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The Effect of Digitalization on Non Performing Loan and Fee Based Income in Banking

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A B S T R A C T

This research investigates the influence of mobile banking transactions, technology, and information investment on non performing loan and fee-based income. This study was conducted on commercial banks listed on the Indonesia Stock Exchange during 2018-2022. The purposive sampling method was used to select the sample, and the data came from the bank's annual report. Multiple regression analysis is used to analyze the relationship between variables. Partial test results show that mobile banking transactions have a significant adverse effect on the NPL ratio and a significant positive effect on fee-based income. Meanwhile, technology and information investment does not affect the NPL ratio but significantly positively affects fee-based income. These results show that increasing mobile banking transactions can support non performing loan and fee-based income.

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INTRODUCTION

In the 21st century, a notable advancement in technology has prompted businesses worldwide, both in the service and goods sectors, to integrate technology into their operations (Syuhada et al., 2019). Digitalization, the transition from analogue to digital technology, has emerged as a global focus for businesses (djpb.kemenkeu.go.id). In Indonesia, the Directorate General of Treasury, Ministry of Finance, has reported substantial growth in the digital industry, reaching USD 41 billion in 2019 and projected to reach USD 130 billion by 2025 (djpb.kemenkeu.go.id). The COVID-19 pandemic in 2020 expedited the adoption of digitalization, altering daily lifestyles and reinforcing reliance on electricity and the internet.

Various sectors, including manufacturing, have been influenced by digital transformation, employing artificial intelligence (AI) to enhance productivity and reduce operational costs (Syuhada et al., 2019). This positive impact of digitalization is evident in Indonesia's digital industry value, growing from USD 41 billion in 2019 to USD 77 billion in 2022 (jpg.kemenkeu.go.id). The banking sector has undergone a significant transformation, with digital banking transactions reaching IDR 5,024 trillion in the country in 2022. Doran et al.'s (2022) study suggests a positive impact of increased Internet banking usage on bank performance. However, Al-Smadi and Al-Wabel's (2011) findings indicate a significant negative impact of e-banking on bank performance. Xie and Wang (2023) argue that digital transformation enhances bank performance, while Zhao et al.'s (2022) study suggests that fintech innovation may diminish a bank's overall profitability and asset quality.

Pranata and Dewi's (2023) research emphasizes the influence of mobile banking transactions on banking fee-based income. In contrast, Rahayu and Lestari's (2022) findings state that mobile banking does not significantly affect banking fee-based income. Damayanti and Syahwildan (2022) find that mobile banking significantly influences the financial performance of Islamic banks in Indonesia, while Thio and Yusniar (2021) confirm that mobile banking does not significantly impact banks' financial performance.

The recent study by Ramadhani (2021) demonstrates the significant effect of technology and information investment on banks' financial performance. In contrast, Wibowo et al. (2018) contend that investment in technology and information does not influence banks' financial performance. This study investigates the impact of mobile banking transactions on banks' financial performance and fee-based income and the influence of technology and information investment on these two aspects. The research seeks to identify whether mobile banking transactions and technology investment significantly influence financial performance and bank fee-based income. Therefore, this research concentrates on technological and informational aspects and establishes connections with financial performance and bank fee-based income. The practical implications of this research involve offering valuable insights for bank management to enhance banking services through digitalization services. Additionally, from a scientific standpoint, it is anticipated to serve as a crucial reference for research related to the impact of digitalization on non performing

loan and banking fee-based income. The study results are expected to aid policymakers in formulating regulations about using digitalization services in the banking sector.

LITERATURE REVIEW

Maslow's Hirarchy of Needs

Abraham Maslow's theory posits that individuals typically fulfil basic needs before progressing to higher-order needs. In his seminal work "A Theory of Human Motivation" (1943), Maslow delineated five hierarchical levels of human needs, from physiological and security needs to affection, esteem, and self-actualization. Sumarwan (2003) concurs with this perspective, asserting that higher-level needs become salient once consumers' fundamental needs are satisfied. In the context of the banking sector, Sumarwan emphasizes the pivotal role of customer security and comfort in determining banking performance. According to Monalika et al. (2022), the augmentation of banks' financial performance aligns with customer satisfaction and comfort. To achieve this, banks must ensure the fulfilment of customer needs, particularly in selectingselecting service products, transaction security, and facilitatingfacilitating convenience through the digitalization of banking services, such as ATMs, internet banking, and mobile banking.

Banking Industry

As a financial services industry, banking involves collecting and distributing funds to and from the public. Commercial banks in Indonesia offer diverse products and services, including transactions like transfers, clearing, and foreign exchange. Traditionally, bank performance relied on interest income from loans. However, the digitalization era has ushered in a shift, with an increasing emphasis on fee-based income. Digital transactions, including payments via virtual accounts, interbank transactions, and mobile banking services, have emerged as significant additional income sources. In adapting to digital transformation, effective management necessitates strategic planning of future investments to maximize benefits.

Non-Performing Loan

The Non-Performing Loan (NPL) ratio is a vital indicator in assessing the financial health of a bank. If the NPL is below 5%, it is considered healthy; conversely, above 5% signifies credit risk. A high NPL ratio hampers earnings due to unpaid interest and adds to operational expenses. Digitized, e-channel services such as mobile banking provide new sources of revenue from fee-based income. This income, used as capital to extend credit, reduces dependence on third-party funds and interest, and has the potential to reduce the NPL ratio through growth in lending.

Fee Based Income

Fee-based income, comprising operational income excluding interest, encompasses commissions, fees, and charges for various services, as per SAK 31 of 2015. Several banking products contribute to fee-based income diversification, enhancing customer services and optimizing overall financial performance.

Bank Digitalization

The Fourth Industrial Revolution's advent has seen automation and cyber technology integration across various industrial sectors, including banking. Digitalization in banking manifests through applications like core banking systems, risk monitoring, and bank facilities. By using information technology in the form of a digitalization system, this can be a strong factor in reducing indications of fraud (Sudrajat, 2022). Profits from fee-based income generated through e-channels, such as ATMs, EDC, internet banking, SMS banking, and mobile banking, underscore the significance of digitalized services. Notably, the popularity of mobile banking is on the rise, especially in conjunction with government-led cashless initiatives. Bank Indonesia records indicate a surge in mobile banking transaction volume from 5,534,245 transactions at the end of 2021 to 8,354,937 transactions at the end of 2022.

Information Technology Investment

Investment in information technology (IT) is deemed a strategic decision in the corporate realm, augmenting resource capabilities and curbing operational costs. Fitzpatrick (2005) delineates IT investment as encompassing the entire life cycle costs of work utilizing IT, extending to operational costs post-implementation. In the banking sector, there has been a paradigm shift in investment focus from physical infrastructure and human resources to IT. The proliferation of digital banking services propels banks to optimize IT investments to meet customer needs, resulting in substantial returns from fee-based income. Data from the Financial Services Authority (OJK) indicates an 18.21% increase in bank fee-based income between Semester I 2022 and 2023, amounting to IDR 275.99 trillion. This surge correlates with the escalating utilization of digital banking services.

METHODOLOGY

Population and Sample

The empirical study encompasses commercial banks listed on the Indonesia Stock Exchange (BEI) from 2018 to 2022. A purposive sampling method will be employed to select the sample, with specific criteria to be met by the chosen banks. Firstly, selected banks must be conventional commercial banks listed on the Indonesia Stock Exchange throughout the 2018-2022 timeframe. Secondly, the bank must have an available annual report for the same period. Lastly, selected banks must provide relevant information or data about the variables under investigation in this research. The utilization of a purposive sampling method and adherence to these criteria aim to ensure that the selected samples offer a meaningful representation for analysis concerning the impact of digitalization on banks' non performing loan and fee-based income.

Data Types and Sources

Quantitative data sourced from external parties and of a secondary nature will be utilized in this study. The data collection involves obtaining necessary data from bank annual reports, accessible through the Indonesia Stock Exchange (BEI) website. After data collection, descriptive statistical analysis will be employed to process the research data. This analysis aims to comprehensively depict the data, encompassing measures such as the mean, variance, standard deviation, maximum and minimum values, kurtosis, and skewness. This preliminary analysis facilitates understanding the distribution and characteristics of the data for use in the study.

Data Analysis Technique

A classic assumption test will be conducted following the descriptive analysis to ensure the appropriateness of employing the model in this research. Various analytical tests will be undertaken to identify potential violations of classical assumptions, including the normality test, multicollinearity test, heteroscedasticity test, and autocorrelation test, as outlined by Ghozali (2009). The subsequent phase involves regression analysis to delineate the linear relationship between the dependent and independent variables. The proposed regression equation is a foundational tool for elucidating the dynamics of relationships between variables. Hypothesis testing will be conducted to assess critical aspects of the model, with the coefficient of determination test offering insights into the model's ability to explain variations in independent variables. Simultaneous influence and partial tests will be employed to ascertain the dependent variables' joint and individual impact on the independent variables. Significance in these test results enhances comprehension of each variable's contribution to the model. This comprehensive analysis establishes a robust groundwork for interpreting results and deriving conclusions in this research using the methodology articulated by Ghozali (2009).

RESEARCH RESULT

Descriptive Statistics

Descriptive statistics is an analysis to produce descriptive results or descriptions of the data used in research in terms of the average (mean), maximum and minimum levels, and standard deviation. The following are descriptive statistics obtained in testing this research data:

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
MB	52	10.8182	15.7372	13.655934	1.2395580
INV	52	9.6821	13.1892	12.203674	1.0223455
NPL	52	.0080	.0727	.026806	.0119876
FBI	52	9.8348	13.6749	12.367951	1.0148467

Based on descriptive statistics, the average mobile banking transaction volume reached IDR 507,385,504,788,462.00. The bank with the most significant transaction volume is Bank Central Asia Tbk. (BCA) in 2022, reaching IDR 5,460,000,000,000,000.00, while Bank Maspion Indonesia Tbk. in 2018 had the smallest transaction volume of IDR 65,801,000,000.00. Meanwhile, technology and information investment has an average inventory acquisition of IDR 5,741,349,976,788.00. Bank Rakyat Indonesia Tbk. Recorded the most significant investment in 2022, IDR 15,460,220,000,000.00, while Bank Maspion Indonesia Tbk. in 2018 had the most minor investment of IDR 4,809,090,000.00. The NPL ratio averages 2.68%, with Bank Victoria International Tbk. In 2021, it had the highest NPL ratio, 7.27%, and Bank Tabungan Pensiunan Nasional Tbk. (BTPN) In 2019, it had the lowest NPL ratio, namely 0.80%. Lastly, fee-based income has an average other operating income of IDR 10,363,189,314,442.00, with Bank Rakyat Indonesia Tbk. in 2022 recording the highest fee-based income of IDR 47,302,800,000,000.00 and Bank JTrust Indonesia Tbk. in 2021 it has the minor fee-based income of IDR 6,836,000,000.00.

Classic Assumption Test

This research involves two multiple regression models, each using the NPL and fee-based income variables as the dependent variable. A normality test was carried out with the one-sample Kolmogorov-Smirnov test to ensure the normality of data distribution. The results show that both have significance values above 0.05, namely 0.200 and 0.064, meeting the standard distribution criteria. Next, the multicollinearity test looked at the tolerance value and Variance Inflation Factor (VIF). Both regression models show tolerance values above 0.10 and VIF below 10, indicating the absence of multicollinearity.

Furthermore, the autocorrelation test using the Durbin-Watson test shows the Durbin-Watson value for the first model is 2.324, and the second model is 2.152. By comparing the Durbin-Watson values with the critical range (1.4741 to 1.6334), both meet the criteria for the absence of autocorrelation. Then, a heteroscedasticity test was carried out via a scatter plot, which showed that no regular pattern was formed and the points were evenly distributed above and below the number 0 in both regression models. Therefore, there is no heteroscedasticity in the two regression models.

Hypothesis Testing

Coefficient of Determination Test

In the coefficient of determination test on the first regression model, an adjusted R square value of 0.551 was obtained. 55.10% of the dependent variable, namely the NPL ratio, can be explained by the independent variables, namely mobile banking transactions, and technology and information investment. Meanwhile, 44.90% can be explained by variables outside this research model. In the coefficient of determination test for the second regression model, an adjusted R square value of 0.869 was obtained. 86.90% of the dependent variable, namely fee-based income, can be explained by the independent variables, namely mobile banking transactions and technology and information investment. Meanwhile, 13.10% can be explained by variables outside this research model.

Simultaneous Effect Test

In the coefficient of determination test for the first regression model, an F value of 32.328 and a significance value of 0.000 were obtained. Based on the criteria, the significance value obtained is <0.05, and it can be concluded that the first regression model is considered fit and suitable for further research. In the coefficient of determination test for the second regression model, an F value of 170.850 and a significance value of 0.000 were obtained. Based on the criteria, the significance value obtained is <0.05, and it can be concluded that the second regression model is considered fit and suitable for further research.

Partial Test

Based on the partial test results of the first model, the t-value for the mobile banking variable was -2.950, and the significance value was 0.005 (< 0.05). Thus, a significant negative relationship exists between mobile banking transactions and the NPL ratio. Therefore, the first hypothesis in the first regression model is declared supported. For the following independent variable, namely the technology and information investment variable, the t value was -0.605, and the significance value was 0.548 (> 0.05). Thus, there is no relationship between information technology investment and NPL. Therefore, the second hypothesis in the first regression model is declared invalid. In addition, based on the simultaneous influence test carried out, a multiple linear regression equation was obtained in the first model, namely:

$$\boldsymbol{NPL = 0,042 - 2,950\ MB - 0,605\ Inv + \varepsilon}$$

Based on the partial test results of the second model, the t-value for the mobile banking variable was 2.987, and the significance value was 0.004 (< 0.05). Thus, a significant positive relationship exists between mobile banking transactions and fee-based income. Therefore, the first hypothesis in the second regression model is declared supported. For the following independent variable, namely the technology and information investment variable, the t value was 9.249, and the significance value was 0.000 (<0.05). Thus, a significant positive relationship exists between information technology investment and fee-based income. Therefore, the second hypothesis in the second regression model is declared supported. In addition, based on the simultaneous influence test carried out, a multiple linear regression equation was obtained in the first model, namely:

$$\boldsymbol{FBI = 0,467 + 2,987\ MB + 9,249\ Inv + \varepsilon}$$

DISCUSSION

The Effect of Mobile Banking Transactions on Non Performing Loan and Fee-Based Income

Based on the partial test, the first independent variable from the first regression model, namely mobile banking transactions, has a t-value of -2.950 and a significance value of 0.005. Therefore, mobile banking transactions significantly adversely affect non performing loan. Likewise, in the second regression model, mobile banking transactions have a t-value of 2.987 and a significance value of 0.004. Therefore, mobile banking transactions have a significant positive effect on fee-based income.

Customers' increasing need and comfort for bank services encourages banks to digitize these services. Digitalized services such as mobile banking make customer transactions faster and more straightforward, increasing the value of customer transaction volumes. The greater the value of customer transaction volume in mobile banking, the more fee-based income in transaction fees, virtual account fees, or other fees obtained by the bank. Furthermore, this fee-based income can be used by banks as capital in distributing credit. The greater the fee-based income obtained from mobile banking, the greater the bank's capital in distributing credit. If credit distribution is carried out optimally and the bank can restrain the growth rate of non-performing loans, this can reduce the bank's NPL ratio. The NPL ratio is part of financial performance, reflecting the company's ability to manage and allocate resources (Widianingsih & Sudrajat, 2011).

The Effect of Technology and Information Investment on Non Performing Loan and Fee-Based Income

Based on the first partial test, the second independent variable from the first regression model, namely technology and information investment transactions, has a t value of -0.605 and a significance value of 0.548. Therefore, technology and information investment do not affect non performing loan. However, on the contrary, in the second regression model, the technology and information investment transaction variable has a t value of 9.249 and a significance value of 0.000. Therefore, technology and information investment significantly positively affect fee-based income.

The increasing need for employees and customers for digitalized systems encourages banks to maximize investment in technology and information. Of course, the bank will get a return from the IT investment, which can be transaction fees, virtual accounts, or other costs in the form of fee-based income obtained from mobile banking services or other e-channel services. However, this IT investment is only partially for customer service needs but also for employee needs related to operational systems such as the core banking system. This means that IT investment only partially produces returns in the form of income, which can be used as capital for lending or reducing the NPL ratio. Apart from that, IT investment decisions that produce returns in the form of fee-based income can increase the value of company equity, which has an impact on increasing the welfare of shareholders (Hartawan et al., 2020).

CONCLUSIONS AND RECOMMENDATIONS

In contrast, technology and information investment do not affect non performing loan. However, in the second model, mobile banking transactions and technology and information investment positively influence fee-based income. These results align with previous research and provide insight into how increasing the volume of mobile banking transactions can increase fee-based income. However, this research has limitations, such as a limited sample size and a focus on only two factors: mobile banking transactions and technology investment. Therefore, research supports expanding the bank sample population and developing other digital factors, such as digital literacy and government

regulations, to deepen understanding of the impact of digitalization on non performing loan.

ADVANCED RESEARCH

Still conducting further research to find out more about the limitations regarding the Effect of Digitalization on Non-Performing Loans and Fee Based Income in Banking

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