigation. Future research that explores a wider range of variables can provide a more holistic understanding of the complex dynamics influencing bank stock returns in Indonesia. By addressing these opportunities for future research, we can gain a deeper understanding of the impact of digital transformation and inform strategies for banks to maximize the value of their digital initiatives, ultimately contributing to a more robust and innovative financial landscape in Indonesia.

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