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THE ADVANTAGES AND CHALLENGES OF IMPLEMENTING SUKUK THROUGH BLOCKCHAIN TECHNOLOGY

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Abstrak: *Instrumen keuangan harus mampu beradaptasi dengan cepat di era 4.0. Salah satu inovasi keuangan Islam yang disoroti saat ini yaitu penerapan sukuk berbasis teknologi blockchain. Penelitian ini bertujuan untuk mengetahui secara spesifik keuntungan penerapan sukuk melalui teknologi blockchain dan menskalakan sudut pandang terkait tantangan-tatangan yang di hadapi dalam penerapan sukuk melalui teknologi blockchain. Penelitian ini menggunakan pendekatan kualitatif. Teknik pengumpulan data yang dilakukan yaitu studi pustaka dengan mengumpulkan data dari studi sebelumnya berupa dokumetasi artikel, jurnal ataupun buku serta data publikasi dari pihak lain. Teknik analisis data yang dilakukan yaitu reduksi data, penyajian data, dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa sukuk dapat memperoleh banyak manfaat dari teknologi blockchain. Meskipun blockchain memiliki kelebihan, namun ada sisi risiko dan tantangan yang perlu diselesaikan. Dalam menjawab tantangan ini, perlu adanya sinergi yang selaras di antara semua pemangku kepentingan, mulai dari cendekiawan Syari'ah, akademisi, hingga regulator dan industri.*

Kata kunci: *Sukuk, Blockchain, Smart Sukuk, Smart Contract, Cryptocurrency.*

Abstract: *Financial instruments must be able to adapt quickly in the 4.0 era. One of the Islamic financial innovations highlighted at this time is the application of blockchain technology-based sukuk. This study aims to determine specifically the advantages of applying sukuk through blockchain technology and to scale the point of view regarding the challenges faced in applying sukuk through blockchain technology. This research uses a qualitative approach. The data collection technique used is literature study by collecting data from previous studies in the form of documentation of articles, journals or books as well as publication data from other parties. The data analysis techniques used were data reduction, data presentation, and conclusion drawing. The results show that sukuk can get many benefits from blockchain technology. Although blockchain has its advantages, there are risks and challenges that need to be resolved. In responding to this challenge, it is necessary to have a harmonious synergy among all stakeholders, from Syari'ah scholars, academics, to regulators and industry.*

Keywords: *Sukuk, Blockchain, Smart Sukuk, Smart Contract, Cryptocurrency.*

Introduction

The Fourth Industrial Revolution, often known as Industry 4.0, is a technological shift that is altering the way things operate and interact in general.[1] The influence will be felt in the regulation and governance of all technology-enabled activities and transactions. Not only that, but technological innovation is fast transforming financial

[1] Klaus Schwab, "The Fourth Industrial Revolution: What It Means and How to Respond," *World Economic Forum*, last modified 2016, accessed April 7, 2021, https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/.

instruments, and integrating sukuk to blockchain is one of the areas being explored.[2]

The goal of using blockchain to explore sukuk is to find a solution to the issues of sukuk structure. The following are some of the most significant obstacles to increased market acceptance. First, the sukuk issuing documentation procedure is slower and less efficient than that of conventional bonds, resulting in greater expenses. Second, the Sharia ulama's judgement is crucial for any sukuk structuring procedure, and including Sharia judgements raises the cost of the procedure, Third, there is no standardization like in the traditional bond market, which slows down the structuring process, raises expenses, and restricts market spread. Fourth, internationally acknowledged Sharia norms are required so that diverse sukuk organizations may approach Sharia conflicts in a consistent manner. Lastly, I'll mention Other difficulties include tax treatment that differs from those of traditional bonds, credit rating requirements, and asset concerns throughout the transaction period.[3]

A number of parties are necessary in a traditional or conventional sukuk structure to facilitate appropriate asset transfer, preserve investor interests, and maintain compliance with relevant rules across all sukuk tenors. The following parties may be involved in the issuance of traditional sukuk: 1) Issuer, usually a special purpose vehicle (SPV), which issues sukuk and protects underlying assets for sukuk holders, 2) sukuk holders, who are sukuk owners, 3) Obligors,

[2] Blossom Finance, "Invest in Changing Lives Good Return: Great Impact," last modified 2019, accessed April 6, 2021, https://blossomfinance.com/.
[3] N Khan et al., "Tokenization of Sukuk: Ethereum Case Study," *Global Finance Journal* (2020), https://www.sciencedirect.com/science/article/pii/S1044028319303552.

who require funding and are responsible for paying sukuk holders / investors, 4) Sharia advisors, who guarantee that the sukuk structure is Shari'ah compliant, 5) Regulators, such as capital market approval authorities, 6) Legal advisors who guarantee that the structure is legal, 7) Investment banks, both individually and collectively, who operate as the primary regulator, rating adviser, and major manager, who guarantees and administers bids and advises the obligor, 8) Facility agent, who oversees the operational parts of the sukuk depository.[4] (see Figure 1).

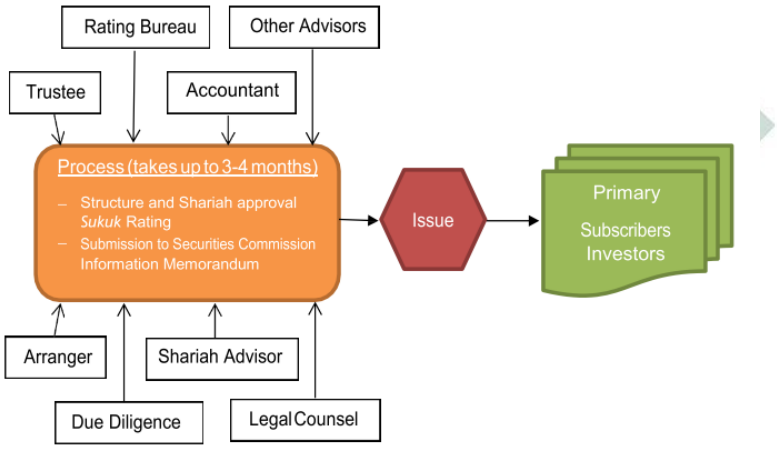

Figure 1
Process and Arrangement of Traditional Sukuk Issuance[5]

Meanwhile, the process of issuing sukuk using blockchain technology is far more simplified and straightforward.[6] The use of

[4] Comcec (2018) in Sherin Kunhibava et al., " Ṣukūk on Blockchain: A Legal, Regulatory and Sharī'ah Review ," *ISRA International Journal of Islamic Finance* ahead-of-p, no. ahead-of-print (2021).
[5] Mohamed (2019) in Ministry of Finance, *Blending Islamic Finance and Impact Investing for The SDGs* (Jakarta: Fiscal Policy Agency, Minister of Finance, The Republic of Indonesia, 2019).

blockchain-based sukuk, according to Zaka and Shaikh, can enable asset tracking, hence enhancing investor trust. Mohsin also presented the new Sukuk Wakaf model, emphasizing the usage of blockchain-based smart contracts to improve the efficiency and transparency of the waqf collecting process. Muneeza et al. found that because blockchain-based publication promotes efficiency and lowers costs, it can enable fundraisers on crowdfunding platforms to issue their own shares. The HSBC Center for Sustainable Finance, in collaboration with the Sustainable Digital Finance Alliance, released a report in which they conducted a study on blockchain-based bonds, including green bonds, issued by banks up to Q3 2019, with the results demonstrating efficiency and lower costs across all bonds.[7]

Thus, this article attempts to identify the advantages of implementing sukuk through blockchain technology and to scale the point of view regarding the challenges faced in the process of implementing sukuk through blockchain technology.

Literature Review

Sukuk

Sukuk, also known as sharia bonds, are long-term securities based on sharia principles that are issued by an issuer to sharia bond holders (sukuk) and require the issuer to pay income to the sharia bond

[6] Mohamed (2019) in ibid.
[7] Khan et al., "Tokenization of Sukuk: Ethereum Case Study."

holders in the form of profit sharing, margin, or fees, as well as repay the bond funds when the term expires.[8]

Sukuk differs from traditional bonds in two important ways. First, there's the contract, and and second, in terms of connectivity with the real sector. Depending on the transaction pattern utilized, the transactions that underpin the issuance of sukuk vary substantially each contract. Profit-sharing contracts like mudarabah and musharakah, buying and selling contracts like murabahah, salam, and istisna, and rental contracts like ijarah are among the sukuk contracts. Unlike traditional bonds, which are only based on the payment of interest, these bonds are based on the payment of both principal and interest.[9] Then there's an underlying transaction in the form of a certain number of assets that serves as the foundation for the issuance of the sukuk, and the most important thing is the existence of a Sharia-compliant agreement between various related parties that ensures that all transactions carried out in this financial instrument are free of prohibited items like Maysir, Gharar, and Riba.[10]

Sukuk are separated into two types in Indonesia, according on the issuer. The first is the State Sukuk, also known as State Sharia Securities, which is issued by the government (SBSN). The second type of sukuk is corporate sukuk, which is issued by the corporation itself as

[8] Dewan Syariah Nasional, *Fatwa DSN (Dewan Syariah Nasional) MUI No. 32/DSN-MUI/IX/2002 Tentang Obligasi Syariah (Sukuk).* (Jakarta: Majelis Ulama Indonesia, 2002).
[9] Irfan Syauqi Beik, "Memperkuat Peran Sukuk Negara Dalam Pembangunan Ekonomi Indonesia," *Jurnal Ekonomi Islam Al-Infaq* 2, no. 2 (2011): hlm 66.
[10] Miftahul Rahmawati and Hendri Tanjung, "Analisis Sukuk Negara Sebagai Alternatif Pembiayaan Anggaran Pendapatan Dan Belanja Negara," *An-Nisbah: Jurnal Ekonomi Syariah* 5, no. 1 (2018): 338–357.

the issuer. State Sharia Securities, or State Sukuk, are government securities issued on the basis of sharia principles as proof of involvement in SBSN assets, both in rupiah and international currencies.[11]

Blockchain Technology

Blockchain is peer-to-peer computer software that comprises a data base and operates as a global accounting ledger using a distributed system made up of "blocks" that are maintained by computer networks. In a vast network of all users, a peer is connected from one computer to another, and this network follows an agreed-upon protocol that is validated without the need of a central authority or third-party intermediaries.[12] Transactions, transaction records, and a method for verifying and storing transactions are the three main components of the blockchain. As a result, blockchain is made up of transaction records in a database system that work together as a public ledger, with the majority of the parties involved in the system verifying the history of every transaction carried out and disseminated on it. The blockchain notes are not intended to be modified or erased.[13]

Blockchain technology is frequently confused with digital currencies such as Bitcoin. In truth, blockchain is a distributed payment mechanism that is utilized in Bitcoin and other digital currency

[11] Pemerintah Republik Indonesia, *Undang-Undang Republik Indonesia Nomor.19 Tahun 2008 Tentang Surat Berharga Syariah Negara*, 2008.
[12] Darcy W. E. Allen, "Discovering and Developing the Blockchain Crypto-Economy," *SSRN Electronic Journal* (2017): 1–26.
[13] Kunhibava et al., " Ṣukūk on Blockchain: A Legal, Regulatory and Sharī'ah Review ."

transactions. It can also be used for other purposes.[14] From an Islamic legal standpoint, blockchain technology is permissible since it is a breakthrough online payment system that outperforms the banking industry's financial technology. This is not in opposition to Islam; in fact, Islam encourages the use of a future online payment system.[15]

Research Methods

This research uses a qualitative approach. The data collection technique used is literature study, by collecting library documentation from articles, journals or books as well as publication data from other parties that are the source for assessing the problems in this article.

The data analysis techniques used in this article are data reduction, data presentation, and conclusion drawing. These three data analysis processes will later sharpen the essence of this article and eliminate data that is not related to the problem formulation of the article, so that it will become a discussion that answers the problem formulations that underlie this article.

[14] Satoshi Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System," *www.bitcoin.org* (2008).
[15] Asep Zaenal Ausop and Elsa Silvia Nur Aulia, "Teknologi Cryptocurrency Bitcoin Untuk Investasi Dan Transaksi Bisnis Menurut Syariat Islam," *Jurnal Sosioteknologi* 17, no. 1 (2018).

Results and Discussion

SWOT Analysis on Blockchain Technology

Blockchain provides a number of advantages. Transparency: The blockchain's transaction records are all publicly available.[16] The way transactions are recorded and authenticated on the blockchain can also assist to protect the integrity of records.[17] Due to these benefits, blockchain has the potential to become a transparent innovation platform for e-commerce, particularly in the domains of finance, monetary, supply chain, stock on hand, financial books, and exchanges.[18] As a result of this transparency, blockchain may be used in a variety of industries, particularly finance, and its applicability is projected to expand.

Furthermore, by decreasing and eliminating middleman roles and exchange fees.[19] Blockchain can drastically lower transaction costs. Blockchain technology has the potential to significantly improve data processing efficiency. Companies in the financial services industry prefer this capability. Because of these benefits, financial institutions may save millions of dollars in operational expenses by permitting peer-to-peer transaction reconciliation and settlement. Blockchain eliminates the need for huge back-office processes by allowing transactions to be

[16] JaeShup Oh and Ilho Shong, "A Case Study on Business Model Innovations Using Blockchain: Focusing on Financial Institutions," *Asia Pacific Journal of Innovation and Entrepreneurship* 11, no. 3 (2017): 335–344.
[17] Victoria L Lemieux, "Blockchain Recordkeeping: A Swot Analysis," *Information Management* (2017).
[18] Hossein Ghanbary, "Combination SWOT-AHP Analysis for Using Blockchain in E-Commerce," *Journal of Economics and Administrative Sciences* 3, no. 1 (2021).
[19] Ibid.

created and completed quickly.[20] The blockchain also provides for the recording and storage of data changes, as well as the tracking and auditing of data through files.[21]

Another benefit of Blockchain is that it is a decentralized and peer-to-peer network. In this situation, the benefits of a decentralized and peer-to-peer network, such as distributed processing and distributed security, ensure that the blockchain is highly efficient, particularly for private and consortium kinds. Furthermore, because all transactions that are saved and mirrored across the blockchain system can be tracked, blockchain is effective in reducing the danger of crime. As a result, harmful behavior like financial fraud can be reduced, lowering risk across the system.[22]

Not only that, but blockchain can ensure that all sensitive data or data is kept private. Data hashing, strong and irreversible encryption, and the creation of private and public keys are all used to accomplish this.[23] As in cryptocurrencies, transactions that occur in cryptocurrencies are very secure with strong cryptographic functions. The transaction is protected by a secret signature, known as cryptography, which prevents forgery and duplicate issuance.[24] Furthermore, the problem of double spending can be solved by a blockchain ledger that records all transactions indefinitely.[25]

[20] Lemieux, "Blockchain Recordkeeping: A Swot Analysis."
[21] Ghanbary, "Combination SWOT-AHP Analysis for Using Blockchain in E-Commerce."
[22] Ibid.
[23] Ibid.
[24] Nakamoto, "Bitcoin: A Peer-to-Peer Electronic Cash System."
[25] Charles W. Evans, "Bitcoin in Islamic Banking and Finance," *Journal of Islamic Banking and Finance* 3, no. 1 (2015): 1–11.

Although blockchain has many advantages, it also has certain drawbacks, such as a lack of standards. Aside from the extensive network that already exists, there is no uniform standard for blockchain applications. Standardization can help cut expenses, improve consensus methods, and bring interoperability to the table (between networks and blockchain chains).[26] As a result, blockchain technology is still in its early stages, and standards for transactions are currently being developed throughout the world.[27] Furthermore, because the regulatory position of blockchain is unknown, Blockchain and Bitcoin will encounter challenges in gaining greater acceptance by current financial institutions if the future regulatory position of blockchain remained unclear.[28]

The next weakness is the issue of application integration; Blockchain solutions need large adjustments or whole system replacement. Companies must develop a new strategy in order to make the changeover.[29] Furthermore, there is a disadvantage to complexity. Although blockchain offers both promise and benefits, industry participants may find the technology's sophisticated characteristics, such as the encryption principles and distributed ledger underpinning it, challenging to comprehend. As a result, developing a blockchain

[26] Ghanbary, "Combination SWOT-AHP Analysis for Using Blockchain in E-Commerce."
[27] Thien Vu Tran and Hue Hong Hoang Trinh, "Blockchain Technology for Sustainable Supply Chains of Agri-Food in Vietnam: A SWOT Analysis," *Science & Technology Development Journal - Economics - Law and Management* 5, no. 1 (2021): first.
[28] M. Niranjanamurthy, B. N. Nithya, and S. Jagannatha, "Analysis of Blockchain Technology: Pros, Cons and SWOT," *Cluster Computing* 22, no. 2 (2019): 14743–14757, https://doi.org/10.1007/s10586-018-2387-5.
[29] Ibid.

application necessitates a unique combination of skills that not every sector is willing to invest in.[30]

Another problem is that users may lose all of their data if their ID is lost. What happens if a user forgets his personal login data needed to obtain access to his own account? This is a concern that continues to be asked about blockchain technology. In this event, the user's account will be permanently deleted, together with all of the user's settings, information, and assets.[31] Furthermore, when a private key is hacked or stolen, there is no universal remedy.[32] Therefore, it is still urgently needed to develop future innovations for this blockchain technology.

Regardless of its strengths and drawbacks, blockchain technology offers both opportunities and threats. For example, improving system security is one of the opportunities. Blockchain is naturally more safe than many other storage systems since it is built on encryption. Furthermore, this data is dispersed, and no one has complete control over the database. Data can't be erased at random, and it won't be accessible to anybody who isn't allowed to see it.[33] Additionally, blockchain provides organizations and end users with efficiency benefits

[30] Urenna Nwagwu, "A SWOT Analysis on the Use of Blockchain in Supply Chains," 2020, https://soar.wichita.edu/handle/10057/18846.
[31] A. Vilkov and G. Tian, "Blockchain as a Solution to the Problem of Illegal Timber Trade between Russia and China: SWOT Analysis," *International Forestry Review* 21, no. 3 (2019): 385–400.
[32] Oh and Shong, "A Case Study on Business Model Innovations Using Blockchain: Focusing on Financial Institutions."
[33] Ghanbary, "Combination SWOT-AHP Analysis for Using Blockchain in E-Commerce."

(including cost savings), as well as the mechanisms that underpin smart contracts and provide smart audit capabilities.[34]

Another advantage of using Blockchain technology is that it allows you to raise money from a big number of people via software. Furthermore, blockchain enables organizations to trade across national borders, ensuring real-time information. A highly complicated business will profit the most from blockchain, since it streamlines international transaction chains.[35] In terms of economic virtualization, the usage of digital technologies such as blockchain will give a long-term competitive edge for corporate development. The capacity to extend operational tools as well as the construction of new services in the future is a competitive advantage of blockchain technology. The global financial services sector is expected to become extremely competitive.[36]

Furthermore, blockchain technology has the potential to help small and medium businesses grow. The trend of developing small and medium businesses will be determined by the creation of new blockchain-related firms. Companies may use cryptocurrency mining to produce their own coin that may be linked to certain items. Furthermore, blockchain technology has the ability to create new professions, positions that demand advanced talents and need knowledge of

[34] Advait Deshpande et al., "Distributed Ledger Technologies/Blockchain: Challenges, Opportunities and the Prospects for Standards," *British Standards Institution*, no. May (2017), https://www.rand.org/pubs/external_publications/EP67133.html.
[35] Nwagwu, "A SWOT Analysis on the Use of Blockchain in Supply Chains."
[36] Vovchenko et al, 2017 in Mohamad Osmani et al., "Blockchain for next Generation Services in Banking and Finance: Cost, Benefit, Risk and Opportunity Analysis," *Journal of Enterprise Information Management* (2020).

blockchain technology or specialized business fields via smart contracts.[37]

When it comes to threats, blockchain is also vulnerable to environmental regulations, since the prospect of global warming has prompted a renewed focus on ecologically beneficial conduct. Large blockchain networks require a lot of power, which is highly expensive. The bitcoin network currently consumes more energy than the majority of countries on the planet. The energy load will be considered more than ever as the use of blockchain grows. There may be a lot of pushback to this large-scale energy usage if new energy sources are not found to power blockchain-based programs.[38]

Furthermore, although blockchain provides several advantages for businesses, cryptocurrencies may be hijacked by miners or other individuals with the greatest authority over the network. The use of cryptocurrencies can potentially lead to severe price volatility and asset manipulation. Where the movement of traded currencies is influenced not only by the supply and demand connection, but also by trading that is driven by emotional investors.[39]

Another threat is that blockchains might become disruptors, revolutionizing every sector. The implementation of this technology has been seen to have a substantial impact on how the market works or how the industry functions. The introduction of Blockchain will alter how

[37] Vilkov and Tian, "Blockchain as a Solution to the Problem of Illegal Timber Trade between Russia and China: SWOT Analysis."
[38] Katalyse.io, 2018 in Ghanbary, "Combination SWOT-AHP Analysis for Using Blockchain in E-Commerce."
[39] Nwagwu, "A SWOT Analysis on the Use of Blockchain in Supply Chains."

businesses operate and will have a negative impact on those that refuse to accept it.[40]

Application of Sukuk through Blockchain Technology; SmartSukuk by Blossom Finance.

Sukuk blockchain is a novel idea in today's society, and Smart Sukuk is one of the platforms that offers sukuk issuance using blockchain technology. Blossom Finance's Smart Sukuk is a blockchain-based sukuk issuing platform.[41] The smart Sukuk issued by Blossom Finance in Indonesia is one of the first developments in this area, and this platform is regarded to be one of the greatest blockchain applications in the field of Islamic Finance.[42] This sukuk reflects two emerging trends in the Islamic capital market: digital innovation and a rising focus on social impact finance.

Furthermore, this platform is the first blockchain-based sukuk to support socially beneficial enterprises. The SmartSukuk on this platform is based on an Ethereum "Smart Contract," which is essentially a blockchain-based computer program. Smart contracts control all data, assignments, computations, and payments linked to sukuk, leaving an indelible audit trail at every stage.[43]

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[40] Ibid.

[41] Blossom Finance, "World's First Primary Sukuk Issuance on Blockchain Closes," *Https://Blossomfinance.Com/*, last modified 2019, accessed April 6, 2021, https://blossomfinance.com/posts/worlds-first-primary-sukuk-issuance-on-blockchain-closes.

[42] Babas Mounira, "Blockchain Technology Applications in the Islamic Financial Industry -The Smart Sukuk of Blossom Finance's Platform in Indonesia Model-," *Economic Sciences, Management and Commercial Sciences Review* 13, no. 2 (2020): 309–325.

[43] Blossom Finance, "World's First Primary Sukuk Issuance on Blockchain Closes."

Blossom Finance has created two blockchain contract methods for its sukuk.[44] The funds are gathered and invested in the venture capital business "PBMT Social Ventures" as the sukuk issuer, the first sukuk, namely the sukuk mudarabah, which is developed based on the profit sharing concept. The issuer contributes to a microfinance cooperative that provides loans to small companies such as farms and neighborhood groceries. The money created by deposited-funded activities is distributed among investors. PMBT has a sharia review board that regulates mudarabah agreements and funding as a regulated body under the Indonesian Financial Services Authority.[45]

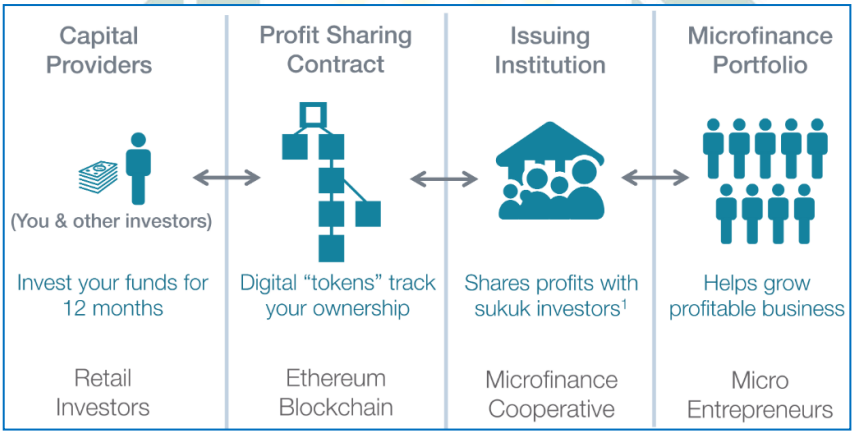

Figure 2.
Issuance of Smart Sukuk through Blossom Finance[46]

[44] Ricard Whitehead, "Islamic Microfinance Start-up Sets up Sukuk on Blockchain, Targets SMEs, Social Impact Projects," *Salaam Gateway - Global Islamic Economy Gateway*, last modified 2018, accessed April 6, 2021, https://www.salaamgateway.com/story/islamic-microfinance-start-up-sets-up-sukuk-on-blockchain-targets-smes-social-impact-projects.
[45] Blossom Finance, "Invest in Changing Lives Good Return: Great Impact."
[46] Mathew J.Martin, "Halal & Ethical Investments Using Sukuk, Good Returns, Great Impact," *Blossom Finance*, accessed April 6, 2021, https://docsend.com/view/j7jczhp.

The second sukuk is structured as sukuk al-istisnaʿ wa al-ijarah or asset-based rental sukuk. However, even though the technology is ready, no funds have yet been mobilized for the sukuk. Blossom Finance is said to be evaluating candidates for a second sukuk issuer, which will be used to fund projects such as the construction of hospitals. Upon completion, the hospital and its facilities will be rented out and the profits will be distributed to investors.[47]

In general, blockchain technology offers several advantages, including being more transparent, indestructible, decentralized, resilient, irreversible, efficient, and lowering transaction costs, thanks to its digital ledger. All of these benefits can make transactions more convenient and so contribute to Maslahah's welfare. Furthermore, the digital ledger in the "smart contract" is meant to defend against fraud, which is one of the Maqasid's five pillars. Al-sharia (the goal of sharia), which is to defend Al-Mal (property).[48]

Advantages of Implementing Sukuk through Blockchain Technology

The advantage of implementing sukuk on blockchain is the Comparison of Issuance costs. When comparing the cost of issuing conventional sukuk to the cost of tokenizing sukuk via blockchain on Ethereum, it is clear that tokenization of sukuk via blockchain on Ethereum saves money.[49] Blockchain technology, as discussed in the

[47] Blossom Finance, "Invest in Changing Lives Good Return: Great Impact."
[48] Osama Hamza, "Smart Sukuk Structure from Sharia Perspective and Financing Benefits: Proposed Application of Smart Sukuk through Blockchain Technology in Islamic Banks within Turkey," *EJIF – European Journal of Islamic Finance* (2020): 1–8, https://www.ojs.unito.it/index.php/EJIF/article/view/3983.
[49] Khan et al., "Tokenization of Sukuk: Ethereum Case Study."

SWOT analysis, can lower transaction costs by reducing or eliminating the role of middlemen and exchange fees. Financial services firms may benefit from this capability.

Furthermore, blockchain technology has the potential to significantly improve information processing efficiency. Blockchain makes clearing and settlement procedures more efficient by ensuring automatic delivery and payment methods without the need for a central authority. This considerably reduces the risk of a settlement.[50] Institutions can save tens of thousands of dollars in back office and operational expenditures thanks to blockchain. Blockchain can significantly reduce expenses, especially when it comes to settlements, which may be reduced by more than 99 percent. Counterparty risk is further reduced because settlement takes place in real time.[51]

Another advantage is the comparatively low cost of developing a blockchain system and its long-term applicability, which allows transactions to be made not only faster but also cheaper. Furthermore, system availability among network members is guaranteed 24 hours a day, seven days a week, ensuring seamless and simple synchronization in its architecture. Finally, the system's transactions are visible, traceable, and auditable. This enables a single record presentation to have a seamless influence on the audit process, allowing regulators to more easily watch and interfere only when necessary. It can also make

[50] Jonathan Chiu and Thorsten V. Koeppl, "Blockchain-Based Settlement for Asset Trading," *Review of Financial Studies* 32, no. 5 (2019): 1716–1753.
[51] Jibrel, "Sukuk Bonds on the Blockchain.," *Medium.Com*, last modified 2019, accessed May 24, 2021, https://medium.com/jibrel-network/sukuk-bonds-on-the-blockchain-9b5bf02778d0.

underlying assets and cash flows more transparent.[52] Blockchain can increase investor confidence in decision making, given the amount of information provided and transparency.

Furthermore, when sukuk is issued using blockchain technology, the letters provided to sukuk holders or investors are distributed as tokens (crypto) that represent a piece of or ownership in the underlying asset, as well as dividend payments or profit sharing. Due diligence and KYC verification can be identified using blockchain technology, sukuk ratings based on issuers can be done using an automated market value technique, and asset evaluations can be done using an automated market valuation approach, Sharia compliance and assessment can be reviewed automatically based on AI and legal provisions and dividend allocation (payments) can be made through smart contracts.[53]

Challenges of Implementing Sukuk through Blockchain Technology

Regulatory challenges

Capital market products cannot be released without the consent of regulatory authorities. The securities commission of each nation is the sukuk market's regulatory authority, particularly the capital market's regulator. One of the key reasons that regulators must oversee capital markets is to guarantee that investors are protected and that market activity is controlled in a fair and ethical way.

One of the peculiarities of the sukuk blockchain is that it is part of a decentralized issuance process, which raises regulatory concerns. It

[52] Murugiah, 2018 Kunhibava et al., " Ṣukūk on Blockchain: A Legal, Regulatory and Sharī'ah Review ."

[53] Mohamed (2019) in Ministry of Finance, *Blending Islamic Finance and Impact Investing for The SDGs*.

is feasible to break some of the present consumer protection requirements in the capital markets if there is no single regulatory authority to regulate all parts of issue.[54] The important point to remember is that the sukuk blockchain may also fail, and there is still a danger of default. As a result, the regulatory authority is critical to the success of this sukuk blockchain initiative.

Shariʾah challenges

A qualified Shariah adviser or Sharia committee is necessary to support a structure that conforms with applicable Sharia requirements, as is necessary in other Islamic financial instruments, to guarantee that the sukuk is a Shariah compliant product.[55] Considering Shari'ah adherence to its structure is highly crucial for the validity of all sukuk, the same standards must be observed when sukuk are built on blockchain technology.

Unlike traditional bonds simply requires a single blockchain-based structure for all issuances, independent of the issuance reason. The debtor and creditor have the same relationship as the issuer and bondholder. As a result, the structure will be consistent across all sorts of publication. However, in the sukuk structure depending on the type of underlying sharia contract, the steps involved must be different for each type of contract and their variations.[56] As a reason, a Shari'ah adviser or

[54] Mashiyat Tasnia, Muhammad Mustapha, and Mohammad Hassan, "Critical Assessment of the Legal Recourse for the Case of Sukuk Default for the Asset-Backed Sukuk and Asset-Based Sukuk Structures," *European Journal of Islamic Finance*, no. 7 (2017).
[55] Securities Commission Malaysia, *Capital Market Architecture Blueprint in a Decentralised World*, 2018.
[56] Bouheraoua et al, 2012 Kunhibava et al., " Ṣukūk on Blockchain: A Legal, Regulatory and Sharī'ah Review ."

Sharia committee must be present at every stage of sukuk issuance, including blockchain-based sukuk.[57] As a result, unlike blockchain bonds, the sukuk blockchain still requires Shari'ah committee approval. This indicates that financial expenditures in sharia advising services cannot be avoided in blockchain-based sukuk since the lack of a sharia adviser introduces the danger of sharia non-compliance.

In addition, the issue of sharia regarding the use of cryptocurrency is still being debated and there are many differences of opinion. In Islamic finance, sharia compliance with digital currencies is an issue that has not been unanimously resolved among jurists or scholars. While most legal experts do not provide the legality or validity of digital currency, others also have the opposite viewpoint.[58]

Conclusion

The Islamic capital market and sukuk have benefited from blockchain technology, which has enabled creative advances in financial intermediation. When combining modern technology with sukuk goods, however, caution must be used to avoid legal, regulatory, and sharia problems, among other dangers. In the previous section of this article, we discussed how blockchain technology might improve sukuk. Despite the benefits of blockchain, there are dangers and issues with blockchain-based sukuk that must be addressed. In this case, harmonic linkages must be developed among all parties, from Shari'ah scholars and

[57] Securities Commission Malaysia, *Capital Market Architecture Blueprint in a Decentralised World*.
[58] Abubakar et al, 2018 in Kunhibava et al., " Ṣukūk on Blockchain: A Legal, Regulatory and Sharī'ah Review ."

academics to regulators and industry, in order to produce Islamic financial products and assure their long-term relevance.

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