



DIGITAL BANKING: CATALYST OR CHALLENGE? ANALYZING PROFITABILITY AMIDST THE COVID-19 PANDEMIC

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Abstract: This study investigates the impact of digital banking on banking sector's profitability during the COVID-19 pandemic. As the pandemic prompted a noticeable decline in banking profitability, the industry responded by hastening the integration of digitalization strategies to align with evolving customer preferences. Focusing on the specific impact of banking digitalization within the pandemic context, the study employs panel data spanning 2017 to 2022 from six conventional commercial banks. The analytical framework incorporates variables encompassing mobile and internet banking transactions, bank size, economic growth, and a COVID-19-related dummy variable. The study's banking yielding a positive impact and internet banking showing a negative effect. However, bank size and economic growth do not exhibit statistically significant relationships with profitability. The COVID-19 pandemic negatively affects banking profitability. Even though digital banking initiatives like mobile banking can enhance profitability, significant challenges related to other digital channels such as internet banking remain. The pandemic complicates these dynamics, adaptive and careful approach is highly needed to digital transformation in the banking sector.

Keywords: Digital Banking; Profitability; COVID-19

Abstrak: Penelitian ini membahas dampak digital perbankan terhadap profitabilitas sektor perbankan selama pandemi COVID-19. Pandemi menyebabkan penurunan yang signifikan dalam profitabilitas perbankan, industri perbankan merespon preferensi pelanggan yang berkembang melalui strategi digitalisasi. Berfokus pada dampak digitalisasi perbankan pada saat pandemi, penelitian ini menggunakan data panel dari tahun 2017 hingga 2022 dari enam bank komersial konvensional. Variabel yang digunakan diantaranya mobile banking dan internet banking, ukuran bank, pertumbuhan ekonomi, dan variabel dummy terkait COVID-19. Hasil penelitian menunjukkan bahwa mobile banking memiliki dampak positif, sementara internet banking memiliki dampak negatif terhadap profitabilitas. Ukuran bank dan pertumbuhan ekonomi tidak menunjukkan hubungan yang signifikan secara statistik dengan profitabilitas. Pandemi COVID-19 berdampak negatif terhadap profitabilitas perbankan. Meskipun mobile banking dapat meningkatkan profitabilitas, namun tantangan yang signifikan terkait saluran digital lain seperti internet banking tetap ada. Pandemi memperumit dinamika ini, sehingga pendekatan yang adaptif dan hati-hati sangat diperlukan untuk transformasi digital di sektor perbankan.

Kata Kunci: Perbankan Digital; Profitabilitas; COVID-19



INTRODUCTION

Banks play a significant role in a country's economy, as they serve as crucial financial institutions. Banking institutions are intermediaries that collect and distribute funds (Hartanti, 2017). Indonesia's COVID-19 pandemic in March 2020 impacted various sectors, including the banking sector. A Demirguc-Kunt et al. (2020) study shows that the Covid-19 pandemic has put the banking sector in a pretty depressed position and had long-term impacts. The banking sector faces challenges during the pandemic, such as liquidity issues, the risk of debt default, and a decreased ability to facilitate credit, all of which can have an impact on the stability of financial performance or banking profitability (Wójcik & Ioannou, 2020). The stability of financial performance or banking profitability is an essential factor in determining the sustainability of a banking institution. One indicator that can be used to measure a bank's financial performance or bank profitability is Return on Asset (ROA).

Table 1.
Development of ROA of Conventional Commercial Banks

Year	Return on Asset (ROA)
2016	2,23%
2017	2,45%
2018	2,55%
2019	2,47%
2020	1,59%
2021	1,85%
2022	2.45%

Source: Banking Industry Profile Report (2023)

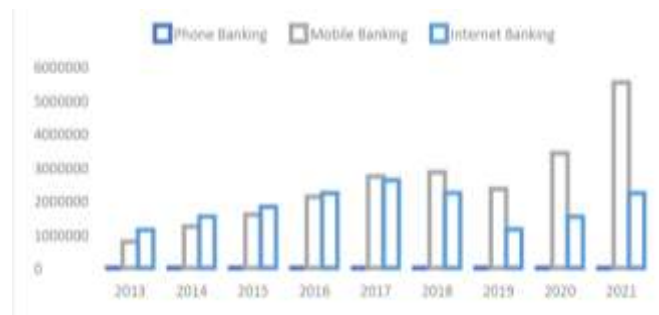
The ROA (Return on Assets) metric shows how efficiently a bank can produce income from its assets. A higher ROA reflects effective asset utilization, whereas a lower ROA points to less efficient asset management. The ROA of Indonesian banks experienced considerable fluctuations between 2016 and 2022. Notably, there was an increase in ROA from 0.32% in 2016 to 0.32% in 2018 and 0.26% in 2021. Conversely, there was a decline in ROA of 0.08% in 2019 and the most significant decrease of 0.88% in 2020. The decline in ROA, particularly in 2020, indicates the effect of the COVID-19 pandemic on the financial performance of Indonesia's banking sector.

In 2022, there was a notable rise in the return on assets (ROA) to 2.45%. This increase in profitability can be attributed to the strategic measures implemented by both the government and individual banks to address the challenges posed by the Covid-19 pandemic. Among the factors that have had a substantial impact on the banking sector's profitability is the adoption and utilization of technology, specifically the implementation of digital banking services. Incorporating digital banking services has facilitated cost reduction in operational activities

(Yohani & Dita, 2019) . Khairina (2022) further asserts that digital transactions have played a significant role in sustaining the banking industry's profitability amidst the pandemic.

The COVID-19 pandemic has accelerated the transformation of banking digitization, where digital banking becomes necessary for every bank to provide optimal customer service. The development of banking digitization is also supported by the number of internet users in Indonesia, which continues to increase to 132 million people (PWC, 2018). As outlined by the Financial Services Authority (2018), digital banking constitutes an electronic financial service that has been designed to optimize the effective exploitation of customer data, thereby facilitating the seamless and expedient dissemination of tailored information to customers, in alignment with their individual requirements, thereby enhancing the overall customer experience. This mode of banking can be autonomously navigated by the customers themselves, encompassing a comprehensive consideration of diverse security facets.

The various conduits of digital banking encompass an array of platforms, including the Internet, mobile phones (both smartphones and digital feature phones), Automated Teller Machines (ATMs), Point of Sale (POS) terminals, Near-Field Communication (NFC)-enabled devices, integrated circuits, electronically-enabled cards, biometric apparatus, tablets, and sundry other digital frameworks (AFI, 2016).



Source: Bank Indonesia (2022)

Figure 1.
Transaction Volume Digital Banking (Thousand) 2013 – 2021

Figure 1 illustrates the number of transactions conducted through three digital banking channels. The data demonstrates that mobile banking has gained widespread usage in recent years. Notably, the volume of digital banking transactions, mainly through mobile banking, exhibited a significant surge from 2020 to 2021, totaling 2.1 billion transactions. Additionally, the transaction value for mobile banking during the same period amounted to 2,960 trillion (Bank Indonesia, 2022). These findings indicate a transition from conventional banking systems to digital platforms amidst the pandemic. Digital banking services have the advantage of reaching a larger market share, facilitating more efficient transactions for customers (Sudaryanti

et al., 2018), and lowering operational costs for banks, thereby increasing bank profitability (Arofany & Tandika, 2019).

Numerous studies have been conducted to assess the impact of digital banking on bank profitability, yielding varied findings. The influence of digital banking on banking performance is significantly positive in several studies (Yanikkaya et al., 2018; Okon & Amaegberi, 2018; Khairina, 2022). Okon and Amaegberi (2018) utilized panel analysis techniques and the Seemingly Unrelated Regression (SURE) model to examine the effect of digital banking on bank profitability in Nigeria from 2007 to 2016. Mobile banking transaction volume served as a proxy for digital banking, while return on assets (ROA) was employed as a proxy for bank profitability. The findings indicated a significant positive relationship between mobile banking and ROA. In contrast, George Owusu-Antwi et al. (2020) and Anastasia and Munari (2021) reported contradictory results, demonstrating a significant negative association between digital banking and bank profitability.

In addition to examining digital banking, this research also investigates the impact of the Covid-19 pandemic on bank profitability. The study conducted by Haider and Mohammad (2022) examines how banks' profitability is affected by the Covid-19 pandemic, employing a dummy variable. The findings of the study reveal divergent outcomes between developed and developing countries. Specifically, in the case of European banks, the COVID-19 variable negatively influences bank profitability, as measured by return on assets (ROA). Conversely, in developing countries, specifically South Asia, the COVID-19 pandemic positively impacts bank profitability, as indicated by ROA.

This study highlights the role of digital banking for banking profitability during COVID-19 pandemic. By focusing on mobile banking and internet banking as a representative measure of digital banking and examining the impact of COVID-19 on return on assets (ROA) as an indicator of bank profitability using dummy variables. Several control variables are incorporated in this research, such as company size represented by total assets and GDP as a proxy for economic growth. The intended outcome of this research is to enhance banking services by considering the factors that influence banking performance.

As the Covid-19 pandemic began, banking profitability experienced a downturn. According to the data provided by the OJK for 2020, the Return on Assets (ROA) indicated a year-on-year decline of up to 0.88%. Furthermore, there has been a notable increase in digital banking transactions, particularly through mobile banking channels. This shift signifies transitioning from traditional banking systems to digital platforms during the pandemic. In light of this

phenomenon, the present study aims to analyze the effects of banking digitization and the Covid-19 pandemic on banking profitability in Indonesia.

LITERATURE REVIEW

Financial performance assesses a company's success in executing its operational activities. Within the banking sector, financial performance is commonly evaluated through profitability indicators. As mentioned by Kasmir (2019; p. 196), profitability ratios serve as metrics to gauge the efficacy and proficiency of a company's management in generating profits. These ratios can be evaluated utilizing various indicators such as return on assets (ROA), return on equity (ROE), and net interest margin (NIM) (Yanikkaya et al., 2018).

Return on Assets (ROA) is a profitability ratio to measure profits generated by all assets and as an indicator of the efficiency of a company's management. One of the weaknesses of this ratio is that it needs to consider the off-balance sheet, which is a significant source of income for the bank. Several studies using ROA as a profitability ratio include Yanikkaya et al. (2018), Anastasia & Munari (2021), Okon & Amaegberi (2018), and Haider & Mohammad (2022).

Factors affecting bank profitability include internal factors and external factors. Internal factors include capital adequacy, liquidity, the level of provisioning, bank size and digital banking (Yanikkaya et al., 2018; Okon & Amaegberi, 2018; Khairina, 2022), while bank external factors include macroeconomic conditions, competition, policies, and regulations, law and technology application (O'Connell, 2023 ; Syafri, 2012). Utilizing technology through digital banking products and services is a strategy to grow and sustain market share, ultimately enhancing profitability.

McKinsey's investigation in 2014 illustrates that the adoption of digital banking contributes to a potential upswing of cost efficiency, with estimates ranging between 15% to 20%. This aligns with economic theory, which posits that technological advancements catalyze improvements in both productivity and efficiency. Consequently, heightened efficiency and productivity within a bank correspondingly amplify its propensity to assert dominance within the market landscape.

Price Waterhouse and Coopers (2018) assert in their research that a predominant approach among Indonesian banks involves the integration of digital banking technology as a primary strategic endeavor. The degree of assertiveness with which a bank pursues the implementation of digital banking technology has direct implications for its comparative efficiency against peers, consequently influencing its overall profitability.

In accordance with the guidelines set forth by the Financial Services Authority (2018), digital banking encompasses an electronic financial service that has been innovatively devised to optimize the leverage of customer data. Its principal objectives are to facilitate the efficient provisioning of customer information and services in a manner that is expeditious and tailored to individual needs. Moreover, this mode of banking operation can be autonomously managed by customers, wherein due consideration is given to a range of protective measures. The repertoire of digital banking channels encompasses diverse mediums such as phone banking, SMS/mobile banking, and internet banking.

Okon & Amaegberi (2018) examined the impact of digital banking on the profitability of four banks in Nigeria for the period 2007 – 2016. The research applies panel regression analysis methods, with variables used are return on assets (ROA), ATM, Mobile Banking, POS, company size, private investment, and inflation. The results show that ATM, Mobile banking, POS, and company size significantly positively affect ROA.

Yanikkaya et al. (2018) conducted a comprehensive study to examine the determinants of profitability within both conventional banks and Islamic banks across nations characterized by an Islamic majority, as well as in the United Kingdom. The investigation spanned the years from 2007 to 2013 and involved a dataset comprising 74 Islamic commercial banks and 354 conventional commercial banks with the GMM panel regression methodology.

The research's focal point was the examination of the variables influencing profitability, gauged through the indicators of Net Interest Margin (NIM) and Return on Assets (ROA). Within this framework, a range of independent variables was considered, including electronic banking (e-banking) and mobile banking (m-banking) services, the extent of financial services penetration, indicators related to commodity prices such as crude oil and agriculture, as well as macroeconomic factors such as inflation and economic growth.

The research outcomes underscore several noteworthy insights. Notably, foreign ownership, engagement with digital banking services, and fluctuations in exchange rates exhibit a statistically significant and positive impact on Return on Assets (ROA).

Anastasia & Munari (2021) researched internal, external, and mobile banking factors on the ROA of commercial banks in 2015-2019. The findings indicate that CAR had a positive impact on profitability, whereas economic growth, BOPO and mobile banking transactions had a significant negative impact. NPL, LDR, company size, inflation and internet banking transactions did not have a significant affect on profitability.

Sundas and Qiang's research (2014) measured the relationship between e-banking and the performance of 10 commercial banks in Pakistan from 2002 to 2012. Several other independent variables, namely Operational Performance, Credit Risk, Spreads, Loan Interest Rates, Internet Banking Transactions, Non-Performing Loans to down payment and intermediation fees. The results of this study indicate that e-banking has a positive and significant impact on banking performance as measured using ROA and ROE. E-banking is one strategy that is quite effective in saving costs in competing with domestic and foreign banks.

Research by Haider & Mohammad (2022) analyzes the factors that influence profitability and the impact of COVID-19 on bank profitability in several European and South Asian countries using dummy variables. The data used is monthly data for six years from the top 10 countries with the highest GDP. In Europe and South Asia. The results show that credit quality and bank efficiency are less important factors in determining profitability during COVID-19. Conversely, the size of a company or bank and maintaining liquidity are important determinants. The COVID-19 crisis has had a negative affect on profitability in European banks, while South Asian banks have shown a significant positive impact.

According to Trujillo-Ponce (2013), economic growth has a significant positive effect on banking profitability. If economic growth experiences positive growth, then this will have an impact on banking performance which will increase as seen from the increased profit rate.

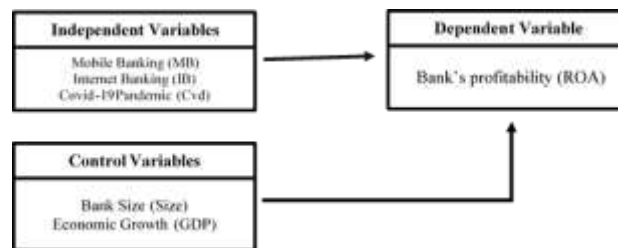


Figure 2. Research Framework

Hypothesis

Based on the theoretical basis and previous research, the research hypothesis formed is as follows:

- H1 : Mobile banking has a positive influence on banking profitability
- H2 : Internet banking has a significant negative effect on banking profitability
- H3 : Bank size has a significant positive effect on bank profitability
- H4 : Economic growth has a positive influence on bank profitability
- H5 : The pandemic has a significant negative effect on banking profitability

RESEARCH METHOD

This quantitative descriptive study uses secondary data from the Financial Services Authority (OJK), the Central Bureau of Statistics (BPS), and each bank's website. The population in this study are all banking companies listed on the Indonesia Stock Exchange in the 2017 – 2022 period, namely 46 conventional commercial banks. The sampling technique is done by using the purposive sampling method. The criteria specified in the study are (1) banks that are listed on the Indonesian Stock Exchange; (2) Conventional commercial banks; (3) Banks that submit complete monthly financial reports for the 2017-2022 period; 4) Banks that implement and have digital banking service data.

Based on the existing criteria, six banks were selected as the object of this research, including PT. Bank Central Asia, Tbk, PT. Bank Negara Indonesia (Persero), Tbk., PT. Bank Rakyat Indonesia (Persero), Tbk, PT. Bank Mandiri, Tbk, PT. Bank CIMB Niaga Tbk., and PT Bank Mega, Tbk. The data used is annual data divided into two research categories, namely before the pandemic (2017-2019) and during the pandemic (2020-2022).

Based on previous research, (Okon & Amaegberi, 2018);(Yanikkaya et al., 2018); dan (Haider & Mohammad, 2022) The following is the regression equation in this study:

$$ROA_{it} = a + b_1MB_{it} + b_2IB_{it} + b_3Size_{it} + b_4GDP_{it} + b_5Cvd_{it} + e_{it}$$

Where: ROA as a proxy for banking profitability; Mobile Banking (MB) and Internet Banking (IB) as banking digitalization proxies; CVD is a pandemic with a dummy variable where 1 = during the pandemic and 0 = before the pandemic; the control variable, namely the bank specific factor; Size as a proxy for total assets or bank size; and macroeconomic factors, namely the GDP growth rate as a proxy for economic growth; i = Conventional Commercial Bank; t = year (2017-2022); α = Intercepts; b = Regression parameters; e =Error term.

The Eviews 9 software package is employed to conduct panel data regression analysis. The initial step in this analysis involves the selection of three distinct models: specifically, the common effect model, the fixed effect model, and the random effect model. To determine the most appropriate model between the common effect and fixed effect models, the Chow Test is employed.

In situations where the fixed effect model is deemed the preferable choice, the analysis proceeds with the application of the Hausman test. This test serves the purpose of identifying the more suitable model between the fixed effect model and the random effect model. In addition, a battery of classical assumption tests is performed, encompassing evaluations for

normality, multicollinearity, heteroscedasticity, and autocorrelation. The following are the stages of panel data regression analysis adopted from Zulfikar (2018) presented in Figure 3.

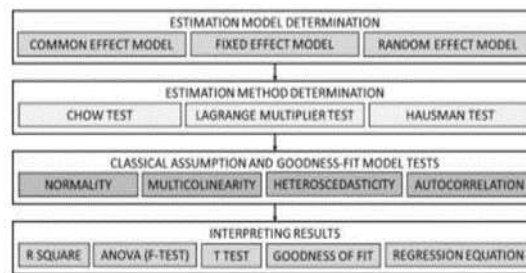


Figure 3. Stages of panel data regression analysis (Zulfikar, 2018)

RESULT AND DISCUSSION

In this research, an investigation is conducted utilizing panel data sourced from six Indonesian commercial banks, spanning the timeframe of 2017 to 2022. The objective of the study is to analyze the interplay between bank profitability and a range of pertinent determinants encompassing both bank-specific factors, macroeconomic variables, and distinct dummy variables characterizing the economic disruptions stemming from the COVID-19 pandemic. There are three stages that involves in this study are estimating the most appropriate model, classical assumption test, and interpretation of regression results.

Tabel 2.
Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.000000	5	1.0000

Source : Processed Data

To undertake this examination, the panel data regression model is employed. This modeling approach involves the careful selection of one among three available models, namely the Common Effect Model (CEM), the Fixed Effect Model (FEM), and the Random Effect Model (REM). Each of these models offers a distinct lens through which to assess the intricate relationships within the data. Model selection was done using the Chow test and Hausman test. From the results of the Chow test, it was concluded that the FE model is better than the CE model. Then the Hausman test, the results show that the best model is the RE model. A Hausman test was conducted to determine the most appropriate model, revealing that the probability value of the random cross-section exceeded 0,05 by 1.000. As a result, the random-effect model is the most appropriate.

Classical Assumption Model

The model used in this study is the random effect model with the Generalized Least Square (GLS) method. The classic assumption tests used are normality test and multicollinearity test. The normality test aims to test the distribution of residual variables in a regression model. In this study, the normality test used the Jarque Bera test. When the Jarque Bera probability is more than 0.05, the data is said to be good and normally distributed. In the normality test results, it can be seen that the Jarque Bera probability is greater than 0.05, so the data used for this study is normally distributed data.

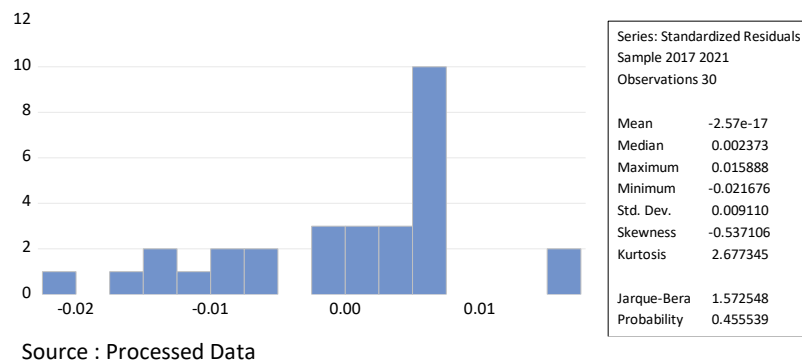


Figure 4. Normality Test Result

The criteria for determining the presence of multicollinearity symptoms can be seen from the correlation coefficient value between independent variables. If the correlation value between independent variables > 0.9 then multicollinearity occurs, and if the correlation value between independent variables < 0.9 then there is no multicollinearity (Ghozali, 2013). The test results in Table 3 show that the correlation value of the NPF, FDR, BOPO, and PBH variables is < 0.9 . This indicates that the regression model does not suffer from multicollinearity issues.

Table 3.
Multicollinearity test

LN_MB	LN_IB	LN_ASSET	LN_GDP	D_CVD
1				
0.847	1			
0.824	0.786	1		
0.296	0.02	0.128	1	
0.297	-0.010	0.120	0.631	1

Source : Processed Data

Regression Analysis

Table 4.
Panel Data Estimation Results with Random Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.010560	0.161223	-0.065502	0.9483
LN_MB	0.004897	0.001560	3.139638	0.0044
LN_IB	-0.003061	0.001482	-2.064749	0.0499
LN_ASSET	-0.001789	0.004016	-0.445577	0.6599
LN_GDP	0.005895	0.016085	0.366459	0.7172
D_CVD	-0.012813	0.002594	-4.939023	0.0000
Effects Specification				
			S.D.	Rho
Cross-section random			0.005682	0.6057
Idiosyncratic random			0.004584	0.3943
Weighted Statistics				
Root MSE	0.005027	R-squared		0.417357
Mean dependent var	0.009165	Adjusted R-squared		0.295973
S.D. dependent var	0.006698	S.E. of regression		0.005620
Sum squared resid	0.000758	F-statistic		3.438323
Durbin-Watson stat	0.925524	Prob(F-statistic)		0.017491
Unweighted Statistics				
R-squared	0.073290	Mean dependent var		0.027003
Sum squared resid	0.002407	Durbin-Watson stat		0.291508

Source : Processed Data

Based on the estimation results using the RE model, it is known that banking digitalization indicated by mobile banking (MB) and internet banking (IB) affects bank profitability as shown by ROA. Mobile banking has a positive influence on banking profitability. This aligns with research conducted by (Islam et al., 2019). Online banking provides 24-hour banking options, easy access, secure transactions, and lower fees. Instead of lengthy monthly reports, online banking makes financial activities and day-to-day operations easier. Handling disruptions or delays in transactions will be faster, and routine billing can be done automatically, reducing physical activity related to transactions.

Internet banking, a form of banking digitization, harms banking profitability. This is by research conducted by (Arif & and Masdupi, 2020). Compared to the advantages of online banking itself, the costs associated with infrastructure, maintenance, and human resources are high. Customers may have yet to use Internet banking to its full potential, or it may not be as effective. Some banks still prefer to make in-person transactions instead of internet banking services. (Arif & Masdupi, 2020).

As indicated by assets and economic growth, bank size has no effect on banking profitability. This study's results align with research conducted by (Al-Harbi, 2019); (Alhempri & Zainal, 2016). Income growth that does not significantly affect profitability indicates that internal factors are influenced by internal management and administrator decisions determining bank performance (Kiganda, 2014). This means that banking performance in Indonesia is unaffected by the business cycle. This contradicts the theory because banking performance should be positively related to economic growth. When the economy grows, banking will grow, but when the economy is in recession, banking profits will also decrease. The condition of the Indonesian banking system, which is not affected by the business cycle, may indicate no connection between the real and monetary sectors. This means that banking in Indonesia still needs to be an intermediary institution (Alhempri & Zainal, 2016).

Bank size can be an important determinant of bank performance if banking has increased returns to scale (increasing return to scale). However, size can have a negative impact when the bank becomes very large due to bureaucratic and other reasons (Naceur & Omran, 2011). This study shows that assets do not affect bank profitability during the study period. This aligns with research results (Naceur & Omran, 2011); (Tharu & Shrestha, 2019). It is not easy to achieve cost-saving efficiency and increase a bank's size. This means that a bank with a large scale can face scale inefficiencies. Because when the size of the bank is too large, it will make coordination difficult (Alhempri & Zainal, 2016)

The dummy variable of COVID-19 (CVD) affects banking profitability. The COVID-19 pandemic has harmed banking profitability; in other words, the crisis has caused a decline in banking profitability. This study's results align with research conducted by (Katusiime, 2021) and (Haider & Mohammad, 2022), bank performance (ROA, ROE and NIM) were impacted and were significantly lower during the pandemic. However, (Elnahass, 2021) also founds that the financial performance of the global banking sector has decreased due to the Covid-19 pandemic

CONCLUSION

In the context of the COVID-19 pandemic, digital banking emerges as both a catalyst and a challenge for the profitability of the banking sector. This study reveals that the digitalization process within the banking sector has a significant impact on profitability, with mobile banking showing a positive influence and internet banking exhibiting a negative effect. Interestingly, factors such as bank size and economic growth do not present statistically significant relationships with profitability. Additionally, the negative impact of the COVID-19 pandemic on bank profitability highlight the complex dynamics between external disruptions and financial

performance. This highlights that while digital banking initiatives like mobile banking can drive positive outcomes, significant challenges remain related to other digital channels such as internet banking. The pandemic further complicates these dynamics, emphasizing the need for a careful and adaptive approach to digital transformation within the banking sector.

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