

Islamic Banking Efficiency in The Covid-19 Pandemic Era and The Role of Digitalization

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Over the past two years, the COVID-19 pandemic has affected the banking industry. In the current sustainable era, increasing efficiency is one of the goals that must be achieved by banks. This study aims to measure the efficiency of Islamic banking, especially during the COVID-19 pandemic from 14 Islamic banks in Indonesia within a period of 6 years, from 2015 to 2020. The non-parametric method, Data Envelopment Analysis (DEA) is used as a research method in measure efficiency. DEA results are also used to identify input and output variables that must be improved if a decision-making unit (DMU) needs to increase its efficiency in the form of potential improvement. The results of the study show that COVID-19 has an impact on decreasing the efficiency of Islamic banking in Indonesia. The Islamic banks with the highest efficiency scores are Bank Syariah Mandiri, BRI Syariah, and Maybank Syariah. Furthermore, based on the analysis of potential improvement, the most important variable to be improved by banks during the pandemic is the variable amount of financing. Islamic banking is also required to be able to adapt to digitalization in order to survive during the crisis caused by the COVID-19 pandemic and remain able to compete with conventional banking or new startups in the banking sector.

Keywords: Islamic Bank; Efficiency; DEA; Covid-1; Digitalization

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INTRODUCTION

Islamic banking is defined as an agency that collects funds from the public in the form of financing or other to improve the community's standard of living. In Indonesia, Islamic banking began operating in 1992 with the Banking Law no. 7 of 1992. At the same time, Bank Muamalat was established as the first bank to operate according to the Qur'an and Sunnah. Since 2008 the development of Islamic banking in Indonesia has continued to experience a rapid increase, namely since the issuance of Law Number 21 of 2008 concerning Islamic Banking (Lestari & Huda, 2020). The development of Islamic Commercial Banks (BUS) in Indonesia has increased. In 1999 there were two sharia commercial banks, then in 2018, 13 Sharia commercial banks increased again in 2019 to 14 sharia commercial banks (Financial Services Authority, 2019).

In the last two years, the COVID-19 pandemic has affected the financial industry in Indonesia, including the banking industry, both conventional and Islamic banking. Based on data from the Indonesian Banking Statistics, as of November 2020, the NPL

(Non-Performing Loans) ratio for conventional banking reached 3.15% (Financial Services Authority, 2020a), while in the Sharia Banking Statistics in December 2020, the NPF (Non-Performing Financing) ratio for Islamic banking was up to with December 2020 reaching 3.13% (Financial Services Authority, 2020b). In addition to the NPF, the impact of COVID-19 on the banking sector, especially Islamic banking, can be seen from the profitability ratio or Return to Assets (ROA). The profitability ratios of Islamic banks and sharia business units experienced an increasing trend from 2019 to the first quarter of 2020. However, both trends began to decline in April 2020, in line with the COVID-19 outbreak in Indonesia.

The COVID-19 pandemic also impacts changes in transaction patterns in the community, where consumers are expected to reduce transactions in cash to reduce the potential for virus transmission. From the producer side, non-cash transactions are used as a branding tool to restore consumer confidence and provide security guarantees to them. This has resulted in an increase in electronic money transactions in the community.

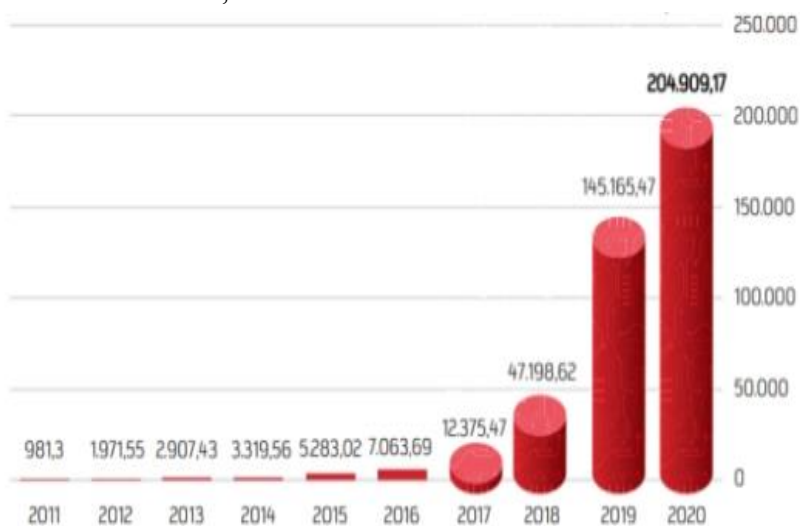


Figure 1: Value of Electronic Money Transactions 2011-2020 (in Billion Rupiah)
Source: Bank Indonesia (2020)

Banking is the lifeblood of the national economy, which determines the flow of funds for financing sources of economic activity. A sound and stable banking system is the primary basis for promoting economic growth and improving welfare. Efficiency is a crucial issue for banks because it can measure bank performance (Sarifuddin et al., 2015). The bank strives to manage its performance to achieve the maximum efficiency level to be more competitive. A competitive bank will help the country develop and accelerate economic recovery in times of economic uncertainty. The higher the level of banking efficiency of a country,

the more sustainable its growth will be. This is very crucial, especially during the current pandemic.

Efficiency measurement is considered very important to be carried out as a finding of information on how the current performance of the unit is. This study aims to analyze the efficiency of Islamic banking in Indonesia from 2015 to 2020 using the Data Envelopment Analysis method. Furthermore, this study tries to explain the role of digitalization in improving banking efficiency, especially Islamic banking.

LITERATURE REVIEW

The concept of efficiency starts from microeconomics, namely producer theory and consumer theory, where producer theory states that producers tend to maximize profits and minimize costs. In contrast, consumer theory states that consumers tend to maximize their level of satisfaction (Ascarya & Yumanita, 2006). There are two kinds of efficiency, namely economic efficiency and technical efficiency. Economic efficiency tends to a macroeconomic point of view, where prices are not considered unspecified because they fluctuate following macro policies. Meanwhile, technical efficiency tends to a micro perspective because it is limited to technical and operational relationships in converting inputs into outputs (Ascarya & Yumanita, 2006).

There are three approaches in defining the relationship between inputs and outputs in banking activities: the production approach, the intermediation approach, and the modern approach. The intermediation approach complements the production approach and explains banking activities as the transformation of money lent by depositors and lent back to debtors (Muliaman & Wimboh, 2003). The intermediation approach is most often used in research because this approach is considered the most suitable for evaluating the efficiency of all banks.

Many previous researchers have done research analyzing the efficiency of Islamic banking. Hassan (2006) analyzed the efficiency of the Islamic banking industry with a panel analysis in the period 1995-2001. The techniques used to test the efficiency of this bank are in the form of parametric (cost and profit efficiency) and non-parametric (Data Envelopment Analysis) techniques. Suseno (2008) researched the analysis of efficiency and economies of scale in the Islamic banking industry in Indonesia, namely Islamic Commercial Banks (BUS) and banks that have sharia units or Sharia Business Units (UUS) for the period 1999-2004. Another related study was conducted by Rusydiana et al. (2019) and Rusydiana (2018).

Abidin and Endri (2009) examined the level of efficiency in Regional Development Banks (BPD) throughout Indonesia from 2006-2007 with a technical approach using the DEA method. Faisal, Zainuri and Yulianti (2015) on the efficiency of Islamic banking in Indonesia after the 2008 Global Financial crisis using the DEA method. The research population determined in this study are 11 Islamic Commercial Banks and 12 Sharia Business Units (including Regional Development Banks) with a research period of 2010-2014. Then the research of Cahyono and Rani (2017) is to measure the efficiency of UUS BPD on the island of Sumatra by using Data Envelopment Analysis (DEA). This research differs from previous research in several ways. First, this study uses the 2015-2020 research period and analyzes

efficiency performance in 2020, when the COVID-19 outbreak began to spread in Indonesia. Second, this study tries to analyze the role of digitalization as an approach to improving Islamic banking efficiency.

METHOD

This study uses a non-parametric quantitative approach, Data Envelopment Analysis (DEA). Dea was initially developed by Charnes, Cooper & Rhodes (1978) and later expanded by Banker, Charnes, & Cooper (1984) to measure the productivity and efficiency of business units. This allows some outputs (weighted) and some inputs (weighted) to measure productivity or efficiency, or is usually referred to as a weighted level of output resulting from a given input.

In the literature study on efficiency, DEA is widely used to measure technical efficiency, including the efficiency of financial institutions (Sharma et al., 2013). In addition, the DEA method can also provide information about the Decision-Making Unit (DMU) (in this context, Islamic Commercial Banks in Indonesia) which is inefficient in the use of inputs and what variables cause inefficiency. Finally, this method can produce information about how much input and output must be adjusted to achieve a relatively maximum efficiency value

The process of converting inputs into outputs is known as technical efficiency. A business unit is said to be efficient if it can produce maximum output for a certain level of production (input), or if a unit can minimize costs for a certain level of output. Ozcan (2008) divides efficiency into several aspects: technical efficiency, scale efficiency, cost efficiency, and allocation efficiency. Because this research only applies to the internal technical relationship between inputs and outputs, a company is considered economically practical if it can reduce production costs to produce specific outputs.

DEA's two basic models are the Charnes, Chopper & Rhodes (CCR) model and the Bankers, Charnes & Rhodes (BCR) model. The CCR model is used with the assumption that changes in the output value produced by the DMU will always be the same as the proportion of adding a particular output value. This is in line with the Constant Return to Scale (CRS) assumption that the production function is fixed. Meanwhile, the BCR model assumes that changes in the output value produced by the DMU are different for each proportion of changes in specific input values. This is in line with the Variable Return to Scale (VRS), which means that each input does not necessarily produce the same output. Therefore, this research on banking efficiency is calculated by comparing the CRS and VRS models with an intermediation approach to reflect the activities of Islamic banks.

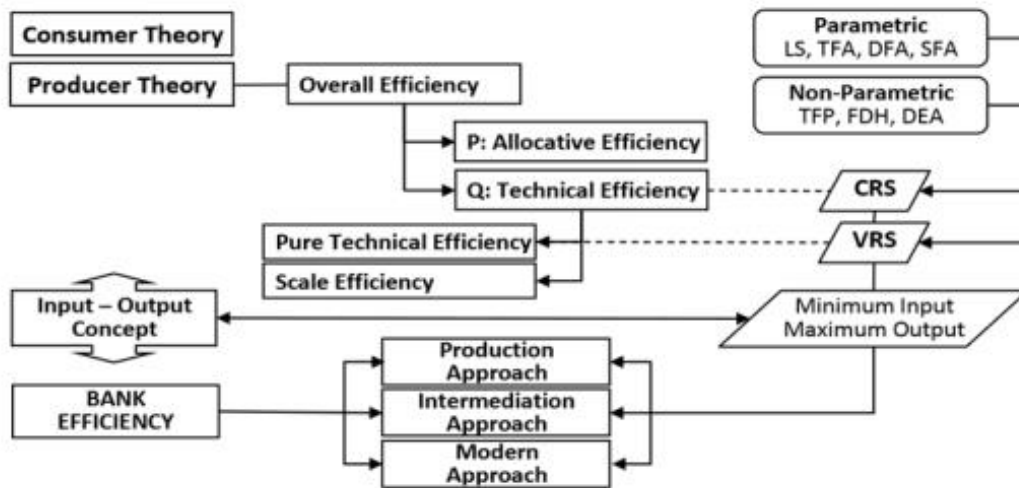


Figure 2: DEA method in banking (Ascarya, 2012)

The data used in this study focuses on the efficiency analysis of 14 Islamic Commercial Banks in Indonesia in the 2015-2020 period. The input variables used in this study are fixed assets, labour costs, and third-party funds. Meanwhile, the output variables used are total financing and operating income. The selection of input-output variables is in line with Sufian (2007),

Ascarya & Yumanita (2008) and, Rusydiana & Marlina (2019). Data related to the input and output variables used were obtained from each bank's financial statements and annual reports. The descriptive statistics of the input and output variable data used in this study are as follows:

Table 1: Descriptive Statistics of Input and Output Variables (in million)

Variables	max	min	Mean	St-dev
Input				
Fixed Assets	Rp3.357.284	Rp2.210	Rp484.802	Rp745.565
Labour Expense	Rp2.167.489	Rp7.316	Rp443.746	Rp503.968
Third-Party Funds	Rp84.334.054	Rp40.162	Rp16.143.533	Rp21.374.235
Output				
Total Financing	Rp125.990.338	Rp5.066	Rp16.707.445	Rp26.563.185
Operating Income	Rp8.635.480	Rp31.277	Rp1.766.224	Rp2.082.349

RESULT

This section will show the efficiency value of each Islamic bank in Indonesia in the 2015-2020 period. The efficiency value is obtained using the DEA method and

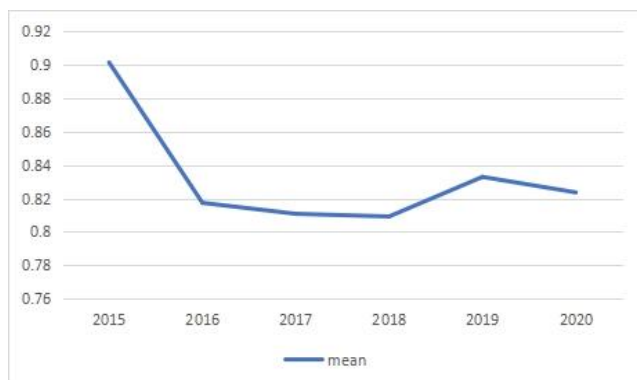
the Maxdea 8 software. The results of DEA data processing are displayed with an efficiency range of 0-1. A score of 1 indicates the bank's ability to be optimal and efficient in managing its input and output variables. Meanwhile, if the efficiency value is further away from number 1, the bank is considered inefficient.

Table 2: Efficiency Value of Islamic Banks in Indonesia

DMU	2015	2016	2017	2018	2019	2020	mean
Bank Aceh Syariah	1,00	0,59	0,70	0,71	0,65	0,59	0,708
Bank BNI Syariah (BSI)	0,90	0,81	0,88	0,77	0,70	0,60	0,777
Bank BPD Nusa Tenggara Barat Syariah	1,00	0,91	1,00	1,00	0,76	0,77	0,908
Bank BRI Syariah (BSI)	1,00	1,00	0,98	1,00	1,00	1,00	0,997
Bank Jabar Banten Syariah	0,86	0,77	0,70	0,70	0,72	0,71	0,745
Bank Mega Syariah	0,69	0,76	0,77	0,72	0,79	0,80	0,756
Bank Muamalat Syariah	0,94	0,78	0,85	0,65	0,62	0,64	0,747
Bank Panin Dubai Syariah	1,00	0,87	0,78	0,75	1,00	1,00	0,901
Bank Syariah Bukopin	0,92	0,85	0,77	0,84	0,87	1,00	0,876
Bank Syariah Mandiri (BSI)	1,00	1,00	1,00	1,00	1,00	1,00	1,000
Bank Tabungan Pensiunan Nasional Syariah	0,93	0,90	0,70	0,77	1,00	0,96	0,876
Bank Victoria Syariah	0,75	0,59	0,67	0,73	0,82	0,81	0,729
BCA Syariah	0,63	0,61	0,64	0,69	0,72	0,64	0,654
Maybank Syariah Indonesia	1,00	1,00	0,90	1,00	1,00	1,00	0,983

From table 2, it is known that the Islamic bank with the highest efficiency value is Bank Syariah Mandiri (BSM). BSM is the only Islamic banking that achieves maximum efficiency during the six-year research period—then followed by Bank Rakyat Indonesia (BRI) Syariah and Maybank Syariah in second and third place with efficiency values of 0.99 and 0.98.

Furthermore, efficiency values can be classified into four groups based on their efficiency scale, namely fully efficient (1), Highly Efficient (0.8-0.99), medium efficient (0.5-0.79), and low efficient (0, 0-0.49) (Rusydiana, 2017). Of the 84 DMUs analyzed (14 banks for six years), 23 DMUs are in the fully efficient category, 20 DMUs are in the highly efficient category, and 39 DMUs are in the medium efficient category. Interestingly, none of the DMUs is classified as low efficient. This shows that the achievement of Islamic banking in Indonesia in terms of efficiency has been quite good in the last five years.

**Figure 3:** Trends in Islamic banking efficiency in Indonesia 2015-2020

Furthermore, based on observations during the research period, it was found that the efficiency value of Islamic banking in Indonesia fluctuates every year. The average efficiency of Islamic banks in Indonesia decreased from 2015 to 2017, then began to increase from 2018 to 2019, and decreased again in 2020. These results illustrate that the trend of Islamic banking efficiency in Indonesia had begun to increase in 2019 but experienced a decline in 2020 when the covid-19 outbreak began to spread in Indonesia and affected the economy. This illustrates that the spread of COVID-19 is affecting the banking industry, especially Islamic banking, in terms of efficiency performance.

This finding is in line with several previous studies. The spread of COVID-19 has affected banking activity in many countries. It has sparked a cautious reaction from depositors (e.g., withdrawal rates) and financial intermediaries (e.g., reduced market funding) (Baldwin et al., 2020). In Indonesia, overall banking performance declined when COVID-19 began to spread (Nugroho et al., 2020).

Potential Improvement

Besides producing efficiency values, the DEA method can also produce potential improvements or the level of improvisation required by the DMUs to achieve optimal efficiency values. It can be known what variables need to be optimized for use. Analysis of potential improvement is carried out by processing the last anniversary of the research period separately to determine the actual value that inefficient DMUs must achieve. This analysis compares the actual value and the projection value of each variable, converted into per cent. The results of the potential improvement analysis can be seen in the following table:

Table 3: Analysis of Potential Improvement

DMU	Fixed Asset	Labor Expense	Third-Party Fund	Total Financing	Operational Income
Bank Aceh Syariah	-2,65	0	0	63,44	63,44
Bank BNI Syariah (BSI)	-19,20	0	0	94,44	40,53
BPD Nusa Tenggara Barat Syariah	0	0	0	29,32	18,59
Bank BRI Syariah (BSI)	0	0	0	0	0
Bank Jabar Banten Syariah	-17,64	0	0	48,44	33,23
Bank Mega Syariah	-50,43	0	0	75,35	9,24
Bank Muamalat Syariah	-80,09	0	-22,20	44,99	44,99
Bank Panin Dubai Syariah	0	0	0	0	0
Bank Syariah Bukopin	0	0	0	0	0
Bank Syariah Mandiri (BSI)	0	0	0	0	0
BTPN Syariah	0	0	0	0	0
Bank Victoria Syariah	0	0	0	0	0
BCA Syariah	0	0	0	48,78	62,85
Maybank Syariah Indonesia	0	0	0	0	0
Average	-12,14	0	-1,59	28,91	19,49

The results of the potential improvement analysis show the percentage of improvised values that need to be carried out by Islamic banks that are not yet efficient. For example, Bank BCA Syariah in the future must reduce its fixed assets by 2.65% and increase its operating income and total financing by 63.44% to achieve an efficient performance. Overall, the most dominant variable in causing inefficiency is the amount of financing. This can be seen from the average value of the variable, where the average percentage of the improvised value of the amount of financing is higher than the other variables. Islamic banks that are not yet efficient need to increase the amount of their financing by 28.91% to achieve an efficient performance.

The Role of Banking Digitization

The existence of the COVID-19 outbreak has had a broad impact on the economy, especially the financial and banking industries. The impact of COVID-19 on the banking industry sector was initiated by the large number of business owner customers who had difficulty paying their obligations to banks, resulting in bad loans. The increase in the ratio of non-performing loans (NPL) and funding freezes are one of the direct impacts of COVID-19 in the banking industry (Baldwin & Weder, 2020; Jaelani & Hanim, 2020). Governments have tried several policies in various countries to reduce the impact, including social distancing policies and restrictions on public activities.

On the one hand, this policy will reduce a country's economic performance, where economic activity cannot move as usual. However, on the other hand, limiting physical activity makes people have to adapt to digitalization. The Covid-19 pandemic has

accelerated the transformation of the banking industry, which forced changes in people's behaviour from the previous physical economy to a virtual economy. Referring to the press release of the August 2021 Bank Indonesia (BI) Board of Governors Meeting, the value of digital banking transactions as of July 2021 rose 53.08% (YoY). The value of electronic money transactions, which facilitate e-commerce transactions, also rose sharply by 57.71%. The number of QRIS merchants has also expanded to around 9.4 million

Over the past few years, demands for digital acceleration have become increasingly prominent, driven by changes in public expectations for fast, efficient, and secure financial services that can be done from anywhere. Such conditions require banks to prioritize digital transformation to increase bank competitiveness. Islamic banking is required to capture this phenomenon and make adaptations. Adaptation is carried out not only because of the demands of the COVID-19 pandemic but also because Islamic banking can still compete with conventional banks or new startup startups in the banking sector.

The phenomenon of optimizing digital transformation is in line with the findings in this study, where banks with good digitization capabilities tend to produce efficient performance. This can be seen from the three banks that achieve the highest efficiency scores have good digitization capabilities. Bank Syariah Mandiri has internet-based service features, including BSM net banking, BSM mobile banking, BSM card, BSM SMS banking, BSM Electronic Payroll, and BSM E-Money. Bank Syariah Mandiri also provides online funding and financing services for Small and Medium Enterprises (MSMEs) through the BSM Mitra application and

collaboration with a Syariah fintech institution. Mandiri Syariah has disbursed Rp 11.3 trillion to 35,295 MSME business actors. With 12 per cent for micro-enterprises, 58 per cent for small businesses, and 30 per cent for medium enterprises.

The sharia bank with the next highest efficiency value is BRI sharia. This bank launched several digital services in 2018, including BRISPay, BRIS Travel, BRISSMART, and BRZZI BRIS. BRI Syariah was also able to adapt well during the pandemic by launching i-Kurma. This application is used to process financing applications, making it easier for marketers to check prospective customer data. By optimizing this application, BRI Syariah recorded significant growth in financing. Based on the BRIS 2020 financial report, as of June 2020, BRI Syariah has disbursed micro-financing for MSMEs amounting to Rp9.5 trillion, growing 150% compared to the position in June 2019.

The Islamic banking with the third-highest efficiency value is Maybank Syariah. In contrast to BSM and BRIS, Maybank Syariah applies a leverage model by synergizing with its parent PT Maybank Indonesia Tbk to utilize all the bank's resources and networks to market Sharia-based financial products. This effort has contributed to the average percentage of annual asset growth of The UUS of Maybank Indonesia has reached 17.1% in the last five years. Concerning digitalization, Maybank Syairah's parent company, PT Maybank Indonesia Indonesia Tbk, won an award as the best digital bank at the "3rd global retail banking innovation awards 2020". Maybank Indonesia also explained its readiness by providing a comprehensive and community-based digital ecosystem with M2U digital banking through a one-stop-shop solution feature for sharia products such as zakat and alms, to sharia financial planning Hajj or Umrah.

The importance of digital optimization is also reinforced by findings in the analysis of potential improvement, where the amount of financing is the main factor in overall banking inefficiency. Increasing the amount of financing is becoming increasingly important considering the COVID-19 pandemic has resulted in a decrease in people's income and difficulties in running a business. Islamic banks are required to increase the amount of financing by 28.91% in order to achieve an efficient performance. Through digitalization, it is hoped that banks will increase the amount of financing channelled to the public and business actors.

Therefore, Islamic banking is expected to start investing in creating a digitalization system in its banking system. In addition to expanding access to Islamic financial products and services to meet the needs of the community, the existence of a digitalization system saves more on operational costs for Islamic banking considering the relatively little ability to raise funds for Islamic banking compared to conventional banking, so

that Islamic banking can achieve a more efficient performance.

CONCLUSION

This study aims to analyze the efficiency of Islamic banking in Indonesia during the 2015-2020 period using the Data Envelopment Analysis (DEA) method. The results of this study indicate a fluctuating trend in the efficiency of Indonesian Islamic Commercial Banks (BUS). The average efficiency of Islamic banks in Indonesia decreased from 2015 to 2017, then began to increase from 2018 to 2019, and decreased again in 2020, when the COVID-19 outbreak began to spread in Indonesia. This illustrates that the spread of COVID-19 has affected the banking industry, especially Islamic banking, in terms of efficiency performance

The following finding from this research is that Bank Syariah Mandiri is the bank with the highest efficiency value during the 6-year research period, followed by BRI Syariah and Maybank Syariah. Furthermore, an analysis of potential improvements using data from 2020 shows that the variable that causes inefficiency in Islamic banking comes from the output variable, namely total financing. Islamic banks that are not yet efficient need to increase the amount of their financing by 28.91% to achieve an efficient performance.

Islamic banking in Indonesia needs to innovate products to provide more varied choices for customers so that financing distribution can be more optimal. Islamic banking is also required to be able to adapt to digitalization to survive during the crisis caused by the COVID-19 pandemic and remain able to compete with conventional banking or new startup startups in the banking sector. Recommendations for academics include continuing to update banking efficiency information and data, especially in 2021 because the pandemic is still not over, so further research is expected to produce solutions to improve efficiency performance, with various updates according to the situation.

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