



The Influence Of Financial Technology (Fintech) Using Dig2 And Gdp Variables On Bank Efficiency In Indonesia

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Abstract. The number of electronic money and FINTECH institutions is increasing rapidly, but this opens up opportunities for illegal FINTECH institutions. Not only that, there is the risk of data fraud and data use violations (breach), To measure the health of FINTECH, DIG2 variable shows the ratio of IT costs to total operating costs generated from secondary data. and GDP is an important indicator for measuring economic health. country. The sample in the research was selected based on core capital, there were 4 commercial bank companies from each book bank 1, 2, 3, and 4 with a total of 8 commercial bank companies. This research methodology uses intermediation efficiency with data processing data envelopment analysis (DEA) from the data. The efficiency value is obtained with the input, aka total three-party funds, while the result is operating profit without interest, and credit provided. From these results, the Y variable is used as an influence, and the DIG2 and GDP variables are X and then the influence is tested with data. panel regression. As for the results of the results of bank intermediation efficiency levels, there are efficient values in book 3 banks, such as OCBC NISP, Tbk, BTPN, Tbk, and Permata Bank., while for book 2 and book 4 banks the values can be said to be efficient, in the relationship regression results between DIG2 as digital technology financing itself has positive results, while for the GDP value coefficient it has negative results or no increasing effect on bank efficiency, while simultaneously for the DIG2 variables digital technology costs and GDP have positive coefficient results.

Keywords: Banking; Efficiency; DIG3; GDP.

1 Introduction

At the end of 2019, China became the first country to notify the World Health Organization (WHO) of pneumonia in Wuhan, Hubei Province, China. A total of 12 out of 44 pneumonia cases were found in Wuhan City, China, on the last day of 2019. Initially, the cases were thought to be linked to traditional markets selling fish and other marine animals. On January 10, 2020, the cause of the infection began to be identified, and it was discovered that the cause was a new coronavirus, whose genetics have been revealed. The World Health Organization (WHO) declared this coronavirus case a global emergency at the end of January 2020, and on February 11, 2020, WHO gave the name COVID-19. According to Worldometer, to date the number of positive cases has

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reached 168,000,175 people, with 3,487,572 deaths and 149,342,494 people who have recovered. [1].

Based on Indonesian BPS survey data, the ICT indicator that shows the most significant growth is household internet use, which reached 78.18 percent in 2020. This increase was also followed by growth in cellular telephone use, which in 2020 reached 62.84 percent. In addition, computer ownership in households also increased, reaching 18.83 percent in 2020. Internet use by the population continued to increase during the 2016-2020 period, with the number of people who have internet access increasing from around 25.37 percent in 2016 to 53.73% in 2020. In contrast, household ownership of fixed-line telephones has decreased, from 3.49 percent in 2016 to 1.65 percent in 2020.

According to Bank Indonesia (BI) data from August 2021, the value of electronic financial transactions has increased by 43.66% year-on-year to reach IDR 24.8 trillion. Apart from that, the value of digital banking transactions in the previous month also increased by 39.39 percent YoY, reaching I DR 17,901.76 trillion, which was accompanied by developments in financial technology marked by the increasing number of licensed fintech startups. As an association, AFTECH members account for 80% of all fintech startups licensed in Indonesia. The number of startup AFTECH members increased by 54% by the end of 2019. By the end of 2020, the number of members had increased by 54%, there was an increase of 56.7%, with a total of 362 startup members (Indonesian Fintech Association (AFTECH) 2020).

The problems that exist in financial technology cannot be separated from several weak government regulations, especially in the banking sector, apart from increasing use due to the effects of the pandemic, the following are the hot issues that have been put forward to the public and have been summarized by the author:

- a. According to the records of the Financial Services Authority (OJK), there were 1,490 illegal fintechs in 2021. This number is an increase compared to the previous year of 1,026 companies, there is a chance that illegal fintechs could violate the rules of business ethics[2].
- b. Continuously driven innovation means that various business models in the fintech sector continue to develop. There are peer to peer (P2P) lending, marketplaces for investment, digital transactions and even equity crowd-funding. The general aim of innovation is to create conditions so that the business sector can develop well.[3]
- c. The existing system in the application of fintech itself has an influence on consumers[4]in his research, he explained that the level of public trust and security in fintech was still 31.2%.

A bank is an organization that uses inputs to achieve outputs. The efficiency of a bank can be measured based on its ability to utilize available inputs to produce optimal output. The DEA (Data Envelopment Analysis) method is used to compare banks' ability to produce maximum output by utilizing the resources they have. This is the reason for using the DEA method to evaluate performance, as each bank is considered a decision making unit (DMU).

In an oligopoly market or industry, maintaining market share is a strategy of expanding, or at least maintaining, market share in order to remain competitive or lose market power, according to economic theory [5]. Next, this study will review the theoretical and practical literature, hypothesize why banks should use digital banking technology, and provide an overview of bank efficiency indicators using data envelopment analysis (DEA) techniques. Finally, we will create an empirical model, and describe the model and data used in this study, and at the end of the section, we will discuss the empirical results on how digital banking affects bank efficiency and the impact of digital banking.

Transaction costs for buyers and sellers include agent commissions and closing costs, including title searches, appraisals, and government fees. In addition, there are also payments received by banks and brokers in exchange for their role. The time and labor required to transport goods or commodities over long distances is another type of transaction cost. Investors pay close attention to transaction costs because they are a major component that affects net returns. Fees lower returns, and ultimately, high transaction costs can result in hundreds of thousands of dollars in losses, not only because of the out-of-pocket costs but also because it reduces the amount of investment capital available. Additional costs, such as mutual fund expenditure ratios, have the same effect. The standardization of transaction costs differs for different asset classes.

[6] Digital finance, also known as fintech, is financial services that are delivered with minimal cash and traditional bank branches using digital infrastructure such as mobile phones and the internet. By using the digital national payment infrastructure, individuals and companies can easily make transactions via phone, computer, or cards used at POS. Definitions cover many topics:

- all types of financial services, including payments, savings, credit, insurance, and all financial products.
- as well as all types of users, including individuals from different economic classes, companies of different sizes, and governments;
- all types of financial service providers, including banks and payment service providers, other financial institutions, telecommunications companies, new fintech companies, shops and more

According to the Secretary General of the International Association of Insurance Supervisors, a member or organization of the Financial Stability Board (FSB), fintech is technology that enables innovation in financial services. It leads to new business models, applications, programs, and products in financial services, which can have a major impact on financial markets, institutions, and the provision of financial services.[6] Fintech is a term that refers to companies that combine new and innovative technologies with financial services. As new entrants to the financial market, Fintechs aim to attract customers with goods and services that are easier to use, efficient, transparent, and automated compared to those currently available[6]. The following figure illustrates these categories and provides a detailed overview of existing industry subsegments.

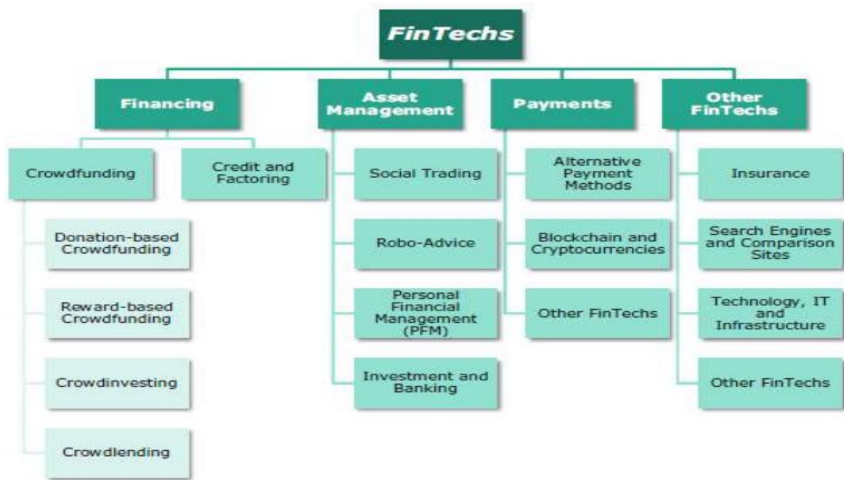


Fig. 1. Fintech Industry Classification

The financing sector includes fintech segments that provide funds to individuals and companies.. This segment is divided into fintech which provides services based on the contribution of many people (crowdfunding subsector) and fintechs that provide credit or factoring services without involving public participation). Fintechs that offer advice, asset management, and personal wealth indicators fall under the asset management segment. In addition, this segment is divided into more specialized subsections.

Fintech companies that provide personal financial planning services are part of the personal financial management subsegment, primarily concerned with managing and displaying financial information through software or application-based services. Portfolio management systems that offer investment advice based on algorithms and are largely automated, as well as occasionally performing investment decision-making, fall under the robo-advisor subsection. The payments segment includes fintech whose services relate to payment transactions, national and international. Below is a subsection of blockchain and cryptocurrencies, which includes fintechs that offer virtual currencies (cryptocurrencies) in place of traditional fiat money, enabling the storage, use and exchange of cryptocurrency as legal tender.[7]

Efficiency from an economic and production perspective are two common concepts of efficiency in economic theory, looks broadly at the allocation of resources in an economy that brings prosperity to society[8]. The concept of efficiency comes from micro-economic theory, namely producer theory and consumer theory. According to producer theory, producers seek to increase profits and reduce costs. However, according to consumer theory, customers seek to maximize their benefits or satisfaction. In producer theory, it is known that there is a production frontier line. The concept of efficiency only looks at technical and operational relationships in the production process, such as the conversion of inputs into outputs[9].

Apart from being a way to improve the effectiveness of financial politics, To assess bank performance, efficiency is also an important indicator. Efficiency consists of two aspects, namely cost efficiency, or profit efficiency, and profit efficiency, or profit efficiency. Then profit efficiency is divided into two, namely standard profit efficiency and alternative profit efficiency.[10].

1. A metric known as cost efficiency is used to measure the level of operating expenses of a bank compared to a bank with best practice costs-also known as cost efficiency-that has the same technology and produces the same output.
2. Profit efficiency standard is a measure of bank efficiency based on the bank's ability to generate the highest level of profit at a certain output price level. This is compared to the profitability levels of the top operating banks—also known as practice banks—in the sample. In truly competitive market conditions, where input and output prices are decided by the market, this model is often associated.
3. Effectiveness of Alternative Income, often assoc
4. related to uncompetitive market conditions where banks are considered to have market power to determine input prices, but not output prices.

Efficiency measurements are carried out through three approaches[11], namely:

1. The ratio method assesses the level of efficiency by calculating the ratio between inputs and outputs used. The calculation results will reflect high efficiency, if the output is maximum with minimum input.
2. Regression methods measure efficiency by using models of specific output levels as a function of different input levels. This is the way to write a regression equation:

$$Y = f(X_1, X_2, X_3, X_4... \quad X_n)$$

Where :

Y = output X = input

According to the Financial Services Authority (2016), the Fintech industry faces the following problems:

1. Regulations to Support Fintech Development. It discusses how we create regulations on digital signatures and the use of digital documents to maximize opportunities for the Fintech industry.
2. To maximize the potential of Fintech in a complex business environment, various institutions and agencies must work together.

According to the Financial Services Authority (2016), Fintech users face the following threats:

1. Protection of user funds. Possible loss of money or impairment of financial ability due to wrongful Fintech actions, fraud, or natural accidents
2. User Data is protected. Fintech users are vulnerable to data misuse, either intentionally or unintentionally, such as hacking or malware.

Fintech developments in Indonesia have a significant impact, especially in terms of transactions and payments. With high population mobility, the need to support every transaction carried out also increases, and this need can be met comprehensively through technology in the financial sector. According to the Financial Services Authority (OJK), Fintech has several functions in Indonesia, namely (a) encouraging the same level of social welfare, (b) fulfilling domestic needs that are still very large, (c) encouraging the unfair distribution of national money on more than 17,000 islands, (d) increasing national financial inclusion, and (e) increasing the export capabilities of MSMEs which are still very low.

Fintech developments currently include services such as e-Money, GOPAY, OVO, and will likely continue to develop with various other payment instruments. Meanwhile, technology-based payment instruments issued by banks and widely used today are Credit Cards and Debit Cards.

Financial Technology (Fintech) Classification

1. Fintech helps connect investors and investors, such as e-commerce markets like crowdfunding and peer-to-peer lending. OJK (Financial Services Authority) regulates crowdfunding and peer-to-peer lending.
2. Market Aggregator: Fintech will function as a financial product comparator by collecting and aggregating financial data for use by users as a reference. It can also be referred to as a financial aggregator or comparison site.
3. Risk and Investment Management, also known as Fintech, plays the role of a digital money manager. According to the requirements provided, users will be assisted in determining the most suitable investment product.
4. Payments, Settlement and Clearing, Fintech: Payments such as payment gateways and e-wallets fall under this category. BI (Bank Indonesia) oversees this category as this payment process also includes money circulation which will be the responsibility of Bank Indonesia.

One analytical approach is data envelopment analysis (DEA). Thanassou-lis [12] talk about the use of DEA especially for the banking sector. The DEA is used to evaluate individual banks both at the bank level and at the branch level. Eight studies have been conducted on the use of DEA to assess bank efficiency at the branch level. In a recent study, the citations network analysis method [5] was used to examine 620 journal articles indexed in the web science database from 1985 to April 2016. The results showed that researchers most frequently used the data envelopment analysis (DEA) method to evaluate the level of bank efficiency from both sides.³

DEA assesses the ability of each bank to produce the best possible output using available resources, as expected of each bank as a decision-making unit (DMU). As stated by [5], these are the reasons for using the Data Envelopment Analysis (DEA) technique

to measure performance. DEA is a linear program created by Charnes, Cooper, and Rhodes in 1978, and is based on research conducted (Farrell, 1957). The DEA method is very popularly used to measure and evaluate the efficiency of DMUs, especially for the banking sector. Academics and practitioners often use DEA as an efficiency meter to measure bank efficiency at the banking industry level using banks as DMUs, as well as at the individual bank level using branch offices or bank business units as DMUs.

Application of Financial Technology (FINTECH)

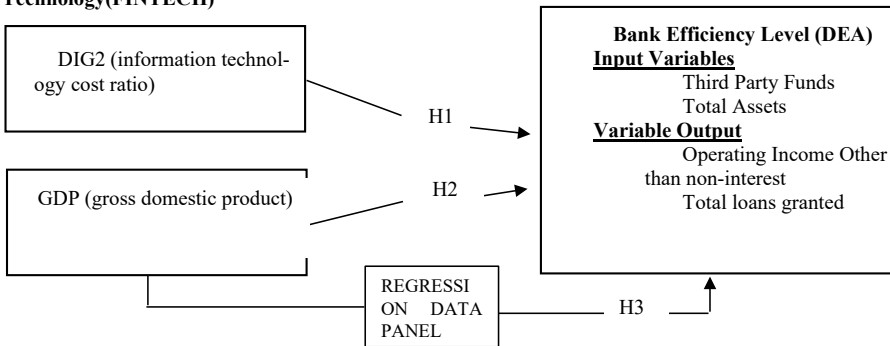


Fig. 2. Framework

H1 = It is suspected that financial technology (FINTECH) using the DIG2 variable partially has a positive and significant effect on bank efficiency

DIG2 is the percentage of IT costs to total operating costs created from secondary data collected by the Financial Services Authority (OJK). Financial Services Authority Regulation (POJK) number 12/POJK.3/2018, which regulates the implementation of digital banking services by commercial banks, emphasizes the increasingly fierce competition in the financial services industry and encourages banks to improve the quality of services to customers more efficiently and productively, and ensure service continuity. This is an effort to increase bank capabilities and make optimal use of developments in information technology to support banking service innovation. In this case, In order to encourage better customer financial management, banks need to provide access to information technology-based banking services that are easily accessible without restrictions on place and time.

According to research by Nwankpa and Roumani (2016), According to Kurniawan et al. (2021), digital transformation is a sociocultural process of adapting companies to new organizational forms and the skills needed to remain viable and relevant in the

digital landscape. Thus, the author wants to know the application of digital transformation.

Referring to Wirdiyanti's (2018) research, this research uses digital technology as one of the variables that has an influence on banking efficiency in Indonesia. Therefore, the author wants to know whether the advancement of digital technology affects the efficiency of Indonesian banks. Because several studies have discussed the development of FINTECH in recent years, such as in research by Mawarni et. al. (2021), Mutisari (2020) explains how the development of digital technology in the banking industry has grown rapidly, especially during the COVID-19 pandemic.[14]

H2 = It is suspected that financial technology (FINTECH) using the GDP variable partially has a positive and significant effect on bank efficiency

GDP, Real Gross Domestic Product: GDP is the market value of all final (Final) goods and services produced in a country in a period. GDP is an important indicator to measure the economic condition of a country. It will be easier for banks to run their business in developing countries, rather than operating in countries that are experiencing an economic recession. According to Mankiw (2014), Using the following equation, the components of GDP can be explained:

$$Y = C + I + G + NX$$

Where :

Y = GDP

C = Consumption (C)

I = Investment, State Expenditure

NX = Net Exports

Banks operating in countries with higher GDP growth will be more competitive as higher economic growth rates attract investors to set up new businesses, both local and international. Several other studies that use GDP as a variable measuring banking efficiency include Batir et al (2017), Pambuko (2016), Marsodang et al (2019), Fitroh et al (2020). According to Repkova (2013), GDP growth has a significant negative effect. An increase in GDP will attract more investors to establish new banks, both local and international. As a result, competition will increase between banks operating in GDP growth countries. These results are also in line with the results of research conducted by Batir et al (2017) and Pambuko (2016) which explains that there is a negative influence between GDP growth and banking efficiency. Based on this, the author uses this variable as a variable for external factors that influence banking efficiency in Indonesia. This refers to the research of Wirdiyanti (2018), Marsondang (2019), Meyliana (2017), Sujarwo (2018), Fitroh (2020).[15] [16][17].

H3 = It is suspected that financial technology (FINTECH) using the DIG2 and GDP variables simultaneously influences bank efficiency

2 Method

2.1 Data Usage

In this study, a quantitative approach was used. This approach is a type of research that tests theories by calculating research variability and analyzing data through procedures.[18]

Table 1. Number of Commercial Banks Based on Core Capital

Bank Group / Group of Banks	December 2021			
	< Rp. 1 trillion (BOOK 1)	Rp. 1 to 10 trillion (BOOK 2)	Rp. 10 to 50 trillion (BOOK 3)	> Rp. 50 Trillion (BOOK 4)
Bank Performance 1	-	20	51	4
Bank Performance 2	-	-	5	11
Bank Performance 3	-	-	-	12
Bank Performance 4	-	-	-	4
Total	-	20	56	31

Source: OJK Indonesian Banking Statistics 2021

According to statistics on banking in Indonesia, as of December 2021, there were 115 banks in Indonesia that were categorized according to core capital performance: BUKU 1 does not exist, BUKU 2 does 20, BUKU 3 does 56, and BUKU 4 does 31. Although it is a small pool, BUKU 4 organizes and manages 50.5% of the total assets held by the Indonesian banking sector, with a core capital of more than 3 billion.

The object of research is commercial banks registered with Bank Indonesia (BI) in the BUKU 4 bank category (5 banks) from 2019 to 2021. Primary data were collected using purposive sampling techniques from financial reports accessed through the official websites of Bank Indonesia, the Financial Services Authority (OJK), and the Central Statistics Agency (BPS). Over the past three years, the Indonesian banking industry has seen a rapid increase in the adoption of digital banking technology. The following is a selection based on the four main pillars used in this study:

Table 2. Bank Sample

No	BANK BOOK 2	BANK BOOK 3	BANK BOOK 4
1	JP. Morgan Chase Bank, NA	Bank OCBC NISP, Tbk	PT Bank Rakyat Indonesia Tbk
2	Bank Shinhan Indonesia	The Bangkok Bank Comp. Ltd	PT Bank Mandiri Tbk (BMRI)
3	Bank BRI Agroniaga, Tbk	Bank BTPN, Tbk	PT Bank Central Asia Tbk
4	BPD East Kalimantan and North Kalimantan	Permata Bank	PT Bank Negara Indonesia

Results: data processed 2022

2.2 Research Variables

As mentioned in Berger and Mester (2003) and Deyoung et al. (2003), technology adoption can reduce unit costs and some banking services have evolved into low-cost, high-volume businesses dominated by high-tech banks. They found that investment in digital technology can not only increase bank operating costs but also result in increased income; the positive difference between the increase in income and bank operating costs suggests that the application of technology has a non-linear effect on bank scale efficiency. The following are the variables used:

1. Independent variables are called independent variables, The independent variable is the variable that affects or causes the change or emergence of the dependent variable. Independent variable (X) in this study is the ratio of information technology costs X2 is gross domestic product.
2. Dependent variable or dependent variable, Bank efficiency is the dependent variable (Y) in this study; it is the variable that is influenced or is the result of the independent variable.

2.3 Data Analysis Methods

The first focus of the research is to evaluate the efficiency of the DEA method by using an intermediation approach to compare output variables with input variables. This considers that banking functions as an intermediary institution, channeling funds from the public in the form of fees and FINTECH to support national economic growth. The estimated DEA consists of one output (O) and one input (I), each of which is the sum of the following variables:

Table 3. Intermeditation Approach

INTERMEDIATION APPROACH		
Variable	Definition	Source
Inputs	Amount From:	
	Third-party funds	Balance Sheet
	Total Assets	Balance Sheet
Outputs	Amount From:	
	Non-Interest Operating Income	L/R
	Credit given	Balance Sheet

Results: data processed 2022

Using FINTECH as the dependent variable, the second step of the research was to calculate the influence of internal and external factors, namely efficiency (based on DEA measurement results), using panel data regression. Next, the third stage aims to simul-

taneously test the influence of the third hypothesis regarding internal and external factors in the implementation of FINTECH as an independent variable on the dependent variable efficiency (based on DEA measurement results), also using panel data regression.

Frontier analysis uses non-parametric data envelopment analysis (DEA) (Paradi, 2018). Thanassoulis discussed the application of DEA specifically for the banking industry. [12] DEA is also used to analyze each bank at the bank level and branch level as DMUs. Paradi and Zhu (2013) conducted research on eighty studies related to the use of DEA in an effort to evaluate bank effectiveness at the branch level. In his latest research, Kaffash investigated 620 journal publications indexed in the web science database from 1985 to April 2016 using citation network analysis techniques. The results show that, when it comes to evaluating the degree of bank efficiency from both the bank side, researchers mostly use the data envelopment analysis (DEA) method.

A bank is a business that has inputs (resources) to achieve outputs (resources). The ability of a bank to use its inputs to produce outputs as much as possible by using existing resources as expected by each bank as a decision making unit (DMU) is a way that can be seen at the level of bank efficiency.

3 Results

To start this research, MAX DEA 8 software was used to carry out DEA analysis. As input data, Third Party Funds and Total Assets are used, and as output data, Non-Interest Operating Income and Loans are given. The description of the data resulting from the processing process is as follows:

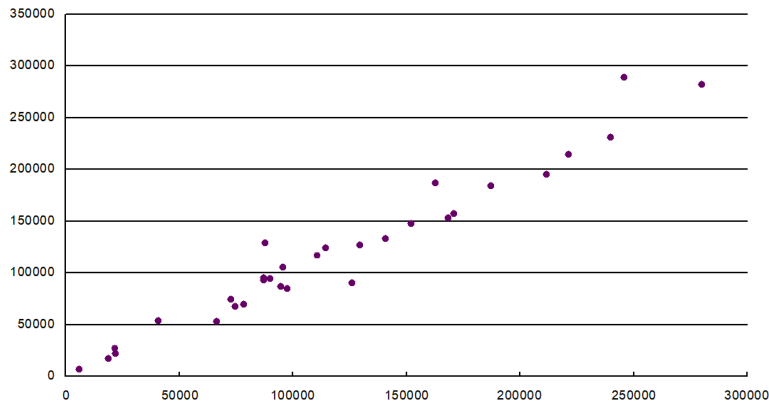


Fig. 3. Distribution of Bank Intermediation Efficiency Data

The scatterplot results from the DEA data description can be seen from the data distribution above; The distribution of points in the scatterplot follows the straight line number 0 and shows the distribution of data around the diagonal line and the diagonal di-

rection line, which shows that the data used is normally distributed. After the description of the scatterplot data, the efficiency results of each book bank 2, 3 and 4 are processed, which are shown in the following table.

Table 4. Results of Intermediation Efficiency Analysis

NO	Bank	Year Score Value-			Average	Standard deviation
		2019	2020	2021		
BANK BOOK 2						
1	JP. Morgan Chase Bank, NA	0.426661562	0.2648 87	0.2841 08	0.3252 19	0.0883 76
2	Bank Shinhan Indonesia	0.200827011	0.1923 64	0.1951 74	0.1961 22	0.0043 10
3	Bank BRI Agroniaga, Tbk	1.000000	0.6152 96	1.0000 00	0.8717 65	0.2221 09
4	BPD East Kalimantan and North Kalimantan	1.000000	0.9746 74	0.9794 98	0.9847 24	0.0134 47
BANK BOOK 3						
1	Bank OCBC NISP, Tbk	1.000000	1.0000 00	1.0000 00	1.0000 00	0.0000 00
2	The Bangkok Bank Comp. Ltd	1.000000	1.0000 00	1.0000 00	1.0000 00	0
3	Bank BTPN, Tbk	0.674092	0.7840 35	0.7839 18	0.7473 48	0.0634 42
4	Permata Bank	1.000000	1.0000 00	1.0000 00	1.0000 00	0
BANK BOOK 4						
1	PT Bank Rakyat Indonesia Tbk	1.000000	0.9617 38	1.0000 00	0.9872 46	0.0220 91
2	PT Bank Mandiri Tbk (BMRI)	0.421204	0.3063 17	0.6875 46	0.4716 89	0.1955 64
3	PT Bank Central Asia Tbk	1.000000	1.0000 00	0.9964 72	0.9988 24	0.0020 37
4	PT Bank Negara Indonesia	0.837325	1.0000 00	0.8824 60	0.9065 95	0.0839 80

Source: Data processed by MAX DEA 8 2022

In measuring efficiency using DEA, if the score reaches 1, then the bank is considered efficient. However, if the value is more than 1 or less than 1, Furthermore, bank 34 is considered inefficient. According to the data above, the average book efficiency value of 2 banks shows that JP. Morgan Chase Bank, NA has a score of 0.325219 which means it is inefficient, Bank Shinhan Indonesia with a score of 0.196122 is also inefficient, Bank BRI Agroniaga, Tbk with a score of 0.871765 is inefficient, and BPD East Kalimantan and North Kalimantan with a score of 0.984724 is also inefficient. None of the four banks showed efficiency, possibly due to the need to evaluate variables such as the amount of third party funds, total assets, non-interest operating income, and credit provided, both additions and reductions. For bank book 3, Bank OCBC NISP, Tbk

achieved a score of 1.000000 which means efficient, The Bangkok Bank Comp. Ltd is also efficient with a score of 1.000000, while Bank BTPN, Tbk with a score of 0.747348 is considered inefficient, and Bank Permata with a score of 1.000000 is also efficient. Of the four banks in book 3, three banks, namely Bank OCBC NISP, Tbk, The Bangkok Bank Comp. Ltd, and Bank Permata, have achieved efficiency.

In Book 4 banks, PT Bank Rakyat Indonesia Tbk has an average score of 0.987246 and the conclusion is inefficient, PT Bank Mandiri Tbk (BMRI) has an average score of 0.471689, while PT Bank Central Asia Tbk has an average score of 0.998824, and PT Bank Negara Indonesia Tbk has an average score of 0.906595. In the next stage, a panel regression of top DIG2 and GDP data is performed.

Table 5. Regression Analysis Results

Information	Mark
Constant	1,553
DIG2	0.300
GDP	-0.901
R	0.161
R Square	0.726
R Square Adj	0.733
F Count	0.442

Source: Data processed 2022

According to the regression equation results, there is a positive constant value of 1.553 which indicates a positive influence. The DIG2 variable coefficient has a positive value of 0.300, which indicates that any increase or decrease in DIG2 variable will increase bank efficiency by 0.300. These results are consistent with research by Wirdiyanti (2018), which also shows that digital technology has an influence on banking efficiency in Indonesia. There are several previous studies, such as Mawarni et al. (2021) and Mutisari (2020), show that digital technology has grown rapidly in banking, especially during the COVID-19 pandemic, which are perceived as challenges rather than threats or obstacles.

If GDP increases or decreases, efficiency will not increase by -0.901, because the coefficient variable of GDP produces a negative value of -0.901. This indicates that if GDP increases or decreases, efficiency will not increase by -0.901. Thus, competition will increase for banks operating in countries with high GDP. and this is in line with Batir et al (2017) and Pambuko (2016) which explains the negative relationship between GDP growth and bank efficiency. Based on this, the author uses this variable as a variable for external factors that influence banking efficiency in Indonesia. This refers to the research of Wirdiyanti (2018), Marsondang (2019), Meyliana (2017), Sujarwo (2018), Fitroh (2020).

Simultaneously, the coefficient value of the DIG2 and GDP variables shows a positive value of 0.442, which means that every increase or decrease in DIG2 and GDP will increase efficiency by 0.442. This influence indicates that financing and gross domestic product (GDP) can be influenced by efficiency, where the positive impact is smoothing the quality of financing and reducing the risk of financing problems (Masthuroh et al., 2015). The results of this study are in line with the findings of Mutamimah and Chasanah (2012) and Popita (2013), who concluded that the efficiency of banks is not affected by the increase in GDP. According to Budi Wibowo (2019), As a financial institution, banks see that the financial technology (fintech) industry is becoming one of the increasingly popular ways to obtain financial services in the digital era. It is expected that one of the fastest growing fintech sectors in Indonesia will help increase the number of people who have access to financial services

4 Conclusion

Based on the research results and discussion above, it is clear that the book 3 banks-Bank OCBC NISP, Tbk, Bank BTPN, Tbk, and Bank Permata-have the most efficient level of bank intermediation efficiency. Meanwhile, banks in book 2 and book 4 categories have not yet reached a level of efficiency that can be said to be optimal. The regression results show that the DIG2 variable, which represents digital technology financing, has a positive influence of 0.300 on bank efficiency. On the other hand, the GDP coefficient shows negative results, or there is no increasing effect on bank efficiency, with a value of -0.901. Simultaneously, the variables DIG2 (digital technology costs) and GDP have a positive coefficient of 0.442, indicating a positive influence on bank efficiency. In the results of this research, it is believed that the value of the influence between variables is in line with previous research, including the DIG2 variable digital technology financing, Batir et al (2017), Marsondang (2019), Meyliana (2017), Sujarwo (2018), Fitroh (2020), and GDP are in line with Mutamimah and Chasanah (2012) and Popita (2013).

This research has limitations because there is an uncontrolled error factor of 27.4% in this research variable. Apart from that, there are two variables that can influence financial technology. It is hoped that further research will add newer variables that influence FINTECH.

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