

Smart Sukuk Implementation in Indonesia: Assessing Blockchain Technology's Impact on Islamic Microfinance Accessibility and Efficiency

Hadjer Labadi*

Univ. 8 May 1945 Guelma, Algeria
Hadlab2010@gmail.com

Hadjab Ikram

Univ. Tipaza, Algeria
hadjab.ikram@cu-tipaza.dz

Received: 06/01/2026 Accepted: 23/01/2026 published: 31/01/2026

Abstract:

This research examines Indonesia's pioneering implementation of Smart Sukuk using a mixed-methods descriptive-analytical approach to evaluate this digital platform's effectiveness and impact. Our findings reveal that Indonesia's Smart Sukuk implementation represents a significant breakthrough in Islamic financial market democratization by eliminating financial intermediation, reducing transaction costs and accelerating funding processes from weeks to days. Most importantly, this innovation has enabled 234 small entrepreneurs—previously excluded from the financial market due to high minimum sukuk investments—to access Islamic capital funding, with investors achieving an annual return of 15.5%. The Blossom Finance platform's successful implementation of smart contracts in Sukuk issuance demonstrates a viable model for emerging markets seeking to develop inclusive Islamic financial ecosystems while maintaining Shariah compliance. This study contributes to the growing body of knowledge on fintech applications in Islamic finance by providing the first comprehensive analysis of an operational Smart Sukuk platform's tangible economic impact on microfinance accessibility.

Keywords: Blockchain Technology, Smart Contracts, Smart Sukuk, Islamic bonds, Islamic Financial Market, Indonesia

Jel Classification Codes: G15, F40, F64

I. INTRODUCTION

* Hadjer Labadi

Blockchain technology is one of the main pillars to facilitate the digital economy, which revolutionized the world financial services industry, in the framework of the Fourth Industrial Revolution 4.0. Blockchain technology has contributed to the reduction of costs and speeding up access to financial products. Many businesses tended to invest in the creation of blockchain-based applications, which offered a promising chance for up-and-coming businesses to offer financial innovations that would advance financial markets and automate the securities working mechanism as we transitioned to a digital age. One of these securities, smart sukuk based on blockchain technology, can be used to raise money to finance small and medium-sized businesses, giving them greater access to the Islamic financial market and offering them cutting-edge products at affordable prices that could improve their structure and productivity.

The first smart sukuk was introduced by Blossom Finance, a Fintech company founded by Matthew J. Martin in Indonesia. It is a startup company that originally was founded in San Francisco but then moved to Jakarta with the hope of concentrating on microfinance in Indonesia. The micro-sukuk issuance strategy that would fund Indonesia's Baitulmal WA Tamwil (BMT) is overseen by Blossom Finance. In an attempt to improve the microfinance sector's funding system, which currently primarily relies on banks, and to foster quick access to Islamic financial services in the sukuk market, it introduces its smart sukuk platform for the first time. It does this by automating and standardizing the sukuk's accounting, legal, and payment procedures.

Study Problematic:

The core issue of this research revolves around the issues and opportunities of blockchain-based smart sukuk in the Indonesian Islamic finance system. Given that conventional Islamic microfinance institutions (BMTs) experience serious constraints regarding funding accessibility, operational efficiency, and market reach. Therefore, the main question of this research is :

How does Blockchain reshape the Indonesian Islamic financial market using blockchain sukuk?

Hypotheses:

Primary hypothesis: The use of blockchain-based smart sukuk in the Indonesian Islamic financial market significantly enhances the financial inclusion of SMEs by reducing transaction costs, streamlining procedures, and expanding market accessibility compared to traditional sukuk instruments.

Secondary hypotheses:

-Smart contracts platform reduce and facilitate sukuk issuance operational inefficiencies against conventional practice.

-Blossom Finance smart sukuk model is a sustainable funding solution that enhances BMTs' independence from traditional banking institutions.

-Blockchain sukuk facilitates greater access of smaller Businesses to Islamic capital markets by lowering the minimum investment thresholds and simplifying compliance requirements.

-As a new structured technology, smart sukuk application could face several challenges related to technological issue

Aims and Objectives: This study examines the following:

-The study analyzes the application of blockchain in the sukuk structure, introducing a digital era of sukuk processing.

-It demonstrates how blockchain-based smart sukuk used by Blossom Finance in Indonesia transforms Islamic financial markets by providing a kind of accessibility, reducing costs, and facilitating the funding process for small and medium enterprises.

-It captures the innovative aspect of smart sukuk as a fintech application in Islamic finance, and its potential impacts on SMEs.

-It introduces the main opportunities of implementing blockchain in the Indonesian Islamic financial ecosystem.

Literature of Previous Studies: The researches on blockchain applications in Islamic finance is framed around four main themes, namely: (1) technical foundations with potential applications, (2) economic and market impact, (3) regulatory and Shariah compliance aspects, and (4) case implementations and empirical assessments.

- **Technical Foundations and Potential Applications**

Research on the technical architecture of blockchain and its possible incorporation into Islamic financial instruments builds a fundamental understanding of what the technology could really do. (Wu & Tingting , 2018) review the possibilities of blockchain systems in an extensive number of financial applications, focusing on the decentralized, transparent, and immutable characteristics of blockchain. Their discussion points out that, even though blockchain does present many benefits in the context of asymmetric cryptography, distributed consensus, and smart contracts, many of the applications are still in very early stages of development. Further technical foundations are presented in (Shrimali & B. Patel , 2022), who describes how the architecture of blockchain could specifically facilitate the tokenization and automation of financial instruments.

- **Economic and Market Impacts**

The second research stream explores the effect of blockchain on macroeconomic level based on financial market, as (Olaniyi, 2018) employs quantitative methods to analyze blockchain technology's relationship with financial market in the United States and China between 2008-2016. This research indicates a positive

correlation between blockchain innovation and financial development indicators, including GDP growth rate and trade openness, providing empirical evidence for blockchain's economic significance beyond theoretical possibilities. This economic perspective is confirmed by (WANG et al., 2025), who validate the effectiveness of blockchain-based matching for financial derivatives that uses smart contracts for secured data sharing among participants, ensuring the integrity and immutability of transaction data.

- **Regulatory and Shariah Compliance Considerations**

Investigating the legal and Shariah compliance aspect constitutes a critical area of discussion in governing Islamic financial instruments. (Mustapha, 2021) addresses this intersection through a systematic examination of legal and Shariah issues surrounding blockchain-based sukuk. This research identifies how blockchain solutions may resolve certain inefficiencies in traditional sukuk transactions while raising new regulatory questions, which govern blockchain uses. Similarly, (Osama Hamza, 2020) examines smart sukuk models from a Shariah perspective in the Turkish context, highlighting potential issues with capital guarantees while acknowledging benefits in market access, processing efficiency, and cost reduction. (Kunhibava, 2021) further explores the regulatory dimensions, emphasizing the need for appropriate governance frameworks that maintain Shariah compliance while enabling innovation.

- **Case Implementations and Empirical Assessments**

The most recent research stream focuses on empirical implementations of smart sukuk platforms demonstrate by (Malika, 2021), who slightly introduces case studies of blockchain sukuk implementations, including Blossom Finance, Wethaq Capital, and HLC platforms, demonstrating how the technology standardizes issuance processes and mitigates structural challenges. (Khan et al., 2022) provide a detailed technical case study on tokenizing Murabaha sukuk through smart contracts, documenting potential cost reductions for issuers and small-to-medium enterprises. These empirical studies move beyond theoretical discussions to analyze actual performance metrics and implementation challenges.

Research Gap: While existing literature has established theoretical frameworks, economic impacts, regulatory considerations, and initial case studies, there remains a significant gap in comprehensive analyses of operational blockchain sukuk platforms and their tangible economic impacts on financial inclusion. Most studies focus on potential applications or technical designs rather than measuring actual outcomes for previously excluded market participants. The present study addresses this gap by providing the first real application, which is Indonesia's Blossom Finance platform, offering quantifiable evidence of how blockchain-

based smart sukuk has democratized access to Islamic capital markets for small entrepreneurs and enhanced operational efficiency in the sukuk issuance process.

II. Methodology:

This study adopts a **mixed-methods descriptive-analytical approach** to evaluate the implementation and impact of Smart Sukuk in Indonesia via the Blossom Finance platform. The methodology integrates qualitative and quantitative data through the following four components:

Documentary Analysis

- Review of official reports from Blossom Finance
- Financial statements from BMT Bina Ummah
- Indonesian regulatory frameworks
- Reports from IFSB and other Islamic finance authorities

Case Study : In-depth examination of Blossom's Smart Sukuk platform

- Ethereum-based smart contract structure
- Issuance and payment workflow
- Investor and SME demographics
- Financial metrics (returns, costs, processing times)

Comparative Analysis: Contrast between traditional sukuk and smart sukuk on:

- Cost efficiency
- Speed of issuance
- Investment accessibility
- Shariah and regulatory compliance

Data Collection & Analysis

- Primary Data: Metrics from Blossom Finance (Sep 2019–Sep 2020)
- Secondary Data: Market data from IFSB and academic literature
- Analytical tools used include descriptive statistics and qualitative impact assessment.

The basic structure of this article is as follows: the first section introduces a background of blockchain and smart sukuk. The second section introduces Blossom Finance's smart sukuk, followed by the BMT funding system through smart sukuk. Finally, the significance of Blossom Smart Sukuk in the Indonesian Islamic Capital Market and the main smart sukuk application challenges are discussed.

1. Theoretical background of the study

This part introduces the main variable of this study, which are blockchain and smart sukuk.

1.1. The Concept of Blockchain Technology

Blockchain is a digital distributed database that facilitates value exchange on the internet without the need for a middleman. All network parties (nodes) record and share transactions simultaneously, and all data is stored in fixed

structures called "blocks" after receiving consensus from all participants (validation) (Hadjer L. , 2022, p. 282). This technology has six primary features (Labadi, p. 60):

a. **Decentralization:** Blockchain does not use any central nodes to validate the data because the data is enrolled, stored, and reformed in a decentralized environment, eliminating risks that may arise from a centralized database. Thus, it does not have any central point of failure that can bring down the system in case of an attack. The algorithm of consensus has the responsibility to secure and offer a type of security against any attack that will disrupt the chain of blocks.

b. **A Distributed Ledger:** In fact, there is only one unique version of the ledger and every user of the network has the same version of the ledger with a full and up-to-date copy. Because, any alteration of the ledger made by a member of the network is thus shared to all nodes, after verification, and it is added to the chain. Therefore, the transparency in blockchain is offered since all participants in the network hold the complete history of the transactions, and the change is always accessible to anyone who has a gaining access to the system.

c. **Immutability:** The blockchain cannot be reversed because no transaction can be modified, erased, or reversed other than if more than 51% of the users agree with changing it. That would essentially imply that the hackers need to take over more than half of the nodes, something that is not probable. However, although it is considered improbable and challenging to break the immutability of a blockchain, if there is a huge number of resources, it is actually possible in theory.

d. **Consensus Mechanism:** Technically, verification and authentication of the assets moved in a decentralized network like blockchain is the responsibility of agreed algorithm, as it dictates rules for making a transaction valid and prevents double spending errors. Consensus is employed to achieve consensus among nodes of a network. For example, when the network size increases, the number of nodes increases and it becomes nearly impossible to achieve the consensus and to ensure that all the nodes in the system possess the same exact copy. The process used to achieve consensus in a blockchain network is known as mining. Mining is vital because it ensures that all the blocks added to the ledger are secure and unalterable.

d. **Accessibility:** From the perspective of accessibility, blockchain can be categorized into two classes, which are permissionless (public) and permissioned (private). The public blockchain network is accessible to everyone and anyone can join the network either as a participant or a consensus authority (miner). In contrast, the private blockchain has some limitations that determine who can join the network because he/she must obtain a permission from the party owning the platform before accessing the network.

Those main features impose the use of this technology to apply in the financial

scope, including the financial market, particularly the Islamic financial market, giving rise to Smart Sukuk, which expresses the combination of Blockchain as a fintech technique and Sukuk as a main financial instrument in the Islamic financial market. One of the first experiences of smart sukuk took place in Indonesia by the Blossom Finance platform.

1.2. The concept of Smart Sukuk

Smart sukuk or blockchain sukuk are sukuk designed on blockchain based on smart contracts, which is one of the major applications of blockchain. Smart contracts are a computer programming code which can execute, facilitate and enforce the negotiation or performance of an agreement (i.e. a contract) via blockchain technology. The procedure is fully automated and can be used as an addition or substitute for legal agreements, whose conditions are preserved in a computer language in the form of a series of instructions (Wang, 2018, p. 31).

In this regard, Smart Sukuk are encrypted Islamic financial securities/instruments of the same value that express a fraction of ownership of the investment issued based on a blockchain platform as per the smart contract rules. It provides transparency, cost savings and mediation charges, apart from the fact that dividends and financial returns are automatically paid on a blockchain platform (Kunhibava, 2021, p. 7). Smart Sukuk has different features that define its composition, the following are regarded as the primary points:

- There is no difference in the Sharia contracts that underlie designing traditional sukuk and smart sukuk. Technically, however, the main difference appears to be in the issuance process, which mainly depends on blockchain, i.e., smart contracts, which are responsible for structuring the contracts as well as enforcing them (Hamza, 2020, p. 4).
- In sukuk blockchain, sukuk issuance is digitized. At the operational level, blockchain automates and enforces contractual regulations regarding payment and ownership transfer via an algorithm of smart contracts, which encrypts business rules and party agreement within which the investment is being undertaken through digital tokens or cryptocurrency (Rejeb, 2021, p. 11).
- Smart sukuk undergo an automated process that smart contracts carry out to increase investor trust by increasing efficiency, transparency, cost reduction, time gain, and asset tracking.
- The returns that sukuk holders or investors receive when they are issued on a blockchain are given out as tokens, or cryptos, which correspond to a share of ownership in the underlying asset (Iman & Arifin, 2021, p. 5).
- The primary function of smart sukuk is to automate and standardise the legal and accounting payments as well as the overheads associated with conventional sukuk offers.
- There is no difference between smart sukuk and conventional sukuk in their

types, or in their Sharia issuing principles, since they differ only in their structure (Mounira, 2022, p. 319).

1.3. The Difference between Smart and Conventional Sukuk

In terms of their legality and the principles of their issuance, Smart sukuk do not differ from conventional sukuk, as both of them are structured based on Sharia provisions. However, the difference lies in their issuing processes. Table 1 explains the operational differences between conventional and smart sukuk.

Table (1) : Comparison of Conventional Sukuk vs Smart Sukuk

Comparison Item	Conventional Sukuk	Smart Sukuk
The Entire Lifecycle	Paper-based issuance process	Online issuance via blockchain platform
Sukuk Issuer and Manager	SPV or financial company with multiple roles: asset ownership, fund collection, documentation, payments	Blockchain platform and smart contracts manage issuance and payments
Sukuk Documents	Traditional contracts signed by involved parties per Sharia requirements	Smart contracts signed electronically via blockchain platform
Investors	Banks, funds, companies, or qualified individuals	Cryptocurrency users via blockchain platform
Investment Currency	Fiat currencies	Cryptocurrencies, though fiat can be used via banks for proceeds management
Listing of Sukuk	Listed in financial markets after licensing	Listed and traded directly on blockchain platforms based on supply and demand
Extinguish / Redemption	Redeemed per issuance documents; nominal or market value depending on Sukuk type	Redeemed per smart contract terms defined on the platform
Sharia Committee	Formed to assess compliance and approve structure; subject to governance standards	Blockchain platform can appoint Sharia committee for structure and smart contract review
Risks	Credit, market, operational, liquidity, Sharia, legal, and	Includes all conventional risks plus technical, regulatory, and misuse

	performance risks	risks (e.g., laundering, tax evasion, etc.)
--	-------------------	---

The source : (Hadjer L. , 2024, p. 102)

2. Smart Sukuk Experience in Indonesia

2.1. Blossom Finance Company Background

The idea for Blossom Finance Company began at the Silicon Valley venture capital startup incubator program in San Francisco, California, USA in October 2014. This startup company in financial technology is supported by Silicon Valley to make an ethical financial service based on Islamic principles of equal opportunity, participation, and financial inclusion. Actually, first, Blossom Finance is an Indonesian Islamic Fintech company that uses Blockchain to fund small businesses on the crowdfunding principle (Peredaryenko, 2019, p. 174). It piloted a microfinance trial in July 2015 to invest in micro-businesses in the Jakarta metropolitan region. Again, in June 2016, it invested in 95 micro-businesses and gained 15.4% in 12 months as returns. It debuted the Smart Sukuk Platform in May 2018 during the Islamic finance news conference in Kuala Lumpur, Malaysia. It launched the world's inaugural blockchain sukuk in September 2019 to finance Baitulmal WA Tamwil (BMT) in Indonesia (Finance, 2025).

Blossom Finance allows for zero-interest investing and encourages profit sharing for small businesses. It offers investors high-yielding investments in which Blossom generates co-funds collected. It works to expand financial inclusion in developing nations. It is based on the World Bank report in 2017 that stated there is a financial gap in developing nations, even more so Islamic nations, where the ratio of the population who lack bank accounts reaches up to 76% and have no access to general financial services. So, this company was formed to address the need of the financial gap based on Islamic Sharia provisions utilizing the Indonesian market. It then started raising funds on a crowdfunding basis whereby borrowers and lenders are directly matched using the Blossom blockchain platform. Blossom Finance has been assisting microfinance institutions in Indonesia in raising funds from global investors with a purpose to fund small businesses with the goal to alleviate regional poverty using crowdfunding platforms since 2015. Therefore, Blossom's intelligent sukuk principles would help institutions to issue low-cost, Shariah-compliant funding from cross-border investors (foreigners) through blockchain technology (Peredaryenko, 2019, p. 176).

2.2. Sukuk Mechanism Based on Blossom Finance Platform

Sukuk issuance in Indonesia is only accessible to the government and large institutions because of the expensive issuing cost and complexity. Recently,

Blossom Finance initiated a new initiative to alter this reality through the application of blockchain in the issuance process.

2.2.1. Smart Sukuk Structure on Blossom Finance Platform

Blossom smart sukuk platform is developed on the Ethereum blockchain layer, which is formed through the utilization of smart contracts. As, the contracts encode business rules directly into the underlying payment process, which ensures the execution of contract terms, related to the transfer of ownership of assets and the payments of the owners. Blossom Company chooses three specific structures for smart sukuk as inaugural issuance: Mudaraba, Istisna, and Ijara Smart Sukuk. Mudaraba Sukuk (profit-sharing Sukuk) have been issued to supply funds for small companies, but Istisna and Ijarah Sukuk have yet to be activated because they would be activated to finance construction projects such as building hospitals or schools. Upon construction, hospital operators will lease the buildings from the sukuk investors at a pre-agreed profit margin (Finance, 2025). For example, figure 1 shows how Blossom smart sukuk for construction projects operate.

Figure (1): The Working Mechanism of Blossom's Smart Sukuk for Construction Projects.



The Source: (Finance, 2025)

Any business that wishes to raise funds can issue smart sukuk on the Blossom platform where investors can invest funds and receive smart sukuk tokens, the digital form of Blossom sukuk ownership. With the help of blockchain technology, the funds invested in sukuk will be tracked to the precise amount to see where and for what they are being utilized by the network. This confirmation can be done by encrypting and adding the confirmed certificate to the blockchain in PDF format, where it cannot be erased or altered. In addition, Blossom blockchain platform smart contracts also adhere to a standardized protocol named ERC20, which makes sukuk tokens tradable worldwide on

hundreds of public cryptocurrency stock exchanges (Rejeb, 2021, p. 14). Consequently, the investors are offered a share in smart sukuk, representing their ownership-share in the asset and the terms of sukuk ownership, upon payment from the institution, the funds are automatically transferred to the smart sukuk owners in the form of Tokens through blockchain according to the terms under the smart contracts without the use of conventional banks and intermediaries. Investors can also hold sukuk until their maturity dates, or dispose of their ownership of sukuk to a third party. Such subsequent sale to a third party is called "a secondary trading", as it is what makes sukuk a "securitized" asset (Hussein, 2019, p. 25). In the case of Indonesia, Sukuk will be acceptable (halal) only if there is effective transfer of true ownership of the underlying asset to the holders. Also, in the event of trading smart sukuk in cryptocurrencies, this will not be acceptable unless the government permits the possibility of trading. Blossom Finance explains that digital currencies like Bitcoin and Ethereum are permissible according to their nature, but Muslims cannot use them if prohibited by the government of their country. Hence, Blossom smart sukuk facilitate issuance of Sukuk in fiat currency and remove the necessity for institutions to put cryptocurrencies on their balance sheet. Blossom Finance makes use of Ethereum as a platform to send and receive cross-border payments, as a ledger to record ownership, and as a technology to execute trades on global stock markets. Concisely, Blossom does not release any cryptocurrency-based sukuk in accordance with the fact that the cryptocurrency is susceptible to value fluctuations and does not assist Muslims in making purely speculative investments. Thus, all Blossom Smart Sukuk will be tied to actual projects that are connected to productive economic activity and the legal tender (Finance, 2025).

2.2.2. Features of Blossom Finance Smart Sukuk

Here are the main characteristics of Blossom Smart Sukuk (Finance, 2025):

- The smart sukuk offered by Blossom involve taking on risk instead of transferring it, and they are based on assets rather than debt;
- The Blossom Finance platform uses Ethereum smart contracts to increase efficiency and make them widely recognised. Standardising and automating the accounting, legal payments, and overheads of conventional sukuk offerings is the primary significance of smart sukuk, which will be fully supported by a licensed legal entity in the issuance country;
- In terms of fees, Blossom will not charge investors or institutions any up-front fees for their microfinance smart sukuk. Rather, Blossom will get the carried capital profit, which is a 20% portion of the investor's earnings. This implies that Blossom only profits when investors make money and could lose if investors don't profit from the transaction; this is precisely how the Islamic system divides gains and losses.

- In terms of pricing, Blossom aligns its incentives with those investors to have a commission structure that is solely based on profit-sharing.

3. BMT Smart Sukuk based on Blossom Finance Platform

The devastating problem of unemployment, causing the spread of poverty among large sections of the Indonesian people, is one of the major concerns for Indonesia, which is classified as one of the largest Islamic countries in terms of population. He further pointed out that the government has been fully aiding Islamic financial institutions to help in the mitigation of poverty in the country with its plans and intentions. The government has legalised the operations of Islamic microfinance institutions in an effort to support their transparent and professional operations and to improve their prospects for the future. Hence, the government programs provided more impetus to these institutions to expand their activities and increase their demand for services. This was further reinforced by investments from fintech companies into the capital market, thereby providing a much larger segment of investors the opportunity to access their services via these platforms.

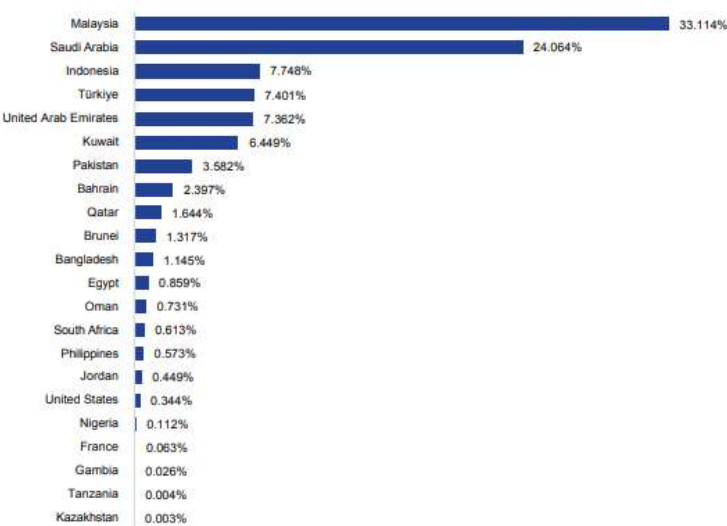
3.1. Islamic Microfinance in Indonesia

Since their emergence two decades ago, Islamic microfinance institutions have gained wide recognition for their role in fighting poverty in Indonesia. They provide financing for small activities for the poor and lower-income sections. These institutions work in fact quite differently from conventional banks since they do partake in the projects of investors, and their recent growth is attributed to the advent of Sharia laws in their dealings with the beneficiaries of their services. 72% of Muslims around the world, according to statistics, do not use banking services because they do not follow the provisions of Sharia on usury, gambling, and other taboos associated with financial transactions. Government support in Indonesia drove these institutions to higher success in the agenda of combating poverty and improving the conditions for citizens, as the Islamic microfinance sector in Indonesia forms part of the banking system with about 5,500 funding financial institutions designed to finance small projects with a financial balance of up to US\$ 590 million (Ripal et al., 2023, p. 336). These institutions have made investment financing for small projects available to a large number of rural residents in regions afflicted by poverty and unemployment. The projects have given residents an opportunity to improve their living conditions. The report of the Ministry of Cooperatives and Small and Medium Enterprises in 2017 concluded that the total number of small and medium enterprises in the country reached 55.2 million. The overall financing of the BMT is based on the function of collecting and distributing funds in the form of zakat, takaful, charities, spending, and waqf (endowment) (Ripal et al., 2023, p. 336). Some

projects, however, need a long-term capital basis, so it is said to go for the Islamic capital market to raise long-term finances through Sukuk.

In fact, due to the high cost related to Sukuk issuance in Indonesia, these micro enterprises really do not have any chance to access Islamic capital market, where essentially the majority of their market depends on sovereign sukuk with very high values. The first issuance of Sukuk by the Indonesian government was back in 2008 based on Law No. 19 of 2008 regarding Sharia sovereign securities. Indonesia has the third largest Sukuk market with market share of global Sukuk outstanding valued at US\$99 billion in 2023 after Malaysia and Saudi Arabia as shown on figure 2.

Figure (2): Top Countries in Sukuk Outstanding in 2023



The Source: (IFSB, p. 60)

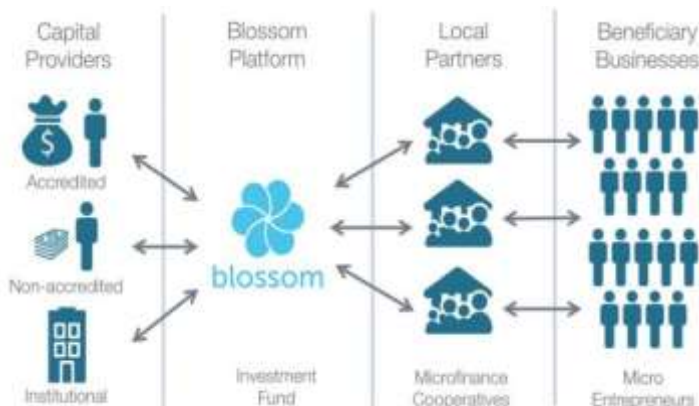
More than 90% of total sukuk issuance in Indonesia is dominated by sovereign sukuk due to costs that prohibit the entry of smaller investors into the sukuk market, since these are the instruments favored by sovereign issuers in Indonesia to finance budget deficits and maintain liquidity levels. as from 2014-2024, sovereign sukuk financed infrastructure projects worth Rp 241.96 trillion, including toll roads, railways, airports and seaports, as well as education and health facilities (IFSB, p. 60).

Therefore, Blossom proposed an extension for access to the Sukuk market through this Ethereum blockchain, which mostly stems from the idea of crowdfunding to enable a greater portion of smaller investors to invest in sukuk for funding projects consociated with Baitul Maal wa Tamwil (BMT), an Islamic micro-finance institution located in Yogyakarta, Indonesia.

3.2. Baitul Maal WA Tamwil’s Smart Sukuk

Baitul Maal wa Tamwil (BMT) is an Islamic financial institution in Indonesia that assists small- and medium-sized enterprises (SMEs) and entrepreneurs often excluded from traditional financing and acts towards expanding financing conditions for SMEs. The BMT model was originally formed in the late 1990s in response to the Asian financial crisis for the purpose of stimulating grass-roots economic growth and job creation; the BMT avoids consumptive loans with its underwriting model and opts to finance productive business activity to enhance the income of family households (Adnan, 2015, p. 162). In Indonesia, BMTs vary in size and in their assets under management; they have less than US\$1 million in assets, whereas they also have BMTs that manage assets of more than the equivalent of US\$250 million. BMTs aim to eradicate poverty by offering free savings products to the working poor, financing small businesses in order to help entrepreneurs start or develop their businesses in handicrafts, food, clothing, and automotive parts small to medium industries. In addition to banking products, BMTs implement different social impact programs within their communities (Adnan, 2015, p. 162). In general, the BMT model in Indonesia is hailed as the most successful Islamic microfinance model in the world. Therefore, considering the current technological developments and the entry of many fintech companies into the financial industry, in order to keep pace with the digital revolution and provide financial services to a wider range of investors, these organizations had to embrace blockchain technology. In this regard, and since its public announcement in May 2018of, Blossom has focused its Smart Sukuk to finance Baitul Maal wa Tamwil institutions using Mudarabah structure on 29 September 2019, where investors receive dividend payments resulting from a portfolio of microfinance investments managed by BMT Bina Ummah as shown in the figure 3 (Finance, 2025). Blossom sukuk open multiple avenues for innovation in the Islamic capital market, being the first primary issuance on a public blockchain represented in micro sukuk with small values. The platform allows subscription and periodic payments made with any cryptos, tokenized assets, or fiat money. Its smart sukuk are on ERC20 standards, allowing trade digitally through any existing blockchain wallet and easily listable on secondary markets (Hussein, 2019).

Figure (3): The Figure Title BMT Bina Ummah Smart Sukuk Based on Blossom Finance Platform



The Source: (Martin, 2018, p. 19)

BMT Bina Ummah has raised Rp715 million (US\$50,456) from issuing primary sukuk on the blockchain via the Blossom smart sukuk platform, as summarized in table 2 (Ummah, 2020, p. 1). The fund-raising is a smart Mudaraba Sukuk, in local currency, that has a one-year maturity, i.e. 29 September 2020, to be used to provide funds to 234 local entrepreneurs to finance their agriculture and food distribution projects.

Table (1) : BMT Bina Ummah Smart Sukuk Issuance based on Blossom Finance Platform

Sukuk type	Issuer	Value	Manner	Period	Beneficiaries	Annual return
Mudarabah smart sukuk	BMT on Blossom Finance Platform	Rp715 Million (US\$50,456)	blockchain based on Ethereum-smart contracts	1 year	234 local entrepreneurs	Annually 15.5%

The Source: by the researcher based on (Finance, 2025)

These smart Mudarabah Sukuk worth Rp715 million have done well for investors with an annualized gross return of 15.5% since their issuance. This figure captures a cumulative realized profits distribution of Rp81 million (US\$5515) for the initial nine (9) months since issuance as exhibited in figure 4.

Figure (3): BMT Bina Ummah Smart Sukuk Performance



The Source: (Ummah, 2020, p. 1)

Since all the investors in BMT smart sukuk were American, their returns were influenced by the prevailing Rupiah-Dollar exchange rate. During the peak of the Covid-19 crisis, the Indonesian Rupiah weakened against the American Dollar along with the currencies of many other emerging markets. In March of 2020, the average exchange rate of the Rp vis-à-vis the US\$ had fallen to 10.45%, as against the rate at the time of issuance. Accordingly, the value of their recorded profits in March fell to Rp 9.70 million from Rp10.22 million in February and continued declining until May at the range of Rp 8.71 million to recover back to its high in June at Rp11.73 million. This is due to the normalization of the financial market activities after their adaptation toward the Corona pandemic (Finance, 2025).

4. Significances of Blossom Smart Sukuk in the Indonesian Islamic Capital Market

In evaluating the growth of the Islamic capital market based on smart sukuk in Indonesia, it is important to acknowledge all the benefits that have emerged from the integration of blockchain into the processes of securitization and digitization (tokenization) of sukuk, in both quantitative and qualitative aspects. Thus, the significances of Blossom smart sukuk in the Indonesian Islamic capital market could be summarized below (Finance, 2025):

- Blossom Finance has done away with the traditional sukuk instead developed smart sukuk which means that all the structuring, registration, assignments, calculations, payment, trading of sukuk would implement through blockchain protocol that is Ethereum smart contracts in an indelible fixed manner, leaving out of intermediaries and lower costs.
- Platforms such as Blossom's smart sukuk simply take away the conventional barriers of making micro investments viable, clear, with reduced intermediary

costs, thus making global finance so much more acceptable irrespective of the size or borders; thus enabling small investors in Indonesia to benefit from micro sukuk with a relatively small financial value to invest in the agriculture sector and food distribution, as well as to develop the sukuk market to a considerable larger scale, since high-value sovereign sukuk has pretty much dominated the sukuk market in the last couple of years.

- Blossom smart sukuk highlight two growing trends in Islamic capital markets: firstly, the digital innovation using smart contract- based securitization, and secondly the increasing focus on financing small investors. As Blossom platform is the first platform that finances projects of small enterprises whose owners were previously unable to access Sukuk market. Therefore, Blossom smart sukuk provide more accessibility and remove the high barriers, which prevent the entry into the Islamic capital market;

- On Blossom platform, both registration to and payment using any cryptocurrency or tokenized asset (in the absence of any restriction imposed by the issuing authority) is permitted besides payments by fiat currencies; additionally, it offers an alternate model of payment that doubles as a wrapper for ERC20 standards in an Islamic finance market so that any digital exchange may be performed through existing blockchain wallets or secondary markets.

5. Challenges of Smart Sukuk Application in the Islamic Financial Market

Though the merits of blockchain technology and its recent applications in financial institutions include such factors as secure financial services at low costs, simpler procedures around financial transactions, and an absence of mediation, the challenges impeding its adoption cannot be ignored at the level of contract and transaction settlement. This is especially true for Islamic financial market services and products. Therefore, this section shed light on the regulatory, legal, Sharia, cyber risks, and challenges of technological infrastructure that pertain to sukuk structuring experiments on blockchain technology.

a. Regulatory and Legal Challenges

Generally, financial market products cannot be issued without the approval of the regulatory authority; the same applies for the Islamic capital market products, which cannot issue sukuk without the securities commission's approval of the respective countries (Iman & Arifin, 2021, p. 165). In fact, one of the prime reasons behind supervising the financial market among the regulatory authority is to see that the investors are being protected and the organized activities of the market are in a manner which is acceptable and ethical. Nonetheless, one feature of blockchain sukuk is that, while normally there exists a centralized regulatory authority to supervise all aspects of issuance, in the case of blockchain sukuk, absence of such an authority may

lead to breach of some consumer protection standards and terms of contracts that currently apply within financial markets (Kunhibava, 2021, p. 128). The other main issue about the implementation of blockchain is how the network operators will abide by national provisions regarding professional secrecy. Equally, the legal enforceability of smart contracts in the event that there does not exist any law to organize their structuring could be yet another major regulatory issue concerning the implementation of blockchain. Therefore, the issues concerning smart sukuk and blockchain, in general, are to find regulatory legislation for their operation and adaptation to the financial realms (Septiana & Sanjayawati, 2021, p. 129). Most of the countries have not made any explicit laws or legislation regarding regulation of financial transactions using the contemporary blockchain technology by their legislative bodies. So, financial institutions could not have used it in the large scale before the existence of clear rules and regulations that could define the rights of all parties on one hand and regulate the working mechanism on the other hand, though others like China, Germany, and Japan, have greatly tried in that regard and have established a few guidelines and laws, which basically mark the beginning of the solution (Alaeddin et al., 2021, p. 103).

b. Sharia Challenges

To assume that sukuk are Sharia-compliant products, we need the approval of a legitimate Sharia advisor or committee over their structures based on the relevant Sharia rules as is required for any other Islamic financial product. The latter must similarly apply in the structuring of blockchain-based sukuk, since Sharia compliance in the sukuk structuring is required for the validity of the sukuk itself (Malaysia, p. 19). Smart sukuk unlike conventional securities only need one blockchain-based structure for all the issuances regardless of the different issuing objectives; where, the relationship between the issuer and holders also remains as debtor and creditor. Accordingly, this structure will remain uniform in all the issuances. Sukuk structures depend on the kind of underlying Sharia contracts by which they have been structured since everything involved will differ for each of the types. The differences, hence, should show in each structure. For this reason, it is one of the requirements of sukuk issuance steps, even by a blockchain-based sukuk, that a Sharia advisor or Sharia committee be involved throughout (Malaysia, p. 58). Hence, there needs to be Sharia committee endorsement of the structure of blockchain sukuk, and developing a uniform smart sukuk structure for all types would be quite challenging.

c. Cyber Risks Challenges

Though difficult to hack, blockchain technology still bears hacking risks. Being an online application, blockchain/smart sukuk is subject to cyber threats like hacking and other such threats. Consequently, security issues revolving around hacks are amongst the prominent challenges in using blockchain for financial transactions and services. Data related to customers in financial transactions and their protection are among FinTech's most significant concerns. Therefore, launching these new financial technology applications and transferring all data through these applications could face possible threat of hacking or being lost, which may use to take control of customer accounts, leading to robberies of hundreds of millions. Hence, there is indeed much need to be done in the security aspect of the technologies and the research on vulnerability that hackers can make use of to obtain customer's data or assets through identity theft, hacking, and online fraud. As such, the new financial technologies offer a very promising ecosystem for suspicious deals. For now, the focus is on mechanisms for monitoring and controlling any financial operation undertaken through such more modern means and cryptocurrencies (Alaeddin et al., 2021, p. 105). So, no financial institution would guarantee safety on the one hand and not know who the other party dealing with it is, before starting dealing through these technologies. Therefore, some of the specific jurisdictions have attempted to address and regulate cyber risk matters. In this arrangement, the securities commission of Malaysia issued extra regulations on companies regarding cyber risks, i.e. the guidelines of cyber risk management in 2018, which applied to all capital market operators or entities (Alaeddin et al., 2021, p. 105). The Guidelines were to even further enhance and sharpen cyber risk management in the industry from various sources, including regular monitoring and review of cyber security issues of regulated entities with respect to preventing and detection of cyber incidents as well as swift reporting of breaches to the Securities Commission of Malaysia.

d. Technological Infrastructure Challenges

The first thing that stands in the way of using the blockchain for processing transactions is the cost incurred by it. The costs of electricity for continuous operations related to validating transactions are huge, as well as those associated with the computing power required for mining high-specification machines, with a very fast processor. Data and information storage costs and the costs associated with having a network capable of processing large transaction volumes are also considered. Furthermore, in view of the fact that most financial institutions now have several systems they have invested in, which cost hundreds of millions, switching from the old system to the new system is quite costly. So new mechanism switching means dumping all those programs and mechanisms and wasting exorbitant costs these

institutions paid long before just to acquire these programs to create a new cost to them (Alaeddin et al., 2021, p. 106). Therefore, each blockchain product must have its own ecosystem, initially represented in (Hussein, 2019, p. 26):

- A full technology stack encompassing infrastructure, middleware, and software applications (INTERNET); Startups innovating traditional products and creating new markets;
- Solutions and service providers implementing end-to-end solutions for enterprises;
- Funders and venture capitalists who take risky bets alongside entrepreneurs and scientists;
- Developers and technology experts working in core technology and extended technology areas;
- Users conditioned to try out products both as consumers and as enterprise customers.

III. Conclusion:

The introduction of smart sukuk in Indonesia is a significant benchmark in the growth of Islamic finance in the Fourth Industrial Revolution era. The study has examined how Blossom Finance's pioneering application of Ethereum smart contracts in issuing sukuk has created new possibilities for BMT institutions and SMEs to enter previously inaccessible capital markets

- **Hypotheses Testing:**
 - ✓ Smart sukuk implementation in Indonesia through Blossom Finance has proven to bring a decrease in the transaction cost and enabled 234 small entrepreneurs, who otherwise could not access the financial markets, to obtain their capital funding. This is evidence that blockchain technology builds financial inclusion for SMEs, which support Primary Hypothesis.
 - ✓ Such smart sukuk, built on the blockchain, automate and standardize almost everything in the structuring of sukuk, execution of contracts, as well as their payment processes. They reduce processing times from weeks to days. The efficiency of this system is based on smart contracts in the legal, accounting, and compliance aspects.
 - ✓ The BMT Bina Ummah initiative has been demonstrated through smart sukuk, providing a kind of independence on conventional banks and helped to attract global investors to fund SMEs with annualized returns of 15.5%.
 - ✓ Smart sukuk implementations have encountered various challenges relating to the regulatory and legal issues concerning guidelines to regulate the sukuk structuring on block chain; there are also sharia challenges which relate to what extent the sukuk structure is in

compliance with the Islamic Sharia provisions; cyber risks challenges which relate to security of participants' data and properties which could be hacked on block chain; and lastly technological infrastructure challenges in terms of infrastructural costs of blockchain integration. All of these three statements support the secondary hypotheses.

▪ **Study Findings**

- ✓ The findings show that Smart Sukuk is transforming Indonesia's Islamic finance landscape in several ways. First, it is facilitating legal, accounting, and payment processes—which have been automated by blockchain technology—and which led to higher transaction costs as well as operational inefficiencies faced by small institutions in accessing the sukuk market. Second, the Islamic finance landscape in Indonesia is being opened up through the standardization of sukuk issuance procedures, which has boosted confidence among potential investors in these areas. Third, the Smart Sukuk platform, which is developed by Blossom Finance, is the third significant sukuk market in Indonesia.
- ✓ Our analysis also shows how Blossom Finance's innovative strategy has successfully closed the gap between cutting-edge financial technology and financing principles that adhere to shariah. The immutability, transparency, and decentralization of blockchain technology enable smart sukuk to seamlessly integrate with Islamic finance's focus on risk-sharing, ethical investment, and real asset backing.
- ✓ The implications of the study are far-reaching. Democratization of access to the Islamic capital market using smart sukuk enables microfinance institutions to reduce the need to rely on conventional banking systems. In addition, the smart sukuk enables microfinance institutions to enhance their services to the underbanked population. This approach provides a model for emerging markets to develop their inclusive Islamic financial ecosystem.
- ✓ However, there are still issues with technical infrastructure, market education, and regulatory frameworks. Coordination between regulators, financial institutions, and technology companies will be necessary for the future development of smart sukuk in order to create thorough regulations that safeguard investors and promote innovation.
- ✓ As Indonesia seeks to establish itself as a center for Islamic finance and financial technology convergence, smart sukuk shows how technological innovation can propel financial inclusion on ethical and religious principles. Such a combination of tradition and innovation holds key lessons for global Islamic finance development and highlights opportunities for fintech solutions to address long-standing issues in emerging market financial systems.

– **Referrals and references:**

1. Adnan, M. A. (2015). The effectiveness of Baitul Maal wat Tamwil in reducing poverty The case of Indonesian Islamic Microfinance Institution. *Humanomics*, 31(2), pp. 160-182. <https://www.emerald.com/insight/content/doi/10.1108/h-03-2012-0003/full/html>
2. Alaeddin, O., Al Dakash, M., & Azrak , T. (2021). Implementing the Blockchain Technology in Islamic Financial Industry: Opportunities and Challenges. *Journal of Information Technology Management*, 13(3). https://jitm.ut.ac.ir/article_83116.html
3. Finance, T. O. (2025, 4 26). www.blossomfinance.com
4. Hadjer, L. (2022). Blockchain Technology Application In The Uae Banking Industry. *Journal of Economics and Finance*, pp. 280-294. <https://asjp.cerist.dz/en/article/176574>
5. Hadjer, L. (2024). The Use of Blockchain Technology in the Development of the Islamic Financial Market, case study: smart sukuk. 8 May 1945, university of Guelma. https://doi.org/https://scholar.google.com/citations?view_op=view_citation&hl=ar&user=kU4tLFgAAAAJ&citation_for_view=kU4tLFgAAAAJ:2osOgNQ5qMEC
6. Hamza, O. (2020). Smart Sukuk Structure from Sharia Perspective and Financing Benefits: Proposed Application of Smart Sukuk through Blockchain Technology in Islamic Banks within Turkey. *European Journal of Islamic Finance*. <https://doi.org/https://doi.org/10.13135/2421-2172/3983>
7. Hussein, E. (2019). Blockchains for Islamic finance: Obstacles Challenges. Munich Personal RePEc Archive,, pp. 1-39. https://mpra.ub.uni-muenchen.de/92676/1/MPRA_paper_92676.pdf
8. IFSB, T. I. (n.d.). <https://www.ifsb.org/wp-content/uploads/2024/09/IFSB-Stability-Report-2024-8.pdf>
9. Iman, A. k., & Arifin, S. (2021). The Advantages and Challenges of Implementing Sukuk through Blockchain Technology,. *An-Nisbah, Jurnal Ekonomi Syariah*, 08(02), pp. 247-270. <https://doi.org/10.21274/an.v8i2.4665>
10. Khan, N., Kchouri, B., Yatoo , N., Kräussl , Z., Patel, A., & . (2022). Tokenization of sukuk: Ethereum case study. *Global Finance Journal*, 51. <https://www.sciencedirect.com/science/article/abs/pii/S1044028319303552>
11. Kunhibava, S. (2021). Şukūk on blockchain: a legal, regulatory and Sharī'ah review,. *International Journal of Islamic Finance*, 11(01). https://www.academia.edu/70481709/%E1%B9%A2uk%C5%ABk_on_blockchain_a_legal_regulatory_and_Shar%C4%AB_ah_review
12. Labadi, H. (n.d.). The Future Of Blockchain-based Crowdfunding In The Arab Countries: Prospects And Challenges. pp. 54-64. <https://asjp.cerist.dz/en/article/210751>
13. Malaysia, S. C. (n.d.). 2019. <https://www.sc.com.my/resources/publications-and-research/sc-ar2019>

14. Malika, B. (2021). Sukuk Tokenization: Successful Experiences. *Journal of Studies in Economics and Management*, 4(1). <https://asjp.cerist.dz/en/downArticle/635/4/1/155687>
15. Martin, M. J. (2018). Blossom: Halal & Ethical Investments Using Sukuk, Good returns, Great impact. <https://www.blossomfinance.com/posts/blossom-wins-world-islamic-fintech-award>
16. Mohamad, N. E., Mohd Saad, N., & bin Mohamed, Z. (2022). An Overview of Sustainable and Responsible Investment Sukuk for Social Impact Financing, Accelerating Transformation towards Sustainable and Resilient Business: Lessons Learned from the COVID-. *European Proceedings of Finance and Economics*, 01. <https://pdfs.semanticscholar.org/7d79/c3cf8bff719ff817765d2b46472be0b28e5d.pdf>
17. Mounira, B. (2022). ethaq - Sukuk Investment. *Journal of Financial, Accounting and Managerial Studies*, 09(02), pp. 1-30. <https://asjp.cerist.dz/en/article/192508>
18. Mustapha, S. K. (2021). Sukuk on blockchain: a legal, regulatory and Sharia review. *ISRA International Journal of Islamic Finance*. https://www.researchgate.net/publication/348417787_A_Sukuk_on_blockchain_a_legal_regulatory_and_Shari'ah_review
19. Olaniyi, E. (2018). Blockchain Technology and the Financial Market: An Empirical Analysis . *School of Management & Social Sciences*, pp. 1-27. https://mpra.ub.uni-muenchen.de/99212/2/MPRA_paper_99212.pdf
20. Osama Hamza. (2020). Smart Sukuk Structure from Sharia Perspective and Financing Benefits: Proposed Application of Smart Sukuk through Blockchain Technology in Islamic Banks within Turkey. *European Journal of Islamic Finance*. <https://ojs.unito.it/index.php/EJIF/article/view/3983>
21. Peredaryenko, M. (2019). FinTech, Blockchain, and Islamic Finance – Building the Future in the New Islamic Digital Economy. *Emir Research*.
22. Rejeb, D. (2021). Smart Contract's Contributions to Mudaraba. *Tazkia Islamic Finance and Business Review*, 15(01), pp. 1-18. <https://doi.org/https://doi.org/10.30993/tifbr.v15i1.236>
23. Ripal, A., Zulfikar , H., Riyaldi, R., Suhendra, S., Hendra, A., & Hidayati, N. (2023). Analysis of Murabahah Financing Strategy in Increasing the Number of Members: A Case Study on BMT (Baitul Mal Wal Tanwil). *ADIJAYA*, 1(2), pp. 334–344. <https://e-journal.naurendigiton.com/index.php/jam/article/view/318>
24. Septiana, N. I., & Sanjayawati, H. (2021). Sukuk on Blockchain: Application, Advantages, and Challenges. *JHIBIZ*, 5(2). <https://ejournal.uniramalang.ac.id/index.php/jhibiz/article/download/855/585/3135>
25. Shrimali, B., & B. Patel , H. (2022). Blockchain state-of-the-art: architecture, use cases, consensus, challenges and opportunities. *Journal of King Saud University - Computer and Information Sciences*, 34(9), pp. 6793-6807. <https://doi.org/https://doi.org/10.1016/j.jksuci.2021.08.005>
26. Ummah, B. B. (2020). Variable Profit Rate Sukuk. https://cdn.prod.website-files.com/5fdcd636938bd7a36510d1c7/60129e9532abea6b20d11458_BMT%20Bina%20Ummah%20%20-%202020%20Q2%20Report.pdf

27. Wang, A. W. (2018). *Crypto Economy: How Blockchain, Cryptocurrency and Token Economy are Distrupting the Financial World*. United States of America: Racehorse Publishing.
28. WANG, H., LIU, J., & ZHAO, J. (2025). Blockchain Smart Contracts for Decentralized Matching of Counterparties and Automatic Settlement of Financial Derivatives. *Blockchain: Research and Applications*.
<https://doi.org/https://doi.org/10.1016/j.bcra.2025.100300>
29. Wu, B., & Tingting , D. (2018). The Application of Blockchain Technology in Financial markets. *Journal of Physics: Conference Series*, 1176(4).
<https://iopscience.iop.org/article/10.1088/1742-6596/1176/4/042094>