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Indonesian Banking Policy in The Digital Era and Its Impact on Competition in the Banking Industry

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Abstract: The role of digitalization is increasingly shining along with the development of the world of technology. Technological developments have changed most of human life, the use of smartphones, computers, laptops, the internet, and interconnected applications allows *Business-to-business (B2B) and Business-to-customer* (B2C) *relationships to* run well. One of them is the development of information technology in the banking sector which encourages higher public needs for better financial access. The main policies taken by the Government and regulators in anticipating these changes must have an impact on the existence and competition of banks, especially entering the Bank 5.0 Era. In several developed countries, digital banking contributes to improved banking performance, which also aligns with improved banking performance in Indonesia. This research will also discuss the role of the government and regulators in anticipating technology Disruption in the Financial Services Industry (entering the Bank 4.0 era) and its impact on banking competition in the next 5 years.

This study aims to analyze the impact of technology disruption and banking digitalization and the role of the government in the competition of the banking industry, and also the national economy.

The methodology used in this study is quantitative approaches. A quantitative approach was chosen to analyze secondary data from various individual bank reports (2012 to 2022) using econometric methods with a panel data model.

The results of this study show that: (i). The 5 banks that dominate market share during the 2017.1 – 2022.4 period are BBRI (12,813%), BMRI (10,120%), BBCA (7,606%), BBNI (5,852%), and BNGA with a market share of 2,270%; (ii). Company Size, Capital Adequacy Ratio, Loan Deposit Ratio, and Net Interest Margin have a positive and significant effect on achieving banking efficiency that provides digital banking services. Meanwhile, Non-Performing Loans, BOPO, and Third-party funds have no effect on achieving efficiency for banks that provide digital banking services; (iii). Corporate Governance has been proven to have a positive effect on achieving banking efficiency that provides digital banking services; and (iv). Regulatory changes require the identification of a system change or the emergence of risks in the banking and financial services market. With a few exceptions, regulators are clearly not innovators, and therefore the regulator's response to innovation is to see it as a risk to banking and financial markets.

Keywords: Public Policy, IT Disruption, Banking Digitalization, Banking Competition

Introduction

Today, digitalization is increasingly contributing to global productivity and economic growth. It cannot be denied that the investment growth that is currently occurring; both in absolute terms and relative to tangible assets, is driven in part by the emergence of the digital economy (Bernini, et al., 2022). Likewise in the banking sector, the digital transformation that has occurred has placed services as the main growth factor to meet consumer demand (Manser, et al., 2021). However, there are still many obstacles on the organizational side (such as: structural, systemic, or strategic aspects of the organization, risk of abuse, network infrastructure, gaps, and others (Lähteenmäki

& Nätti, 2013), including governance, innovation, and resource performance, especially in developing countries that traditionally target the lower classes (Museba, 2021). The development of the banking digitalization trend is a concern for regulators, apart from existing opportunities and potential such as Digital Opportunity, Digital Behavior, and Digital Transactions (increasing E-Commerce, Digital Banking, and electronic money transactions) but on the other hand the emergence of risks in data problems, misuse of technology, third party risks (outsourcing) and so on, so a supportive regulatory framework is needed. On the other hand, regarding the performance of the financial sector, is certainly not only influenced by the credit side. What is no less important is the level of banking efficiency in running its business. This is because the more efficient a bank is, the more effective the implementation of monetary policy will be.

One measure of profitability is the Return on Assets (ROA) variable. This ROA value is also influenced by many factors such as: Bank size (Al-Jafri & Alchami, 2014., 2015; Chabachip et al., 2019, Non-Performing Loans (Karim et al., 2010a and 2010b; and Chabachip et al., 2019), Loan to Deposit Ratio (Paleni et al., 2017), even to the role of corporate governance/GCG (Haryati & Kritijadi, 2014; Iramani et al., 2018) and various other variables as controlling variables, such as Gross Domestic Product/GRDP. This research will try to examine and analyze the impact of the banking digitalization trend on banking competition and efficiency as well as strategies for facing competition in the service industry Finance in the Banking Era.

Theoretical Foundation

Bank Transformation and Efficiency

Bank transformation is defined as a change in form, strategy, culture, business, technology, and bank processes in a better direction in responding to future challenges, resulting in greater profitability. Even though it also encourages disruption in the banking industry, this transformation can provide new and better solutions to help manage financial problems. According to Berger et al. (1995), there are several factors underlying banking transformation, namely: (i). Financial innovation; (ii). Technical changes, such as the availability of ATMs, information exchange processes, telecommunications, and human resource skills; (iii). Liberalization; (iv). Competition; and (v). Regulatory changes. From the description above, it can be said that banking transformation is a process of change carried out by banks which is motivated by various conditions or factors that trigger it, one of which is related to technology, and influences how banks carry out their functions. Ultimately this will lead to high bank efficiency. Sufian & Muzafar (2009), Hadad (2003), and Lin et al (2009) state that there are two approaches to measuring banking efficiency, namely the production and intermediation approaches. According to Kwan (2002), the intermediation approach is widely used in bank efficiency research because it includes interest expenses which amount to half or two-thirds of total bank costs.

Banking Parameters

Based on previous research (Bambang, 2002) states that bank performance can be measured by its profitability, which ROA, ROE, and BOPO describe. ROA is a ratio used to measure net profits obtained from the use of assets and is useful for measuring the extent of the company's effectiveness in utilizing all resources it has. Meanwhile, Bambang (2002) says Return on Equity/ROE is a comparison between the amount of profit available to the owner of one party's own capital and the amount of their own capital that produces that profit or in other words profitability Own capital is the ability of a company with its own capital working within it to generate profits. The higher this ratio, the better because it provides a greater level of return to shareholders. As a comparison for this ratio is the risk-free interest rate, for example, the interest rate on Indonesian bank certificates (Darasono, 2005). An increasing ROE ratio shows an increase in shareholders which can increase stock returns. Return on Equity (ROE) is the company's ability to generate profits with its own capital. According to Samsyudin, (2004) ROE is a measurement of the income available to company owners (both ordinary shareholders and preferred shareholders) for the capital they invest in the company. According to Husnan & Enny (2004) it is a ratio that measures how much profit is the right of the owner of his own capital. The higher the level of ROE of a company, the better the return on funds invested.

Furthermore, according to Bank Indonesia regulations, BOPO is a comparison between total operating costs and total operating income. Operational efficiency is carried out by banks in order to find out whether the bank's operations related to the bank's main business are carried out correctly (in accordance with the expectations of management and shareholders) and is used to show whether the bank has used all its production factors appropriately and successfully (Marwadi, 2005). Thus, the operational efficiency of a bank as proxied by the BOPO ratio will affect the bank's performance.

This ratio, which is often called the efficiency ratio, is used to measure the ability of bank management to control operational factors on operational income. The increasing ratio reflects the bank's lack of ability to reduce operational

costs and increase operational income, which can lead to losses because the bank is less efficient in managing its business (SE. Internal BI, 2004). Bank Indonesia determines that the best figure for the BOPO ratio is below 90%, because if the BOPO ratio exceeds 90% to close to 100% then the bank can be categorized as inefficient in carrying out its operations. Operating income is the sum of total interest income and total other operating income. Furthermore, according to Brigham & Houston (2010: 4), firm size shows the size of the company as shown by total assets, total income, and earnings after tax. In this research, the firm size used comes from the total assets of each bank.

Digitalization Strategy

Digital strategies have become increasingly popular in various industries but are still in the introduction and growth stages (Schallmo, et al 2018). The naming of "Digital Strategy" still varies: some use the concept of "Digital Business Strategy", and there are also "Digital Transformation Strategy", but all of these concepts talk about the same phenomenon. The digital strategy infrastructure is the internet, which practically everyone can get access to. If the internet is hardware that provides connectivity, digital technology is the capability to process data with software to develop digital strategies (Sheperd & Henderson, 2019). Digital synergy acts as a window to see external market or consumer conditions, as well as see the company's internal conditions for use in company activities. Regarding external conditions, digital strategies can dig up information to find out market opportunities, whether they are growing or being disrupted by alternative products.

Regarding the company's internal conditions, digital strategy can provide an indication of marketing capabilities to serve the market. The domain of digital strategy is identifying key opportunities and/or challenges in business, identifying unmet needs and targets from external interests (consumers as online assets), and developing capabilities to take online initiatives. There are many approaches to conducting digital strategy, but essentially, they all go through 4 steps: (i). Identify opportunities and challenges in the online asset business that can provide solutions; (ii). Identify unmet needs and goals and external stakeholders closest to key business opportunities and/or challenges; (iii). Develop a vision of how online assets will meet the needs, goals, opportunities, and challenges of those business and external stakeholders; and (iv). Prioritize a series of online initiatives that can make this vision a reality. There are several drivers of digital transformation that need to be paid attention to, according to Hyvonen (2018) and Makinen (2017), as listed in the table1 below.

Table 1. Driver Table of Digital Transformation

Dimension	The Motor of Digital Transformation
External pressure for change	Changes in consumer desires
	Response to competitive pressures from the market
	Maintain a long-term competitive position
	Increased competition due to public regulations
	The end of the system life cycle
	Companies are expected to anticipate the future needs of consumers
	Globalization
	Innovation by start-up
Internal pressure for change	Find new sources of growth
	Find ways to lower costs
	Promotion of top management's vision
	Declining sales and financial pressure from today's core business
	Efforts to improve efficiency, productivity, innovation, corporate social responsibility, and other public

Source: Pasaribu (2020)

The end of the system life cycle Companies are expected to anticipate future needs from consumers Globalization Innovation by start-ups Find new sources of growth Find ways to lower costs Promotion of top management's vision Declining sales and financial pressure from today's core business. Efforts to improve efficiency, productivity, innovation, corporate social responsibility, and others

Empirical Study

The results of several previous studies and research as well as several works of literature, show that with the development of IT Disruption, which drives innovation in banking digitalization, it turns out that it is able to fulfill customer satisfaction which makes them trust and have loyalty which results in repeat purchases. Brodie et al. (2011) show that if a company can increase customer commitment to the product, it will create opportunities for customers to have repeat interactions. Brodie et al. (2011) also mention that loyalty, satisfaction, consumer empowerment, emotional bonds of trust, and commitment are the main outcomes of consumer interactions with banks. Engagement is largely based on customer satisfaction (see also: Butcher et al., 2001 and Rauy Ruen et al., 2007).

The importance of the relationship between consumers and banks is discussed in a study by Jemric & Vujcic (2002), where performance indices for banks are investigated in terms of customer retention and monthly costs incurred. From repeat customer purchases, income will increase, this shows that banking performance is increasing. Banking performance is measured using profitability (showing whether the company's performance is in good condition and profitable for its shareholders. Meanwhile, bank size also influences efficiency (Halkos & Salamouris (2001), Girardone et al. (2007), Dellis & Papanikoloau, (2009), and Ab-Rahim et al. (2012)). NPLs were also found to have a significant influence on the level of banking efficiency (Jemric (2002) on Banks in Croatia, Abd-Karim et al. (2010) in Malaysia & Singapore, and Widiarti, et al. (2015) in Indonesia. The CAR variable on the level of banking efficiency (Aini (2013) and Widiarti et al. (2015).

LDR is also considered to be one of the determinant factors of the level of banking efficiency (see; Widiarti et al., 2015 and Pambuko, 2016). The Deposit variable has a significant effect on Efficiency (Pambuko (2016). The NIM variable has a significant effect on Efficiency (Kurniawan & Mahardika (2021). The GCG variable has a significant effect on Efficiency (Podpiera, et al, 2008; Wanniarachchige & Suzuki, 2010; Fungacova, et al, 2013; Arrawatia, et al, 2015; and Pracoyo, 2022). The efficiency variable has a significant effect on banking competition.

Research Methodology

This research is research with a quantitative approach using panel data regression analysis to analyze and examine the determinants of bank efficiency, performance, and profitability. The type and source of data used is secondary data with the research year 2017-2021. The population used in this research were all 107 banks consisting of government banks (4), regional development banks (26), national private banks (69), and foreign banks (8). The data period taken is the 2017-2021 data period.

To estimate model parameters with panel data, there are several techniques offered, namely fixed coefficients over time and individuals (Common-Effect)/Ordinary Least Square. This technique is no different from making regression with cross-section or time series data. Before creating a regression, you must combine cross-section data with time series data (called pool data). Then this combined data is treated as a single observation to estimate the model using the OLS method. As mentioned above, this method is known as Common Effect estimation. However, by combining the data, one cannot see the differences; both between individuals and over time. It is assumed that data behavior between companies is the same over various time periods. Assuming that α and β will be the same (constant) for each time series data across the section, then α and β can be estimated with the following model, namely by using NxT observations. Therefore, there are 2 regression models as below:

Model 1: $Y = \alpha + \beta 1X1it + \beta 2X2it + \beta 3X3it + \beta 4X4it + \beta 5X5it + \beta 6X6it + \beta 7X7it + \beta 8X8it + \varepsilon it$

Model 2: $\cup = \theta o + \theta 1\, Y + \mu it$

Y= Efficiency Bank; X_1 = Size/Total Aset; X_2 = NPL/Non Performing Loan; X_3= CAR/Capital Adequacy Ratio; X_4 = LDR/Loan to Deposit Ratio; X_5= BOPO/Operating Income Ratio; X_6= DEP/Deposit on Thirds party fund; X_7= NIM/Net Interest Margin; X8 = GCC/Good Corporate Governance; ∪ = Banking competition; α, β, θ = constants; ε, μ = error term

Research Results and Discussion

Model Selection Test

Before testing the theoretical hypothesis, for the panel regression model, the appropriate model is first selected, namely by using testing stages, namely Chow Testing (table 2.), Hausman Testing (table 3.), and LM Testing (table 4.).

Table 2. Chow Test

Effects Test	Statistic	d.f.	Prob.
Model Efficiency			
Cross-section Chi-square	319.394	13	0.0000
Model Competitive			
Cross-section F	3.820	(37,146)	0.0000
Cross-section Chi-square	8.013796	13	0.8427

Source: data processed

Table 3. Hausman Test

Effects Test	Statistic	d.f.	Prob.
Model Efficiency			
Cross-section random	31.149396	8	0.0001

Source: data processed

Table 4. LM Test

Effects Test	Statistic	Prob.
Model Competitive		
Breusch Pagan	7.058191	0.0079

Source: data processed

Chow's test results concluded that the correct model was the Fixed Effect Model (FEM). For this reason, the Hausmann test was carried out and the FEM model was selected. The LM test was carried out for the Competitive model because, from the results of the Chow test, CEM was selected. The results of LM testing processing using Breusch Pagan concluded that for the competitive model, REM was used as a suitable model.

Hypothesis Test

From the model selection test, the appropriate model for the Efficiency equation is FEM while for the Competitive equation is REM.

Testing the Coefficient of Determination (R^2)

The coefficient of determination is used to determine how much variation or behavior of the independent variable is able to explain the dependent variable in a model. The results of testing the coefficient of determination are shown in table 5., with the following explanation: a. For the efficiency model, the adjusted R^2 value is 0.810, which means that the variation or behavior of the independent variables, namely SIZE, NPL, CAR, LDR, BOPO, DPK, NIM, and GCG, is able to explain the variation or behavior of the dependent, namely efficiency of 81%, while the remainder is 100. - 81 = 19% is a variation from other independent variables that influence Efficiency but are not included in the model. This condition shows that the efficiency model has a good goodness of fit model; and b. For the Competitive model, the coefficient of determination value is 0.0011, which means that the variation in the behavior of the independent variable, namely efficiency, is able to explain the variation or behavior of the dependent variable, namely competitive (banking competition), which is 0.11% and the remaining 99.09% is the variation in the independent variable. others that influence competitiveness but are not included in the model. The low R^2 value for the Competitive model can be understood considering that the factors that influence competition are very complex, especially those related to macroeconomic conditions such as goods markets, money markets, capital markets, and foreign exchange markets. This research only limits the influence of competitiveness from one aspect, namely the achievement of efficiency achieved by each bank that provides digital services.

Table 5. The Result of the Coefficient Determination (R^2) Test

Model	R^2
Model Efficiency	0.825
Model Competitive	0.0011

Source data: diolah dengan EViews9

Global Testing (F Test)

Global testing or F-test is carried out only for multiple regression models with more than 1 independent variable, namely in the Efficiency model, while global testing is not carried out for the Competitive model because it only consists of one independent variable. The processing results for the F test can be seen in table 6. From the processing results, the p-value of F is 0.0000 < 0.05, which means that Ho is rejected (Ha is accepted), so it can be concluded that the efficiency model has proven that there are at least independent variables that have a significant effect on the dependent variable.

Table 6. F-Test Result (Global Test)

odel	F-Value	Sig-Value
Model Efficiency	57.93563	0.0000

Source: Data Processed

Partial Testing (t-Test)

Efficiency Model

Partial testing is carried out to test the influence of each independent variable on the dependent variable. The results of partial test processing for the efficiency model and competitive model can be seen in Table 7

Table 7. Results of t-Test Model Efficiency

Variable	Model Efficiency		
	Coefficient	$t_{statistic}$	p-value
SIZE	0.355	6.088	0.0000**
NPL	-0.051	-0.512	0.6088
CAR	0.123	2.019	0.0444**
LDR	0.031	2.418	0.0163**
BOPO	-0.005	-0.475	0.6351
DPK	0.009	1.543	0.1239
NIM	0.008	2.536	0.0118**
GCG	0.015	1.907	0.0575*

*=alpha 10% *=alpha 5%**

Source: Data processed

#Hypothesis 1

Hypothesis 1 aims to test the effect of company size on efficiency. From the processing results, an estimated coefficient value of 0.355 is obtained, which means that increasing company size will increase efficiency and conversely decreasing company size will reduce efficiency. The statistical t value of 6.088 produces values of 0.000 < 0.05, which means that Ho is rejected and Ha is accepted, so it can be concluded that it is proven that company size has a positive and significant effect on the efficiency achievements of banking companies in carrying out their business operations.

#Hypothesis 2

Hypothesis 2 was carried out with the aim of testing the effect of NPL on efficiency. The processing results obtained an estimated coefficient value of -0.051, which means that increasing NPL will reduce efficiency and conversely decreasing NPL will increase banking efficiency. The statistical t value is -0.512 with values of 0.608 > 0.05, which means Ho is accepted so it can be concluded that it is not proven that NPL has a significant effect on the efficiency achievements of banking companies in carrying out their business operations.

#Hypothesis 3

Hypothesis 3 was carried out with the aim of testing the effect of capital adequacy (CAR) on efficiency. The processing results obtained an estimated coefficient value of 0.123, which means that increasing CAR will increase efficiency and conversely decreasing CAR will reduce efficiency. The statistical t value of 2.019 produces values of 0.044 < 0.05, which means Ho is rejected and Ha is accepted so it can be concluded that it is proven that CAR has a positive and significant effect on the efficiency achievements of banking companies in carrying out their business operations.

#Hypothesis 4

Hypothesis 4 aims to test the effect of LDR on efficiency. From the processing results, an estimated coefficient value of 0.031 is obtained, which means that increasing LDR will increase efficiency and conversely decreasing LDR will reduce banking efficiency. The statistical t value of 2.418 produces values of 0.0163 < 0.05, which means Ho is rejected and Ha is accepted so it can be concluded that it is proven that LDR has a significant positive and significant effect on the efficiency achievements of banking companies in carrying out their business operations.

#Hypothesis 5

Hypothesis 5 was carried out with the aim of testing the effect of BOPO on efficiency. From the processing results, an estimated coefficient value of -0.005 is obtained, which means that increasing BOPO will reduce efficiency and conversely decreasing BOPO will increase banking efficiency. The statistical t value of -0.475 produces values of 0.635 > 0.05, which means Ho is accepted so it can be concluded that it is not proven that BOPO has no significant effect on the efficiency achievements of banking companies in carrying out their business operations.

#Hypothesis 6

Hypothesis 6 was carried out with the aim of testing the effect of DPK on efficiency. The processing results obtained an estimated coefficient value of 0.009, which means that increasing deposits will increase efficiency and conversely decreasing deposits will reduce banking efficiency. The statistical t value of 1.543 produces values of 0.123 > 0.05, which means that Ho is accepted so it can be concluded that it is not proven that DPK has no significant effect on the efficiency of banking companies in carrying out their business operations.

#Hypothesis 7

Hypothesis 7 was carried out with the aim of testing the effect of NIM on efficiency. From the processing results, an estimated coefficient value of 0.008 is obtained, which means that increasing NIM will increase efficiency and conversely decreasing NIM will reduce banking efficiency. The statistical t value of 2.536 produces values of 0.011 < 0.05, which means that Ho is rejected and Ha is accepted, so it can be concluded that it is proven that NIM has a significant positive effect on the efficiency achievements of banking companies in carrying out their business operations.

#Hypothesis 8

Hypothesis 8 was carried out with the aim of testing the effect of GCG on efficiency. The processing results obtained an estimated coefficient value of 0.015, which means that increasing GCG will increase efficiency and conversely decreasing GCG will reduce banking efficiency. The statistical t value of 1.907 produces values of 0.0575 < 0.10,

which means Ho is rejected and Ha is accepted so it can be concluded that it is proven that GCG has a significant positive effect on the efficiency achievements of banking companies in carrying out their business operations.

Competitive Model

Partial testing is carried out to test the influence of each independent variable on the dependent variable. The results of partial test processing for the efficiency model and competitive model can be seen in Table 8.

Table 8. t-Test Result of Model Competitive

Variable	Model Competitive		
	Coefficient	t-statistic	p-value
Efficiency	-0.022	-3.224	0.0000*

*=alpha 10% **=alpha 5%*
Source: Data processed

#Hypothesis 9

Hypothesis 9 was carried out with the aim of testing the influence of the competitiveness efficiency of the banking industry. The results of the processing obtained an estimated coefficient value of -0.022, which means that increasing efficiency will reduce the Competitive value, and conversely, decreasing efficiency will increase the Competitive value. The statistical t value of -3.224 produces a p-value of 0.0014 <0.05, which means Ho is rejected and Ha is accepted so it can be concluded that it is proven that efficiency will further increase the competitiveness of the repair industry significantly.

Discussion Analysis

The test results on the efficiency model for hypothesis 1 resulted in the conclusion that company size was proven to have a significant positive effect on achieving banking efficiency that provides digital services in carrying out its business processes. These findings are in line with existing data where banks that have a larger size achieve higher efficiency as a form of banking success in managing their business processes. The results from Figure 4.25 show that there is a positive relationship between companies with a higher size which will result in higher efficiency achievements and vice versa. The results of these findings indicate that achieving the level of banking efficiency can be seen from the bank's ability to manage its business processes and this condition can be seen whether banking has experienced significant development over time by looking at the parameters of company development over time. Total Assets as a proxy for Firmsize can be proven to stimulate the achievement of the level of efficiency possessed by banks that provide digital services.

Conclusions and Suggestions

Conclusion

Some conclusions obtained from the results of this research are:

1. Banks that provide digital banking services dominate the banking market share in Indonesia. The 5 banks that dominate market share during the 2017.1 – 2022.4 period are BBRI (12.813%), BMRI (10.120%), BBCA (7.606%), BBNI (5.852%) and BNGA with a market share of 2.270%;
2. Company Size, Capital Adequacy Ratio, Loan to Deposit Ratio, Net Interest Margin, and Good Corporate Governance are proven to have a significant effect on achieving banking efficiency that provides digital banking services. Meanwhile, Non-Performing Loans, BOPO, and Third-Party Funds have no effect on achieving efficiency for banks that provide digital banking services; and
3. Regulatory changes require the identification of a system change or the emergence of risks in the banking and financial services market. With a few exceptions, regulators are clearly not innovators, and therefore the regulator's response to innovation is to see it as a risk to banking and financial markets.

Suggestion

Some suggestions from the results of this research are: (i). Because this research is limited to banks that provide digital banking services, for further research to be more comprehensive, it is necessary to conduct comparative research based on book bank groups, as well as groups providing digital banking and non-digital banking services; (ii). Regulators need to encourage leaders of banking institutions to focus on technology-based or digital-native supervision, rather than process-based policies and regulations; (iii). To support bank competitiveness and innovation, adjustments are needed to the licensing mechanisms and classification of products or activities that banks can carry out; and (iv). It is hoped that banking policies and regulations that have been and will be issued in the future will provide space for innovation and continue to prioritize prudential aspects so that banking stability can always be well maintained.

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