THE IMPACTS OF MOBILE BANKING TECHNOLOGY ADOPTION ON THE FINANCIAL PERFORMANCE AND STOCK PERFORMANCE OF BIG BANKS IN INDONESIA

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ABSTRACT

Banking in Indonesia has a very serious challenge from the competition that they have with other banks, and the rise of fintech companies in Indonesia. In cope with changes, mobile banking technology adoption is a very crucial factor that needs to be done by banks to adapt with the current situation. This will accelerate the technology adoption to create more efficient, cost saving, and obtain a better reach to the customers The Purpose of this research is to measure the impact of Mobile Banking Technology Adoption towards the Financial and Stock Performance before and after technology adoption. The financial performance is measured by CAMEL ratio of banks and the value added of this research is the stock performance that included in the research. The stock performance is measured in stock return and stock risk (standard deviation) of the banks. The research will use class IV banks as samples, because Class IV Banks is already considered as Big Banks with a capital of more than 30 Trillion IDR, and a successful Mobile banking tech adoption that has reached many users in Indonesia. The data of financial performance and stock performance from the seven banks in Indonesia that are collected will be tested using the F-test, T-Test and Regression method to measure on financial performance and stock performance. This research also measures the macroeconomic factor during the mobile banking technology implementation such as GDP (Gross Domestic Product), interest rate, currency rate and exchange rate. This result shows that the technology adoption on mobile banking have lower performance for ROE and NPL of the banks. On the macroeconomic side, the result shows positive impact and negative impact towards GDP performance to the financial performance of the banks. However, the result shows the technology adoption will strengthen banks financial performance on bank's CAR and LDR. This finding becomes important for banks to accelerate technology adoption to increase their competitiveness against competitors and adapt in a changing market. This is proves that the technology adoption is a journey that the banking industry must take and mobile banking adoption help the banks to gain more funds and more loan from the market with the very effective approach at scale. However, the banks should do the technology adoption on the credit scoring model and to measure the churn in their funding system to create lower NPL and higher ROE.

Keywords: Banks in Indonesia, Financial Performance, Macroeconomy Factor, Stock Performance

INTRODUCTION

According to Lipton et al. (2016), in the future, there will be a banking system based on digital technology that not only performs the basic functions of banks as a financial intermediary institution and financial service provider, but also(beyond solely as financial advisors to their customers) interact real time through mobile devices used by its customers. This future scenario of technology trend supported by the level of smartphone ownership and internet usage in Indonesia increases the likelihood of banking process being done digitally. This creates a shift in the customer's behavior, whereas previously they prefer going to a branch office for transactions and other banking necessities, nowadays they conduct most of it via their smartphones from basically anywhere, which also tends to save time and money.

According to McKinsey & Company's research on digital banking in Asia (McKinsey & company, 2015), the full time equivalent (FTE) approach reveals that 30 top process in banks use 50 percent of their cost, 20 percent of process in banking services can be digitized and potentially increase efficiency up to 15-20 percent of the total banking costs. McKinsey (2016) also stated that consumer adoption of digital banking experienced a significant increase, especially with smartphone users. This data is supported by AT Kearney's analysis of the Banking Transformation Roadmap (AT Kearney, Inc, 2014) and survey revealed that by 2020, 80% of the market share will be dominated by smartphone users, meaning smartphone apps will play a very important role in customer accessibility.

Based on the data from We are social in 2019, the percentage of the population as bank consumers in Indonesia are 49% with a total population of 268.2 Million people. It shows the huge market for Banks in Indonesia. In a Financial Services Authority (OJK) reveal, in data and e-banking users experienced significant growth, in which the number of e-banking users (SMS banking, phone banking, mobile Banking, and internet banking) increased by 270%, from 13.6 million users at 2012 to 50.4 million users at 2016. This is also supported by data from eMarketer which shows the aggressive growth of mobile phone users which increased sharply year by year. This means around 193.4 Million devices would be connected by 2019 and the digital approach will bring tremendous impact for the banking industry. According to a recent study by Millward Brown from AdReaction, Indonesians are ranked as one of the world's most addicted smartphone users, in which on average spend more than three hours a day on their devices.

One of the most important technological adaptation is the implementation of mobile banking which will increase the competitiveness of the banks against the techonologically advanced start-up financial companies that have witnessed aggressive growth in Indonesia because of their faster processing time, and better technology usage .The adaptation of technology, will be recognized as an investment. In this study, the impact between mobile banking technology adoption on financial performance is measured.

Based on the data of the financial industry about the percentage of banks that already applied digitalization, it's found that most of banks in Category III and II still consider it very hard to operate their own mobile banking apps. These banks still perform manual transactions that requires the customer to phsisically go to banks to perform their transactions. This research will elaborate more on the implementation of mobile banking among Category IV banks. It will investigate the banks performance after the implementation of mobile banking. These seven Category IV banks are establsihed banks and are a benchmark for other banks.

Mabwai (2016) and Hauwa (2017) elaborated in detail regarding the impact of the mobile banking on financial performance of banks by using CAMELS ratio and other supporting financial ratios. Based on the previous journal, there is still no further research regarding the impact of mobile banking on stock performance. The research gap that is needed to be answered becomes an added value for this research.

These are the research question as follows:

1.   What are Macroeconomics factors that affect Financial Performance:
a.   Before the Mobile Banking Technology Adoption of Big Banks in Indonesia?
b.   After the Mobile Banking Technology Adoption of Big Banks in Indonesia?
c.   Overall period of Mobile Banking Technology Adoption of Big Banks in Indonesia?
2.   What are Macroeconomics factors that affect Stock Performance:
a.   Before the Mobile Banking Technology Adoption by Big Banks in Indonesia?
b.   After the Mobile Banking Technology Adoption by Big Banks in Indonesia?
c.   Overall period of Mobile Banking Technology Adoption by Big Banks in Indonesia?
3.   How is the impact of the Mobile Banking Technology Adoption on the financial performance of Big Banks in Indonesia?
4.   How is the impact of the Mobile Banking Technology Adoption on the stock performances of Big Banks in Indonesia?

These research objectives are as follows:

1A. Macroeconomic factor affects Financial Performance Before the adoption of Mobile banking technology by Big Banks in Indonesia
1B. Macroeconomic factor affects Financial Performance Ratio After the adoption of Mobile banking technology by Big Banks in Indonesia
1C. Macroeconomic factor affects the Financial Performance Ratio on the Overall Period of Mobile banking technology adoption by Big Banks in Indonesia

2A. Macroeconomic factor affects Stock Performance Before Mobile banking technology adoption by Big Banks in Indonesia
2B. Macroeconomic factor affects Stock Performance After Mobile banking technology adoption by Big Banks in Indonesia
2C. Macroeconomic factor affects Stock Performance on the Overall Period of Mobile banking technology adoption by Big Banks in Indonesia

3.   Mobile Banking Technology Adoption affects Financial Performance of Big Banks in Indonesia
4.   Mobile Banking Technology Adoption affects Stock Performance of Big Banks in Indonesia

LITERATURE REVIEW

Macroeconomic Factor

In this research the macroeconomy factor that used are GDP, Inflation, Interest Rate and Exchanger Rate. Brooks (2014) defines Gross Domestic Product (GDP) as the market value of all final goods & services produced within a country in each period. According to Jibrin (2016), the interest rate is the amount a lender charges for the use of assets expressed as a percentage of the principal. James (2019) defines exchange rate as the value of one nation's currency versus the currency of another nation or economic zone. Vega (2019) defines inflation as quantitative measure of the rate at which the average price level of a basket of selected goods and services in an economy increases over a period. It is the constant rise in the general level of prices where a unit of currency buys less than it did in prior periods.

Chaudry and Kamath (1995) found that US banks during the 1970s and 1980s depend on general interest rate trends. Meanwhile, Guru and Balashanmugam (2002) found a negative relationship between interest rates and bank profitability. Isaac (2012) found that interest rates have significant positive effect on financial performance of commercial banks in Kenya, which was at a 95% confidence level. Otuori (2013) found that exports and imports Interest rates, inflation and exchange rates were all highly correlated. By manipulating interest rates, central banks could exert influence over both inflation and exchange rates and changing interest rates impact inflation and currency values. Hefferman and Fu (2008) found that inflation rate positively affects the profitability of banks. Madsen (2004) used Fisher's hypothesis to estimate the relationship between share returns and inflation.

Mobile Banking

Mobile banking has been defined by James (2019) as the act of making financial transactions on a mobile device (cell phone, tablet, etc). This activity can be as simple as a bank sending fraud or usage activity to a client's cell phone or as complex as a client paying bills or sending money abroad.

Financial Performance

According to Hussein (2012), financial performance is explained as the degree to which financial objectives are being or has been accomplished. The research is used CAMELS as the financial performance for Banking industry. Julia (2019) CAMELS is an acronym for six components of bank safety and soundness: Capital adequacy, Asset quality, Management quality, Earning ability, Liquidity and Sensitivity.

Stock Performance

According to Brigham and Houston (2010), the difference acquiring and offering cost which is shaped by the activity of the stock exchange within the auxiliary advertise is called stock return. James (2019) define the risk-return trade-off as the trading principle that links high risk with high reward.

According to the research from Angelica Giovanni and Roy Sembel (2019) which measured the Macroeconomic factor towards Stock Performance of LQ45 Companies at IDX, reveals that (1) changes in the currency exchange rate of IDR versus USD negatively affect stock return, (2) GDP growth rate negatively affects stock return, (3) inflation rate is insignificant in explaining the stock return, (4) interest rate negatively affects stock return, (5) JKSE's return positively affects stock return.

Mobile banking technology adoption and financial performance

Mobile banking is defined by Tiwari, Buse & Herstatt (2006) as any transaction (including the transfer of right or ownership to use goods and services) which is started and/or completed by using mobile access to computer networks with the assistance of an electronic gadget. Furthermore, they pointed out that mobile banking means the provision of bank-related financial services with the assistance of mobile telecommunication devices. Recently, financial services industry has been open to a historical transaction. E-development is evolving and advancing quickly in all areas of financial markets and financial intermediation among which are E-money, E-brokering, E-financing, E-insurance, E-exchange, E-banking and even E-supervision. For the development of the banking industry, these new information technologies are becoming most important factors. In the financial institution sector, innovation has been significantly propelled, playing a key role in improving the standards of services.

Mobile banking adoptions are continuously being developed and have now become the bank's favourite platform for offering their services. A major focus for mobile network providers and the banking industry is According to Coelho (2003), one of the main strategies for growth, is the mobile banking and the potential it offers in providing various services. For instance, the mobile banking adoptions would enable a real-time 2-way data transmission, banking services, among other services (Daniel, 1999). As new technologies becomes increasingly on demand and new advancement in the economy makes opens up new opportunities which are difficult to assume, many organizations are searching for ways on how to embrace technology as a strategy for survival (Kingoo, 2011). The advantages of mobile banking can be utilised to increase proficiency and help business develop through efficient, cheap and reliable money service support system that lessen the need for cash transaction and the associated risks (Anyasi & Otuba, 2009). Progression in information technology has changed how organizations conduct and operate their business over the past few years (Al-Jabri, 2012). Mobile banking and the internet have not just made financial organization provide banking services via mobiles and online, but they have provided their customers with easy access to financial services and other benefits. There are a lot of research on the impact of the mobile banking to the financial performance before.

RESEARCH METHODOLOGY

Research Design

Based on the Research Design as shown below, they are classified into 2 variables which are X & Y. For Variable X, the indicator is the year that banks apply mobile banking technology during the year as dummy variable. While variable Y is symbolized by Y1 and Y2. Y1 has eight sub-variables which will be measured by looking at the bank's financial report for 12 Quarter before and 12 Quarter after the Mobile banking technology adoption as Banking technology adoption. Sub-variable Y2 is measured by stock performance as the indicator which is represented by the stock price for 52 weeks before and after mobile banking implementation. This research applies the descriptive explanatory model and conduct surveys to collect quantitative data. The main question to be addressed is the causal effect between Mobile Banking Technology Adoption (X), and Financial Performance (Y1) and Stock Return (Y2). However, in this research model, Y1 and Y2 will be put before and after the implementation of mobile banking.
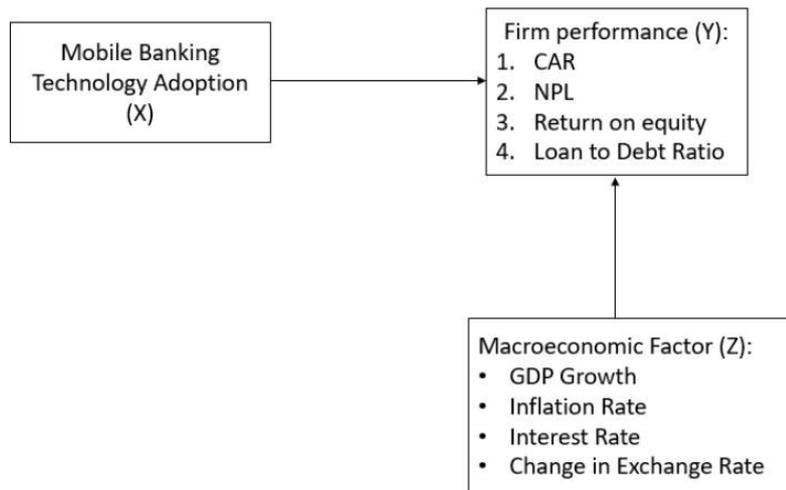
Figure1.1. Research Design

In this research there are three regression analyses that will be tested, which is explained below:

1A.   Macroeconomic factor affects Financial Performance Before the adoption of Mobile banking technology by Big Banks in Indonesia

$Y1Bjit = \alpha01Bj + \beta1BjGDGDPt + \beta1BjIFINFLt + \beta1BjITINTRt + \beta1BjERERt + \varepsilon1Bjit$

1B.   Macroeconomic factor affects Financial Performance Ratio After the adoption of Mobile banking technology by Big Banks in Indonesia

$Y1Ajit = \alpha01Aj + \beta1AjGDGDPt + \beta1AjIFINFLt + \beta1AjITINTRt + \beta1AjERERt + \varepsilon1Ajit$

1C.   Macroeconomic factor affects the Financial Performance Ratio on the Overall Period of Mobile banking technology adoption by Big Banks in Indonesia

$Y1jit = \alpha01j + \beta1 jGDGDPt + \beta1 jIFINFLt + \beta1jITINTRt + \beta1 jERERt + \varepsilon1jit$

2A.   Macroeconomic factor affects Stock Performance Before Mobile banking technology adoption by Big Banks in Indonesia

$Y2Bjit = \alpha02Bj + \beta2BjGDGDPt + \beta2BjIFINFLt + \beta2BjITINTRt + \beta2B jERERt + \varepsilon2Bjit$

2B.   Macroeconomic factor affects Stock Performance After Mobile banking technology adoption by Big Banks in Indonesia

$Y2Ajit = \alpha02Aj + \beta2AjGDGDPt + \beta2AjIFINFLt + \beta2AjITINTRt + \beta2AjERERt + \varepsilon2Ajit$

2C.   Macroeconomic factor affects Stock Performance on the Overall Period of Mobile banking technology adoption by Big Banks in Indonesia

$Y2jit = \alpha02j + \beta2 jGDGDPt + \beta2 jIFINFLt + \beta2jITINTRt + \beta2 jERERt + \varepsilon2jit$

3.   Mobile Banking Technology Adoption affects Financial Performance of Big Banks in Indonesia $Y1jit = \alpha01j + \gamma ijD + \beta1 jGDGDPt + \beta1 jIFINFLt + \beta1jITINTRt + \beta1 jERERt + \varepsilon1jit$

4.   Mobile Banking Technology Adoption affects Stock Performance of Big Banks in Indonesia $Y2jit = \alpha02j + \gamma ijD + \beta2 jGDGDPt + \beta2 jIFINFLt + \beta2jITINTRt + \beta2 jERERt + \varepsilon2jit$

Based the Hypotheses elaborated above, the regression result will be rejected or accepted as explained below: H0: Coefficient = 0

HA: Coefficient =/= 0
p-value ≤ 0.05 □ Reject Ho
p-value ≥ 0.05 □ Not Reject Ho

For the p value result, the remarks is as follows: If p value > 0.05 → "not significant"
If p value ≤ 0.05 → "significant"

Variables

Based on the table below, these are the variable that being used in this research. Mobile banking technology adoption as variable X. Variable Z will be known as Macroeconomic Factor as control variable which they will have GDP, Inflation Rate, Interest Rate and Change in Exchange Rate. This data will be according to Bank Indonesia and BPS as ell for the Macroeconomic Factor

Table 1.1. Operational Variables

Variable	Dimension	Indicator	Definition	Scale
Mobile Banking Technology Adoption (X)	Date of Adoption	Date of Adoption	0 for before mobile banking Technology adoption	Nominal
			1 for after mobile banking technology adoption	
Macroeconomic Factor/Control Variable (Z)	GDP Growth	GDP Growth of Indonesia	According to BPS Indonesia	Ratio
	Inflation Rate	Inflation Rate of Indonesia	According to BPS Indonesia	Ratio
	Interest Rate	Interest Rate of Government Bonds Yield	According to Bank Indonesia	Ratio
	Change in Exchange Rate	Change in Exchange Rate of Indonesia	According to Bank Indonesia	Ratio
Financial Performance (Y1)	Capital Adequacy	Capital Adequacy Ratio	(Tier I Capital + Tier II Capital) / Total Weighted asset x 100%	Ratio
	Asset Quality	Non-Performing Loan	Non-performing loans (NPL)/ total loans x100%	Ratio
	Earning	Return on Equity	Net (Income/Average Shareholder Equity) x100%	Ratio
	Liquidity	Loan to Debt Ratio	Total loan/total deposit x 100%	Ratio
Stock Performance (Y2)	Sensitivity	Stock Return	52 Weeks After and Before Mobile banking technology adoption	Ratio
		Stock Risk	Stdev of Stock Return = $\sqrt{\text{Var}}$	Ratio

Data collection

This research will collect the data from seven Category IV Banks in Indonesia as samples for this research, and which all of them are publicly listed and was conducted from September 2019 until December 2019. The Secondary data used in this research is the financial performance using the 6 years data buy analyze ; 3 years before and 3 years after the implementation of the financial analysis theory, used as the time length to measure the financial performance of the company. For the stock performance the data will used 1 year before and 1 year after mobile banking technology adoption. The data used in this research was collected through the internet and Bloomberg.com.

Table 1.2. Data Collection Period

Banks	Mobile Banking Launched	Period for Stock Performance	Period for Financial Performance
BCA	12 Nov 2012	Before: Sept 2011-Sept 2012 After: Dec 2012-Dec 2013	Before: Sept 2009-Sept 2012 After: Dec 2012-Dec 2015
BNI	27 September 2015	Before: June 2014-June 2015 After: Sept 2015-Sept 2016	Before: June 2012-June 2015 After: Sept 2015-Sept 2018
BRI	30 May 2012	Before: Mar 2011-Mar 2012 After: June 2012-June 2013	Before: Mar 2009-Mar 2012 After: June 2012-June 2015
Mandiri	20 May 2016	Before: Mar 2015-Mar 2016 After: Jun 2016- Jun 2017	Before: Mar 2013-Mar 2016 After: Jun 2016- Jun 2019
Danamon	9 Nov 2014	Before: Sept 2013-Sept 2014 After: Dec 2014-Dec 2015	Before: Sept 2011-Sept 2014 After: Dec 2014-Dec 2017
CIMB Niaga	21 Juni 2012	Before: Mar 2011Mar 2012 After: Juni 2012-Juni 2013	Before: Mar 2009-Mar 2012 After: Juni 2012-Juni 2015
Panin	21 April 2016	Before: Mar 2015-Mar 2016 After: Juni 2016-Juni 2017	Before: Mar 2013-Mar 2016 After: Juni 2016-Juni 2019

According to Christensen, Johnson, and Turner (2011), a population is the full set of elements from which the sample is selected. The target population of this research is the Category IV Banks in Indonesia and all of them are publicly listed. Uma Sekaran defines sample as limited number of observations selected from a population on a systematic or random basis, which (upon mathematical calculation) yield generalizations about the population. From a total population of (N), the researcher decides to choose seven Category IV Banks in Indonesia as samples for this research, and which all of them are publicly listed.

Based on the data collection period shown above, this research was conducted from September 2009 until December 2019. The Secondary data used in this research using 6 years data; 3 years before and 3 years after the implementation of the mobile banking technology adoption. For the stock performance, the research used 1 year before and 1 year after mobile banking technology adoption. The data used in this research was collected through the internet and Bloomberg.com. The data collection will be using different time slot depend on the where the banks already implements mobile banking.

FINDING, ANALYSIS AND DISCUSSION

The result based on our research objectives are divided into some part, which are descriptive statistical analysis, multicollinearity test, regression, T-test, F-test and dummy variable regression.

Descriptive Statistical Analysis

The total sample of quarterly data three years before and three years after of the seven banks shows that means of some variables slightly increased after the adoption of mobile banking technology. The ratios that slightly increased are NPL CAR, LDR and Change of Currency. However, there are some mean variables that slightly decreased after adoption such as ROE, Bonds Interest Rate, Inflation Rate and GDP Growth.

The total observation data taken from seven banks are 56. For the stock data, the data collected per quarter is during the period of 52 weeks before and 52 weeks after technology adoption. Because the data is covering a 52 week period and collected in a quarterly basis, in which from each seven banks will be collected four data before and four data after technology adoption. In this table, there are 8 data per bank (before and after).

Based on the data shown above, it shows that some mean variables slightly increased after the adoption of mobile banking technology, such as Stock Return and Stock Risk (in Standard Deviation). However, most of the mean variables decreased after mobile banking technology adoptions, such as Interest Rate, Inflation Rate, Change of Currency, GDP Growth.

Multicollinearity Test

According to Hair et al. (1999), the maximun acceptable level of VIF is 10. A VIF value over 10 is a clear signal of multicollinearity. To detect a multicollinearity problem between each independent variable, Variance Inflation Factor (VIF) is used as a benchmark. All the variable already tested and shows that the variable did not have multicollinearity problem. This is because all the variables have a Variance Inflation Factor below 10.

Regression Test

In this research, the regression analysis shows that the LDR and CAR from the Hypothesis 1A is Rejected. For Hypothesis 1B the NPL, ROE and LDR is all Rejected and considered as significant. For Hypothesis 1C, there is only NPL that rejected. However, for hypothesis 2A and 2C is considered as not rejected and only Hypothesis 2B from Stock return that considered as rejected and shown the number of p-value below 0.05.

Table 1.2. Regression Result of Hypothesis 1&2

No	Dependent Variable	Independent variable	Sig. Result	Result
1A.	CAR	*Overall Regression*	*0*	*Rejected*
	NPL	Overall Regression	0.263	Not Rejected
	ROE	Overall Regression	0.152	Not Rejected
	LDR	*Overall Regression*	*0.012*	*Rejected*
1B.	CAR	Overall Regression	0.716	Not Rejected
	NPL	Overall Regression	0.001	Rejected
	ROE	Overall Regression	0	Rejected
	LDR	Overall Regression	0.028	Rejected
1C.	CAR	Overall Regression	0.454	Not Rejected
	NPL	Overall Regression	0	Rejected
	ROE	Overall Regression	0.105	Not Rejected
	LDR	Overall Regression	0.244	Not Rejected
2A.	Stock Return	Overall Regression	0.106	Not Rejected
	Stock Risk	Overall Regression	0.055	Not Rejected
2B.	Stock Return	Overall Regression	0	Rejected
	Stock Risk	Overall Regression	0.771	Not Rejected
2C.	Stock Return	Overall Regression	0.362	Not Rejected
	Stock Risk	Overall Regression	0.767	Not Rejected

T-test

Based on the T-test Result, for Hypothesis 3 there are some of the variable that rejected and considered as significant. between two group of data, which are CAR, ROE, and LDR. This number shows that the dependent variable which is mobile banking technology adoption had the impact of Financial performance of big banks in Indonesia. For Hypothesis 4 all of the result are rejected and shows the mobile banking implementation not had impact to the stock performance.

F-test

From the table shown below, the data from the big banks shows that there are no variable from Hypothesis 4 that considered as significant for Mobile banking technology adoption impact to the stock performance.

Dummy Variable Regression

Based on the dummy variable regression there are some factor that considered as significant and for CAR and LDR the result is positive which means that the there is the positive difference between the financial performance on after vs before mobile banking technology adoption and it shows that the Big banks experience the higher performance of these ratios which mean very good. From the CAR ratio, this is means that the Banks can succesfully gather more fund from the market and reach more customers as they become inline with the OJK mission for banks in Indonesia which is to create financial inclusion for those customer who live far from physical banks. This also very good strategy against fintech that aggressively collect fund from the market which becomes very tight competitor of banks. From the LDR ratio, this is means the banks can successfully disburse more loan to the market, However Banks also have big challenges in having this implementation because the NPL is tend to be increased after mobile banking technology adoption. This is means the banks also need to prepare better digital transformation roadmap for data driven decision and implement automation on the credit scoring to prevent the bad credit in the banks.

Table 1.3. Regression Result of Hypothesis 3&4

No	Dependent Variable	Independent variable	Sig. Result	Result
3	CAR	T-test After vs Before	0	Rejected
		Overall Regression	0	Rejected
		Dummy Variable After vs Before	0	Rejected
	NPL	T-test After vs Before	0.056	Not Rejected
		Overall Regression	0	Rejected
		Dummy Variable After vs Before	0.246	Not Rejected
	ROE	*T-test After vs Before*	*0*	*Rejected*
		Overall Regression	*0*	*Rejected*
		Dummy Variable After vs Before	*0*	*Rejected*
	LDR	*T-test After vs Before*	*0*	*Rejected*
		Overall Regression	*0.005*	*Rejected*
		Dummy Variable After vs Before	*0.001*	*Rejected*
4	Stock Return	F-test After vs Before (Variances)	0,139	Not Rejected
		T-test After vs Before	0,948	Not Rejected
		Overall Regression	0.061	Not Rejected
		Dummy Variable After vs Before	0.014	Rejected
	Stock Risk	Overall Regression	0.337	Not Rejected
		Dummy Variable After vs Before	0.832	Not Rejected

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this research is to identify the impact of before and after mobile banking technology adoption on financial and stock performance. This research uses CAMELS ratio to measure the bank's performance before and after mobile banking technology adoption. The conclusion that shown below already answered research objectives based on the finding, analysis, and discussion on the chapter 4. The recommendation will explain further the suggestion for the banking industry and for the next research as the significant contributions in this research.

Conclusion

1. To investigate the Macroeconomic factors that affect financial performance:

    a) *Macroeconomic factor affecting Financial Performance Before Mobile Banking Technology Adoption of Big Banks in Indonesia*
        In this hypothesis, CAR and LDR shows a high p-value result on the macroeconomic impact. The CAR is affected macroeconomically by GDP and Interest Rate, while the LDR is also affected as such by GDP and Interest Rate. Both ratios show negative impact of Interest rate towards CAR and LDR, and positive impact of GDP Growth towards CAR and LDR

    b) *Macroeconomic factor affecting Financial Performance Before Mobile Banking Technology Adoption of Big Banks in Indonesia*
        In this hypothesis, NPL, ROE and LDR shows high a p-value result from the macroeconomic impact. Both significant levels of NPL and ROE are affected with by the negative impact of interest rates and positive impact of GDP growth, while LDR is only affected macroeconomically by the positive impact of the interest rate

    c) *Macroeconomic factor affecting Financial Performance Ratio during the Overall Period of Mobile Banking Technology Adoption of Big Banks in Indonesia*
        In this hypothesis, only NPL shows high a p-value result from the macroeconomic impact. The NPL is affected macroeconimically by the positive impact of interest rate and negative impact of GDP growth.

2. To investigate the Macroeconomic Factors that Affect Stock Performance:

    a) *Before Mobile Banking Technology Adoption of Big Banks in Indonesia*
        In this hypothesis, there are no variable testing from the macroeconomic factors that are rejected and considered as significant towards its effect on stock performance.

    b) *After Mobile Banking Technology Adoption of Big Banks in Indonesia*
        In this hypothesis, the Stock Return are affected by the Interest Rate and GDP Growth. The stock return are affected by the positive impact of Interest rate and GDP growth towards Stock Return.

    c) Overall Period of Mobile Banking Technology Adoption of Big Banks in Indonesia
        In this hypothesis, there are no variable testing that are rejected and considered as significant towards Stock Return and Stock Risk.

3. To investigate the impact of Mobile of Banking Technology Adoption on the Financial performance of Big Banks in Indonesia

    1) The CAR shows there is difference between after vs before mobile banking technology adoption. The result shows positive impact which means the banks experienced higher CAR after adoption.
    2) The NPL shows there is no difference between after vs before mobile banking technology adoption. This is because the R square also shown 17% which means there is still other factor that determine NPL and all the significant level are not rejected.
    3) The ROE shows there is difference between after vs before mobile banking technology adoption. The result shows a negative impact which means the banks experienced lower ROE after adoption. This is because the R square result is shows as 12% which means there will be other factor that determine the ROE performance.
    4) The LDR shows there is difference between after vs before mobile banking technology adoption. The result shows a positive impact which means the banks experienced higher LDR after adoption.

4. To investigate the impact of Mobile of Banking Technology Adoption on the Stock performance of Big Banks in Indonesia.

    1) The stock return shows there is difference between after vs before mobile banking technology adoption. The result shows a negative impact which means the banks experienced lower stock returns after implementation. This is because the R square shows low 18% which means the mobile banking it's not dominant factor that influences the stock return. Therefore, the macroeconomic such as interest rate and inflation rate is more determinant factor for stock performance in banking industry.
    2) Stock risk shows no difference between after vs before mobile banking technology adoption.

Recommendation:

1. The Banks need to monitor the GDP growth and Interest rate because these factors affect the financial and stock performance of banks. Banks need to create a projection and a preventive action towards the aggressive GDP Growth and adjustment of the interest rate established by the Central Banks of Indonesia. This is to keep the financial and stock performance always meeting the business target.
2. The banks should create a better digital transformation road map for their technology adoption, because data shows during the first three years of mobile banking technology adoption, the banks experience higher NPL and lower ROE. This also

means the technology adoption is not an instant solution for banks to reduce cost and increase revenue, whether it is a digital transformation journey for banks to reach more customers or increaseing the strength of banks to thrive in the current competition.

3. The Banks should invest more on their scoring system and data-driven decisions while they implement mobile banking technology, because the LDR increase means the number of loan disbursements could reach out to more to potential customers in Indonesia. The CAR increase means the banks successfully acquire more capital from the market to cover bad credits. With a more transparent and easier digital process, the banks also need to invest more in the credit scoring system, in order to make sure the loan disbursements creates a lower NPL and a higher net income which will impact the bank's ROE.

4. The Banks need to utilize mobile banking as prime media to promote funding products where banks could secure direct revenue from things such as government bonds, corporate bonds, mutual funds and insurance. While for loans, they could also aim for more consumer loans which will offer a competitive interest rate that could compete with other fintech companies, and consumers will readily use mobile banking as a payment channel which makes it a one stop solution for them without phisically going to a bank.

This study only covers the Banks in Category 4; therefore, these are some recommendation for the next research on below:

1. Based on research, the next researcher could use GDP growth and Interest rate as the macroeconomic factor for Banking Industry. This is because in this research the result shows strongly highly impact of GDP Growth and Interest rate as the macroeconomic factor that influenced financial performance and stock performance.

2. In this research, the stock return is considered have no significant impact towards the mobile banking implementation on the big banks in Indonesia. However, the next researcher could measure the Banks Category 3 for the next research. The next researcher must look on the Bank Category 3 that already launched apps and considered as Public Listed Company to create easier process in gathering the data.

3. This scope of this study is only Bank Category 4 as early adopter. Therefore, the next study should cover the wider scope for Banks Category 3 and 2 for those who already launch apps. Some of the Banks in Category 3 and 2 already launch apps and this topic could become the next research to know the impact of Mobile Banking technology adoption to the Financial Performance and the Stock Performance.

4. For the next study, the researcher could measure the financial performance and stock performance for the Banks who already launch Super Apps. Basically, in Indonesia, there still a very few banks that already launched Super Apps. The Super Apps means the Banks already fully digitized all their operation and the customer can do all their transaction needs via online in one Apps

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