# Revealing the Key to Financial Stability During the Covid-19 Crisis

Annisa Syaqbania<sup>a</sup>, Eogenie Lakilaki<sup>b\*</sup>, Rizki Amelia<sup>c</sup>

<sup>a</sup>Accounting, Sriwijaya University, annisasyaqbania@gmail.com, Indonesia <sup>b</sup>Ikatan Akuntan Indonesia, eogenie.lakilaki03@akuntanindonesia.or.id, Indonesia <sup>c</sup>Accounting,Sriwijaya University, rzkiamelia16@gmail.com, Indonesia

**Abstract.** The Covid-19 pandemic has caused significant shocks to the financial sector, affecting the performance and stability of financial institutions. This study aims to analyze the effect of Loan to Deposit Ratio (LDR), capital adequacy, and credit risk on financial stability during the Covid-19 pandemic. The samples of this study were 18 banking sector companies listed on the Indonesia Stock Exchange during the period 2020-2022. This study uses a quantitative approach in analyzing statistical data regression. The results of this study prove that the Loan to Deposit Ratio and capital adequacy have a positive effect on financial stability. Meanwhile, credit risk has a negative effect on financial stability. The implications of this study can serve as a guide for financial authorities and related institutions in making policies to maintain financial stability amid the pandemic crisis.

Keywords: Capital Adequacy Ratio, Financial Stability, Loan Deposit to Ratio, Non-Performing Loans

\*Corresponding author. E-mail: annisasyaqbania@gmail.com

#### Introduction

The Covid-19 pandemic crisis has caused a significant slowdown in the global economy, resulting in halted business activities, high economic uncertainty, and increased financial risks for many companies and individuals. This situation creates serious pressure on the financial sector, including banks and other financial institutions. In this context, identifying and analyzing factors affecting financial stability is critical to addressing complex and profound economic challenges. The pandemic encourages people to withdraw their money from banks or known as "bank panic" this will disrupt bank liquidity. The same phenomenon has also occurred two decades ago, namely in 1998 and 2008, known as panic withdrawal due to lack of confidence (Fauziah et al., 2020).

The banking sector has an important position in the economy, this is because banks are intermediary institutions and encourage economic development through money loans, but currently banks in Indonesia are still dependent on third party funds. Therefore it is important to maintain financial stability in the banking sector. The stability of a bank is important because it strengthens the bank's position in the world market (Sulaiman & Hashim, 2018). The maintenance of banking financial stability will increase public confidence in banks so as to control the inflation rate. In the banking sector, all commercial banks face various challenges due to the decline in economic growth, which causes an increase in bad loans and reduces public confidence. As a consequence, there was a credit crisis with a decrease in credit distribution during the pandemic period (Darjana et al., 2022). Previous research found that banks, especially conventional banks, are more dependent on external funding sources (Septiari & Mazlifani, 2018).

As of February 2020, the Financial Services Authority (OJK) announced that the national banking non-performing loan ratio increased by 2.7%. The increase in non-performing loans in banks is due to weak bank credit growth. In addition, since April 2020, the increase in non-performing loans has also been seen in financial technology companies, this is indicated by the NPL value of 6.08% which exceeds the maximum limit of 5% (Munandar et al., 2021). This condition poses challenges for the banking sector in managing credit risk and maintaining overall financial system stability.

In Indonesia, liquidity refers to having enough financial resources to meet all maturing liabilities, whether predictable or not. Often, companies struggle to pay their debts on time due to insufficient funds (Sinarti & Rahmadany, 2018). Loan to Deposit Ratio (LDR) is one of the important indicators in measuring bank liquidity. LDR reflects how much credit is provided by the bank compared to the deposits that have been collected. During the Covid-19 pandemic, the demand for credit decreased, which led to a decrease in banking activities (Syahwildan & Parulian, 2022). An increase in credit risk may occur due to the reduced ability of borrowers to repay their debts due to difficult economic conditions. Capital adequacy is a vital indicator in assessing the stability of financial institutions. Capital serves as a store of value that can be used to cover losses arising from risks faced by financial institutions. During the Covid-19 pandemic, there is a decline in income and economic uncertainty that can reduce the capital adequacy of financial institutions, increasing the risk of inability to deal with potential losses. Credit risk is the potential failure of borrowers to fulfill their obligations, and this risk may increase during periods of economic instability such as the Covid-19 pandemic. High credit risk can lead to an increase in the number of bad debts, affect the financial performance of financial institutions, and negatively impact the stability of the financial system as a whole. In addition, capital adequacy is important in assessing the ability of financial institutions to cope with potential losses. Low capital adequacy may lead to an inability to bear risks, which may threaten the financial stability of banks and the financial system as a whole during times of economic crisis. At the same time, credit risk has become even higher during the Covid-19 pandemic as many companies and individuals are experiencing financial difficulties. Decreased income and liquidity can cause credit quality to decline, increase the number of bad debts, and cause a negative impact on the financial health of financial institutions. The capital adequacy ratio, average value of Tier 1 to total risk weighted assets (TRWA), and total capital to TRWA of both banking systems show that both meet core capital adequacy of 6%, and total capital. by 8%. This shows that banking has a strong position in facing financial shocks (Sulaiman & Hashim, 2018).

Financial stability is often measured using various indicators, one of which is the z-score, which describes a bank's ability to withstand financial shocks. The z-score is used to analyze the stability of a bank, with the value obtained through the z-score formula introduced by Altman (1968). The stability of the banks in this table depends on the average value of all banks. If the z-score value is higher than the average value then a bank can be said to be stable, conversely if the z-score value is lower than the average value then the bank is unstable.

Many studies have discussed the impact of each of these indicators on financial stability separately, but research that combines these three indicators in the context of the Covid-19 pandemic is still limited. This pandemic has brought new dynamics that affect the banking sector simultaneously, so a holistic analysis is very necessary. In addition, existing research focuses more on the period before the pandemic, so there is an urgent need to maintain conditions during and after the pandemic in order to understand the changes that occur and formulate relevant policies. This research aims to find out how the Loan to Deposit Ratio (LDR), capital adequacy, and credit risk influence financial stability during the Covid-19 pandemic. Through this research, it is expected to understand how these factors interact and impact the financial health of banks during this uncertain period. The results of this study will provide valuable insights for regulators, policy makers, and banking industry players to take appropriate actions in facing the economic challenges caused by the Covid-19 pandemic.

#### **Literatur Review**

# Agency Theory

Agency theory explains the bond between the company owner and the manager who runs the company's operations where the agency relationship comes in one or more people provide work or services to others and delegate authority to the agent regarding decision making and managing funds so that there can be conflicts due to differences in interests and information with the company's internal conditions called asymmetric information (Jensen & Meckling., 1976); Willenborg & McKeown 2000; (Nugroho & Anisa, 2018). Fund owners or shareholders, investors are the part that shares power, while those who get power are banks.

#### Bank Financial Stability

Financial system stability is a condition where economic mechanisms in pricing, fund allocation and risk management function properly and support economic growth. The meaning of financial system stability can be understood by conducting research on factors that can cause instability in the financial sector. According to agency theory, bank managers as agents have incentives to maximize short-term profits, which often conflict with the long-term interests of principals who want bank stability and sustainability. This conflict of interest can lead to decisions that increase bank risk and threaten financial stability. Therefore, it is important to implement supervisory and incentive mechanisms that align with the long-term interests of principals to ensure that bank managers make the right decisions to maintain the bank's financial stability. Financial system instability can be triggered by a variety of causes and fluctuations. This is generally a combination of market failures, both due to structural and behavioral factors. Market failure itself can come from external (international) and internal (domestic) sources (Fauziah et al., 2020).

#### Loan to Deposit Ratio (LDR)

Loan to Deposit Ratio (LDR) is a ratio used by banks and financial institutions to measure the extent of loans provided by banks to customers compared to the total deposits received from customers. This ratio helps in assessing how liquid the bank is and the extent to which the bank utilizes existing funds to provide loans (Anggari & Dana, 2020).

If the LDR is more than 100%, it means that the bank provides more loans than the total deposits it has. This indicates that the bank relies on other sources of funds besides customer deposits, such as interbank loans or external funding. Conversely, if the LDR is less than 100%, it means that the bank is lending less than its total deposits, indicating that the bank is more liquid and less reliant on external sources of funds. LDR is an important indicator for regulators and other interested parties to monitor a bank's financial health, liquidity and credit risk.

# Credit Risk (Financing)

Credit risk is the risk of the customer's inability to fulfill his obligations in full and on time to the bank in accordance with the agreement. A low rate of return on credit funds causes the amount of funds to decrease as a result it will affect banking operations. In this case, the bank must incur large write-off costs due to the high number of non-performing loans. In the end, the bank will lose income and the opportunity to channel funds from third parties more effectively (Nugraheni, 2022).

for banks in carrying out their operational activities. The Capital Adequacy Ratio (CAR) is a measure in determining the level of bank capital adequacy, where the high ratio will increase the capital owned by the bank, used as financing, and cover the risk of using assets in the form of loans that indicate risk.

CAR is a ratio that measures capital adequacy which has a function in collecting the risk of losses that may occur in the bank. If the CAR ratio value is high, the bank can bear risky returns. On the other hand, the capital adequacy ratio (CAR) can be affected by a decrease in risk-weighted assets as used by OJK in determining the health and stability of a bank. Capital adequacy is measured by comparing the capital to RWA ratio, where RWA (Risk Weighted Assets) is calculated using weighting factors based on the risk level of assets in the financial statements and management accounts. The percentage of the bank's minimum capital requirement is regulated in POJK number 11 /POJK.03/2016, which is 8%.

# Effect of Loan to Deposit Ratio on Financial Stability

LDR is a ratio to measure the ratio of the amount of credit and funds received by the bank. Banks can maintain liquidity at a healthy level and evaluate company performance so as to maintain financing or capital within the minimum limits of Bank Indonesia (Kurniawati & Indriyani, 2022). This is also in accordance with agency theory where banks and third parties (customers) have different interests. From an agency theory perspective, bank managers (agents)

(ROE) and impact their compensation. However, a high CAR is important to absorb losses and maintain bank financial stability. This conflict of interest can make managers prefer to keep capital as minimal as possible to increase ROE, but this can reduce the bank's ability to face unexpected losses and the risk of bankruptcy. Low capital adequacy can reduce shareholder and depositor confidence, as well as increase systemic risk in the banking sector. This is in line with research (Oktavionita et al., 2022) which states that capital adequacy has a positive effect on financial stability.

# Capital Adequacy

A management's ability to see and examine risks that can affect bank capital is referred to as capital adequacy (Muarif, et. al, 2021). If banks have adequate capital, this will have an impact on efficiency and benefits

may be motivated to increase LDR in order to demonstrate good performance to shareholders (principals). However, an excessive increase in LDR can increase liquidity risk, especially if there is a large withdrawal of funds by depositors. The conflict of interest between the manager's desire to show high credit growth and the need to maintain liquidity can affect the bank's financial stability. If the LDR is too high, the bank may face serious liquidity problems, which can shake the confidence of depositors and shareholders, and threaten the bank's financial stability. This is in line with Khemiri's research (2023) which shows that the Loan to Deposit Ratio (LDR) has an effect on bank stability.

H<sub>1</sub>: Loan to Deposit Ratio has a negative influence on financial stability

# Effect of Capital Adequacy on Financial Stability

Capital Adequacy is indicated by CAR (Capital Adequacy Ratio). If the CAR is higher, the better the bank can feel the consequences of risky returns. If the CAR value is high, the bank can help operations and contribute to significant profitability. If the CAR is higher, the bank's ability to bear the consequences of each risky productive asset is getting better. If the CAR score is high, it can bear the costs of operational activities and contribute significantly to profitability. Agency theory suggests that bank managers may be reluctant to increase capital because it could reduce return on equity

H<sub>2</sub>: Capital Adequacy Has a Positive Effect on Financial Stability

#### Effect of Credit Risk on Financial Stability

An increase in credit risk causes a decrease in the level of bank stability, if the level of credit risk increases, the bank's collapse will be greater, along with an increase in the level of credit risk causing a decrease in bank stability. According to agency theory, bank managers may have incentives to take higher risks in lending to increase short-term profits, especially if their compensation is tied to short-term performance. However, an increase in credit risk can result in a spike in NPL, which in turn can erode bank profitability and capital, and threaten financial stability. This conflict of interest can influence managers' decisions in managing credit portfolios, where they may tend to ignore credit quality in pursuit of short-term profits. This is in line with research (Nugraheni, 2022) and (Fatoni & Sidiq, 2019) which states that credit risk has a negative effect on financial stability.

H<sub>3</sub>: Credit Risk Negatively Affects Financial Stability

#### **Research Method**

This research is a quantitative study that refers to statistical measurements to evaluate hypotheses. The population in this study were all Conventional Banks listed on the Indonesia Stock Exchange (IDX). By using purposive sampling, there were 18 Conventional Banks in Indonesia that were selected as samples in this study.

The following sample selection criteria were used:

- 1. Conventional banks listed on the IDX during the research period, namely 2020 to 2022
- 2. Conventional Banks that have audited financial statements from 2020 to 2022
- 3. Conventional Banks with complete data related to all research variables during the period 2020 to 2022.
- 4. Excluding Islamic Banks
- Table 1

No	Sampling Criteria	Company
1	Banks listed on the Indonesia Stock Exchange for the period 2020 to 2022	46
2	Islamic banks listed on the Indonesia Stock Exchange for the period 2020 to 2022	(5)
3	Conventional banks that do not have audited reports for the period 2020-2022	(0)
4	Conventional banks that do not have complete data for the period 2020-2022	(23)
Total	18	
Multi	3 years	
Total	54	
Source	Research Data 2023	

Source: Research Data, 2023

Based on the above criteria, there were 18 Conventional Banks selected as samples in this study. So, there are 54 data that will be tested for three years. The multiple linear regression analysis method is used in processing this research data. The following is the model used in this study:

$$Y = \alpha + \beta 1 LDR + \beta 2 CAR + \beta 3 NPL + \varepsilon$$

Description:

Nugraheni (2022) explain that good bank stability shows that banks are able to fulfill their role as intermediary institutions in channeling public funds in the form of credit. Bank financial stability can be measured using Z-score as has been done by Oktavionita et al. (2022) and Fatoni dan Sidiq (2019). The formula for calculating Z-score is as follows:

## Z-Score = $(ROA + Eq/TA) / (\sigma ROA)$

LDR is a ratio to determine how the bank's ability to pay its obligations to short-term customers. According to Santi and Andriyani (2018), LDR is the bank's ability to repay customer funds. The LDR is measured on a ratio scale and the amount is expressed in percent (%). LDR is measured on a ratio scale and the amount is expressed in percent (%). The LDR formula is (SE BI 13/30 / DPNP December 16, 2011):

LDR = (Loans / Third Party Funds) × 100%

Capital adequacy is the ability of bank management to monitor and control risks that can affect the amount of bank capital. The minimum CAR ratio set by Bank Indonesia is 8%. Capital Adequacy Ratio (CAR) can be used to measure capital adequacy as has been done by Rustendi (2019). CAR can be calculated using the following formula:

# CAR = (Capital (core capital + supplementary capital)) / RWA × 100%

Risks that arise when customers fail to fulfill their obligations to the bank in accordance with the agreement are known as credit risk. Credit risk in this study is measured using Non-Performing Loan (NPL) as done by Oktavionita et al. (2022). According to BI regulation 15/2/PBI/2013, the maximum NPL limit is 5%; any NPL that exceeds 5% will have an impact on

bank stability. NPL can be calculated using the following formula:

NPL = (Total non-performing loans)/(Total loans) × 100%

# **Results and Discussion**

# Descriptive Analysis

Based on the results of descriptive statistical output from the SPSS program in the table, the results show: First, the Z score variable shows the lowest value of 7.26 and the highest value of 49.10. The standard deviation value for ZScore is 7.85. The LDR variable shows the lowest value of 0.50 and the highest value of 1.60. The standard deviation value for LDR is 0.20. The CAR (Capital Adequacy) variable shows the lowest value of 0.11 and the highest value of 0.59. The standard deviation value of CAR is 0.08. The NPL (Credit Risk) variable shows the lowest value of 0.01 and the highest value is 0.51. The standard deviation value of NPL is 0.10. This indicates a good and even distribution of data.

Table 2 Descriptive Statistical Analysis Results

	Ν	Min	Max	Std. Dev.
ZSCORE	54	7.26	49.10	7.85195
LDR	54	0.50	1.60	.19516
CAR	54	0.11	0.59	.08041
NPL	54	0.01	0.51	.10070

Source: SPSS output, 2023

# Classical Assumption Test

The classic assumption test was a filter for the feasibility of data to be further analyzed in regression (Ghozali, 2018). Classical assumption text proxied by normality test, autocorrelation test, heteroskedaticity test, and multicollinearity test.

Table 3 Classical Test Results					
Variable	Normality Test	Autocorr elation Test	Heteros kedastic ity Test	Multicollinar ity Test	
	(Kolmogorov Smirnov)	(Durbin Watson)	(Glejser Test)	Tolera nce	VIF

BFC	0,20	3.164	0,56	0,94	1.31
LDR		> 1.080	0,59	0.95	1.04
CAR			0,09	0.96	1.03
NPL			0,09	0.98	1.01
Courses CDCC					

Source: SPSS output, 2023

Based on table 3 in the normality test column, the significance value was 0.200, the autocorrelation test result was 3.164 > 1.680, and the heteroscedasticity test results show the BFC variable value of 0.56, LDR 0.59, CAR, and NPL 0.09. The results of the four show more than the 5% level. Thus, this data was declared normally distributed, free from autocorrelation and heteroscedasticity symptoms. Finally, in the multicollinearity test column, it was stated that the tolerance and VIF values of the BFC variable were 0.94 and 1.31, LDR 0.95 and 1.04, CAR 0.96 and 1.03, and NPL 0.98 and 1.01. This shows all variables have tolerance values above 0.1 and VIF values below 10. Thus, the data in this study were free from multicollinearity symptoms. In conclusion, this regression model had passed the classical assumption test and was suitable for analysis using moderation regression

## Determinant Coefficient Test

The coefficient of determination  $(R^2)$  is used to measure the ability of variables that can affect the dependent variable (Ghozali, 2018). The coefficient of determination is between 0 and 1. The size of the R2 value means that the ability of the independent variables to explain the variation in the dependent variable is limited. The following are the results of the coefficient of determination  $(R^2)$  test.

Table 4				
	Detei	minant Coefficier	it rest Results	
Model	R	R Square	Adjusted R Square	
1	.806ª	.649	.628	
Source: SPSS output, 2023				

Based on the coefficient of determination test using the model summary table, the value in the R square column is 0.649, which means that changes in each Loan to Deposit Ratio (LDR), Capital Adequacy (CAR), and Credit Risk (NPL) variable affect changes in Bank Financial Stability (ZScore) by 64.9%.

#### Partial t Test

The t statistical test is basically used to show how far the influence of one each explanatory variable individually in explaining the variation in the dependent variable (Ghozali, 2018). The criterion for determining the t statistical test is if the significant value is less than 0.05, then partially the independent variable can affect the dependent variable.

Table 5 Partial t Test Results					
Model	t	Sig.			
	В	Std. Error	-	~-8	
(Constant)	-5.322	3.802	-1.400	.168	
LDR	10.76	3.441	3.127	.003	
CAR	75.24	8.327	9.036	.000	
NPL	-16.31	6.584	-2.477	.017	
G GDGG ( ) 2022					

Source: SPSS output, 2023

The mathematical equation from table 6 is as follows: Zscore = -5,322 + 10,760 LDR + 75,245 CAR - 16,309 NPL +  $\varepsilon$ 

The negative constant coefficient states that assuming the absence of LDR, CAR, NPL variables, the bank's financial stability tends to decrease by 5.322. The positive LDR regression coefficient states that assuming the absence of other independent variables, then if LDR increases, the bank's financial stability tends to increase by 10.760. The positive CAR regression coefficient states that assuming the absence of other independent variables, then if CAR increases, the bank's financial stability tends to increase by 75.245. The negative NPL regression coefficient states that assuming the absence of other independent variables, then if NPL increases, the bank's financial stability tends to decrease by -16,309.

Based on partial tests using the t test, the value of the results for the Loan to Deposit Ratio (LDR) variable t count> t table (3.127> 2.00856), it is concluded that the Loan to Deposit Ratio variable has a significant positive effect on bank financial stability (Z Score), thus accepting H0. Capital Adequacy (CAR) variable t value > t table (9.036 > 2.00856), it is concluded that the Capital Adequacy (CAR) variable has a significant positive effect on bank financial stability (Z Score), thus accepting H2. Credit Risk (NPL) variable t value > t table (2, 477 >1.67591) has a negative direction, so the NPL variable (Credit Risk) has a significant negative effect on the financial stability of banks.

#### F Simultaneous Test

The F statistical test aims to test whether a regression model in the research used shows significant results or not, so that it can ensure that the model can be used to estimate the effect simultaneously on the dependent variable (Ghozali, 2018). The following are the results of the F statistical test in this study.

Table 6					
F Similtaneous Test Results					
	Model	Df	F	Sig.	
1	Regression	3	30.829	.000 <sup>b</sup>	
	Residual	50			
	Total	53			
G GDGG ( ) 2022					

Source: SPSS output, 2023

Based on the table, the decision is made that H1 is acceptable and H0 is rejected. This can be seen in the results of the calculated F value of 30.829 which is greater than the F table value of 2.79 (F count> F table). As well as the results of the significance value whose value is smaller than 0.05, namely 0.000. It can be concluded that the independent variables consisting of Loan to Deposit Ratio, Capital Adequacy, and Credit Risk have a simultaneous influence on bank Financial Stability, and the multiple regression model is feasible to use in this study.

Based on multiple linear regression tests using SPSS, the independent variables, namely Loan to Deposit Ratio (LDR), capital adequacy (CAR), and credit risk (NPL) simultaneously have a significant effect on the financial stability of conventional banks listed on the Indonesia stock exchange during the pandemic. Loan to deposit ratio (LDR) has a significant positive effect on bank financial stability, this shows the greater the LDR value. This shows that banks must improve performance and manage liquidity well (Zaghdoudi, 2019). This is in accordance with agency theory that there are interests between agents and principals in the company, in this case company managers need to know how to manage credit risk so that bank stability is maintained and the public becomes more trusting. These findings support Setiawati (2020)but contradict Khemiri (2023). If the bank's LDR is high, it indicates that operational activities are illiquid. Through lending from creditors, it improves bank health and stability during the pandemic (Violeta & Mulyo, 2020).

Capital adequacy (CAR) has a significant positive effect on bank financial stability. The higher the CAR value, the better the bank's financial stability. This is in accordance with agency theory which explains that an entity has self interest. In this case, banking companies have self-interest through their capital. If the company has high capital adequacy or CAR value, the public will trust the bank. Of course this will improve bank performance (Oktavionita et al., 2022). These findings support the research of Saputra et al. (2020), Aulia and Anwar (2021) and Rustendi (2019). If the CAR value of a bank shows a large value, it illustrates that a bank has the ability to finance operational activities and bear risks (MA & Padli, 2019). With this ability, it will certainly support the financial stability of the bank.

Meanwhile, credit risk (NPL) has a significant negative effect on the financial stability of conventional banks listed on the Indonesia Stock Exchange (IDX) during the pandemic. This is in accordance with the agency theory that there are interests of agents and principals, in this case NPLs indicate substandard credit. Where this will reduce the level of public satisfaction with the bank. Which in turn will reduce the stability of the bank. This condition is supported by Bank Indonesia which has made a maximum NPL or credit risk limit of 5% in BI regulation 15/2/PBI/2013. These findings support the research of (Dwinanda & Sulistyowati, 2021) and Aliu & Çollaku (2021). However, these findings contradict the research of Kurniawati & Indrivani (2022). This shows that the higher the bank's NPL value, the lower the level of financial stability of the bank. An increase in the value of NPL or credit risk causes a decrease in bank stability, if the level of credit risk increases, the bank's collapse will be greater, along with an increase in the level of credit risk causing a decrease in bank stability.

# Conclusion

Covid 19 triggered a crisis that led to an economic slowdown, this situation created serious pressure on the financial sector, including banks and other financial institutions. The role of banking as an intermediary institution shows the importance of maintaining the financial stability of banks. By using agency theory to see how the interests of the agency and customers differ during the covid 19 pandemic and various previous studies, researchers used Loan to Deposit Ratio, Capital Adequacy, and Credit Risk as independent variables in this study. Meanwhile, the dependent variable in this study is bank financial stability. Based on the coefficient of determination test, the Loan to Deposit Ratio (LDR), Capital Adequacy (CAR), and Credit Risk (NPL) variables simultaneously affect Bank Financial Stability (ZScore) by 64.9%.

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# Recomendation

After obtaining the results of this research, the researcher would like to make suggestions that are expected to provide benefits in the future, namely: First, It is hoped that future researchers will examine more references and related sources so that the research results can be better and more complete. Second, It is hoped that future researchers will be more thorough in carrying out the process of data collection, data collection, and research preparation.

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