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Technological Innovation in Influence the Financial Performance of Sharia Banking In Indonesia

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Abstract

This study measures how the role of innovation in technology in moderating efficiency and competition affects financial performance. This study uses secondary data which was conducted at 14 Islamic Commercial Banks in Indonesia which were taken using the non-probability sampling method in the form of purposive sampling from 2013-2020. The data analysis technique used is panel data regression analysis. The results obtained are that efficiency has a significant negative effect on financial performance, competition has a significant negative effect on financial performance, technological innovation can moderate efficiency and competition on the financial performance of Islamic banking in Indonesia.

Keywords: *Innovation, efficiency, competition, technology, performance.*

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1. INTRODUCTION

In supporting the development of the financial sector in Indonesia, banking is one of the keys to being able to see the growth of the national economy. The health of banking in a country is allegedly able to influence the development of a country, because of its important function as a support for the intermediary function (Andriani, 2019). In reviewing banking health, banking financial performance is important in describing national economic conditions. Healthy banking financial performance can indicate healthy economic conditions, whereas if banking health is disrupted, it indicates that there are problems in the national economy at a macro level (Andriani, 2019).

The rapid development of information technology creates an opportunity for various business entities to improve interactions and better relations with their stakeholders (Pratiwi et al., 2021). This indicates that innovation in 2 technologies leads to increased market share (Prasetyaningrum, 2021) and competition and increases efficiency by reducing operational costs. It can be concluded that competition and efficiency are needed to see and control financial performance followed by the influence of innovation on technology.

In Indonesia alone, based on a survey from the Internet Service Providers Association, from year to year it continues to increase. In 2020 yesterday, there were 196.7 million people who were known to be internet users, previously there were 132.7 million internet users (*APJJ, 2021*).

In previous research conducted by (Andriani, 2019; Apriyanti et al., 2021; Kepramareni et al., 2022; Khalifaturofi'ah, 2021; Malik & Anwar, 2021; Prasetyo, 2015; Rajindra et al., 2021) stated the same thing that efficiency as measured by Operational Cost Efficiency has a negative effect on profitability. This negative effect indicates that the greater the value of the Operational Cost Efficiency Ratio as measured by BOPO, the smaller the ROA level. Whereas in research conducted by (Mukira et al., 2022; Santika et al., 2022; Sihotang et al., 2022; Sinta et al., 2021; Ur Rehman et al., 2022) it was proven that Operational Cost Efficiency has a positive relationship to financial performance. This shows that there are differences in the results of proving the effect of Operational Cost Efficiency on the company's financial performance.

According to previous studies, which prove that innovation in technology is considered to have the following effects (Chhaidar et al., 2022; Ermawati et al., 2018; Hannoon et al., 2021; Le & Pham, 2022; Muhammad & Sari, 2020; Yudaruddin, 2022) that innovation in technology has a positive effect on banking financial performance. However, based on previous research (Jardak & Ben Hamad, 2022; Takeda et al., 2021; Wibowo et al., 2018; Zhao et al., 2021) proves that innovation in technology has no effect on banking financial performance.

In previous studies conducted by (Ayusaleha & Laila, 2022; Căpraru et al., 2020; Ju & Tang, 2022; Li & Li, 2022; Sahul Hamid & Ibrahim, 2021; Zhao et al., 2021) it was found that competition has a positive effect on financial performance. Competition is considered to occur when companies improve their services and technological facilities. However, based on research (Khattak & Ali, 2021; Rakshit, 2022; Rakshit & Bardhan, 2022) it was found that competition has a negative effect on financial performance, which means that when competition is higher, it will result in lower company performance.

In 2019, several banks in Indonesia are planning an efficiency strategy that utilizes digitalization and automation. According to OJK data, several banks have succeeded in being more efficient with changes to the ratio of Operating Expenses and Operating Income (BOPO) recorded in April 2019 BOPO was 83.48%, previously in January 2019 it was 82.92%. According to Chhaidar et al., (2022) technology has a positive and significant relationship to profitability. Then in Khalifaturofi'ah, (2021) proves that operational cost efficiency has a negative relationship to banking performance. Technological innovation is thought to strengthen the negative relationship between operational cost efficiency and ROA.

Based on research from McKinsey&Company in April 2018, there has been a significant movement in digital usage. Digitalization has allegedly changed the pattern of customer activity in banking, customers choose to use technological innovation to carry out various banking service activities. This change has forced the banking industry to compete in providing good services both offline and in the network. Sahul Hamid & Ibrahim, (2021) proves that competition can have a positive and significant effect on profitability. Djuniardi, (2020) further, proved that technology affects bank efficiency, competition and price behavior. Thus innovation in technology is thought to be able to moderate the positive effect of competition on financial performance.

The financial performance of various previous studies was influenced by capital adequacy, asset management, solvency, bank size and liquidity, which showed a significant effect on financial performance (Andriani, 2019; Ayusaleha & Laila, 2022; Ju & Tang, 2022; Kepramareni et al., 2022; Khalifaturofi'ah, 2021; Pujiyanty et al., 2022; Rajindra et al., 2021; Sihotang et al., 2022).

Based on previous studies that have been described, we see various phenomena between the influence of innovation on technology, efficiency and competition on banking financial performance. There were several differences in the results in the research which led to lessthan optimal results. This study aims to find a relationship between the influence of innovation variables on technology to moderate efficiency and competition on the financial performance of banks in Indonesia.

Efficiency

Efficiency is an important part of a business entity concept. Points of truth in the business system can be assessed when the company is considered efficient in achieving its goals. This is why efficiency is often measured by looking at the cost side (Naufal & Firdaus, 2018).

One of the efficiency measurements in a company with a ratio approach is to review BOPO efficiency. The BOPO ratio can be used as an indicator of the ability of a bank's management to control its operational costs and operating income. The BOPO ratio measurement indicates that a bank is said to be efficient if the BOPO ratio is at a small value, meaning that the smaller the company's BOPO value, the more efficient the company is in managing its management.

Competition

In the context of competition in banking, competitiveness is viewed from two levels. The first level is the bank's ability to diversify its range of products and services. The second is the ability of a bank to implement competitive prices in its market (Louati & Boujelbene, 2015). In this study, the Lerner index model is used to measure non-structural competition variables.

Based on (Titko, 2015) the Lerner index can measure the level of competition in a company by seeing whether the company is in perfect market competition or not, to assess the level of ability to monopolize the market.

Innovation in Technology

According to the theory put forward by Schumpeter, innovation is a growing cycle that starts with entrepreneurs attracting new customers because of high profit opportunities, which causes a wave of innovation that has the potential to reduce total profits (Chaarani, 2018). Technological Innovation that Leads to Innovation in technology is a company/banking decision to allocate large amounts of funds within the scope of information technology in the form of products or services (Wibowo et al., 2018).

Analysis Model

Based on the previous explanation, the researcher provides an overview the conceptual framework in this study is as follows:

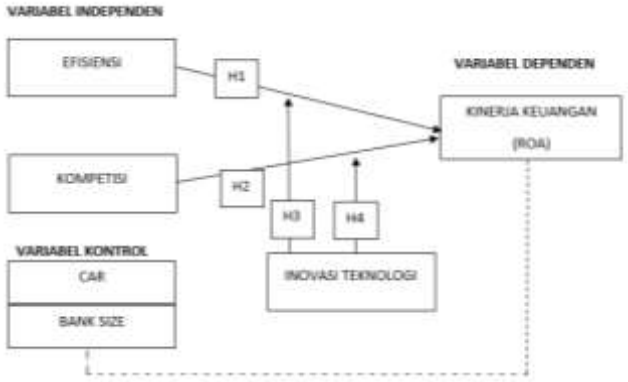

Figure 1 Analysis Model

Source: Author 2022, processed data

Hypothesis

H1: Efficiency has a negative effect on the financial performance of Islamic banking in Indonesia

H2: Competition has a negative effect on the financial performance of Islamic banking in Indonesia.

H3: Technological innovation can moderate the effect of efficiency on the financial performance of Islamic banking in Indonesia.

H4: Technological innovation can moderate the effect of competition on the financial performance of Islamic banking in Indonesia.

The regression model for panel data regression is a regression equation that combines cross section data and time series data. In this study the regression equation that has been compiled is as follows:

$Y = a + b1X1 + b2X2 + b3\,X3 + b4X4$ E (1)

$Y = \alpha + \beta 1X1 + \beta 2X2 + \beta 3X1M + \beta 4X2M + \beta 5X3 + \beta$

Information:

Y	=	Financial Performance (ROA)
α	=	Constant number
β1,2,3,4,5,6	=	Regression coefficient
X1	=	Efficiency
X2	=	Competition
X3	=	CAR
X4	=	Bank Size
M	=	Technology innovation
e	=	Error term

2. RESEARCH METHODS

This study uses a causal associative quantitative approach. This research was conducted at all Islamic Commercial Banks in Indonesia whose data can be found on the official websites of related Islamic banks and also the website of the Financial Services Authority, namely www.ojk.go.id.

This study uses secondary data collected by means of documentation and sampling techniques in the form of purposive sampling. Based on the criteria that have been determined by the researcher by reviewing certain conditions, there are 14 Islamic Commercial Banks as samples in this study.

Table 1.

Definition of Operasional Variabel

No	Variable	Indicator	Data Source
1	Financial Performance	ROA = (Profit after Tax)/(Total Assets)	(Sahul Hamid & Ibrahim, 2021)
2	Efficiency	BOPO = (Operating Expenditures)/(Operating Income) x 100%	(Rajindra et al., 2021)
3	Competition	Lerner Index = Lerner index = (TR-TC)/TR TR = TotalRevenues TC = Total Cost	(Khattak & Ali, 2021)
4	Technology Inovation	TI=ln (noninterest Expense)	(Uddin et al., 2020)

Source: Author 2022, Processed Data

In this study the researcher used descriptive statistical data analysis techniques, with multiple linear regression analysis with the help of a computer program in the form of e-Views 10 software and Microsoft Excel as a test tool.

In this study the regression equation that has been compiled is as follows:

$Y= a+b1X1+b2X2+b3\ X3+b4X4 + e$ *(1)*

$Y= \alpha+\beta1X1+\beta2X2+\beta3X1M+\beta4X2M+\beta5X3+\beta6X4+e$ *(2)*

Information:

Y	=	Financial Performance (ROA)
α	=	Constant number
β1,2,3,4,5,6	=	Regression coefficient
X1	=	Efficiency
X2	=	Competition
X3	=	CAR
X4	=	Bank Size
M	=	Technological innovation
e	=	Error term

Widarjono, (2005) explains that in the selection of statistical models in panel data regression there are three tests that can determine a good model to use in panel data processing, namely the chow test (chow test), hausman test (Hausman Test) and test Lagrange Multiplier (LM). The data in this study must also pass the classical assumption test, in order to determine the feasibility of the model, the feasibility of the model is seen from the fulfillment of the BLUE (Best Linear Unbias Estimator) requirements. Classical assumption tests are in the form of normality tests, autocorrelation tests, heteroscedasticity tests, and multicollinearity tests (Sakti, 2018).

Then do the model feasibility test. The model feasibility test will assess whether the regression model formed can explain the effect of the independent variable on the dependent variable or not. The tests carried out were hypothesis testing and determination coefficient tests (Sakti, 2018). Decision making in hypothesis testing is done by comparing the value of the t statistic with the t table or comparing the probability value to the significance level. The coefficient of determination test is a test that aims to see the ability of the independent variable to explain the dependent variable. The MRA test is a test used to test regression with moderating variables.

3. RESULTS AND DISCUSSION

3.1. Results

Based on a total of 14 Islamic Commercial Banks that will be tested in the 2013-2020 period, a total of 112 N are used. In this descriptive analysis, statistical results will be shown from the summary of the variables that will be tested in this study.

Table 2.
Analysis Descriptive

	ROA	Efficiency	Competition	Technology	Bank Size	CAR
Mean	1,12	89,35	0,55	26,94	29,94	29,33
Max	13,58	217,40	1,00	29,45	32,47	329,09
Min	-20,13	0,81	0,14	24,55	26,43	11,10
Std. Dev	3,90	30,43	0,20	1,26	1,26	39,38

Source: Eviews 12 Processed Data, 2022

Panel Method

Determination of the regression model was carried out using panel data estimation techniques with several tests, namely the Chow Test, Hausman Test and Lagrange Multiplier (LM) Test.

Table 3.
Regression Models

No	Test	Result	Criteria	Model
1.	Chow	0,0000	Prob<5%	Fixed Effect
2.	Hausmann	0,0004	Prob<5%	Fixed Effect
3.	LM	-	-	

Source: Eviews 12 Processed Data, 2022

Then the decision taken is to reject the selected H0 and H1. The selected model is the fixed effect model. In this study, the Lagrange Multiplier was not carried out because in the two previous panel data estimation tests it had been determined that the best model used in this study was the fixed effect model.

Classic Assumption Test

In the classic assumption test, several tests were carried out on the data used in this study, namely the normality test, multicollinearity test, correlation test, and heteroscedasticity test. This test was carried out with the aim of knowing whether the selected model, namely the Fixed Effect Model (FEM) can meet the BLUE requirements (Best Linear Unbias Estimator).

Normality Test

Table 4.
Normality Test

No	Test	Result
1.	Jarque-Bera	2,806907
2.	Probability	0,245747

Source: Eviews 12 Processed Data, 2022

Based on these results, it can be concluded that the probability value of jarque-bera is > 0.05, which means that the data is normally distributed.

Multicollinearity Test

The value seen is the Variance Inflation Factor (VIF). If the VIF value <10 then H0 is accepted or multicollinearity does not occur. If the VIF value > 10 then H0 is rejected or multicollinearity occurs.

Table 5.
Multicollinearity Test

No	Variable	VIF
1.	Efficiency	1,150760
2.	Competition	1,328381
3.	Bank Size	1,500365
4.	CAR	1,687718

Source: Eviews 12 Processed Data, 2022

Based on the test results above, it can be concluded that in the regression model used there is no linear relationship between the independent variables or multicollinearity does not occur.

Autocorrelation Test

The determination of the results of this test is assessed by looking at the Probability Chi-Square value. If the Prob value <0.05 then there is autocorrelation in the residuals. Meanwhile, if the Prob value is> 0.05, there is no autocorrelation in the residuals.

Table 6.
Autocorrelation Test

No	Value	Result
1.	Prob. Chi-Square	0,1344

Source: Eviews 12 Processed Data, 2022

There is no autocorrelation in the residuals.

Heteroscedasticity Test

The conditions based on

- Prob Value Breusch-Pagan LM < level of significance, then H0 is rejected which means there is a symptom of heteroscedasticity.
- Prob Value Breusch-Pagan LM > significance level, then H0 is accepted which means there is no heteroscedasticity.

Table 7.
Heteroscedasticity Test

No	Value	Result
1.	Prob. Chi-Square	0,2957

Source: Eviews 12 Processed Data, 2022

This value is greater than 0.05, which means that H0 is accepted, which means there is no heteroscedasticity.

Model Feasibility Test

Model Feasibility test was conducted to test the selected regression model. This test consists of a Hypothesis Test and a Determination Coefficient Test.

F-Test

Table 8.
F-Test

F-statistic	Prob (Statistic)
16,79468	0,000000

Source: Eviews 12 Processed Data, 2022

This value is lower than the significance level, or less than 0.05, which means that H0 is rejected, or the independent variable simultaneously influences the dependent variable.

T-Test

Table 9.
T-Test

No	Variables	Coefficient	t-statistic	Prob.
1.	X1	-1,031623	-6,223948	0,0000
2.	X2	-154,5637	-3,143691	0,0023
3.	X1Z	0,035842	5,811112	0,0000
4.	X2Z	5,916761	3,231164	0,0017
5.	K1	0,906044	1,381860	0,1704
6.	K2	0,034347	4,111856	0,0001

Source: Eviews 12 Processed Data, 2022

3.2. Discussion

Regression Model Equations

Fixed Effect Model

Y = 178,7822 – 1,031623X1 – 154.5637X2 + 0,035842X1Z + 5,916761X2Z + 0,906044K1 + 0,034347K2

The Influence of Efficiency on the Financial Performance of Islamic Banking in Indonesia

In this study it was found that the efficiency calculated by the BOPO ratio is negatively related to the financial performance of Islamic banking in

Indonesia. It means that if the BOPO value is high, the financial performance will be low, and vice versa.

This study concludes that efficiency has a significant negative effect on the financial performance of Islamic banking in Indonesia. In line with the research hypothesis which states that H1: Efficiency has a negative effect on the financial performance of Islamic banking in Indonesia. This is proof that H1 in this study is accepted.

The Effect of Competition on the Financial Performance of Islamic Banking in Indonesia

This study shows that competition has a negative and significant effect on the financial performance of Islamic banking in Indonesia. We can conclude that competition is a component that can affect the financial performance of Islamic banking in Indonesia. In Indonesia, competition has a significant and negative effect on financial performance which is calculated by ROA. This is in accordance with the hypothesis proposed by researchers, namely H2: Competition has a negative effect on the financial performance of Islamic banking in Indonesia. This means that Hypothesis 2 is accepted in this study.

The Effect of Innovation on Technology in Moderating Efficiency on the Financial Performance of Islamic Banking in Indonesia

The regression coefficient value is 0.035842 with a probability value of 0.000. The results of this study mean that innovation in technology can strengthen the efficiency variable significantly to its effect on the financial performance of Islamic banking in Indonesia. These results are in accordance with the hypothesis proposed by the researchers, namely H3: Technological innovation can moderate the effect of efficiency on the financial performance of Islamic banking in Indonesia. This proves that this hypothesis is accepted in this study.

The Effect of Innovation on Technology in Moderating Competition on the Financial Performance of Islamic Banking in Indonesia

In this study it was found that innovation in technology can moderate the effect of competition on financial performance. This is evidenced by the probability value of the second moderate variable which is worth 0.0017 or less than 0.05 which means that this variable is significant in moderating the competition variable on financial performance. This is in accordance with the hypothesisthat has been proposed by researchers, namely H4: Technological Innovation can moderate the influence of competition on the financial performance of Islamic banking in Indonesia. Proving that this hypothesis is accepted in this study.

The Coefficient of Determination Test

Table 10.

The Coefficient of Determination Test

Indicator	
R-Squared	0,7866832

Source: Eviews 12 Processed Data, 2022

Based on the result, it can be concluded that the variables of efficiency, competition, Bank Size, CAR and Innovation in Technology as moderation are able to explain the Financial Performance variable of 78.7%. While the remaining 21.3% is explained by other variables outside the model in this study.

4. CONCLUSION

This study aims to determine the relationship and examine the effect of efficiency, competition on the financial performance of Islamic banking with innovation in technology as a moderating variable. The concluded results are as follows:

Efficiency as calculated by the BOPO ratio has a negative effect on the financial performance of Islamic banking in Indonesia. This is because a good efficient indicator is the smaller the BOPO value the lower. This means that the lower the BOPO value, the more efficient the Islamic banking is. The more efficient the Islamic banking, the higher its financial performance.

Competition as measured by the Lerner Index has a negative effect on the financial performance of Islamic banking in Indonesia. This is because high competition indicates intense competition among Islamic banks in Indonesia, the higher the competition, the smaller the opportunity to gain. This indicates why in Indonesia competition is centered only on Islamic banking which has large capital.

Technological innovation can moderate the effect of efficiency on the financial performance of Islamic banking in Indonesia. This proves that technological innovation requires an amount of funds related to expenditure which is one of the determining factors for efficiency. Technological innovation strengthens the effect of efficiency on the financial performance of Islamic banking in Indonesia.

Technological innovation can moderate the effect of competition on the financial performance of Islamic

banking in Indonesia. One of the factors of today's high competition is that banks are flocking to provide innovation in the field of technology. This makes innovation important in increasing competition which results in a negative impact on the financial performance of Islamic banking in Indonesia.

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