

## Factors Influence Financial Sustainability Banking in Indonesia

**Arini Mar'ah Sholikhah**

Universitas Maulana Malik Ibrahim Malang, Malang, Indonesia

Arinimars123@gmail.com

**Titis Miranti**

Universitas Maulana Malik Ibrahim Malang, Malang, Indonesia

titis@uin-malang.ac.id

### *Abstract*

*This research aims to determine the factors that affect the financial sustainability of conventional banks and sharia banks in Indonesia. Data obtained from the financial statements of conventional commercial banks and Islamic commercial banks have been published by the Financial Services Authority (OJK) for the period 2014 to 2018. The total population used in this study are all conventional and Sharia banks that publish their financial statements on the OJK. The research variables used include Financial Self Sufficiency (FSS) as the dependent variable. Return on assets (ROA), Cash to deposits (CTD), Loans to assets (LTA), Deposits to assets (DTA) as independent variables. The analysis used is the tree classification. The tree classification method requires the dependent variable in the form of categorical data. Processing results show that three financial performance factors affect financial sustainability, namely ROA, LTA, and DTA. Error in the analysis process is 29%. So that the accuracy of using the tree classification method in predicting the factors that affect banking financial sustainability is 71%.*

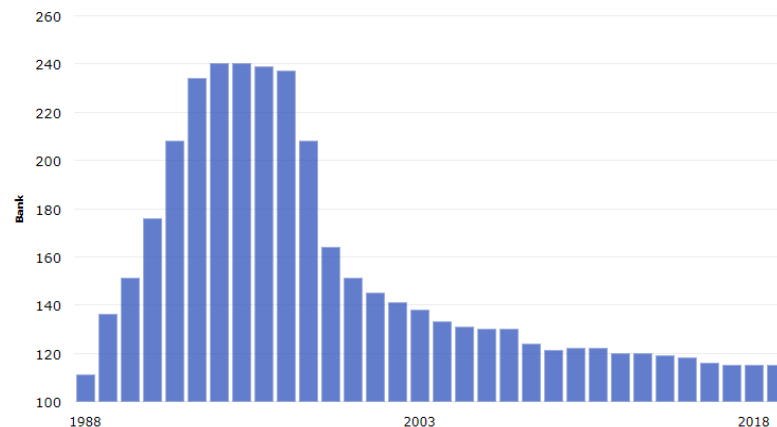
**Keywords:** *Financial sustainability, Tree Classification, Financial Ratios*

### **INTRODUCTION**

A bank is a financial institution as a collector and distributor of funds. The funds are from the public back to the public. Banks are useful to support the development of the economy in a country (Setyowati et al., 2019); (Sharma et al., 2017). Statistical data on banks in Indonesia from 1998 to 2019 are presented in Figure 1. Data obtained from annual reports issued by the Financial Services Authority (OJK). Based on Figure 1, the development of banks in Indonesia in 1998 was quite good. The number of banks in 1998 was 110. In 2005 and 2006, the number of banks reached the highest figure of 240 banks. But in 2008 there was a significant decline in banking. It was caused by the impact of the crisis in Indonesia (BI, 2008). The declining number of banks shows that the survival of banks in Indonesia still low. This considerably weakened the level of economic growth. A good country's economy can be accomplished if banking conditions are healthy (Fahrial, 2018). One idea to find out whether the banking condition is healthy or not is to look at the financial sustainability of the banking system.

**Figure 1.**

**Number of Commercial Banks in Indonesia**



Source: OJK 2019

Financial sustainability is a practice of measurement, disclosure, and accountability efforts of an organization's performance in achieving sustainable development goals to stakeholders both internal and external (Nasfi et al., 2019). The other said that financial sustainability is maintained or expand services within the organization, while developing resilience to occasional economic shocks in the short term (Zabolotnyy & Wasilewski, 2019); (Said et al., 2019); (Fauziah et al., 2020). One of the benefits of financial sustainability is control over the achievement of the work of a company so that it can be used as a tool for decision-making for investors and stakeholders. Financial sustainability is important to know the possibility of going to bank concerns in the future (Uddin & Ahmmed, 2018).

Financial sustainability itself has been officially regulated by OJK in POJK Number 51 / POJK. 03/2017 concerning the application of sustainable finance for all financial institutions (OJK, 2017). Therefore, to develop Indonesia's economy to grow better, it is hoped that banks will implement a financial sustainability system. This is because every bank can minimize risk and maximize profit. Deputy Commissioner for Banking Supervision IV of OJK in 2019 said that there were 8 banks designated by OJK to be banks that applied the principles of financial sustainability (OJK, 2019). Based on POJK number 51 / POJK.03 / 2017 the principle of financial sustainability refers to banks that have undertaken several sustainable financial projects as a whole such as renewable energy, energy efficiency, sustainable agriculture, green building and infrastructure, recycling industry, and eco-tourism.

Research on financial sustainability predictions can be performed in various ways and methods. Some of the previous studies were conducted (Marwa & Aziakpono, 2015). The research shows that short-term financial sustainability can indirectly affect long-term financial sustainability. Research conducted by Yazdanfar (2013) and Marwa and Aziakpono (2015) shows that profitability is a prerequisite for long-term survival and organizational success. The measure used to assess financial sustainability is financial self-sufficiency (FSS). In the previous financial sustainability research, Ayuningtyas et, al. (2018) also conducted a multiple linear regression

method to get a significant variable affecting the financial sustainability of Islamic banking in Indonesia, namely CAR and ROA. It uses the value of the financial sustainability ratio as a measure of financial sustainability. Also, financial sustainability in banking has been investigated using the panel data regression method (Notoadmojo & Rahmawaty, 2017). Some research does financial sustainability with Operational self-sufficiency (OSS) measures from microfinance institutions using qualitative and quantitative methods found that all of the variables tested proved to have a significant effect, namely financial non-governmental organizations (FNGO), the savings and loans companies (S&L), the Credit Unions (CUs), the rural banks (RBs) (Aveh et al., 2013).

Some studies conducted by Marwa and Aziakpono (2015), Yazdanfar (2013), Notoadmojo and Rahmawaty (2016), Aveh et al. (2013) use the value of financial sustainability measures in the form of continuous data. Furthermore, the analysis used is the parametric analysis. Parametric analysis requires the distribution of nominal and homogeneous data. This condition is rarely encountered in real. Another analysis that can overcome the distribution of abnormal and non-homogeneous data is non-parametric

Previous research on financial sustainability using non-parametric methods included (Bayai & Ikhide, 2016). In his research stated that there is a significant relationship between Micro Finance institution (MFI) financing with financial sustainability. Financial sustainability measures used are Operational Self-Sufficiency (OSS) and financial self-sufficiency (FSS). This FSS value is the result of categorization. The method used is the tree classification method. The tree classification method produces an accuracy rate of 75.3%. The research about financial sustainability mentioning that the accuracy of the model is 67.76% (Rebouças et al., 2016).

In previous studies, there were differences in methods, modeling results, variables, or factors that affect financial sustainability. Based on the differences in previous studies, the authors would like to re-examine the factors that affect the financial sustainability of banking in Indonesia. The use of the tree classification method refers to research conducted by Bayai and Ikhide (2016a) and Rebouças et al. (2016) The researcher stated that the method was quite accurate for research related to financial sustainability. Therefore, researchers conducted a study entitled "Factors Affecting Financial Banking Sustainability in Indonesia Using the Tree Classification Method (Study on Banking in Indonesia for 2014-2018 Period)"

## LITERATURE REVIEW

The 1998 Law states, a bank is a business entity that collects funds from the public in the form of deposits and distributes them to the community in the form of credit and/or in other forms to improve the lives of many people. A bank is an intermediary financial institution from parties that have excess funds (surplus units) to those who need funds (deficit units) with the agreed or determined time.

Financial statements are reports that show the current condition of the company in a certain period. "Reports that indicate the company's financial condition at this time or in a certain period (Kasmir, 2016). Fahmi (2017) states that "Financial Statements are information that describes the financial condition of a company, and further that information can be used as a picture of the company's financial performance". Munawir (2010) states, "Financial statements are the result of an accounting process that can be used as a measurement of communication between financial data or activities of a company with parties with an interest in data or company activities".

Financial Sustainability is a measuring tool used to assess the efficiency of an institution or company. This ratio is used to determine the growth rate of the institution. Financial sustainability can be used to determine financial performance so that banks can decide whether to continue operations or not. Benefits of the Sustainability analysis include as an indicator of the sustainability of a bank, measure the sustainability of a bank in terms of bank performance, as a target to increase their capital. Financial Sustainability analysis can be planned through which actions must be carried out now and in the future. Based on this, banks can conduct this analysis themselves using financial sustainability as a factor as well as pro-active and preventive steps for the survival of the bank itself. After conducting an analysis, the bank can decide whether it is required to carry out its operations or support its business activities. The media that is the focus of communicating financial sustainability is divided into three elements, namely: Budget balance, Amount of acceptance or level of debt, Percentage of income increase every year.

To get the maximum profit the bank tries to do any business and issue any product that can support or increase its income. Because banks must be able to compete by continuing to grow without ignoring the risks that exist so that banks are very necessary and pay attention to the financial sustainability of a bank itself.

As an institution with a clear organizational structure, Islam emphasizes the importance of all human beings knowing morals/ethics. Refer to the characteristics of modern organizations such as; transparency and accountability, openness, professionalism, and responsibility. It is based on the Koran which provides the basic rules and principles that form the basis for the formation of modern organizations. The laws of accountability and transparency guide that business institutions must be able to demonstrate the principles of openness and freedom from manipulation. Likewise, the concept of recording both financial statements (profit and loss and changes in the capital as well as other business administration) is regulated in the Qur'an, Surat Al-Baqarah verse: 282.

يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا تَدَايَنْتُمْ بِدَيْنٍ إِلَىٰ أَجَلٍ مُّسَمًّى فَاكْتُبُوهُ ۚ وَلْيَكْتُبَ بَيْنَكُمْ كَاتِبٌ بِالْعَدْلِ ۚ وَلَا يَأْبَ كَاتِبٌ أَنْ يَكْتُبَ كَمَا عَلَّمَهُ اللَّهُ

Qur'an explains that Islam emphasizes the importance of correct business regulation. It is to achieve prosperity and prosperity. Business institutions in Islam do not only function as collectors of capital and channeling capital, but also function in the formation of an economic system that is just and free from wrong economic behavior (Al-Quran, 2015).

## METHOD

The population of this research is all 135 commercial banks and Islamic banks in Indonesia. The sampling technique used was purposive sampling. The criteria are all banks that have been registered with the Financial Services Authority (OJK) and have published their financial statements for the period 2014 to 2018. The data used are secondary data, namely financial statements of banks in Indonesia. The report was downloaded through the Financial Services Authority (OJK) website from the 2014-2018 period to form panel data.

Independent variables (X) of this study are *Return on Asset (ROA)*, *Cash to deposits (CTD)*, *Loans to assets (LTA)*, and *Deposits to assets (DTA)*. Whereas Variable Dependent (Y) is

Financial Self-Sufficiency (FFS) which will categorize banks into two special categories 0 = sustain and 1 = not sustain. It is said to be sustainable if the calculation value of FSS is at least 100% and is said to be unsustainable if the calculation value of FSS is less than 100% (Bayai & Ikhide, 2016)The analytical method used is the calcification tree method. The software used is R software by utilizing the part package. The data analysis stage begins with the formation of classification trees, classification tree pruning, and cross-validation.

## RESULT AND DISCUSSION

Factors that affect financial sustainability determined by data processing. Data processing uses the tree classification method. Data analysis begins with the formation of the maximum tree, pruning the tree, and determining the accuracy of the classification tree or misclassification. Factors that affect financial sustainability can be seen in the optimal classification tree.

The stage of decision tree formation uses independent variables and dependent variables. Independent variables used include ROA, CTD, LTA, and DTA. The dependent variable is the FSS (category). The decision tree is shown in Figure 2. Figure 2 shows a classification tree. The tree is of relatively moderate size and a short depth. the number of classification tree nodes is 11 vertices. The number of node children is 12. the level of depth in the classification tree is 8. Of the 12 existing nodes, 8 children sustain, and 4 children do not sustain (the decision is not accepted). The classification tree in Figure 2 is referred to as the maximum classification tree. The maximum classification tree has the highest number of terminal nodes. The left node is the decision received and the right node is the decision that is not accepted. the maximum classification tree has all variables with categories that will group data. The process forms the decision tree for banking financial sustainability classification.

**Figure 2.**  
**Maximum Tree Classification**

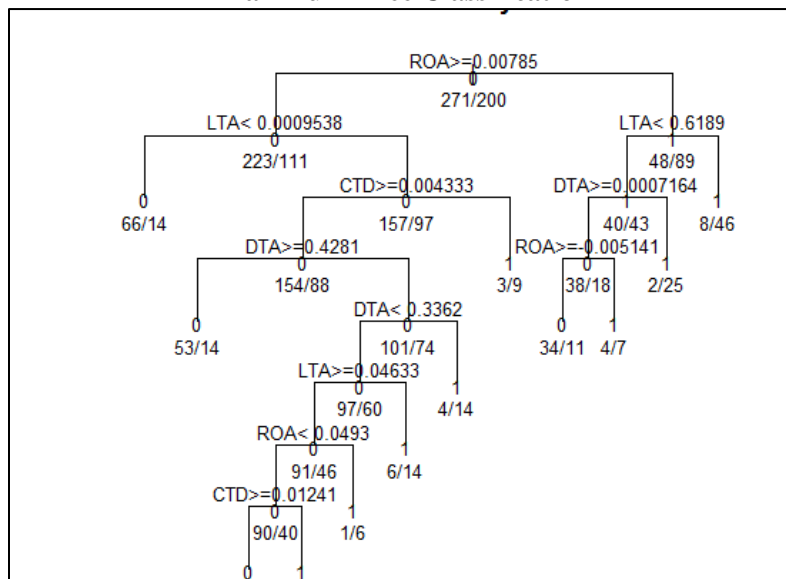


Table 1 displays the amount of data of 471 with the number of terminal nodes 11. The number of nodes 0 has the highest x-error rate of 100%, then the number of nodes 1 with an error rate of x 81%, followed by the number of nodes 3 with the smallest x error is 74.5%, and the last one is the maximum number of nodes which is 11 with an error rate of 80%. The number of terminal nodes showing the tree size is 11. The maximum tree plot is shown in Figure 2. Based on the information in table 1, the researcher can determine the optimal tree for classification. The optimal tree is a classification tree with a certain node and the smallest x-error value. Table 1 shows that the tree size with the lowest x-error rate is at node 3, with the x-error value of 0.745. So, the tree size for the prune result with the lowest error rate is the tree with the number of nodes 3. Figure 3 shows the formation of the optimal classification tree.

**Table 1.**  
**Split of Tree**

CP nsplit	Xerror
0	1.000 = 100%
1	0.810 = 81%
3	0.745 = 74,5%
11	0.800 = 80%

Figure 3. shows the result of the pruning command, which generates a decision tree of three nodes selected from the X-error or least error. The three nodes used are the node that is considered the most appropriate and the node that will make it easier to form the expected banking classification. If too many nodes are concerned, it will complicate the classification process and a high X-error rate. Thus, the Pruning command selects the node with the lowest X-error rate along with the node, which simplifies the classification process.

Figure 3 shows the pruning of the classification tree command that produces the optimal tree. The optimal tree is a decision chosen from X error. The three nodes used are the nodes that are considered the most suitable and the nodes that will make it easier to form the expected banking classification. If there are too many nodes, it feared that it would complicate the classification process. Thus, the classification tree pruning command will select the node with the lowest x-error level. In Figure 4.3, the number of nodes owned by the optimal tree is four sub-knots and a depth of 3. Where three decisions are in a sustainable state, and one choice is not viable.

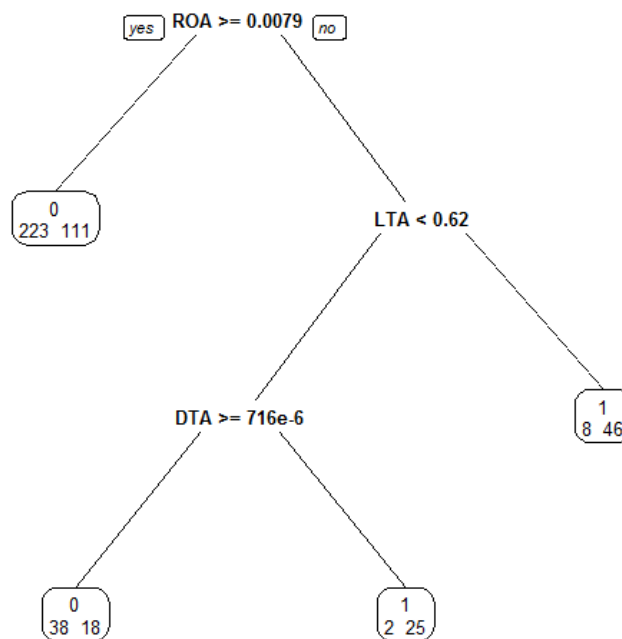
In the results of testing the financial performance factors using the tree classification method itself has characteristics based on Figure 3. Based on Figure 3, banks that can be said to be sustainable are banks that meet the following criteria:

1.  $ROA > = 0.00785$
2.  $LTA < 0.6189$ , if and only if  $DTA > = 0.0007$

It is shown by Figure 4.4 that banking specifications or fulfillment can be said to be sustainable, namely if  $ROA > = 0.00785$  such as BRI Syariah banks in 2016, BNI Syariah 2014 to 2016, Panin Bank 2014. However, if banks have not met these criteria, it cannot be said directly that the banking sector is not sustainable. However, you can see again how the LTA is if the LTA is  $< 0.6189$ , then these banks can still be said to be durable such as MEGA SYARIAH bank in 2014 to 2017, MANDIRI bank from 2014 to 2018, BCA 2014 to 2016, etc, if not we can still do the specifications.

Or another diversion based on DTA, If and only if  $DTA \geq 0,0007$  is still in the sustainable category such as VICTORIA SHARIAH banks in 2017 and 2018. At the stage of looking at the amount of DTA, if both conventional and sharia banking cannot meet the category, it can be said that the banking does not sustain.

**Figure 3.**  
**Optimal Tree Clasification**



The results of the summary formation of the optimal classification tree indicate that the independent or independent variables that significantly influence the classification of banking FS are ROA, LTA, and DTA. It is reinforced by Khediri et al. (2015), Choiruddin (2017), Miranti (2018) which states that ROA affects the economic viability of a company. The ROA variable appears to have a significant effect on financial sustainability. It shows that banks have high profitability and will be able to disclose financial sustainability much better. The higher the return on assets, the higher the amount of net profit from each nominal fund invested in the total assets will increase. Conversely, if the lower the return on assets means the lower the amount of net profit generated (Puspitandari & Septiani, 2017).

LTA is the level of liquidity a bank has. This ratio measures the bank's ability to fulfill customer credit or channel financing to the public against the total assets owned by the bank. If the cash in the bank is large, then the bank is inefficient in carrying out its operational activities. Banking requires large assets to be able to reduce this LTA ratio. This condition made banking still

exist and operate. Financial sustainability is related to the LTA ratio because if the value of the LTA is getting bigger, then the chance for banks to experience financial sustainability failure is getting higher (Khediri et al., 2015); (Bourkhis & Nabi, 2013); (Abedifar et al., 2013).

DTA is a ratio that shows the ability of bank assets to be used from stable funds. DTA has a significant coefficient in the classification process for Islamic banks and conventional banks in the Gulf Cooperation Council (GCC) countries (Khediri et al., 2015). Hamdan (2017), Khrawish and Al-Sa'di (2017) also support the results of this study. Both studies use the deposit value in looking at banking performance.

The next process is to find out the accuracy of the model through misclassification calculations. Misclassification is the observation of incorrect grouping (Breiman, Olsen, et al., 1984); (Raupong et al., 2016). These observations will have a significant influence on the analysis process. Misclassification use to see misclassification in the data processing process. The results of the misclassification seen in Table 2.

**Table 2.**  
**Decision Tree Accuracy**

	Pred;0	Pred;1
Actual;0	261	10
Actual;1	129	71

Table 2 shows the results of the misclassification of 471 data processed using two categories, namely 0 = sustain and 1 = not sustain, show that the corresponding number is 261 and 71 while the number of unsustainable data is 129 and 10. Also, the level of error or misclassification calculated from:

$$misclassification = \frac{\text{the total of data match}}{\text{the total data}} \times 100\%$$

$$\frac{129 + 10}{471} \times 100\% = 29\%$$

This calculation shows that the data has misclassified 29% of the total. It means the data that do not experience misclassification is 71% of the total data tested.

## CONCLUSION

The results showed that the factors that influence the financial sustainability of banking in Indonesia are Return on assets (ROA), Loans to assets (LTA), and Deposits to assets (DTA). In this case, banks can pay attention to these ratios as one warning measure for the banking financial health system. The bank needs to see the feasibility of these ratios to continue operating. This study uses annual financial report data or annual reports from banks from 2014 to 2018 on the OJK website. Further research let by updating data or adding data with the aim that the model obtained is closer to the actual conditions. Other methods can also be used as a form of exploration in terms of mathematical modeling.



## REFERENCES

- Al-Quran dan Terjemahan*. (2015). Jakarta: Departemen Agama RI.
- Abedifar, P., Molyneux, P., & Tarazi, A. (2013). Risk in Islamic Banking\*. *Review of Finance*, 17(6), 2035–2096. <https://doi.org/10.1093/rof/rfs041>
- Aveh, F. K., Krah, R. Y., & Dadzie, P. S. (2013). An Evaluation of Sustainability and Subsidy Dependence of Microfinance Institutions in Ghana. *International Business and Management*, 9.
- Ayuningtyas, R. D., Wati, R., & Safa'ah, F. (2018). Sustainability of sharia rural bank in Central Java. *Jurnal Ekonomi & Keuangan Islam*, 4(2), 59–66. <https://doi.org/10.20885/jeki.vol4.iss2.art1>
- Bank Indonesia. (2008, Oktober). Krisis Keuangan AS dan dampaknya pada Perekonomian Indonesia: -Sebagai Background Informasi-. Jakarta.
- Bayai, I., & Ikhide, S. (2016). Financing and financial sustainability of microfinance institutions (MFIs): A conceptual view. *Banks and Bank Systems*, 11(2), 21–32. [https://doi.org/10.21511/bbs.11\(2\).2016.03](https://doi.org/10.21511/bbs.11(2).2016.03)
- Bourkhis, K., & Nabi, M. S. (2013). Islamic and conventional banks' soundness during the 2007–2008 financial crisis. *Review of Financial Economics*, 22(2), 68–77. <https://doi.org/10.1016/j.rfe.2013.01.001>
- Breiman, L., Friedman, Olsen, J. H., & Stone, C. J. (1984). *Classification and Regression Trees (The Wadsworth Statistics/Probability Series)*. Chapman and Hall.
- Choiruddin, M. N. (2017). ANALISIS DEBT TO EQUITY RATIO (DER), RETURN ON ASSETS (ROA), RETURN ON EQUITY (ROE), NET PROFIT MARGIN (NPM) TERHADAP STOCK PRICE (HARGA SAHAM) PADA PERUSAHAAN SAHAM SYARIAH SEKTOR MAKANAN DAN MINUMAN PERIODE TAHUN 2013-2016. *El Dinar: Jurnal Keuangan dan Perbankan Syariah*, 5(2), 27–43. <https://doi.org/10.18860/ed.v5i2.5238>
- Fahmi. (2017). *Analisis Laporan Keuangan*. Alfabeta.
- Fahrial. (2018). Peranan Bank dalam Pembangunan Ekonomi Nasional. *Ensiklopedia of Journal*, 1(1), 179–184.
- Fauziah, F., Latief, A., & Jamal, S. W. (2020). The Determinants of Islamic Banking Capital Structure in Indonesia. *Al-Tijary*, 5(2), 125–138. <https://doi.org/10.21093/at.v5i2.1765>
- Hamdan, D. A. (2017). The Impact Of Information Technology On Improving Banking Performance Matrix: Jordanian Banks As Case Study. *European, Mediterranean & Middle Eastern Conference on Information Systems 2010*, 4, 1–16.
- Kasmir. (2016). *Analisis Laporan Keuangan*. Raja Grafindo Persada.
- Khediri, K. B., Charfeddine, L., & Youssef, S. B. (2015). Islamic versus conventional banks in the GCC countries: A comparative study using classification techniques. *Research in International Business and Finance*, 33, 75–98. <https://doi.org/10.1016/j.ribaf.2014.07.002>
- Khrawish, H. A., & Al-Sa'di, N. M. (2017). The Impact of E-Banking on Bank Profitability: Evidence from Jordan. *Middle Eastern Finance and Economics*, 13, 142–158.

- Marwa, N., & Aziakpono, M. (2015). Financial sustainability of Tanzanian saving and credit cooperatives. *International Journal of Social Economics*, 42(10), 870–887. <https://doi.org/10.1108/IJSE-06-2014-0127>
- Miranti, T. (2018). Faktor Rasio Keuangan terhadap Sustainability Perbankan di Indonesia: Menggunakan Regresi Logistik. *Jurnal Ekonomi Akuntansi dan Manajemen*, 17(2), 107. <https://doi.org/10.19184/jeam.v17i2.17334>
- Munawir. (2010). *Analisis laporan Keuangan Edisi keempat* (4th ed.). Liberty.
- Nasfi, Iska, Syukri, Nofrivul, & Antoni. (2019). *Financial Sustainability Inthe Assessment Of The financial Performance Of West Sumatra Sharia Financing Bank (BPRS)*. 1, 12.
- Notoadmojo, I., & Rahmawaty, A. (2017). Analisis Faktor-Faktor Yang Memengaruhi Financial Sustainability Ratio Pada Bank Umum Syariah Di Indonesia Periode 2010—2014. *Equilibrium: Jurnal Ekonomi Syariah*, 4(1), 20. <https://doi.org/10.21043/equilibrium.v4i1.1836>
- Otoritas Jasa Keuangan (OJK). (2017). POJK Nomor 51/ POJK.03/2017
- Puspitandari, J., & Septiani, A. (2017). Pengaruh Sustainability Report Disclosure Terhadap Kinerja Perbankan. *Diponegoro Journal Of Accounting*, 6(3), 1–12.
- Raupong, Anisa, & Hasrina. (2016). Analisis Klasifikasi Dua Arah Model Campuran. *Jurnal Matematika, Statistika Dan Komputasi*, 12(2), 83–91.
- Rebouças, S. M. D. P., Oliveira, D. A. B. D, Soares, R. A., Ferreira, E. M. D. M., & Gouveia, M. J. (2016). Classification of the financial sustainability of health insurance beneficiaries through data mining techniques. *Journal of Spatial and Organizational Dynamics*, 4(3), 229–242.
- Said, M. S., Annuar, H. A., & Hamdan, H. B. (2019). An investigation into the financial sustainability of Islamic Saving, Credit Cooperative Society (SACCOS) in Tanzania. *International Journal of Ethics and Systems*, 35(2), 242–259. <https://doi.org/10.1108/IJOES-11-2018-0159>
- Setyowati, D. H., Sartika, A., & Setiawan, S. (2019). Faktor-Faktor Yang Mempengaruhi Pangsa Pasar Industri Keuangan Syariah Non-Bank. *Jurnal Iqtisaduna*, 5(2), 169. <https://doi.org/10.24252/iqtisaduna.v5i2.10986>
- Sharma, S. K., Govindaluri, S. M., Al-Muharrami, S., & Tarhini, A. (2017). A multi-analytical model for mobile banking adoption: A developing country perspective. *Review of International Business and Strategy*, 27(1), 133–148. <https://doi.org/10.1108/RIBS-11-2016-0074>
- Uddin, M. N., & Ahmmed, M. (2018). Islamic Banking and Green Banking for Sustainable Development: Evidence from Bangladesh. *Al-Iqtishad: Jurnal Ilmu Ekonomi Syariah*, 10(1), 97–114. <https://doi.org/10.15408/aiq.v10i1.4563>
- Yazdanfar, D. (2013). Profitability determinants among micro firms: Evidence from Swedish data. *International Journal of Managerial Finance*, 9(2), 151–160. <https://doi.org/10.1108/17439131311307565>
- Zabolotnyy, & Wasilewski. (2019). The Concept of Financial Sustainability Measurement: A Case of Food Companies from Northern Europe. *Sustainability*, 11(18), 5139. <https://doi.org/10.3390/su11185139>