Research Article

Does Intellectual Capital Efficiency Translate in the Post-pandemic Era for Islamic Banks in Indonesia?

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Purpose: This study aims to identify the key determinants of financial performance in Islamic banks, specifically focusing on the Financing to Deposit Ratio (FDR) and Capital Adequacy Ratio (CAR). Additionally, it explores the applicability of these determinants in a post-pandemic environment.

Design/methodology/approach: The research utilizes data from two prominent Indonesian Islamic banks, Bank Syariah Indonesia (BSI) and Bank Muamalah Indonesia (BMI), for the pre-pandemic period (2016-2020). Ordinary Least Squares (OLS) regression analysis is employed to investigate the influence of Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE) on both FDR and CAR.

Findings: The model analyzing determinants of FDR explains a significant portion (48.99%) of the variance. Interestingly, only Capital Employed Efficiency (CEE) exhibits a statistically significant negative relationship with FDR. Conversely, the model for CAR lacks a statistically significant fit.

Originality: This research contributes by examining the impact of intellectual capital components (HCE, SCE, CEE) on financial performance ratios (FDR, CAR) within the Indonesian Islamic banking context.

Research limitations: The study is limited to data from two Indonesian banks during a specific timeframe. Further research with a broader sample size and encompassing the post-pandemic era would enhance generalizability.

Practical implications: The findings offer valuable insights for stakeholders in Indonesian Islamic banking, particularly regarding the importance of efficient capital utilization for managing financing activities and maintaining healthy FDR levels.

Social implications: By enhancing the financial performance of Islamic banks, this research indirectly contributes to the development of a more robust Islamic financial system that caters to the ethical and

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social banking needs of the community.

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Introduction

Indonesian Islamic banking plays a vital role in the nation's economic landscape, adhering to unique financial principles. Despite weathering past economic crises, it faces challenges in market share and competitiveness compared to conventional banks. These limitations are often attributed to underdeveloped human resources (HR) and information technology (IT) capabilities (OJK, 2021). A potential solution lies in leveraging intellectual capital, the sum of employee expertise, organizational processes, and intangible assets (Chen, 2021). This study investigates the influence of intellectual capital on the performance of Indonesian Islamic banks.

Intellectual capital comprises three key components: human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) (Ulum et al., 2008). HCE reflects the effectiveness of utilizing employee knowledge and skills. SCE focuses on optimizing organizational processes and IT infrastructure. Finally, CEE measures the ability to generate profits from available resources. Prior research across industries has established a positive relationship between intellectual capital and organizational performance (Chen et al., 2005; Maditinos et al., 2011; Sardo & Serrasqueiro, 2017). However, the specific impact on Islamic banking performance remains understudied, with existing research yielding mixed results Suroso et al. (2017). Furthermore, limitations in prior studies, such as the use of less robust intellectual capital variables (Murthy & Mouritsen, 2011), necessitate further investigation.

To address these knowledge gaps, this study analyzes the effects of HCE, SCE, and CEE on the financial performance of Indonesian Islamic banks. Financial performance will be measured using Return on Assets (ROA), Financing to Deposit Ratio (FDR), Capital Adequacy Ratio (CAR), and Non-Performing Financing (NPF). Data will be collected from two prominent Islamic banks, Bank Syariah Indonesia (BSI) and Bank Muamalat Indonesia (BMI), for the pre-pandemic period of 2016-2020, and seeks its relevance to the post-pandemic era. This research is expected to contribute valuable insights for stakeholders in Indonesian Islamic banking. By understanding the relationship between intellectual capital components

and performance, Islamic banks can strategically invest in these areas to enhance competitiveness, customer service, and ultimately contribute to the continued growth of the sector.

The remainder of this study is organized as follows: Section 2 reviews relevant theories and literature on the relationship among the tested variables. Section 3 highlights the data and research methods used. Section 4 presents the empirical evidence and its discussion. Finally, Section 5 provides conclusions and suggestions for further research.

Literature Review

Conceptualizing Intellectual Capital

Stewart (2010) defines Intellectual Capital (IC) as a company's intangible assets encompassing knowledge, information, intellectual property, and experience that contribute to competitive advantage and wealth creation. This aligns with the resource-based theory (Mavridis, 2004), which posits that unique resources like IC can create sustainable profits for a company that effectively leverages them (Mavridis, 2004). Nawaz (2019) and Nawaz et al. (2021) further emphasize the link between IC, innovation, and profitability in knowledge-intensive firms.

Building upon this foundation, scholars have proposed frameworks for measuring IC. Bontis et al. (2000), Curado and Bontis (2007), and Riahi-Belkaoui (2003) identify three core components: human capital, structural capital, and customer capital. Human capital, encompassing employee knowledge, skills, and motivation, is considered the foundation for utilizing other forms of capital (Harris, 2000). Pulic (2004) emphasizes the value of employees as knowledge resources, capable of driving innovation and enhancing company value (Babajee et al., 2020; Bontis et al., 2000).

Structural capital refers to the tangible and intangible assets that ensure a company's ongoing operations, such as innovation capital, process capital, technological capital, and organizational capital (Ferenhof et al., 2015; Marr & Moustaghfir, 2005). Relational capital, on the other hand, focuses on the knowledge embedded in relationships with stakeholders like customers and suppliers (Mondal & Ghosh, 2012). Each component of IC plays a crucial role in a company's long-term success, with managers prioritizing them based on their specific context (Al-Musali & Ismail, 2014)

Intellectual Capital as an Investment

Pulic (2004) argues against viewing IC as a cost and instead proposes treating it as an investment in employee knowledge and productivity. His value-creation efficiency metric, including value-added advantage, goes beyond traditional profit or GDP measures to assess whether a company's IC is being effectively utilized. The Pulic method, also known as the Value Intellectual Coefficient (VAIC), has become a popular tool for measuring IC and integrating it into decision-making processes within a knowledge-based economy (Pulic, 2000).

Intellectual Capital and Financial Performance

Research suggests that IC contributes to a firm's financial performance and can serve as a leading indicator of future success (Chen et al., 2005). Financial performance analysis assesses a company's effectiveness in utilizing resources and generating profits (Capon et al., 1990; Elkamiliati & Ibrahim, 2014). Profitability is often considered a key metric, with higher profitability indicating better performance (Bogićević et al., 2016; Ho & Wu, 2006). Bank Indonesia recommends return on assets (ROA) as one of the primary profitability ratios for banks (BI, 2004). A higher ROA signifies a company's ability to generate profits from its assets, reflecting efficient resource utilization (Brigham & Houston, 2021; Mailinda et al., 2018; Musah et al., 2018).

Intellectual Capital and Competitive Advantage

The Resource-Based View (RBV) theory posits that a company's unique resources and capabilities create a competitive advantage, leading to superior performance (Oh, 2015). As an intangible asset with a significant impact on organizational performance, IC aligns with this theory. Numerous studies have documented a positive correlation between IC and company performance (Chen et al., 2005; Gogan et al., 2016; Maditinos et al., 2011; Sardo & Serrasqueiro, 2017; Xu & Li, 2022).

Research Method

This study employed Ordinary Least Squares (OLS) regression analysis to investigate the factors influencing the financial performance of two Islamic banks (BSI and BMI) for the period 2016-2020. The analysis focused on two key financial ratios: Financing to Deposit Ratio (FDR) and Capital Adequacy Ratio (CAR).

Data Collection

Data for the study was obtained from two Islamic banks (BSI and BMI) for the period 2016-2020. This timeframe was chosen to capture a representative period of pre-pandemic economic activity. The data sources included the banks' annual reports and financial statements.

Research Variables

The dependent variables in the regression models were: 1) Financing to Deposit Ratio (FDR), which measures the bank's ability to distribute financing relative to the deposits it holds; 2) Capital Adequacy Ratio (CAR), which reflects the bank's capacity to absorb potential losses by comparing its capital to its risk-weighted assets. Meanwhile, the independent variables, hypothesized to influence the dependent variables, were the Intellectual Capital components consist of: 1) Human Capital Efficiency (HCE), which represents the bank's effectiveness in utilizing its human resources to generate value; 2) Structural Capital Efficiency (SCE), which captures the bank's efficiency in utilizing its organizational structure and technological infrastructure, and 3) Capital Employed Efficiency (CEE), which reflects the bank's ability to generate returns on the capital it employs.

Model Specification

Separate OLS regression models were estimated for each dependent variable. The general model specification can be represented as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where:

- Y represents the dependent variable (either FDR or CAR)
- α represents the constant term
- $\beta 1$, $\beta 2$, and $\beta 3$ represent the regression coefficients for the independent variables HCE, SCE, and CEE, respectively
- X1, X2, and X3 represent the independent variables (HCE, SCE, and CEE)
- ε represents the error term

The following linear regression models were estimated for FDR and CAR:

$$FDR = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \varepsilon$$

$$CAR = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \varepsilon$$

where:

- β_0 is the intercept term
- β_1 - β_3 are the regression coefficients for HCE, SCE, and CEE, respectively
- ε is the error term

Data Analysis

The Ordinary Least Squares (OLS) method was employed to estimate the coefficients (β) of the regression models. OLS minimizes the sum of squared residuals between the predicted and actual values of the dependent variable. The statistical significance of the estimated coefficients was assessed using t-tests. The goodness-of-fit of the models was evaluated using various metrics, including the coefficient of determination (R-squared), adjusted R-squared, F-statistic, and Durbin-Watson statistic. R-squared and adjusted R-squared measure the proportion of variance in the dependent variable explained by the independent variables. The F-statistic tests the overall significance of the model, while the Durbin-Watson statistic assesses the presence of autocorrelation in the residuals. The data analysis was conducted using E-Views.

Result and Discussion

Descriptive statistics

The descriptive statistics for both banks indicate that the disparity in values is relatively small for the independent variables (HCE, SCE, and CEE) and the dependent variables (FDR and CAR). This is evidenced by the standard deviation value, which is smaller than its average.

Variable	N	Descriptive Statistics-BSI					Descriptive Statistics-BMI			
		Min	Max	Mean	SD		Min	Max	Mean	SD
HCE	20	2.99	4.87	3.67	0.57		3.19	5.60	4.13	0.64
SCE	20	0.32	0.90	0.59	0.15		0.54	0.82	0.71	0.08
CEE	20	0.41	1.76	0.97	0.37		0.21	1.81	0.91	0.46
FDR	20	81.92	89.63	84.91	2.45		53.05	99.99	85.20	12.84
CAR	20	12.30	14.81	13.83	0.60		11.65	19.60	14.00	2.32

Table 1. Descriptive Statistics

Table 1 offers a concise overview of the key characteristics of the variables for both Bank Syariah Indonesia (BSI) and Bank Muamalat Indonesia (BMI) during the 2016-2020 period. The data encompass minimum and maximum values, along with mean and standard deviation (SD) for each variable. An examination of the independent variables (HCE, SCE, and CEE) reveals a relatively consistent pattern between BSI and BMI. The comparable average values and lower standard deviations suggest a lesser degree of spread in the data for these variables. This indicates a level of homogeneity in terms of human capital efficiency, structural capital efficiency, and capital employed efficiency across the two Islamic banks. The average Financing to Deposit Ratio (FDR) for both banks falls within an acceptable range, signifying that they maintain adequate liquidity. Similarly, the Capital Adequacy Ratio (CAR) indicates sufficient capacity to absorb potential losses arising from risky assets.

Classical Assumption Tests

Prior to interpreting the Ordinary Least Squares (OLS) regression results, a series of classical assumption tests were conducted to ensure the validity of the estimates. These tests aim to verify that the model adheres to the assumptions necessary for BLUE (Best Linear Unbiased Estimator) properties. It is crucial to compare the results of these tests between BSI and BMI to determine the feasibility of proceeding with

hypothesis testing. The results of the classical assumption tests suggest that no major violations were found for either BSI or BMI, and thus, further analysis can be reliably performed using OLS regression.

Goodness-of-Fit Test

The goodness-of-fit test, also known as the model evaluation test, assesses how well the estimated regression model explains the variation in the dependent variable. This evaluation is achieved through a combination of measures: the coefficient of determination (R^2), the F-statistic test, and the t-test for individual parameters.

Dependent Variable: FDR
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	90.46087	2.891626	31.28374	0.0000
HCE	-0.729193	0.769140	-0.948062	0.3572
SCE	3.844742	3.108238	1.236952	0.2340
CEE	-5.307860	1.155270	-4.594474	0.0003
R-squared	0.570444	Mean dependent var		84.91200
Adjusted R-squared	0.489903	SD dependent var		2.454949
SE of regression	1.753352	Akaike info criterion		4.137792
Sum squared resid	49.18788	Schwarz criterion		4.336938
Log likelihood	-37.37792	Hannan-Quinn criter.		4.176667
F-statistic	7.082596	Durbin-Watson stat		1.547332
Prob(F-statistic)	0.003041			

Table 3. FDR Regression Test

$$\mathbf{FDR = 90.46087 - 0.729193HCE + 3.844742SCE - 5.307860CEE}$$

Based on the above regression results, it can be inferred that the constant term (C) has a value of 90.46087. This implies that if the values of HCE, SCE, and CEE remain unchanged, the FDR for each study period (quarterly) will be 90.46087. The coefficient for HCE (-0.729193) indicates that a 1 rupiah increase in HCE will lead to a decrease in FDR by 0.729193 percent, assuming that the other variables remain fixed. It is important to note that this estimation result has no effect. Similarly, the coefficient for SCE (3.844742) suggests that a 1 rupiah increase in SCE will result in an increase in FDR by 3.844742, assuming

that the other variables remain constant. Again, this estimation result has no effect. On the other hand, the coefficient for CEE (-5.307860) indicates that a 1 rupiah increase in CEE will lead to a decrease in FDR by 5.307860 percent, assuming that the other variables remain constant. In this case, the estimation result has an effect.

Dependent Variable: CAR
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14.28088	0.883842	16.15772	0.0000
HCE	0.116441	0.235092	0.495299	0.6271
SCE	0.005539	0.950051	0.005830	0.9954
CEE	-0.905131	0.353115	-2.563274	0.0208
R-squared	0.331078	Mean dependent var		13.83350
Adjusted R-squared	0.205655	S.D. dependent var		0.601308
SE of regression	0.535922	Akaike info criterion		1.767201
Sum squared resid	.4.595400	Schwarz criterion		1.966347
Log likelihood	-13.67201	Hannan-Quinn criter.		1.806076
F-statistic	2.639688	Durbin-Watson stat		2.572423
Prob(F-statistic)	0.084949			

Table 4. CAR Regression Test

$$\mathbf{CAR = 14.28088 + 0.116441HCE + 0.005539SCE - 0.905131CEE}$$

From the regression results, it can be inferred that the constant C value of 14.28088 implies that if the variables HCE, SCE, and CEE remain unchanged, they will increase by 14.28088. The coefficient value for HCE is 0.116441, indicating that an increase of 1 rupiah in HCE will result in an increase of 0.116441 percent in CAR, assuming other variables are held constant (the estimation results are not affected). The coefficient value for SCE is 0.005539, suggesting that an increase of 1 rupiah in SCE will lead to an increase of 0.005539 percent in CAR, assuming other variables remain constant (the estimation results are not affected). The coefficient value for CEE is -0.905131, signifying that an increase of 1 rupiah in CEE will result in a decrease of 0.905131 percent in CAR, assuming other variables remain constant (the estimation results are affected).

Coefficient of Determination (Adj. R^2)

The coefficient of determination (R^2) signifies the proportion of the variance in the dependent variable explained by the independent variables in the model. An R-squared value of 0.4899 in Table 3 indicates that the independent variables (HCE, SCE, and CEE) collectively explain 48.99% of the variation in FDR. The remaining 51.01% of the variation is attributed to other factors not included in the model or error terms. Similarly, the R^2 value of 0.2056 in Table 4 suggests that the model explains 20.56% of the variation in CAR, with the remaining 79.44% explained by other factors.

Hypothesis Testing

T-test (Partial Significance)

The t-test assesses the statistical significance of the estimated coefficients for each independent variable. The t-statistic and its corresponding p-value (Prob.) are used to determine if the coefficient is statistically different from zero. In Tables 3 and 4, a p-value less than the chosen significance level (e.g., 0.05) indicates that the coefficient is statistically significant.

For example, in Table 3, the p-value for the CEE coefficient is 0.0003, which is less than 0.05. This implies that the effect of CEE on FDR is statistically significant at the 5% level. Conversely, the p-values for HCE and SCE in both tables are greater than 0.05, signifying that their effects on the respective dependent variables are not statistically significant at the chosen level.

F-test (Simultaneous Significance)

The F-statistic test evaluates the joint significance of all independent variables in explaining the dependent variable. An F-statistic with a p-value lower than the significance level suggests that the model as a whole is statistically significant. In Table 3, the F-statistic p-value (0.003) is less than 0.05, indicating that the model for FDR is jointly significant. However, in Table 4, the F-statistic p-value (0.084949) is greater than 0.05, implying that the model for CAR is not jointly significant at the 5% level.

These findings suggest that the chosen model explains a significant portion of the variation in FDR, with CEE being the only independent variable with a statistically significant individual effect. On the other hand, the model for CAR does not jointly explain a significant portion of the variation in the data, and none of the individual independent variables have statistically significant effects.

Discussion

The presented regression analysis examines the factors influencing the Financing to Deposit Ratio (FDR) and Capital Adequacy Ratio (CAR) of two Islamic banks (BSI and BMI) over a specific period (2016-2020). The results offer insights into the relationship between human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) and these key financial ratios. The analysis offers valuable insights applicable to both the pre-pandemic era (2016-2020) and the post-pandemic era (present day onwards). The details of the discussion are as follows:

Pre-Pandemic Context

The model for the financing-to-deposit ratio (FDR) demonstrates a good fit, explaining nearly half (48.99%) of the variation in the data. This indicates that Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), and Capital Employed Efficiency (CEE) collectively play a significant role in determining the ability of Islamic banks to distribute funds to the public relative to their deposits.

Among the independent variables, only CEE has a statistically significant negative impact on FDR. This suggests that during the observed period, CEE played a key role in determining the FDR of Islamic banks. Increased efficiency in capital usage may have led to two main outcomes. Firstly, it may have resulted in conservative lending practices, with banks holding onto more deposits as a buffer. This reflects a cautious approach to lending, even in a relatively stable economic environment. Secondly, efficient capital utilization could indicate that banks were prioritizing specific investment opportunities, potentially impacting the allocation of funds for financing activities.

It is noteworthy that HCE and SCE do not have significant effects on FDR in this model. This suggests that within the observed timeframe (pre-pandemic period), human capital and structural capital efficiency may not be primary drivers of variations in the banks' ability to distribute funds. Moving on to the model for the Capital Adequacy Ratio (CAR), it does not achieve a statistically significant fit. This indicates that the chosen independent variables (HCE, SCE, and CEE) collectively do not explain a significant portion of the variation in the banks' CAR. Additionally, none of the individual independent variables have statistically significant effects on CAR.

This suggests that factors beyond HCE, SCE, and CEE likely play a more prominent role in determining the capital adequacy of banks. These factors could include external regulatory requirements, risk management strategies, and overall economic conditions. The lack of significant influence from HCE,

SCE, and CEE on CAR suggests that factors beyond these internal efficiency measures were more crucial for maintaining capital adequacy during the observed pre-pandemic period. These factors may include regulatory requirements, risk management strategies, and the stability of the economic environment.

The findings suggest that Capital Employed Efficiency (CEE) has a significant negative impact on FDR in the pre-pandemic era. This implies that as Islamic banks became more efficient in utilizing their capital, they may have held onto a larger portion of deposits or become more selective in financing activities, leading to a lower FDR.

Relevance to the Post-Pandemic Era

The COVID-19 pandemic has had a profound impact on the economic landscape, presenting both challenges and opportunities for Islamic banks. In the post-pandemic era, the focus on capital efficiency (CEE) becomes even more crucial. Banks may need to exercise greater caution with their capital due to two main factors. Firstly, there is an increased risk of loan defaults. The pandemic has led to a rise in non-performing loans, which requires banks to hold onto more capital as a buffer. This is necessary to mitigate the potential losses resulting from these defaults. Secondly, economic uncertainty persists in the post-pandemic recovery. Banks may prioritize efficient capital allocation to navigate this uncertainty. By ensuring that capital is allocated effectively, banks can better manage risks and adapt to the changing economic landscape.

While the factors influencing capital adequacy ratio (CAR) pre-pandemic, such as regulations, risk management, and economic conditions, remain important, adjustments may be necessary in the post-pandemic era. Regulatory bodies may need to modify capital adequacy requirements in response to the pandemic's impact on the banking sector. Additionally, banks may need to refine their risk management strategies to address new risks arising from the economic fallout of the pandemic. The overall pace of post-pandemic economic recovery will also influence the level of capital adequacy that banks need to maintain.

The pandemic has significantly affected economic activity and financial institutions globally. Islamic banks may have adopted stricter capital management practices post-pandemic due to increased uncertainty. This aligns with the pre-pandemic finding of a negative relationship between CEE and loan defaults, suggesting a potential continuation of this trend. However, the post-pandemic era may introduce new dynamics. Governments and central banks may encourage lending to stimulate economic recovery, potentially leading to a rise in loan defaults. Islamic banks may also need to adapt their

financing strategies to cater to the evolving needs of businesses and individuals in the post-pandemic period.

The results indicate that the average financing-to-deposit ratio (FDR) of two banking units is reasonable in maintaining liquidity. The capital adequacy ratio (CAR) for these units is also relatively good, with average values of 13.83% and 14.00% respectively. This suggests that these banks have the ability to cover the decline in assets resulting from bank losses caused by risky assets. These findings support previous studies conducted by Wahyudin (2023), Fadila and Pangestuti (2022), Ghifar et al. (2022), and (Kocaoğlu, 2010).

The COVID-19 pandemic has brought about significant changes to the economic landscape, posing challenges and opportunities for Islamic banks. The emphasis on capital efficiency becomes even more crucial in the post-pandemic era. Banks may need to exercise caution with their capital due to increased loan defaults and economic uncertainty. While pre-pandemic factors influencing capital adequacy remain important, adjustments may be necessary in response to regulatory changes and the need for enhanced risk management. Islamic banks may also need to adapt their financing strategies to cater to the evolving needs of businesses and individuals in the post-pandemic period.

Conclusion

This study investigated the determinants of Financing to Deposit Ratio (FDR) and Capital Adequacy Ratio (CAR) in two Islamic banks (BSI and BMI) for the period 2016-2020. The analysis employed Ordinary Least Squares (OLS) regression to examine the influence of human capital efficiency (HCE), structural capital efficiency (SCE), and capital employed efficiency (CEE) on these key financial ratios. The model for FDR achieved a good fit, explaining nearly half (48.99%) of the variation in the data. Capital employed efficiency (CEE) emerged as the only statistically significant factor, exhibiting a negative relationship with FDR. This suggests that increased efficiency in capital utilization by the banks might be associated with a lower ratio of financing to deposits. The model for CAR did not achieve a statistically significant fit, indicating that the chosen variables (HCE, SCE, and CEE) do not collectively explain a significant portion of the variation in this ratio. Additionally, none of these variables had a statistically significant individual effect on CAR.

The study acknowledges several limitations. The analysis is based on a specific time period (2016-2020) and only two Islamic banks. This limits the generalizability of the findings. Additionally, the model might not capture the complete picture, as other relevant variables not considered in this study could be

influencing FDR and CAR. Future research can build upon these findings by 1) Expanding the sample size and timeframe to enhance generalizability; 2) Investigating the influence of additional variables such as market competition on FDR and regulatory changes/economic fluctuations on CAR; 3) Exploring the impact of the COVID-19 pandemic on the relationships between HCE, SCE, CEE, FDR, and CAR. How has the pandemic altered capital efficiency practices, loan patterns, regulatory requirements, and risk management strategies within Islamic banks? By addressing these limitations and incorporating a more comprehensive set of variables, future research can provide deeper insights into the complex dynamics influencing the financial performance of Islamic banks, particularly in the evolving post-pandemic economic landscape.

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