Asset Tokenization in Islamic Finance Historical Perspectives, Sukuk Innovations, and the Shariah Compliant Blockchain

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ABSTRACT
This research article explores the evolving landscape of asset tokenization within the framework of Islamic finance, emphasizing its historical background, key concepts, and implications for the financial ecosystem. It begins with an analysis of financial disintermediation and transaction costs, tracing the emergence of Shariah-compliant blockchain technologies in the global Islamic fintech sector. The study then delves into the intricacies of Sukuk, focusing on traditional Islamic finance principles such as Al-Shuftaza (exchange), Al-Hawalah (transfer), and Al-Kafalah (custodianship), while also examining innovative structures like smart Sukuk and their issuance processes on blockchain platforms.
Further, the article categorizes the nature and classification of tokens, discussing their benefits and the Shariah guidelines that govern smart contracts and token compliance. It also addresses the social challenges and potential impacts of asset tokenization on stock markets, particularly in relation to Islamic finance. The research culminates in a series of recommendations aimed at enhancing the integration of asset tokenization within Shariah-compliant frameworks, fostering financial inclusion, and ensuring ethical investment practices. This comprehensive analysis serves as a foundation for understanding the transformative potential of asset tokenization in promoting sustainable and equitable economic growth in the Islamic financial sector.
Keywords: Islamic Fintech, Asset Tokenization, Islamic Finance, Sukuk Innovations, Shariah-Compliant Blockchain Revolution

Importance and Historical Background

Islamic Fintech is revolutionizing the financial industry by harnessing the power of technology and Islamic ethics to promote greater financial accessibility, economic growth, and innovative, transparent financial solutions that align with Shariah principles. By combining cutting-edge technology with the timeless values of Islam, Islamic Fintech is poised to bring about a more inclusive and equitable financial landscape.

Stock markets play a vital role in facilitating the flow of capital and liquidity, essential components for fostering economic expansion and stability. By providing a platform for buying and selling securities, stock markets enable the efficient allocation of resources, supporting businesses, innovation, and ultimately, economic prosperity.

Smart contracts enable secure and transparent transactions, creating an indelible record of ownership and assets. These transactions are permanent and traceable, ensuring a high level of accountability. the adoption of smart contracts can significantly reduce costs associated with financial contracts and services by up to 95%, potentially transforming the Islamic Banking sector and increasing its efficiency.[1] Asset tokenization is the process of representing ownership of an asset as a digital token on a blockchain or distributed ledger. This allows for the creation of a digital representation of ownership that can be stored, transferred, and traded electronically.

The concept of Financial Disintermediation

To understand financial disintermediation, we first need to grasp the concept of financial intermediation. Financial intermediation involves the transfer of funds from those who have excess capital to those who need it for production or consumption. This process is facilitated by financial intermediaries, such as banks, which collect savings from surplus units and lend them to deficit units. Financial intermediation is a relatively modern industry, with its roots in the western world dating back about three centuries.[2]

Financial intermediaries, such as banks, insurance firms, and investment bankers, serve as a conduit between those who supply and those who utilize financial resources. They are vital to the economy, as they convert modest, low-risk, and easily accessible deposits into substantial, high-risk, and less liquid loans, addressing the varying requirements of borrowers and lenders. This function is crucial for fostering investment, innovation, and entrepreneurship by directing funds from savers to individuals who can deploy them effectively.

Islamic financial institutions differ from conventional ones in how they source and use customer deposits, though the basic intermediation process remains similar. In Islamic banking, savings deposits are accepted based on Wakalah (agency) and Mudaraba (profit sharing and loss bearing) principles, while demand deposits are held under principles of custody and safe keeping.

On the other hand, traditional banks obtain their deposits mainly through lending and holding arrangements. When it comes to generating assets from these deposits, Islamic banks employ financing methods based on sales, leases, and partnerships. In contrast, conventional banks typically rely on interest-bearing loan agreements to create their assets.

Transaction costs

Transaction costs in financial intermediation include search costs, verification costs, monitoring costs, and enforcement costs. These costs are incurred by the transacting parties in various stages: searching for a suitable counterparty, verifying the accuracy of information, monitoring the borrower's activities and ensuring compliance with the contract, and enforcing the contract or recovering debts in case of default.

Financial intermediation plays a crucial role in the economy by connecting entities with surplus resources to those in need of funds. Individual savers often prefer low-risk investments due to high monitoring costs, liquidity issues, and price risks associated with direct investments like purchasing securities. Financial intermediaries, such as banks, help reduce these costs and risks by leveraging their systems, expertise, and economies of scale. They can offer specialized services, such as advisory services, and are equipped to monitor creditworthiness and payment remittances effectively. This specialization allows them to avoid redundant screening processes and reduce the overall cost of financial transactions.

By pooling resources and providing liquidity, financial intermediaries facilitate investment and economic growth. They help mobilize resources, monitor performance, and resolve conflicts among different parties, offering an efficient alternative to individual financial transactions.[3]

Financial disintermediation

Financial disintermediation refers to the process by which investors, entrepreneurs, and consumers access finance directly, bypassing traditional financial intermediaries like banks. This concept, often described as "cutting out the middleman," aims to provide cheaper financial services. Financial disintermediation emerged in the United States during the 1960s.[4]

Disintermediation is becoming increasingly prevalent in the modern economy, especially with the growth of the digital age and the internet. These technological advances are reducing the role and prominence of traditional financial intermediaries. Today, investors can trade online without the need for brokers, accessing financial services more conveniently and cost-effectively.

In Europe, banks traditionally provided around 80% of corporate funding through loans, with the remaining 20% sourced from capital markets, such as bonds. In contrast, in the United States, 80% of corporate funding comes from capital markets, with only 20% provided by banks. Since the 2008 financial crisis, there has been a noticeable shift in some banking systems, such as in the Euro Zone, away from bank-based financing towards financial disintermediation.[5]

Blockchain technology aims to enhance global trust and transparency in financial transactions by leveraging digital currencies to detect fraud and funding for terrorism. Efforts are underway to develop Shariah-compliant

crypto assets for use in Islamic finance, while smart contracts are being employed to automate legal and regulatory processes. Additionally, blockchain is being used to innovate fund management and zakat collection, including creating digital systems to ensure accurate distribution and classification of zakat funds.

The Global Rise of Shariah-Compliant Blockchain in Islamic Fintech

Islamic fintech companies are rapidly adopting blockchain technology to enhance their operations and improve customer experience. HADA DBank, a Malaysian digital bank, has successfully integrated blockchain with Islamic banking principles, ensuring transparency, speed, and security in transactions.[6]

Emirates Islamic, a leading Islamic financial institution in the UAE, has introduced blockchain-based cheques (called "Cheque Chain") to prevent fraud. Al Rajhi Bank, has successfully completed a cross-border money transfer using Ripple blockchain technology.[7]

The Saudi Arabian Monetary Authority (SAMA) has launched a pilot program using Ripple to enhance payments infrastructure in the country. .[8]

The International Federation of Red Cross and Red Crescent Societies (IFRC) has prepared blockchain application to track humanitarian aid contributions.[9]

HelloGold, a Kuala Lumpur-based company, has launched a Shariah-compliant gold-backed cryptocurrency (GOLDX). The Islamic Development Bank's research arm, the Islamic Research and Training Institute (IRTI), is exploring blockchain technology to develop Shariah-compliant products and promote financial inclusion.[10]

These innovations demonstrate the potential of blockchain technology in Islamic finance, enhancing transparency, efficiency, and security in various aspects of the industry.

Sukuk

“Sukuk is a Shariah-compliant financing structure based on profit sharing or asset ownership, securitized and tradable on secondary markets”. Islamic finance prohibits interest payments on loans and debt sales, making sukuk a popular alternative for governments and institutions.

Various sukuk structures exist, which are based on Shariah-compliant contracts such as profit sharing, deferred purchase, asset lease, joint venture, project-based, and Murabaha (cost-plus asset) purchase. Each structure suits different institutional needs.

The operation of an Islamic crypto-asset model is fundamentally based on Shariah principles and involves the use of "issuer coins or tokens" or an "exchange platform" through Shariah-compliant blockchain technology. The primary mode of operation is through a decentralized

trading platform, facilitating direct (one-to-one) buying and selling transactions (Bai' wa al-Shira').

In addition to direct trading, the model can also operate through an exchange platform using a Shariah hybrid mechanism. This hybrid mechanism is facilitated by various Islamic legal doctrines, and is generally based on the following classical Fiqh concept

1. **Al-Shuftaza (Exchange):** Facilitates the exchange of currencies or assets in a Shariah-compliant manner.
2. **Al-Hawalah (Transfer):** Involves transferring funds or obligations from one party to another.
3. **Al-Kafalah (Custodianship):** Ensures a guarantor or custodian is responsible for overseeing transactions.
4. **Al-Amanah (Trust):** Emphasizes the importance of trust and honesty in managing assets.
5. **Al-Wakalah (Agency by Commission):** Allows a representative or agent to act on behalf of another party.
6. **Al-Ju'alah (Reward for Services):** Provides compensation for services rendered.
7. **Al-Ujrah (Service Charge):** Permits charging a fee for services provided within the Shariah framework.[11]

These mechanisms ensure that all transactions and operations are conducted within the ethical and legal boundaries of Islamic finance, thereby maintaining the integrity and compliance of the Islamic crypto-asset model.

In case of default, sukuk holders retain ownership of an asset, unlike bond holders who are left with bad debt. Sukuk ownership represents fractional ownership in the underlying asset or structure.

Smart Sukuk

Smart Sukuk is a revolutionary structure for future sukuk issuances, leveraging blockchain technology and Financial Technology Enhancement. It offers a promising solution for Islamic fundraising, particularly for infrastructure and business developments.

Smart Sukuk differs from conventional sukuk in its features, making it more efficient, transparent, and cost-effective. It enables small and medium enterprises, social impact projects, groups, and associations to issue their own sukuk, democratizing access to Islamic fundraising.

Blossom Finance introduced the world's first Smart Sukuk, utilizing Ethereum blockchain smart contracts to enhance efficiency and global acceptability. This innovation standardizes and automates accounting, legal, and overhead payments, backed by a licensed legal entity in the issuing country.[12]

Sukuk and Block chain technology

Sukūk, also known as Islamic bonds, are financial instruments that comply with Islamic law (Sharīʾah). They represent ownership in tangible

assets, services, or projects, and are governed by Sharīʾah principles, including the prohibition of riba (interest).

The Accounting and Auditing Organization for Islamic Financial Institutions AAOIFI defines _it in the Sharīʾah standards in following words:

"certificates of equal value representing undivided shares in the ownership of tangible assets,usufructs and services or (in the ownership of) the assets of particular projects or special investment activity"[13]

Sukuk, which are financial and investment instruments, can be issued by a range of entities including national governments, multilateral development agencies, multinational corporations, and other corporate bodies. Their popularity has surged both domestically and internationally, and they are used worldwide to finance various public and private projects. Sovereign sukuk are issued by national governments, while corporate sukuk are released by either state-owned or private corporations. Multilateral organizations issue what are known as supranational sukuk. Additionally, within federations, individual state governments issue sukuk referred to as sub-sovereign sukuk.Sukūk have been in existence since the classical Islamic era and have evolved over time. The first modern sukūk was issued in 1990, and since then, they have grown in popularity as a financing instrument for sovereigns and large entities.[14]

However, sukūk issuance is a complex and expensive process, limiting its accessibility. The emergence of blockchain technology offers a potential solution to simplify and reduce the costs of sukūk issuance. Blockchain-based sukūk have the potential to increase transparency, efficiency, and affordability, but face legal, regulatory, and Sharīʾah challenges.

Sukuk on Blockchain Issuance Process

The sukuk issuance process involves several key participants, including the issuer, sukuk holders, obligor, Shariah advisors, regulator, legal advisors, investment bank, and facility agent. To start, the issuer establishes a special purpose vehicle (SPV) that acquires an asset from the obligor and leases it back to them for a specified period. The SPV then issues sukuk (trust certificates) to investors, representing their ownership rights in the asset and lease. Investors purchase these trust certificates, and the proceeds are transferred to the obligor through the SPV. The obligor makes regular lease payments to the SPV, which then distributes the profits to the investors. At maturity, the SPV sells the asset back to the obligor and redeems the sukuk.

Blockchain technology can also be employed in sukuk issuance, where the trust certificates are issued as crypto tokens representing investors' shares in the asset or dividend payments. Blockchain, a decentralized ledger system, records transactions across multiple computers using distributed ledger technology (DLT), cryptography, and smart contracts. Smart contracts

autonomously execute agreements stored on the blockchain, ensuring that transactions are both secure and transparent.

In the blockchainized version of sukuk issuance, the process is similar, but with the added security and transparency of blockchain technology. The SPV creates a blockchain-based platform to issue sukuk tokens to investors, representing their ownership in the underlying asset. The tokens are stored on a digital wallet and can be traded on a cryptocurrency exchange. The smart contracts execute the agreements automatically, ensuring that the terms of the sukuk are enforced. The use of blockchain technology in sukuk issuance offers several benefits, including increased security, transparency, and efficiency.[15]

Tokens

In a specific ecosystem, a token serves as a digital representation of a particular asset, concept, or utility. It can symbolize value, ownership, voting power, or a variety of other possibilities. Tokens are often created to serve a specific purpose within a distributed ledger technology framework. While tokens can assume multiple roles within their native ecosystem, they typically operate on top of established smart contract platforms like Ethereum. Tokens can be categorized in various ways, and one such categorization is as follows:[16]"

Asset tokenization, a innovative financial technology, has the potential to align with the principles of Islamic finance to a significant extent. However, the compliance of asset tokenization with Islamic finance principles depends on various factors, including the specific asset class, tokenization structure, and jurisdiction.

Firstly, the prohibition of interest (riba) is a fundamental principle of Islamic finance. Asset tokenization can avoid riba by utilizing profit-sharing models or rent-based income generation, rather than interest-based returns. This ensures that investors earn profits through legitimate means, without exploiting others.

Secondly, tangible asset backing is a crucial aspect of Islamic finance. Tokenized assets are typically backed by tangible assets, such as real estate, commodities, or other physical assets, which aligns with Islamic finance's emphasis on asset-backed transactions. This provides a sense of security and stability for investors.

In Islamic crypto-asset management, it is essential to have a valuable backing asset with legitimate proof, such as proof of product, asset, property, or commodity (POP), that is at least equivalent in value to the Initial Coin Offering (ICO). This backing asset serves to support the entire operation. The primary goal of this requirement is to establish and maintain legitimate confidence in the market and among market participants. By ensuring that the ICO is backed by tangible, verified assets, it provides assurance of the asset's value and stability, thereby enhancing trust and credibility in the market.

Thirdly, transparency is a key principle of Islamic finance. Blockchain-based tokenization ensures transparency, as all transactions and asset ownership are recorded on a public ledger, visible to all stakeholders. This transparency builds trust and ensures accountability.

Fourthly, risk-sharing is a fundamental principle of Islamic finance. Tokenization can facilitate risk-sharing among investors, which is a key principle of Islamic finance. By sharing risks, investors can reduce their individual burdens and work together to achieve common goals.

Lastly, compliance with Shariah guidelines is essential for asset tokenization to align with Islamic finance principles. Tokenization structures can be designed to comply with Shariah guidelines, such as using Shariah-compliant smart contracts and ensuring fairness and equity in transactions. This requires consultation with Shariah scholars and experts to ensure that the tokenization process adheres to Islamic finance principles.

Nature and Classification of Tokens

Asset Classification

Tokens can represent various types of assets, each carrying different implications under Shariah law. The primary categories include:

1. **Currencies:** When tokens are treated as digital currencies, they must comply with Islamic rules concerning money. This includes avoiding riba (usury), which prohibits earning interest. Additionally, transactions involving these tokens should ensure a fair and equal exchange of value, adhering to principles of fairness and equity.
2. **Securities:** Tokens that represent ownership stakes in companies, debts, or other financial instruments are subject to Islamic finance principles. This means investments must avoid haram (prohibited) activities, such as gambling, alcohol, and other unethical industries. Moreover, the businesses or projects funded by these tokens must be Shariah-compliant, meaning they operate within ethical and legal boundaries set by Islamic law.
3. **Commodities:** Tokens representing physical goods, such as gold or real estate, must ensure that the transactions are free from excessive speculation and uncertainty (gharar). These trades should involve tangible assets or clearly defined services and comply with Islamic contract laws, which emphasize clarity, fairness, and transparency.
4. **Utility Tokens:** These tokens grant access to specific services or products and are not typically considered investments. However, their use must still conform to Shariah principles. This means ensuring that the services or products provided do not involve or support haram activities and that the business practices are ethical and lawful according to Islamic standards.

Thus, Tokenization can apply to a wide range of assets, including:

1. Financial assets: stocks, bonds, funds, and other securities

2. Real estate: property ownership and rights
3. Art and collectibles: unique digital representations of ownership
4. Commodities: gold, oil, and other physical assets
5. Intellectual property: patents, copyrights, and trademarks

Tokens may be divided into following as well

1. **WorkTokens**
   Work tokens grant their holders the ability to participate in, govern, and/or perform tasks on a blockchain. For example, Maker (MKR) tokens enable holders to govern the organization responsible for maintaining the stability of its associated coin, DAI.
2. **UtilityTokens**
   Utility tokens provide access to services or units of services, functioning similarly to API keys that unlock and enable the use of a specific service.
3. **Asset-BackedTokens**
   Asset-backed tokens represent a claim on a tangible asset. To redeem the asset, the token must be returned to the issuer.
4. **RevenueTokens**
   Revenue tokens are issued with the promise of sharing in future revenues, though companies are generally not legally obligated to fulfill these promises.
5. **EquityTokens**
   Equity tokens are intended to represent ownership in the issuing company, offering holders voting rights, a share in future dividends, and a stake in the project's success.
6. **Buy-BackTokens**
   Buy-back tokens are issued with a commitment to repurchase and burn the tokens once the company achieves sustainable revenue, aiming to enhance the token's value over time.[17]

Benefits of Tokenization

Tokenization offers several benefits, including:

1. Increased liquidity: Tokenized assets can be easily bought and sold on digital marketplaces.
2. Fractional ownership: Tokenization allows for the ownership of a fraction of an asset, making it more accessible to a wider range of investors.
3. Reduced costs: Tokenization can reduce the need for intermediaries and streamline the ownership transfer process.
4. Increased security: Blockchain technology provides a secure and transparent record of ownership.

Overall, asset tokenization has the potential to revolutionize the way we own and transfer assets, making it more efficient, accessible, and secure.

Shariah Guidelines for Smart contract

To guarantee Shariah compliance in sukuk issuance, issuers must engage a qualified Shariah advisor to review the blockchain algorithm and

programming. This ensures that the smart contract aligns with the underlying Shariah contracts' requirements (Kunhibava et al., 2021). For instance, in a mudaraba contract, the algorithm must be programmed to differentiate between profit and loss scenarios, accurately distributing profits between the investor and issuer while attributing losses solely to the investor. Smart sukuk can overcome the challenges associated with conventional sukuk issuance, ensuring Shariah compliance. However, when cryptocurrency is involved in the design, additional complexities arise, as Shariah scholars continue to debate its permissibility. [18]

Sharia Compliance in tokens

I. Evaluation of the fundamental business activity

The second stage of screening should evaluate the fundamental business activity or project associated with the token offering. Investing in tokens from projects that are fundamentally non-compliant with Shariah principles is not permissible, regardless of the type of token—be it equity or otherwise. For equity tokens, which represent ownership in a project in exchange for capital, participating in a business that is Shariah non-compliant is forbidden. This restriction also applies to other types of tokens; investing in any token from a non-compliant project is not allowed because it contributes to the funding of an impermissible venture.

This screening criterion applies to both primary and secondary market transactions. The primary market includes private sales, pre-ICO, and ICO sales where investments are directly made to the token-offering company. Similarly, the secondary market involves trading tokens among investors. For equity tokens, secondary market transactions still imply an ownership stake in the project, which remains impermissible if the project is non-compliant.

Token offerings associated with the following industries are considered non-Shariah compliant:[19]

- Conventional financial services based on Riba (interest)
- Exchanges and investment platforms not compliant with Shariah principles
- Risk and Gharar (excessive uncertainty) trading, such as in insurance companies
- Qimar (gambling) and Maysir (betting) activities
- Alcohol and prohibited beverages
- Pork products and non-halal food production, processing, or packaging
- Tobacco products
- Adult entertainment industries, including pornography
- Non-Shariah compliant entertainment and recreational facilities

Trading in tokens backed by unlawful projects (such as interest-bearing loans or hedging) is prohibited. Since their primary use is within these projects, trading in them and the profit earned from it is also not permissible.

Trading in coins and tokens whose projects are not unlawful has varying opinions among scholars. Most scholars lean towards the impermissibility of these due to reasons such as the lack of government backing, their non-monetary nature, or their use in speculative activities. Since there is no disagreement about the widespread fraud and significant losses incurred by people in this area, it is advised to avoid transactions involving them. If someone has earned profit from trading in the past, they should set that profit aside and act according to any final ruling that may be issued. It should also be noted that if the government imposes a ban on this, it becomes obligatory to avoid it, as adherence to laws based on public interest is mandatory in Shariah.

II. legitimacy and authenticity of a project and its token offering

A Shariah board should include technical advisors or scholars who can assess the legitimacy and authenticity of a project and its token offering. In the absence of regulatory oversight for the crypto-asset sector, it is essential for Shariah governance to employ traditional financial KYC and AML procedures to identify potential scams. Any Fatwa issued regarding a token offering should be based on the results of this anti-scam evaluation.[20] Shariah principles support this approach, as reflected in the Quranic verse[21]

III. General Shariah Rules about the tokens

Token Availability: The token must be fully developed and ready for sale at the time of the offering. Tokens that are still in development cannot be sold unless the transaction is structured under an Istisna' agreement with specific terms.

Ownership Requirement: The issuing company must own the token at the time of offering. Selling a token that the company does not yet possess is invalid, unless it is conducted under a Salam agreement with appropriate conditions.

Possession of the Token: The issuing company must physically or constructively possess the token during the offering. The company needs to have control over the token to assume the associated risks, in line with Fiqh al-Mu'amalat principles. "Constructive possession" implies control over the token and all related rights, even if it has not been physically received.

Immediate and Definite Sale: The sale of the token must be immediate and conclusive. Transactions contingent on future events or dates are not valid. To make a future sale valid, it must be conducted again when the time or event arrives.

Unconditional Sale: The sale of the token must be unconditional. Token offerings cannot be based on any conditions. Shariah-compliant transactions require that ownership transfers unconditionally to prevent disputes, uncertainties, and avoid gambling or speculative elements.

Legitimate Asset Classification: The token must qualify as Mal Mutaqawwim, meaning it must be a legitimate and tradable asset under Shariah. It should not be a derivative or non-tradable asset. Shariah scholars specializing in Mal Mutaqawwim should assess this.

Shariah Compliance: The token must not be intended for purposes or uses that violate Shariah principles. Tokens meant for non-compliant activities or utilities cannot be traded or offered.

Transparency and Identification: The token must be clearly identifiable to buyers, ensuring transparency. All significant information about the token should be readily accessible to potential buyers.

Known Pricing: The price of the token must be clear and certain at the time of sale. Buyers should have a definite understanding of the token's price during the offering.

Assured Delivery: Delivery of the token to the buyer must be guaranteed and not dependent on any contingencies. The transaction must be straightforward and reliable, avoiding any elements of chance or uncertainty.

Regulatory Concerns

The regulatory concern regarding Shariah standards in the Islamic crypto-asset model is crucial. It ensures that all activities align with the principles of Shariah law, particularly the objectives known as *al-Maqasid al-Shariah* (the goals or purposes of Islamic law). This includes ensuring ethical practices, fairness, transparency, and the prohibition of activities like usury (riba) or investments in prohibited industries. The adherence to these principles is essential to maintain the integrity and acceptability of Islamic crypto assets among users who follow Islamic finance guidelines.

Blockchain technology should be managed by a regulatory body that operates for the common good, without any personal agendas. This oversight should also include screening by a Shariah board to ensure compliance with Islamic principles. Additionally, any receiver of funds or transactions must be a registered entity, either onshore or offshore. The receiver's identity must be clearly known and free from uncertainty (*gharar*). This requirement helps build user confidence by protecting them from potential fraud and ensuring transparency in all transactions.[22]

In conclusion, asset tokenization has the potential to comply with the principles of Islamic finance, including the prohibition of interest, tangible asset backing, transparency, risk-sharing, and compliance with Shariah guidelines. However, careful consideration and consultation with Shariah scholars and experts are necessary to ensure that asset tokenization aligns with Islamic finance principles.

Social Challenges:

Despite the promising prospects of Islamic crypto assets, several challenges remain. One significant issue is the limited awareness among the public and marketplaces about Islamic crypto assets. Furthermore, there is a

lack of support from governments, relevant organizations, Shariah scholars, and corporate authorities in acknowledging and endorsing these assets. Misunderstandings about crypto assets also exist, creating confusion and hindering their development and adoption. Additional challenges include the absence of Shariah-compliant regulatory frameworks, standards, policies, and guidelines, as well as a shortage of professionalism and technical expertise in this area.

To overcome these challenges, it is recommended to enhance awareness through education, training, research, talks, and the exchange of perspectives on the subject, covering its technical aspects, operational mechanisms, and impact. There should also be initiatives with robust support from governments, Shariah scholars, corporate authorities, and professional bodies to develop the necessary skills and operational expertise. Moreover, the concept of Islamic crypto assets is timely and has the potential to significantly aid economic recovery and sustainability in the post-COVID era. Thus, support from the government and other relevant parties is essential for the success of Islamic crypto assets. A focus on professional development in technical and operational aspects is crucial. Raising awareness among both the public and markets is vital for the success of Islamic crypto assets. Notably, one of the key objectives of Islamic crypto assets is to empower low-income groups by promoting entrepreneurship and a spirit of enterprise.

Conclusion

Islam embraces innovation, unless it contradicts Shariah principles. Blockchain technology aligns with Shariah values, promoting transparency, trust, and justice in financial transactions. It enables secure, transparent, and efficient transactions between parties, eliminating intermediaries and trust issues. Blockchain's inherent trust and transparency make it ideal for Islamic finance, reducing transaction costs and incorporating Islamic values. The technology facilitates Islamic finance in the modern economy, and its adoption is gaining momentum. Workable Shariah-compliant financing structures for blockchain transactions have been developed, enabling automation of various Islamic finance transactions. Blockchain technology has a positive impact on the Islamic finance industry, enabling reliable transactions and paving the way for regulators to integrate Shariah governance into IT governance. However, challenges remain, including regulatory constraints, skill gaps, and technical issues, which require research, regulatory actions, and collaboration to overcome. Despite these challenges, blockchain technology is poised to transform Islamic finance, and its integration is inevitable. [23]

Blockchain technology is revolutionizing various financial sectors, including Islamic finance, by introducing innovations such as smart contracts that could transform financial services and payment systems. In Islamic finance, it is crucial for fintech solutions to comply with Shariah law.

Although technology itself is neutral, fintech innovations must align with Islamic principles to ensure fairness, transparency, and adherence to Shariah regulations. Islamic finance prohibits elements like interest (riba), gambling (maysir), fraud (gharar), and uncertainty (jahl), so fintech applications must avoid these issues and adhere to specific Shariah rules for contracts. Transactions are generally considered permissible in Islam unless explicitly forbidden by Shariah, allowing for the adoption of new financial practices if they align with Islamic principles. Furthermore, the objectives of Shariah (maqasid al-Shariah) guide the application of fintech in Islamic finance, aiming to promote societal benefits while avoiding harm and upholding ethical standards.

The blockchain technology has immense potential, attracting hundreds of financial institutions, both conventional and Islamic, across various jurisdictions. This technology can reinvent financial services, payment systems, and money markets, with possibilities of reconfiguration across industries using smart contracts for loan and intangible property. For Islamic finance, the key issue is ensuring Shariah governance and compliance in blockchain transactions, making them fair, transparent, and Shariah-compliant. While technology is neutral from a Shariah perspective, it's essential to determine which fintech innovations align with Shariah requirements. The default rule in Shariah is that all transactions are permitted unless explicitly prohibited, allowing flexibility for innovations. Fintech innovations are permissible unless they contradict clear Shariah rules, and their application must adhere to Shariah principles, avoiding prohibited aspects like interest, gambling, fraud, and harm. Fintech-based transactions must also follow Shariah rules of contract, including pillars and conditions, and aim to achieve Shariah objectives like realizing benefits and avoiding difficulties and harms.

However, the use of this technology must be regulated. This is because although there are merits necessity of decentralization, still there are some demerits of this technology as well. The main issue is tax evasion. To solve this issue the company adopting the asset tokenization process through blockchain technology, must provide sale purchase detail and ledger detail to the government.

Overall, integrating blockchain into Islamic finance requires careful consideration of Shariah principles to ensure that technological advancements support the ethical and moral framework of Islamic finance. This approach not only promotes innovation but also maintains the integrity and trustworthiness of financial transactions within Islamic guidelines.

Recommendations

To overcome the challenges, it is recommended to enhance awareness through education, training, research, talks, and the exchange of perspectives on the subject, covering its technical aspects, operational

mechanisms, and impact. There should also be initiatives with robust support from governments, Shariah scholars, corporate authorities, and professional bodies to develop the necessary skills and operational expertise. Moreover, the concept of Islamic crypto assets is timely and has the potential to significantly aid economic recovery and sustainability in the post-COVID era. Thus, support from the government and other relevant parties is essential for the success of Islamic crypto assets. A focus on professional development in technical and operational aspects is crucial. Raising awareness among both the public and markets is vital for the success of Islamic crypto assets. Notably, one of the key objectives of Islamic crypto assets is to empower low-income groups by promoting entrepreneurship and a spirit of enterprise.

In Islamic crypto-asset management, a risk management plan is essential to protect the receiver, user, and the system from unforeseen risks. To address this, it is strongly recommended to establish a *takaful* scheme, an Islamic insurance model based on cooperation and shared responsibility. This scheme would help manage and mitigate unpredictable risks associated with Islamic crypto assets, ensuring that all parties involved have a safety net in place.

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