Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3, 243-257
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i3.5185

Project-based Sukuk issuance for sustainable toll road refinancing in Indonesia: A confirmatory factor analysis

Amrin Farikhi[1*], Christiono Utomo[2], Rifki Ismal[3]
[1,2]Department of Civil Engineering, Institut Teknologi Sepuluh Nopember, Indonesia; farikhiamrin@gmail.com (A.F.) christiono@ce.its.ac.id (C.U.)
[3]Bank of Indonesia and Tazkia Institute, Indonesia; rifki_ismal@yahoo.com (R.I.)

Abstract: This paper examines the factors determining the issuance of project-based Sukuk for sustainable refinancing of toll road development in Indonesia. A questionnaire survey was used to obtain the factors that determine the issuance of project-based Sukuk. Experts and practitioners were consulted to identify and analyze the factors influencing the issuance of project-based Sukuk. The questionnaire participants included experienced infrastructure practitioners, regulators, and researchers. The results show that twelve indicators explain the decision to issue project-based Sukuk. Among them, the exchange rate is the most significant influence, with a loading factor value of 0.935, indicating that exchange rates affect Sukuk issuance, followed by the high cost of funds with a value of 0.857, which suggests that the high cost of funding is a strong reason for companies to choose Sukuk as an alternative for infrastructure refinancing. Other indicators, such as the inflation rate with a value of 0.835 and firm competence with a value of 0.809, also have a significant influence. This paper provides valuable findings and references for a toll road project-based Sukuk refinancing scheme to take over a stalled toll road project. The revealed factors benefit toll road stakeholders, such as business entities and the government, when preparing a refinancing scheme.

Keywords: *Factor Analysis, Indonesia, Project-based Sukuk, Refinancing, Sustainability, Toll Road.*

1. Introduction

Indonesia's toll road development program requires a lot of funds. However, due to the current Government's limited budget, it must find an alternative financing scheme to support Indonesia's accelerated infrastructure development program. Creative financing schemes are needed to fund the toll road infrastructure projects by involving private parties or business entities to invest directly in toll road infrastructure. The toll road investment requires robust infrastructure investment characteristics because it needs to have fixed assets, high funding requirements to be provided, and high up-front capital requirements. However, the current conditions faced by business entities that have invested in toll road construction are having problems regarding toll road funding support. Meanwhile, the government still hopes for the participation of business entities in accelerating infrastructure by continuing the construction of the toll road that it has started.

Unfortunately, the construction of the ongoing toll road sections is stalled due to the lack of financial support. Indeed, the sustainability of toll road financing is a solution that must be immediately sought. Currently, most of the toll road financing in Indonesia uses conventional schemes. Meanwhile, Sharia (Islamic principle-based) funds have not been appropriately maximized for infrastructure financing, while Sharia finance has great potential to contribute to Indonesia's infrastructure development. Sharia financing schemes are also the right instrument for infrastructure financing because the fundamental asset is the project itself, which can be used to fund infrastructure investment.

History: Received: 30 December 2024; Revised: 17 February 2025; Accepted: 20 February 2025; Published: 4 March 2025
* Correspondence: farikhiamrin@gmail.com

The Sharia requirement to use underlying assets in its funding schemes gives it better security and investment options for investors [1]. Investment in infrastructure with Sharia schemes is not only limited to Muslims but also the non-Muslims both domestically and internationally [2]. Recently, the Sharia financial industry is gaining momentum sharia-compliant investments on the rise in Muslim countries and globally [3].

As such, the solution for the ongoing toll road infrastructure financing is resumed or refinanced by using a Sharia scheme particularly project-based Sukuk. According to Hussain and Khalil [4] the Sharia capital markets play a vital role in providing long-term funding for economic growth. One of its main instruments is sukuk, which is used to raise funds from the public and assist organizations in financing. The increase in the issuance of Sharia securities in the Southeast Asian Sharia capital market has reflected a rise in economic growth rates, support economic growth and market development [5]. This study will examine factors influencing the issuance of project-based Sukuk, which will be used to refinance toll road development in Indonesia.

2. Literature Review

Utami, et al. [6]Empirical research shows that Sukuk issuance in Indonesia is influenced by company profitability, sharia compliance, Sukuk yield, company age, and inflation rate. Abdullah, et al. [7] increase in interest rates reduces the value of fixed-income Sukuk, which means interest rate influences Sukuk. Sharia compliance is also considered a key risk in Sukuk Issuance for funding infrastructure projects. Said and Grassa [8] explained the implementation of some variables in macroeconomics that influence Sukuk issuance, such as political stability. Kalimullina [9] stated that the exchange rate impacts the performance and size of the Sharia finance market. Furthermore, Saad, et al. [10] Risk of default on bonds and sukuk can be reduced by analyzing the impact of GDP levels on maintaining corporate sustainability. Ahmad, et al. [11] Sukuk affect GDP, while GDP increases producer and consumer prices. Furthermore, Bacha and Mirakhor [12] stated that Sukuk returns depend on GDP growth if the project is non-revenue-generating and on project revenues if it is revenuating, thus avoiding the associated risks.

Rusgianto and Ahmad [13]stated that government incentives attract investors and increase trading. Jobst, et al. [14] explained the Sukuk market has attracted widespread interest from issuers in various countries, although it still faces legal and regulatory hurdles. Continued efforts are needed to overcome the economic, regulatory and legal uncertainties. Bo, et al. [15] found Sukuk Issuance in China faces challenges such as regulation, tax, stamp duty and investor protection, the rule of law, and establishing the Sharia supervisory committee. Bacha and Mirakhor [12] explained that the innovative Sukuk can break the borrowing, leverage, and vulnerability cycle. Leverage magnifies economic fluctuations, causing financial distress and currency depreciation. Foreign currency-denominated projects are often burdened with large debts, requiring government subsidies for continued operations. Kalimullina [9] argued that the unfriendly tax regime makes Sharia investors subject to higher taxes than bank depositors. Value-added tax increases financing costs, while the lack of Sharia mediation, regulation and infrastructure support in Russia may affect investment in Sharia financial markets.

Saad, et al. [16] described that Sukuk trading in the Malaysian capital market is on a larger scale than conventional bonds, which influences Sukuk's attractiveness. While Nagano [17] argued that Sukuk Issuance tends to be chosen based on market momentum and accessibility, which is related to trading volume and liquidity in the secondary market. Ahmed, et al. [1] studied how the issuing company's earnings outlook influences investor reaction, with lower outlooks tending to elicit a negative response. Duqi and Al-Tamimi [18] indicated that sukuk characteristics are the main factors influencing UAE investors' interest, followed by religious factors, return expectations and information availability. Nagano [19] concluded that investors high value companies tend to Sukuk market or has a high reputation. Guermazi [20] explored that rating agencies assess Sukuk, encouraging issuance quality and corporate transparency. Ahmed, et al. [1] stated that investors consider the firm's value and competence and investors value Sukuk from low-prospect companies less. Bo, et al. [15] argued that

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

enhancing investor education, especially for Sukuk investment, operational mechanisms, and risk behaviours, is the most important in influencing Sukuk. Rarasati, et al. [21] explored the factors related to infrastructure project financing schemes and Sharia finance concepts; both knowledge of infrastructure business and Sharia finance should be well-known by all stakeholders.

Grassa and Miniaoui [22] identified that large and long-standing companies prefer conventional bonds. Rarasati, et al. [23] explored the lack of understanding and preparation hampers financing of Islamic projects in infrastructure. Biancone and Radwan [3] stated that the lack of expert human resources in Sharia finance with a financial background and sharia knowledge. Guermazi [20] shows that the Company balances Sukuk costs with religious and social benefits. Warsame and Ireri [24] concluded that Attitude has a significant effect on the intention to use Sukuk, while religiosity alone is not enough. Quality of service and understanding of Sukuk features play an important role. Increasing awareness among Muslims and non-Muslims can encourage the use of Sukuk. Saad, et al. [10] stated that institutional investors reduce the risk of Sukuk default. Saad, et al. [16] investigated that the Board of Directors, with clear rights and responsibilities, can focus on long-term investment decisions of Sukuk, reducing the risk of default and lowering the yield spread. This decision supports long-term financial planning, attracting more institutional investors.

Paltrinieri, et al. [25]analyzed that low growth companies tend to issue Sukuk to expand the investor base and control funding costs. Based on Nagano [17] firms approach the Sukuk market with finance and stock valuations are low. Ahmed, et al. [1] stated that small or risky companies tend to issue Sukuk because of more flexible market access. Halim, et al. [26] indicated that sukuk structure is determined by the financial capacity of the company, not religious identity. Companies with high agency costs, companies with high free cash flow and growth tend to issue Sukuk. Bacha and Mirakhor [12] argued that the problem with debt financing is that the terms of service are not aligned with the risks or cash flows of the project. Pribadi and Wibowo [27] this study uses a logit model to test the effect of company size and fixed assets have a positive effect on Sukuk issuance. Grassa and Miniaoui [22] proved that companies tend to issue Sukuk to obtain larger and longer-term debt than conventional bonds. Guermazi [20] using the sukuk is negatively related to profitability.

3. Methods

3.1. Participants

In this study, the characteristics of respondents are experts and practitioners who can provide correct and objective opinions or answers to empirical problems and have professional experience in specific fields of toll road infrastructure, capital market, and Sharia financing. Experts who can explain constructive and critical published opinions on developing problems can provide justification or opinion on solutions because of their experiences working in areas directly related to the problem and supported by a level of education and specific technical skills.The total number of selected experts and practitioners was 30, with 26.67 % from academics, 13.37 % from regulators, 16.67 % from conventional financing boards, 20 % from Sharia financing boards, and 23.33 % engaged in toll road business entities. Table 1 illustrates respondents from different sectors.

Table 1.
Distribution of respondents.

Roles of Respondent	Frequency	Percentage (%)
Academics	8	26.67
Regulator	4	13.33
Conventional Financing Board	5	16.67
Sharia Financing Board	6	20.00
Toll Road Business Entity	7	23.33
Total	30	100

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

The questionnaire respondents were distributed in years of experience, last education, and job level position. As shown in Table 2, the working experience of respondents was 3.33 % less than 11 years, 40 % between 11-20 years, 40 % between 21-30 years, and 16.67 % more than 30 years. In addition, the last education of the respondents was 6.67 %, 63.33% masters, 30% doctorates, the rest bachelor's degrees. Questionnaire participants included infrastructure industry practitioners and regulators, and researchers from colleges, with 40 % at the director/commissioner level, 33.33 % at the general manager level, and 26.26 % at the professor and associate professor.

Table 2.
Respondent characteristics.

Respondent characteristic	Frequency	Percentage (%)
Years of experience		
Less than 11 years	1	3.33
11 – 20 years	12	40.00
21 – 30 years	12	40.00
More than 30 years	5	16.67
Total	30	100
Last Education		
Bachelor Degree	2	6.67
Master Degree	19	63.33
Doctoral	9	30.00
Total	30	100
Job Level Position		
Director/Commissioner	12	40.00
General Manager	10	33.33
Professor/Associate Professor	8	26.67
Total	30	100

3.2. Materials

This paper mainly focuses on the questionnaire on three key elements related to the knowledge, experience, and views on Islamic infrastructure project financing, particularly on toll road development in Indonesia. The respondents were informed earlier about their selection in this research and the questionnaire's objective. The respondents were also free to ask the researchers questions and share their experiences and views on Islamic infrastructure project financing and toll road development in Indonesia. Respondents received an invitation with an information letter and a link to the questionnaire. They could complete it online at their convenience. Respondents who had not completed it were initially reminded by phone.

3.3. Procedure

Confirmatory Factor Analysis (CFA) was performed in R Studio R.4.4.1 Package Lavaan & SemPlot. Hair Jr, et al. [28] explained that CFA is an analytical method used to test the extent to which several measured variables or indicators can effectively describe a particular factor. In CFA, factors are often called constructs, abstract concepts or latent variables that cannot be measured directly. Therefore, constructs need the help of measurable variables to represent their characteristics. The CFA is formulated as follows:

$$X = \Lambda\xi + \Psi\varepsilon \quad (1)$$

Where :

X = matrix (p x 1) from indicators

ξ = matrix (g x 1) from construct variable

ε = matrix (p x 1) from error

Λ = matrix (p x g) from loading between indicator and construct

Ψ = diagonal matrix (p x p) from loading between indictor and error

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

p = amount of indicators
g = amount of construct

Hair Jr, et al. [28]explained that CFA does not have the best single statistical test to illustrate the power of estimating a model. Instead, several combinations of model fit measures have been developed, producing two perspectives measurement, model fit measures and overall model fit measures. CFA helps ensure that the indicators used are relevant and can accurately describe the construct. Validity can be evaluated through several metrics, such as:

1. Standardized Loading: Loading values above 0.5, ideally more than 0.7, indicate a strong relationship between the indicator and the construct.
2. t-value: Statistical value that shows the significance of the relationship between the indicator and its construct. This value must be greater than the critical value at a particular significance level. However, it can also use the p-value, where a significant indicator measures the construct when the p-value <0.05.

CFA also evaluates indicators' internal consistency level when describing a construct. Reliability can be calculated using metrics such as Construct Reliability (CR). When the value of CR is more than 0.7, these indicators have good consistency. CR is formulated as follows:

$$CR = \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{\left(\sum_{i=1}^{n} L_i\right)^2 + \sum_{i=1}^{n} e_i} - \frac{\left(\sum_{i=1}^{n} L_i\right)^2}{\left(\sum_{i=1}^{n} L_i\right)^2 + \sum_{i=1}^{n} (1 - L_i)} \quad (2)$$

Where :
Li = standardized loading value
e = measurement error value for a construct with a value of 1 – L

Hair Jr, et al. [28] *stated* that the CR value must exceed 0.7. Several goodness-of-fit methods, namely Absolute Fit Measure and Increment Fit Measure, are used to assess the model's overall suitability. An absolute fit measure calculates the overall model fit using several criteria as follows:

1. Chi-Square Statistics: Chi-square measures the covariance of deviations; the model is appropriate if the value is small or P > 0.05.
2. Goodness of Fit Index (GFI): GFI is used to estimate Maximum Likelihood Estimation (MLE) and Unweighted Least Square (ULS) and then generalized to other estimation methods. The GFI value indicates the model fit, with ≥ 0.90 considered good. GFI is formulated as follows:

$$GFI = 1 - \frac{F_k}{F_0} \quad (3)$$

Where :
F_k = Minimum value of the fit function after SEM modelling with k degrees of freedom (S-Σk)
F_0 = The fit function shows the model's fit when the parameters are 0.
High GFI values indicate good model fit. GFI ≥ 0.90 good, 0.80–0.90 marginal [28].

3. Root Mean Square Error of Approximate (RMSEA): RMSEA ≤ 0.05 indicates a close fit, 0.05–0.08 indicates a good fit [29] RMSEA is formulated as follows:

$$RMSEA = \sqrt{\frac{d}{df}} \quad (4)$$

Where :
d = value obtained from the formula

$$\frac{\chi^2 - df}{N - 1} \quad (5)$$

χ^2 = value of the χ^2 test statistic being analyzed
df = degrees of freedom of the analyzed model test
N = number of samples

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

Incremental fit compares models. AGFI, as an analogue of R^2 in regression, is considered good if its value is ≥ 0.9 [30]. The model suitability index is in Table 3.

Table 3.
Model feasibility testing index.

No.	Goodness of fit index	Cut off value
1	P-value Chi-Square	≥0.05
2	GFI	≥0.90
3	RMSEA	≤0.08
4	AGFI	≥0.90

Source: Hair Jr, et al. [28].

The selection of measurement criteria should meet at least one of the increment fit measures and one of the absolute fit measures. Furthermore, the measurements used are χ^2 and degree of freedom, GFI, RMSEA, and AGFI, which provide sufficient information [28].

3.4. Data Analysis

This study uses CFA to determine the factors influencing the decision to issue project-based Sukuk. First-order CFA analysis uses 28 indicators that are thought to influence the decision. First-order CFA analysis also determines each indicator's validity, reliability, and contribution from the latent variable in the decision to issue project-based Sukuk. The indicators are shown in Table 4.

Table 4.
Indicators that Influence the Decision to Issue Sukuk.

Code	Indicators (Factors)
X1	Inflation
X2	Interest Rate
X3	Political Stability
X4	Exchange Rate
X5	Gross Domestic Product
X6	Government Regulation
X7	Tax Support and Incentives
X8	Rule of Law
X9	Government Guarantee
X10	Trading Volume & Liquidity in the Secondary Market
X11	Yield
X12	Firm Reputation
X13	Firm Age
X14	Sharia Knowledge of Investor
X15	Firm Size
X16	Firm Competence
X17	Firm Experience
X18	Sharia Knowledge of Firm
X19	Religious Values
X20	Sharia Compliance Level
X21	Behaviour and Characteristics
X22	Role of Institutional
X23	High Cost of Fund
X24	Stock Undervalue
X25	Cash Flow
X26	Fixed Asset
X27	Financial Distress
X28	Firm profitability

The indicator estimation results are shown in Figure 1.

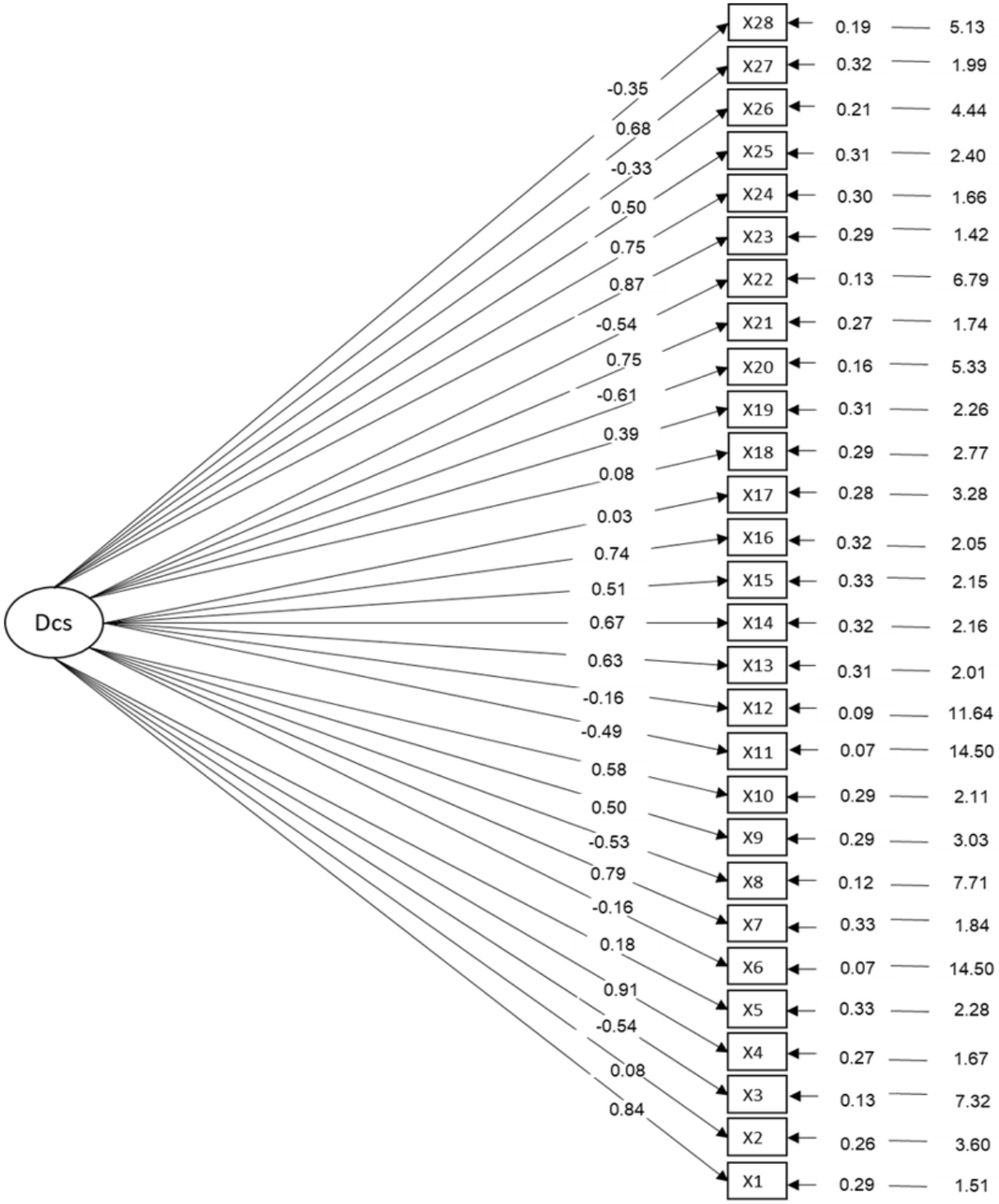

Figure 1.
Standardized Estimate Value of the CFA Model.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

Figure 1 presents a decision path diagram to issue project-based Sukuk, shown by its standardization value. Next, model suitability testing determines whether the resulting model is feasible. The model feasibility test can be seen in Table 5 on the P-value chi-square, GFI, RMSEA and AGFI. The results of the analysis show P Chi-square and RMSEA do not match the cut-off velocity; the resulting P-value < 0,05, and the RMSEA is 0.385, it is more significant than 0.08, so the resulting model is not fit.

In obtaining a fit model, the first step is eliminating indicators that are not valid and reliable. Table 5 shows the validity results with standardized factor loading values and p-values and reliability with composite reliability values. An indicator is declared valid if the standardized factor loading Values ≥ 0.5 and p < 0.05 indicate significance. In this first estimate, there are several invalid indicators because they have a standardized factor loading value of less than 0.5 and a p-value of more than 0.05; this indicator is removed from the model. The reliability test shows a CR value of 0.699; the value is more than 0.6, so reliability is met.

Table 5.
CFA Analysis Results.

Loading Factor		
Indicator (Factor)	**Standardise Loading Factor**	**P-Value**
X1	0.845	0.000
X2	0.081	0.665
X3	-0.542	0.002
X4	0.906	0.000
X5	0.181	0.332
X6	-0.156	0.402
X7	0.788	0.000
X8	-0.53	0.002
X9	0.503	0.004
X10	0.579	0.001
X11	-0.494	0.005
X12	-0.161	0.389
X13	0.634	0.000
X14	0.666	0.000
X15	0.515	0.003
X16	0.736	0.000
X17	0.031	0.869
X18	0.076	0.685
X19	0.391	0.030
X20	-0.61	0.000
X21	0.755	0.000
X22	-0.542	0.002
X23	0.872	0.000
X24	0.751	0.000
X25	0.497	0.005
X26	-0.335	0.066
X27	0.68	0.000
X28	-0.353	0.052
Composite Reliability		0.699
Goodness of Fit		
P-value (Chi-Square)	≥0.05	0.000
GFI	≥0.90	0.980
RMSEA	≤0.08	0.385
AGFI	≥0.90	0.975

Next, the model is re-estimated until valid and reliable indicator results are obtained, as in Figure 2.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

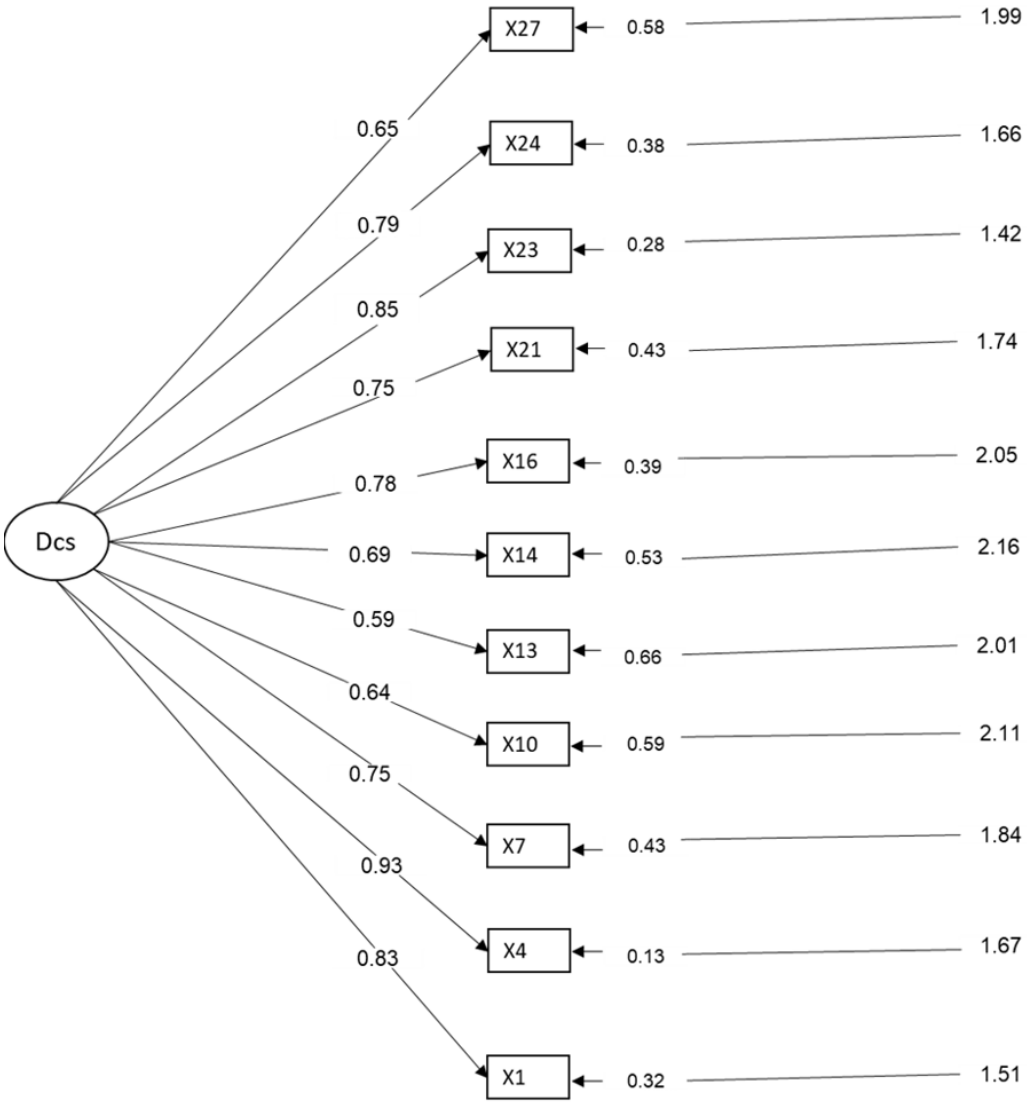

Figure 2.
Standardise Estimate Value of CFA Model re-estimation.

The validity and reliability tests on the re-estimated model are valid and reliable, but the model still does not fit the feasibility test. It can be seen from the four test criteria that the value does not match the cut-off value. Chi-square P value (0.000) < 0.05, the GFI of 0.821 is less than 0.9, the RMSEA value is 0.232, which is still more than 0.08, and the AGFI of 0.682 is less than 0.9, so the model produced in this re-estimation is not fit.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

Table 6.
Results of Re-estimation CFA Analysis.

Loading Factor		
Indicator (Factor)	**Standardise Loading Factor**	**P-Value**
X1	0.825	0.000
X4	0.933	0.000
X7	0.753	0.000
X10	0.638	0.000
X13	0.587	0.001
X14	0.688	0.000
X16	0.783	0.000
X21	0.755	0.000
X23	0.849	0.000
X24	0.786	0.000
X27	0.650	0.000
Composite Reliability		0.829
Goodness of Fit		
Goodness of Fit Index	Cut off Value	Value
P-value (Chi-Square)	≥0.05	0.000
GFI	≥0.90	0.821
RMSEA	≤0.08	0.232
AGFI	≥0.90	0.687

Ensuring the validity and reliability of indicators. However, the resulting model still does not fit; modifications need to be made, where the measurement errors on several items are freed to correlate. The re-estimation results are in Figure 3.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

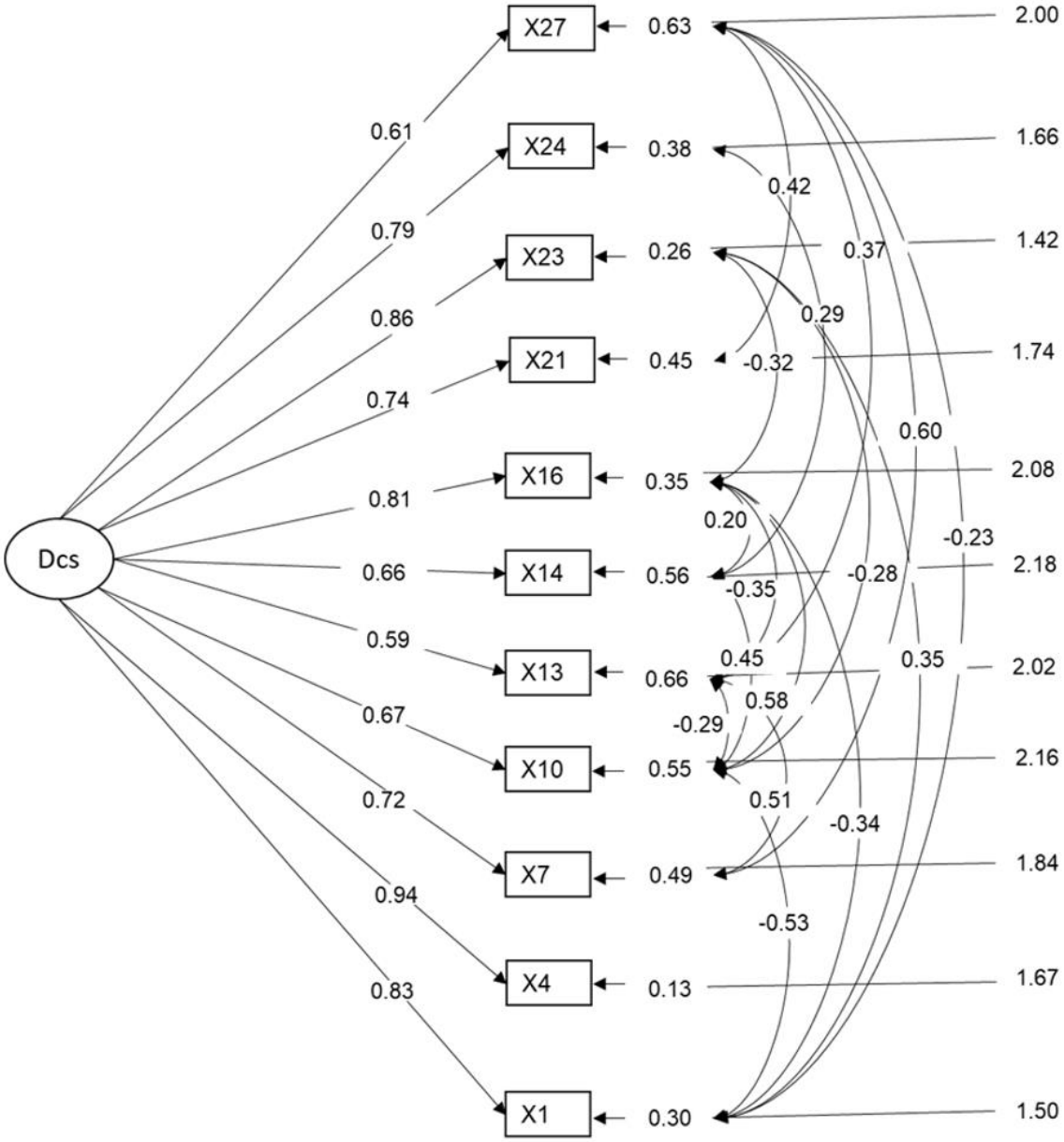

Figure 3.
Standardized Estimate Value of the Modified CFA Model.

Table 7 shows the results of re-estimation after modification by correlating several measurement errors to obtain a fit model. The modification results show that the cut-off values determine all model suitability criteria. The P-value chi-square is 0.525, the value is more significant than 0.05, meaning good fit; the GFI with a value of 0.952 is more significant than 0.9, meaning good fit, the RMSEA is 0.000; the value is less than 0.08, meaning good fit, and the AGFI is 0.867, the value is between 0.8 and 0.9, meaning marginal fit. In the model suitability test, the resulting model meets the criteria the requirements of a reasonable or feasible model. Based on a series of tests on the validity, reliability, and suitability of the model of 28 indicators, which are thought to describe the decision to issue project-based Sukuk, Table 7 shows that 12 indicators can describe the decision to issue project-based Sukuk.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

Table 7.
Results of Modified Re-estimation CFA Analysis.

Loading Factor		
Indicator (Factor)	**Standardise Loading Factor**	**P-Value**
X1	0.835	0.000
X4	0.935	0.000
X7	0.715	0.000
X10	0.672	0.000
X13	0.586	0.001
X14	0.663	0.000
X16	0.809	0.000
X21	0.740	0.000
X23	0.857	0.000
X24	0.790	0.000
X27	0.609	0.000
Composite Reliability		0.826
Goodness of Fit		
Goodness of Fit Index	Cut off Value	Value
P-value (Chi-Square)	≥0.05	0.525
GFI	≥0.90	0.952
RMSEA	≤0.08	0.000
AGFI	≥0.90	0.867

All CFA indicators are shown in Figure 4 significantly contribute to the decision to issue project-based Sukuk because the standardized loading factor values are all above 0.5.

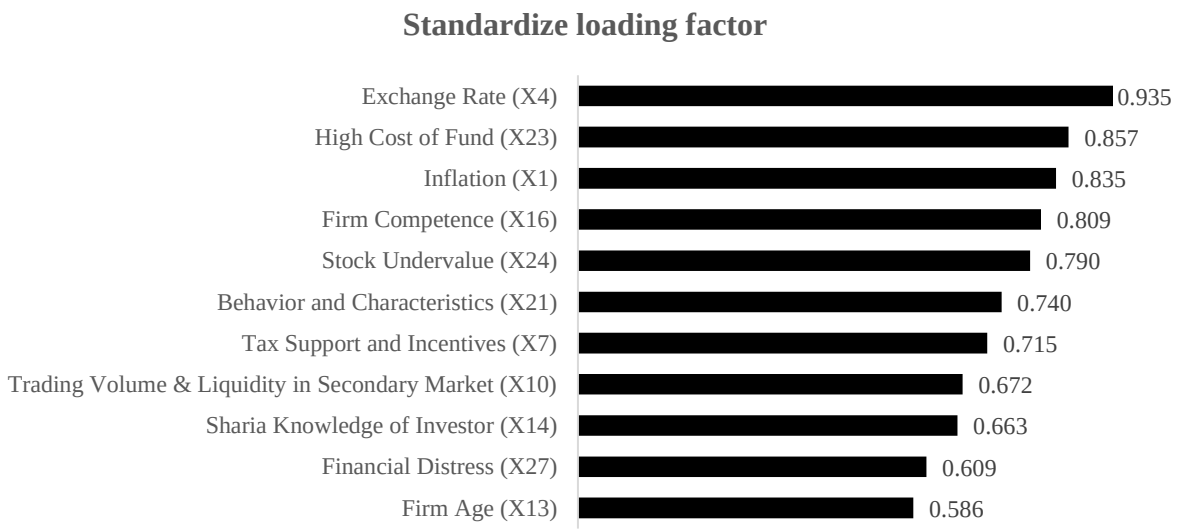

Figure 4.
Standardise Loading Factor on Influential Indicators/Factors.

4. Discussion

The results of the CFA displayed that twelve indicators describe the decision to issue project-based Sukuk-based. Exchange rate shows the most significant influence with a loading factor value of 0.935, indicating that fluctuations in currency exchange rates are the main factor in the decision to issue Sukuk, followed by the high cost of funds with a value of 0.857, which indicates that the high cost of funding is a strong reason for companies to choose Sukuk as alternative financing. Other factors, such as

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

inflation with a value of 0.835 and firm competence with a value of 0.809, also have a significant influence. Inflation reflects macroeconomic conditions that influence financing strategies, while firm competence and share undervaluation are related to credibility.

Exchange rates reflect a country's economic strength and are influenced by government policies. Indonesia implements a floating exchange rate system, where its movements affect bond and Sukuk trading. Unstable exchange rate fluctuations can impact the market, while Sukuk represents ownership claims whose value can increase as the underlying asset increases. The risk profile of Sukuk corresponds one-to-one with the structure.

The cost of funds is the cost incurred to collect third-party funds. It means that the fee calculation is issued for every fund successfully collected from various funding sources after considering the existence of reserve funds that must be maintained. Each type of funding source has a different interest rate. Hence, the low average cost of funds depends on the composition of successful funding sources collected. Cost of funds is the interest that financial institutions pay on funds used, affecting returns. The cost of funds reflects the interest that must be paid to obtain funding. Sukuk and bonds, although they have legal differences, are both debt instruments with the obligation to return the principal. Sukuk can be a source of business funding, with the issuance cost in the form of an interest rate paid to investors. Therefore, Sukuk issuance must be done at the right time.

Inflation is the increase in prices in a certain period that affects the capital market and Sukuk. A decrease in inflation increases investment interest, while an increase in inflation encourages Sukuk issuers to increase yields. Rising prices make investors tend to sell Sukuk, while potential investors postpone investments. The lack of Sukuk in the market causes low liquidity and limited funds. The few Sukuk issuances limit firms' choices to fulfil their investment needs.

Firm competence can influence shareholder considerations when buying, selling, and holding company shares. Reader competency will also be used as a basis for consideration when determining the sukuk rating value. The company's competence will include a collective representation of the historical business entity's activities and its results. Competency describes a business entity's ability to produce value and provide benefits to stakeholders. The competency of business entities in determining the influence of project-based sukuk issuance on the continuation of toll road construction is financial performance. Business entities with good economic performance will foster investor confidence. Companies with high growth and free cash flow tend to choose Sukuk as a source of funding. Sukuk contracts ensure that funds are used only for specific projects, preventing misuse. Empirical studies show that highly leveraged companies issue Sukuk with contracts that are tailored to their financial condition and capital structure.

Moreover, the following findings indicate that stock undervalued, with a value of 0.79, and tax support and incentives, with 0.715, increased Sukuk's attractiveness. On the other hand, indicators such as trading volume and liquidity (0.672), sharia knowledge (0.663), financial distress (0.609), and company age (0.586), have quite a significant influence. Investors' Sharia knowledge shows the importance of market education, while the company's financial condition and company age reflect stability and experience as considerations in issuing Sukuk.

5. Conclusion

This study identifies the factors influencing Sukuk project-based issuance in refinancing schemes for toll road development in Indonesia, using questionnaires from experts and experienced practitioners from the infrastructure industry, regulators, and college researchers. The results show that twelve indicators describe the decision to issue project-based Sukuk. These results show that exchange rates, high cost of funds, inflation, and firm competence are the main significant determinants in the decision to issue project-based Sukuk.

Further, this study highlights the respondents who participated in sustainable refinancing for toll road development. The study may involve other stakeholders, such as the community. However, despite

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 3: 243-257, 2024
DOI: 10.55214/25768484.v9i3.5185

producing valuable findings, the study still has limitations. This research requires more practitioners and experts to get better results.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Copyright:

References

[1] H. Ahmed, M. K. Hassan, and B. Rayfield, "When and why firms issue sukuk?," *Managerial Finance*, vol. 44, no. 6, pp. 774-786, 2018. https://doi.org/10.1108/MF-06-2017-0207

[2] H. Kociemska, "Islamic finance merging public finance within public–private partnership," *International Journal of Islamic and middle eastern finance and management*, vol. 13, no. 4, pp. 579-592, 2020. https://doi.org/10.1108/IMEFM-01-2018-0022

[3] P. P. Biancone and M. Radwan, "Sharia-Compliant financing for public utility infrastructure," *Utilities Policy*, vol. 52, pp. 88-94, 2018. https://doi.org/10.1016/j.jup.2018.03.006

[4] T. Hussain and M. N. Khalil, "Shari 'ah issues in Islamic capital markets of Pakistan," *Journal of Islamic Thought and Civilization*, vol. 9, no. 1, pp. 89-105, 2019. https://doi.org/10.32350/jitc.91.06

[5] M. A. Ledhem and M. Mekidiche, "Islamic securities (ṣukūk) and economic growth: New empirical investigation from Southeast Asia using non-parametric analysis of MCMC panel quantile regression," *Islamic Economic Studies*, vol. 29, no. 2, pp. 119-138, 2022. https://doi.org/10.1108/ies-06-2021-0020

[6] D. E. Utami, I. Trinugroho, and B. S. Sergi, "What determines sukuk issuance type in Indonesia? In Barnet William A & Sergi Bruno S (Eds.), International Symposia in Economic Theory and Econometrics," vol. 26. Bingley, UK: Emerald Publishing, 2019, pp. 195–206.

[7] A. A. Abdullah, A. S. Yazid, A. Abdullah, and M. S. Kamarudin, "Risk in funding infrastructure projects through sukuk or Islamic bonds," *International Review of Management and Business Research*, vol. 3, no. 2, pp. 915–928, 2014.

[8] A. Said and R. Grassa, "The determinants of sukuk market development: Does macroeconomic factors influence the construction of certain structure of sukuk?," *Journal of Applied Finance & Banking*, vol. 3, no. 5, pp. 251-267, 2013. https://ssrn.com/abstract=2318233

[9] M. Kalimullina, "Islamic finance in Russia: A market review and the legal environment," *Global Finance Journal*, vol. 46, p. 100534, 2020. https://doi.org/10.1016/j.gfj.2020.100534

[10] N. M. Saad, M. N. Haniff, and N. Ali, "Corporate governance and default risk in long-term conventional bonds and sukuk in Malaysia," *International Journal of Applied Business and Economic Research*, vol. 14, no. 6, pp. 3709-3723, 2016.

[11] N. Ahmad, S. N. M. Daud, and Z. Kefeli, "Economic forces and the sukuk market," *Procedia-Social and Behavioral Sciences*, vol. 65, pp. 127-133, 2012. https://doi.org/10.1016/j.sbspro.2012.11.101

[12] I. O. Bacha and A. Mirakhor, "Funding development infrastructure without leverage: A risk-sharing alternative using innovative sukuk structures," *The World Economy*, vol. 41, no. 3, pp. 752-762, 2018. https://doi.org/10.1111/twec.12512

[13] S. Rusgianto and N. Ahmad, "Volatility behavior of sukuk market: An empirical analysis of the Dow Jones citigroup sukuk index," *Middle East Journal of Scientific Research*, vol. 13, no. 1, pp. 93-97, 2013. https://doi.org/10.5829/idosi.mejsr.2013.13.1887

[14] A. Jobst, P. Kunzel, P. Mills, and A. Sy, "Islamic bond issuance: What sovereign debt managers need to know," *International Journal of Islamic and Middle Eastern Finance and Management*, vol. 1, no. 4, pp. 330-344, 2008. https://doi.org/10.1108/17538390810919637

[15] D. Bo, E. R. A. E. Ali, and B. Saiti, "Sukuk issuance in China: Trends and positive expectations," *International Review of Management and Marketing*, vol. 6, no. 4, pp. 1020-1025, 2016.

[16] N. M. Saad, M. N. Haniff, and N. Ali, "Firm's growth and sustainability: The role of institutional investors in mitigating the default risks of sukuk and conventional bonds," *Procedia Economics and Finance*, vol. 35, pp. 339-348, 2016. https://doi.org/10.1016/s2212-5671(16)00042-3

[17] M. Nagano, "Who issues Sukuk and when?: An analysis of the determinants of Islamic bond issuance," *Review of Financial Economics*, vol. 31, pp. 45-55, 2016. https://doi.org/10.1016/j.rfe.2016.05.002

[18] A. Duqi and H. Al-Tamimi, "Factors affecting investors' decision regarding investment in Islamic Sukuk," *Qualitative Research in Financial Markets*, vol. 11, no. 1, pp. 60-72, 2019. https://doi.org/10.1108/QRFM-01-2018-0009

[19] M. Nagano, "Sukuk issuance and information asymmetry: why do firms issue sukuk?," *Pacific-Basin Finance Journal*, vol. 42, pp. 142-157, 2017. https://doi.org/10.1016/j.pacfin.2016.12.005

[20] I. Guermazi, "The determinants of sukūk issuance in GCC countries," *Islamic Economic Studies*, vol. 28, no. 1, pp. 25-45, 2020. https://doi.org/10.1108/ies-08-2019-0026

[21] A. D. Rarasati, B. Trigunarsyah, and E. Too, "Sharia-compliant financing in Indonesia infrastructure projects," in *Proceeding of the 13th International Conference on Quality in Research, 1394–1398*, 2013.

[22] R. Grassa and H. Miniaoui, "Corporate choice between conventional bond and Sukuk issuance evidence from GCC countries," *Research in International Business and Finance*, vol. 45, pp. 454-466, 2018. https://doi.org/10.1016/j.ribaf.2017.07.179

[23] A. D. Rarasati, E. Too, B. Trigunarsyah, and F. Cheung, "Islamic project financing implementation for sustainable infrastructure development in Indonesia," in *Proceeding of the 2nd International Conference on Sustainable Technology Development, 24–32*. https://doi.org/10.13140/2.1.1149.5683, 2012.

[24] M. H. Warsame and E. M. Ireri, "Does the theory of planned behaviour (TPB) matter in Sukuk investment decisions?," *Journal of Behavioral and Experimental Finance*, vol. 12, pp. 93-100, 2016. https://doi.org/10.1016/j.jbef.2016.10.002

[25] A. Paltrinieri, M. K. Hassan, S. Bahoo, and A. Khan, "A bibliometric review of sukuk literature," *International Review of Economics & Finance*, vol. 86, pp. 897-918, 2023. https://doi.org/10.1016/j.iref.2019.04.004

[26] Z. A. Halim, J. How, and P. Verhoeven, "Agency costs and corporate sukuk issuance," *Pacific-Basin Finance Journal*, vol. 42, pp. 83-95, 2017. https://doi.org/10.1016/j.pacfin.2016.05.014

[27] S. K. Pribadi and B. Wibowo, "The analysis of company decisions in choosing Sukuk and bonds using logit model," *Economica: Jurnal Ekonomi Islam*, vol. 10, no. 1, pp. 141-164, 2019. https://doi.org/10.21580/economica.2019.10.1.3211

[28] J. F. Hair Jr, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate data analysis*, 7th ed. Upper Saddle River, NJ: Pearson Prentice Hall, 2010.

[29] T. A. Brown, *Confirmatory factor analysis for applied research (D. A. Kenny, Ed.)*. New York: The Guilford Press, 2006.

[30] K. A. Bollen, *Structural equations with latent variables. In Structural Equations with Latent Variables*. Wiley. https://doi.org/10.1002/9781118619179, 1989.