



RESEARCH ARTICLE

The Possibilities of Blockchain in Islamic Banking in the South African Banking Sector

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ARTICLE INFO

Received: AUG 15, 2026

Accepted: SEP 04, 2026

Keywords

Islamic Banking
Fintech
Blockchain
Shari'ah
Finance

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ABSTRACT

This study explores the potential application of blockchain technology in Islamic banking within the South African financial sector. The increasing interest in Islamic finance, combined with the emergence of financial technologies, has created new opportunities for improving transparency, compliance, and operational efficiency in financial systems. The study adopts a qualitative research design based on secondary data and content analysis of scholarly literature, industry reports, and policy documents. The findings indicate that blockchain technology can enhance transparency, reduce operational risks, and improve Shari'ah compliance in financial products such as sukuk, takaful, and waqf management. Furthermore, blockchain may contribute to financial inclusion by providing cost-effective services to underbanked populations in South Africa. However, challenges remain, including regulatory uncertainty, infrastructural limitations, and limited digital literacy. The study concludes that collaboration among regulators, financial institutions, and Shari'ah scholars is necessary to facilitate the adoption of blockchain-based Islamic financial solutions in South Africa.

INTRODUCTION

There is consensus that blockchain is a remarkable new technology that will transform the way transactions are made, this is despite the predictions that the future is more likely to be dangerous due to this innovative and disruptive technology. This is because of its capacity to ensure the immutability of records, foster trust among unknown actors, and do away with the necessity of third-party middlemen in transactions (Ayodeji, 2024). This potential has sparked ongoing discussions about integrating such cutting-edge technologies with traditional Islamic practices (Dahdal, Truby & Ismailov, 2022). The global Islamic finance sector has witnessed significant growth, with its value estimated at US\$2.88 trillion by 2022 (Dahdal, Truby & Ismailov, 2022). South Africa has also embraced Islamic finance, featuring fully-fledged institutions like Albaraka Bank and Habib Bank, alongside Islamic banking windows established by major players such as ABSA and FNB (Saini, Bick & Abdulla, 2011; The Banking Association of South Africa, 2021). Despite being formalised since 1989, Islamic banking products in South Africa remain in their early stages of development (Saini *et al.* 2011). Rooted in principles of trust, honesty and transparency, Islamic finance draws heavily on ethical guidelines from the Quran. For instance, Surah Al-Baqarah 2:42 states, "Do not confound the truth with falsehood, nor conceal the truth knowingly (تَلْبِسُوا وَلاَ تَكْتُمُوا الْحَقَّ وَتَكْتُمُوا بِالْبَاطِلِ الْحَقَّ)", underscoring the moral framework that guides Islamic business practices. Nevertheless, the Islamic banking sector in South Africa faces challenges, including a potential loss of confidence in its financial services (Qasaymeh, 2011). Emerging technologies, such as Financial Technology (Fintech) and Regulatory Technology (RegTech), hold the promise of revitalising interest in Islamic finance and highlighting its distinctions from conventional finance (Dahdal, Truby & Ismailov, 2022). Among these innovations, blockchain technology aligns well with the Islamic tradition of permissible innovation (*bid'ah*), which supports advancements that

adhere to Islamic principles. By enhancing the values of trust and transparency inherent in Islamic finance, blockchain has the potential to sustain these principles more effectively than traditional methods (Chong, 2021).

In essence, this begs the introduction of Fintech innovations such as blockchain. Accordingly, blockchain technology can optimise the values embodied in Islamic finance through *Shari'ah* objectives to promote trust and transparency, making these values more sustainable than having them attained through the traditional modes (Chong, 2021). More importantly, to remain resilient, innovation is a must for both micro and macro-Islamic financial institutions as it provides a key foundational aspect for development in the Islamic financial industry. An example of this is that products and services offered traditionally through “brick-and-mortar” channels bring less attraction these days than those offered via digital platforms (Chong, 2021). Islamic financial institutions are increasingly using blockchain technology for complex financing terms, *Shari'ah*-compliant transactions, and Islamic alternatives to conventional insurance (Elasrag, 2019). Blockchain serves as a system for storing and processing data and transactions. However, its application to Islamic finance is a highly debated topic. Some scholars argue that its application could facilitate tax evasion and money laundering, and lead to the devaluation of fiat currency (Ayodeji, 2024).

The future of Fintech in Islamic finance may be successful in Muslim-majority countries. However, the application in countries with fewer Muslims and different technological developments, such as South Africa, remains a question with many possibilities. The development of Islamic Fintech offers significant opportunities for developing countries by providing cost-effective financial services (Rabbani, Khan and Thalassinis, 2020). Additionally, blockchain technology has the potential to have a significant impact on Islamic finance by enhancing efficiency, meeting standards, and maintaining compliance with *Shari'ah* principles for Islamic banking and financial institutions (Ayodeji, 2024). The challenge in adopting blockchain technology in this case is trust and placing trust in technology is no different stepping stone. Blockchain, by its very definition, should engender trust. But in reality, companies confront trust issues at nearly every turn. For one, users must build confidence in the technology itself. As with any emerging technology, challenges and doubts exist around blockchain's reliability, speed, security and scalability (Elasrag, 2019). Contributing to the blockchain trust gap is a lack of understanding. A further instance of this is that even now, many executives are unclear on what blockchain is and how it is changing all facets of business (Elasrag, 2019). However, literature suggests that Islamic fintech has great potential mainly because of the overlapping norms of *Shari'ah* and fintech, making it easier to implement technological advancement into Islamic finance (Unal & Aysan, 2022). Moreover, the trust shift to Islamic finance could be merged with the opportunities of fintech and increase the potential of Islamic fintech even more. Fintech and blockchain bring transparency and convenience into operations, which is one of the main goals of *Shari'ah*. In simplest terms, a genuinely Islamic business should be transparent and efficient and protect people's wealth. Keeping a business *Shari'ah* compliant is more difficult than keeping it competitive in today's harsh markets (Unal & Aysan, 2022).

In South Africa, a nation with a growing Muslim population and increasing interest in Islamic finance among non-Muslims, understanding the implications and possibilities of blockchain technology is critical. This article explores how blockchain can transform the banking sector in South Africa, offering inclusive financial services for both Muslim and non-Muslim communities.

MATERIALS AND METHODS

This study employed a qualitative research approach to explore the potential application of blockchain technology within Islamic banking in the South African financial sector. A qualitative design was considered appropriate because the study sought to interpret existing knowledge, examine relationships between blockchain technology and Islamic finance principles, and identify emerging opportunities and challenges within the South African context.

The research relied primarily on secondary data sources. Relevant literature was collected from peer-reviewed academic journals, conference papers, institutional reports, and scholarly publications related to blockchain technology, Islamic finance, and financial technology (FinTech). Academic databases such as Google Scholar, ResearchGate, Semantic Scholar, and other online academic repositories were used to locate relevant sources. Additional policy documents and industry reports were consulted to provide contextual insights into the development of Islamic banking and financial technologies in South Africa.

A systematic literature search strategy was used to identify relevant studies. Key search terms included “blockchain,” “Islamic finance,” “Islamic banking,” “fintech,” “blockchain in Islamic finance,” and “blockchain and Islamic banking in South Africa.” The selection of literature was guided by relevance to the research topic, academic credibility of the source, and its contribution to understanding the relationship between blockchain technology and Shari’ah-compliant financial systems.

To analyse the collected data, the study employed qualitative content analysis. This involved reviewing and interpreting the selected literature to identify recurring themes, patterns, and conceptual relationships. The analysis focused on several key areas, including the development of Islamic banking, the technological features of blockchain, potential applications of blockchain in Islamic financial instruments such as sukuk and takaful, and the regulatory and infrastructural challenges associated with blockchain adoption in South Africa.

RESULTS

The Development of Islamic Banking and Its Presence in South Africa

According to Alharbi (2015) the beginning of Islamic banking, in its wider sense, dates back to the early days of Islam and the rise of the Islamic Empire. During the colonisation of Islamic countries, the predominant mode of finance was based on conventional banking, which did not adequately address the needs of an Islamic economy. Muslims sought a mode of finance that could be considered compliant with Islamic law to facilitate their microfinance activities. The decolonisation of Islamic countries created a new environment conducive to the development of Islamic banking (Qasaymeh, 2011). Islamic banks assumed the role of custodians of Muslims’ financial resources, bearing the significant responsibility of deploying these resources in a manner that serves the interests of the banks, their clients and society. In contrast to traditional banking, which is centred on an interest-based system and profit maximisation, Islamic banks operate on an interest-free basis in providing financial services, and the concept of Islamic banking links profit to social prosperity (Qasaymeh, 2011).

Alharbi (2015) defines Islamic banks as a financial institution that (a) abide by *shari’ah* principles in all of their activities through their role as a financial intermediary between savers and investors; (b) provide banking services within the framework of legitimate contracts; and (c) achieves a balance between economic and social return. It is the *modus operandi* of Islamic financial institutions to uphold their key stakes in promoting Islamic teachings and ethical ways of living through their products and services (Chong, 2021). According to Dahdal *et al.* (2022) Malaysia, Indonesia, Bahrain, the UAE and Saudi Arabia lead the development of Islamic finance markets. There are about 1,526 Islamic finance institutions, 1,749 Islamic funds, and 3,420 outstanding *sukuk* (Islamic bond) instruments globally. Interestingly, non-Islamic markets have also experienced rapid growth in Islamic financial products and services in recent years. In Europe, countries like Luxembourg, the Republic of Ireland, and Jersey host numerous Islamic funds, and several European nations are focusing on ethical investing and strengthening trade ties with MENA countries (Dahdal *et al.* 2022).

The rise of Islamic banking requires compliance with halal (permissible) and haram (prohibited) principles, along with the proper use of financing methods like musharaka, mudaraba, and Murabaha. The fundamental principle of Islamic banking is the prohibition of *riba* (interest), which

refers to any extra amount charged for the use of borrowed funds. Charging interest, especially to those in need, is viewed as exploitative in Islam. As *riba* is not permissible in financial transactions, Islamic banking employs profit and loss-sharing (PLS) arrangements and risk-sharing investments as alternatives (Vawda, Padia, Maroun, 2013). According to Qasaymeh (2011), profit generation in Islamic finance must adhere to halal and haram guidelines, ensuring compliance with Shari'ah law. This requires justifying profit while eliminating *riba* and engaging only in halal products. Thus, the Islamic financial system is governed by various institutions that oversee profit justification and enforce prohibitions (Qasaymeh, 2011).

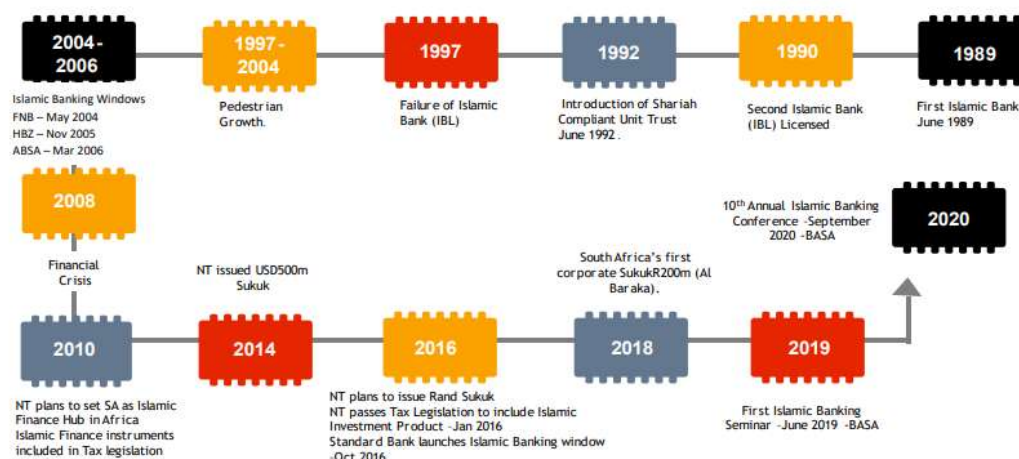


Figure 1: History of Islamic Banking in South Africa

Source: The Banking Association South Africa, Islamic Banking Conference (2020)

For South Africa, the development of Islamic banking can be traced back to as early as 1975 with the establishment of Jaame Limited, a financial company offering *Shari'ah*-compliant products and services. Islamic Bank and Albaraka Bank were the first official Islamic banks to enter the South African market after being awarded banking licenses in 1989 (Qasaymeh, 2011; Moosa & Kashiramka, 2023). Islamic Bank experienced success in the 1990s, but eventually faced bank failure due to mismanagement, leaving Albaraka Bank as the only dedicated Islamic bank in South Africa (Moosa *et al.* 2023). However, in 2004 and 2006, First National Bank and Absa Bank began offering Islamic banking services through their Islamic windows (Qasaymeh, 2011). Since then, the South African government has introduced amendments to tax laws to ensure parity in Islamic and conventional transactions providing definitions to Islamic financial instruments such as *mudaraba* (مُضَارَبَة) (trust financing), *musharaka* (مُشَارَكَة) (partnership financing), and *murabaha* (مُرَابَاة) (cost-plus financing) (Qasaymeh, 2011; Moosa *et al.* 2023).

In the last thirty years, the range of Islamic financial products has expanded significantly, offering various options from basic personal loans to complex infrastructure funding (Hassim, 2023). In 2019, the global value of *Shari'ah*-compliant financial assets was estimated at \$2 trillion (The Banking Association of South Africa, 2021). According to Clark *Moneyweb* (2023), South Africa has shown significant potential for growth in this sector, with the need for banking providers to better understand and serve this specific client segment. The rapid growth of deposits and advances in the Islamic banking market has led to substantial investment in the development of *Shari'ah*-compliant financial products (The Banking Association of South Africa, 2021).

Blockchain: The Backbone of Digital Transformation

Blockchain technology has not emerged overnight as a panacea for all business challenges, despite the recent surge in media attention that may suggest otherwise. In fact, the concept of systematically organising transactions and maintaining records of goods traded and received dates back to ancient civilisations such as Mesopotamia, Egypt, and Babylon (IAB, 2019). Much like traffic

regulations that promote order and safety on the roads, blockchain operates as a peer-to-peer public ledger that enables the secure storage of data in interconnected blocks via cryptographic methods. This technology facilitates the processing of data through the effective integration of financial resources, positioning itself as a distributed ledger system grounded in a decentralised framework designed to safeguard substantial amounts of organisational data (Ayodeji, 2024). According to Bacon *et al.* (2018), blockchain technology can be characterised as a specialised type of database - a structured collection of information. To illustrate this concept in Figure 2, consider a digital notebook shared among consumers. When one records a transaction, such as lending money, it is documented in the notebook. All participants can view this entry and once it is written, it cannot be altered or erased. This ensures that all consumers maintain a clear and permanent record of their transactions, fostering trust and transparency within the group.

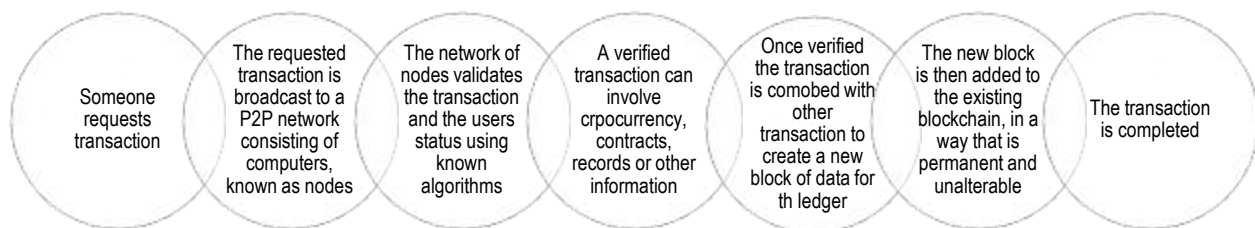


Figure 2: How blockchain works

Source: PWC (online)

Blockchain technology is increasingly significant in driving financial innovations and serves as the foundational technology for the Fintech revolution. Thus far, its predominant application has been in the realm of payments. The evolution of payment instruments and systems has been influenced by advancements in technology, changes in business processes, and the rapidly growing demands of consumers (Ali *et al.*, 2020). The trustless nature of blockchain enhances its consensus mechanism, requiring that nodes across the network reach an agreement for the authorisation or verification of transactions. However, this public disclosure of information contained within blocks presents privacy challenges for users. Despite these concerns, blockchain functions as a distributed database that enforces privacy protections through its decentralised structure and data storage mechanisms (Olaniyi, Alfa & Umar, 2022). There are two primary blockchain mechanisms: proof of work and proof of stake. The proof-of-work mechanism requires nodes within the network to solve complex mathematical problems to add new blocks to the blockchain, as seen in Bitcoin. In contrast, proof of stake relies on the ownership of tokens, which some argue may resemble gambling from a *Shari'ah* perspective (Ayodeji, 2024).

Blockchain functions as a foundational database for Bitcoin; thus, any contemporary discussion of blockchain is incomplete without referencing Bitcoin. Bitcoin is characterised as a decentralised, peer-to-peer digital currency that enables instantaneous payments globally. Although it serves as a form of money, it is classified as virtual currency since it exists solely online. Users can buy, sell, and utilise it as a medium of exchange in modern markets. Cryptocurrencies are created through mining, which rewards participants for validating transactions, representing one of the latest innovations in FinTech and increasingly replacing fiat currencies in certain jurisdictions (Ayodeji, 2024). The Islamic community's comprehension of cryptocurrencies reveals a range of perspectives, significantly shaped by the fatwas of leading *Shari'ah* scholars from countries such as Egypt and Indonesia, who frequently categorise all cryptocurrencies as haram (Unal and Aysan, 2022). However, Unal and Aysan (2022) argue that while mainstream cryptocurrencies like Bitcoin raise notable *Shari'ah* concerns due to their high volatility and inherent Gharar (excessive uncertainty), some scholars argue that these assets could be permissible, highlighting their potential to augment wealth within Islamic society. Additionally, incorporating partnership models

such as *Musharakah* may help mitigate investment risks (Unal and Aysan, 2022). To put it another way, central bank digital currencies (CBDCs) represent a stable alternative with intrinsic value, facilitating direct account access for users at central banks. Nevertheless, the substantial costs associated with distributed ledger technology, alongside inherent risks, often make traditional central bank infrastructures more appealing, as demonstrated by various CBDC experiments (Unal and Aysan, 2022). In summary, blockchain, at least in theory, shows significant promise as a backbone for industry-wide data documentation and management tools, due to its immutability and inherent capacity to provide necessary transparency (IAB, 2019).

The Convergence of Blockchain and Islamic Finance

Although developed under vastly different paradigms, blockchain technology and Islamic finance share fundamental synergies that make their convergence particularly compelling. Islamic finance, rooted in *Shari'ah* law, promotes ethical financial practices that avoid exploitative interest rates (*riba*), excessive uncertainty (*gharar*), and speculative activities (*maysir*) while encouraging risk-sharing and ethical investment. Blockchain, a decentralised, immutable ledger, offers unique features that can address Islamic finance's specific requirements, including transparency, efficiency, and accountability. Together, they have the potential to reshape Islamic financial systems, creating opportunities for increased financial inclusion, efficient transaction mechanisms, and enhanced compliance with *Shari'ah* principles.

Blockchain's decentralised nature allows for secure and transparent transactions without intermediaries, making it suitable for an Islamic financial ecosystem that prioritises transparency and trust. The technology's core features, such as immutability, transparency, and decentralisation, are especially relevant to Islamic finance's ethical and operational requirements. Islamic finance prohibits interest-based income and mandates ethical investments backed by tangible assets, rather than speculative transactions. Blockchain can support this by maintaining a transparent, tamper-proof record of transactions, which aids in ensuring that investments are asset-backed and compliant with *Shari'ah* principles (Kanwal et al., 2023).

One of the critical areas where blockchain has made inroads in Islamic finance is through instruments like smart *Sukuk* and Islamic crowdfunding. *Sukuk*, often referred to as Islamic bonds, must represent an ownership interest in tangible assets or services, aligning with the requirement for asset-backed financing in Islamic law. Blockchain can streamline the issuance, management, and compliance verification of *Sukuk*, reducing administrative costs and improving access for investors. A practical application is demonstrated by Finterra's blockchain-based waqf solution, which leverages smart contracts to ensure transparency in managing endowment funds. This development has made it easier for communities to track and verify the utilisation of funds in compliance with waqf conditions (Kunhibava et al., 2024). Blockchain also facilitates Islamic crowdfunding and peer-to-peer lending platforms, which can be designed to meet *Shari'ah* principles. These platforms leverage blockchain's capabilities to provide transparency and secure transaction tracking, crucial for investors and borrowers within the Islamic finance framework. Furthermore, blockchain-based platforms can potentially lower transaction costs, which aligns with the Islamic finance goal of enhancing financial accessibility and inclusion (Aysan & Unal, 2022).

Despite these advancements, regulatory concerns pose a significant hurdle to the widespread adoption of blockchain in Islamic finance. Ensuring *Shari'ah* compliance in blockchain applications requires oversight mechanisms and an ecosystem that aligns with both technological and Islamic ethical standards. This has led to the emergence of Regulatory Technology (RegTech) solutions tailored to Islamic finance. RegTech uses blockchain and artificial intelligence (AI) to streamline regulatory compliance, enabling real-time reporting and *Shari'ah* audits. These tools ensure adherence to Islamic finance principles, automating complex compliance processes and reducing the risk of non-compliant transactions (Kilic & Turkan, 2023).

Blockchain’s potential to foster financial inclusion is another area where its convergence with Islamic finance is transformative. Islamic finance often serves unbanked populations, particularly in Muslim-majority countries where conventional banking practices may not align with religious values. Blockchain can make financial services more accessible through mobile platforms, enabling individuals to engage in secure, low-cost transactions. This is particularly beneficial in regions with limited access to traditional banking infrastructure but high smartphone penetration. According to Mhlanga (2023), while the Sustainable Development Goals (SDGs) do not specifically address financial inclusion, providing access to financial services for a large segment of the population is essential for achieving many of these goals. Mhlanga found that sustainable development can be significantly enhanced if the technology behind blockchains is effectively utilised to improve financial inclusion. The need for financial inclusion especially in the South African contexts provides a much-needed attention to the use of blockchain in Islamic finance. The financial market in South Africa in remains at crossroads in embracing digital transformation. Therefore, if governments particularly those in developing countries are genuinely committed to increasing their citizens' access to financial services, they must prioritise investment in blockchain technology (Mhlanga, 2023). Moreover, blockchain’s capacity for transparent and immutable transaction records aligns well with the ethical requirements of Islamic finance, making it an ideal tool for fostering trust among unbanked and underserved communities.

The potential of blockchain to advance financial inclusion aligns with Islamic finance’s objectives, as it seeks to serve underbanked populations who may be unable to access traditional banking services. In the study by Saini, Bick, and Abdulla (2011), financial accessibility emerged as a primary factor influencing consumer decisions, with low digital literacy among South African Muslims limiting adoption rates for Islamic financial product. They found that awareness of Islamic finance principles is generally low, with many consumers prioritising affordability and ease of use over religious compliance when selecting financial services. As noted by Rabbani et al. (2020), efforts to leverage blockchain for financial inclusion would benefit from the development of mobile-friendly *Shari’ah-compliant* microfinance platforms that cater to underbanked populations. By implementing blockchain technology in these platforms, Islamic financial services could reach individuals without traditional bank accounts, addressing the socio-economic barriers that have historically limited financial inclusion within South Africa.

Table 2: Socio-Economic Factors Impacting Blockchain Adoption in Islamic Finance

Factor	Impact
Digital Literacy	Limited digital literacy restricts access to blockchain-based services
Financial Accessibility	Blockchain platforms must be affordable to attract lower-income users
Awareness of Islamic Finance	Low awareness restricts demand for <i>Shari’ah</i> compliant blockchain products

According to Mhlanga (2023), blockchain can influence inclusion in several different way such as utilising the potential of blockchain technology in financial transactions, blockchain technology as a tool for boosting financial savings, the application of blockchain technology to the provision of credit and utilization of blockchain technology in the process of providing insurance.

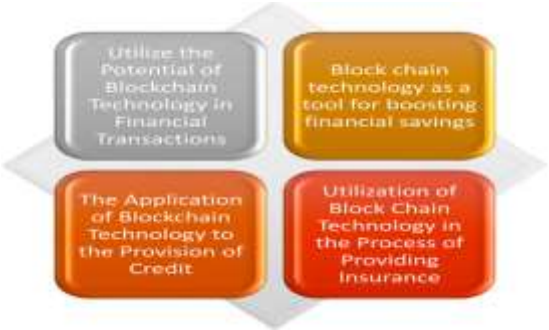


Figure 1: Strategies for Broadening Access to Financial Services Using Blockchain

Source: Mhlanga (2023)

While blockchain offers numerous benefits, it also presents specific risks and limitations, particularly in the context of Islamic finance. The decentralised nature of blockchain, while enhancing transparency, introduces potential *Shari'ah* compliance issues related to transaction verification and dispute resolution. Blockchain transactions are immutable, which poses challenges if a transaction is found to be non-compliant post-execution. Additionally, there are technological barriers, such as limited scalability and high energy consumption in some blockchain models, which may hinder adoption in regions where Islamic finance is growing but technological infrastructure is still developing (Hassan & Lewis, 2007).

The convergence of blockchain and Islamic finance is still in its nascent stages, yet it holds promising prospects for the future of ethical finance. According to Gray (2018), several blockchain applications could significantly impact the South African banking sector, including Private Digital Ledgers, Smart Contracts, and Tokens/Cryptocurrencies. He argues that Private Digital Ledgers are likely to see short-term implementation, while the adoption of Smart Contracts and Tokens/Cryptocurrencies will require extensive stakeholder coordination and considerable effort in educating end users and will face substantial resistance from existing systems and processes. As a result, widespread adoption of these latter two applications is anticipated to occur in the long term (Gray, 2018). For this convergence to be sustainable and scalable, collaboration among financial institutions, regulatory bodies, and *Shari'ah* scholars is essential. Developing standardised guidelines for blockchain applications in Islamic finance can help address compliance concerns while promoting innovation. Additionally, further research is needed to explore new blockchain-based Islamic financial products, such as Islamic stablecoins and tokenised assets, which could widen the scope of *Shari'ah* compliant investment opportunities and enhance global liquidity for Islamic finance. Blockchain presents a unique and powerful toolset for advancing the objectives of Islamic finance, offering pathways for transparency, inclusion, and efficiency. However, its full potential can only be realised if regulatory challenges are addressed, and blockchain solutions are developed with a clear focus on *Shari'ah* compliance. By aligning technological innovation with Islamic ethical principles, blockchain and Islamic finance can create a resilient, inclusive financial ecosystem that promotes sustainable development across Muslim-majority regions and beyond.

Navigating Challenges and Unlocking Potential for Blockchain Adoption in Islamic Finance in South Africa

The convergence of blockchain technology with Islamic finance in South Africa presents transformative potential for enhancing transparency, compliance, and financial inclusion within the sector. However, several key challenges, including regulatory limitations, infrastructural inadequacies, and socio-cultural hesitations, need to be navigated to unlock this potential. This section examines the primary obstacles and strategic opportunities for blockchain adoption in Islamic finance in South Africa.

Regulatory Landscape and Compliance Challenges

According to Elasrag (2019), blockchain's decentralised nature offers an ideal framework for *Shari'ah* compliant finance by ensuring transparent, secure, and tamper-proof transactions. However, regulatory challenges in South Africa create a substantial barrier to blockchain adoption. In South Africa, the National Credit (NCA) Act 34 of 2005 and financial regulations prioritise consumer protection and systemic stability, which may clash with blockchain's relatively unregulated framework (Kholvadia, 2016). Furthermore, the South African Reserve Bank (SARB) has exhibited caution in its approach to cryptocurrencies and blockchain technology, reflecting concerns over security, anti-money laundering (AML) protocols, and the classification of digital assets. As noted by Rabbani, Khan, and Thalassinou (2020), a regulatory framework tailored to the unique features of blockchain is essential for fostering its integration into Islamic finance. In the same vein, Unal and Aysan (2022) emphasise the importance of establishing specific *Shari'ah* compliant standards for blockchain applications. They propose creating a *Shari'ah* Blockchain Regulatory Authority to guide compliance, particularly in defining permissible digital asset

transactions within the Islamic finance sector. Table 1 summarises the primary regulatory barriers facing blockchain in South African Islamic finance, highlighting AML protocols, consumer protection, and *Shari'ah* compliance verification as focal areas of concern.

Table 1: Key Regulatory Barriers for Blockchain in Islamic Finance

Regulatory Challenge	Description
Anti-Money Laundering (AML)	Blockchain's pseudo-anonymity challenges AML compliance efforts
Consumer Protection Laws	Blockchain applications must protect users from potential risks
Lack of Digital Asset Regulations	No established framework for cryptocurrencies and blockchain apps
<i>Shari'ah</i> Compliance Verification	Need for <i>Shari'ah</i> compliant standards for digital financial products

To navigate these challenges, cooperation with regulatory authorities is critical. Kholvadia (2016) argues that implementing a regulatory sandbox model could allow Islamic financial institutions to experiment with blockchain applications under controlled conditions, providing a safer route to explore regulatory alignment while addressing compliance concerns specific to South African and *Shari'ah* law.

Infrastructure and Technological Constraints

Ackermann and Jacobs (2008) examine the infrastructural limitations that hinder blockchain adoption within South Africa's Islamic finance sector. They observe that blockchain platforms demand significant technological resources, including secure digital storage and high-speed internet, which are often expensive and limited in availability. In South Africa, the high costs associated with establishing blockchain infrastructure, particularly in regions with low digital literacy and limited internet connectivity pose a significant challenge to Islamic finance institutions seeking to implement blockchain solutions. Furthermore, Unal and Aysan (2022) highlight blockchain's scalability issues as a limiting factor, especially in a resource-constrained environment. While blockchain's transparent and immutable transaction capabilities offer numerous benefits, these advantages can be undermined by scalability limitations that may affect transaction speed and efficiency. This challenge is particularly relevant in the South African context, where maintaining customer trust is critical in the still-developing Islamic finance sector.

Addressing *Shari'ah* Compliance through Blockchain

In examining blockchain's potential to support *Shari'ah* compliance, Elasrag (2019) highlights that the technology's transparency and record immutability align with core Islamic financial principles. Blockchain's ability to facilitate smart contracts provides a particularly useful tool for Islamic finance. For example, smart contracts can automate the issuance and management of sukuk (Islamic bonds), ensuring compliance with *Shari'ah* principles through programmed rules that monitor the distribution of profits and risk-sharing in real-time. Additionally, Unal and Aysan (2022) observe that blockchain could transform halal supply chain management, where transparency in tracking goods and transactions is critical. By using blockchain to verify each step in the halal supply chain, Islamic finance institutions could uphold ethical investment standards and maintain consumer trust in *Shari'ah* compliance. This application has significant implications for South African businesses engaged in halal-certified products, as blockchain can facilitate secure, transparent tracking across the entire supply chain, from production to consumer delivery.

Strategies for Overcoming Adoption Barriers

Rabbani et al. (2020) examine strategies for mitigating barriers to blockchain adoption, emphasising the need for regulatory sandboxes, targeted education, and international cooperation. Figure 2 provides a visual representation of the strategies to overcoming adoption barriers.

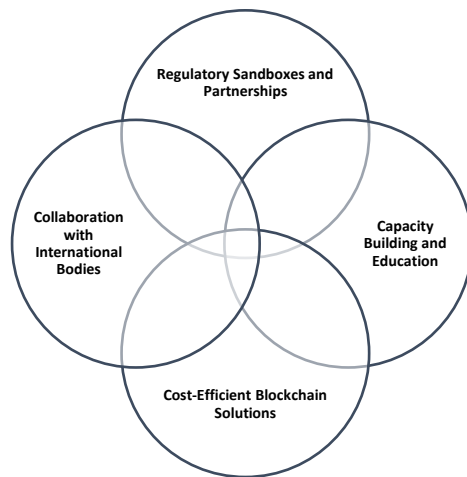


Figure 2: Strategies to overcoming blockchain adoption barriers

1. **Regulatory Sandboxes and Partnerships:** Engaging with regulatory sandboxes, such as the one established by SARB, provides a controlled environment for Islamic finance institutions to explore blockchain applications, ensuring that compliance and regulatory issues are addressed before large-scale implementation.
2. **Capacity Building and Education:** Ackermann and Jacobs (2008) highlight the importance of improving digital literacy within Muslim communities to foster blockchain adoption. Educational programs focused on both blockchain technology and Islamic finance could enhance trust and understanding among potential users, promoting broader acceptance of blockchain-based Islamic finance products.
3. **Cost-Efficient Blockchain Solutions:** Low-cost blockchain solutions, such as permissioned blockchains, are recommended to mitigate scalability challenges and improve accessibility. These solutions can provide an affordable, scalable framework for *Shari'ah* compliant financial transactions, reducing operational costs while adhering to Islamic principles.
4. **Collaboration with International Bodies:** As Unal and Aysan (2022) suggest, partnerships with organisations like the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI) could help establish standardised protocols for blockchain in Islamic finance. Such collaborations could facilitate international compatibility and improve consumer trust by ensuring that blockchain applications align with recognised *Shari'ah* compliance standards.

Blockchain technology has the potential to transform Islamic finance in South Africa by improving transparency, promoting financial inclusion, and ensuring compliance with *Shari'ah* principles. However, there are significant challenges that need to be addressed, particularly regarding regulatory compliance, infrastructure, and consumer adoption. By utilising strategic approaches such as implementing regulatory sandboxes, launching educational initiatives, and developing cost-effective blockchain models Islamic finance in South Africa can fully harness the benefits of blockchain. This will create a more accessible, compliant, and efficient financial ecosystem that serves the needs of both Muslim and non-Muslim consumers.

The Possibilities of Blockchain in Islamic Banking in South Africa: A Yardstick to Successful Islamic Banking?

The rapid advancement of technologies across various industries has generated significant interest that cannot be overlooked. Islamic finance, rooted in the teachings of the holy Quran, stands to benefit from these technological innovations, which not only enhance the principles of safekeeping and protection but also promote transparency, honesty, and truthfulness. According to Dahdal

(2022), “Building the future of Islamic finance on such ostensibly pure foundations is both appropriate and necessary; Islamic finance must be an integral part of the changes taking place in the world of finance and should be at the forefront of these developments.” For instance, in the Islamic Republic of Iran, the implementation of blockchain technology has produced notable outcomes. Pravin et al. (2024) found that “blockchain’s alignment with Shari’ah and ethical principles is evident in its foundational characteristics. The transparency, immutability, and decentralised nature of blockchain ensure that transactions can be conducted in a manner that upholds justice and fairness, which are fundamental tenets of Islamic finance.”

However, the situation may differ in South Africa. This discrepancy arises primarily because South Africa is not an Islamic state, unlike Iran, and the acceptance of technology may vary. It is important to note that the essence of this discussion is not solely about the landscape of the Muslim community, but rather about the application of Islamic banking and blockchain. Opinions among Muslim scholars on the Shari’ah compliance of cryptocurrencies vary. Rabbani et al. (2020) note that some prominent scholars reject cryptocurrencies, deeming them haram for violating fundamental Islamic principles. They argue that for a cryptocurrency to be halal, it must align with Maqasid al-Shari’ah. Some scholars declaring cryptocurrencies as haram may not fully understand these assets. A new strategy involving consumers, government, financial institutions, and investors is necessary to navigate the digital revolution. More insights are needed to understand blockchain and cryptocurrency. Shari’ah scholars should aim to benefit the Muslim community through this financial revolution, as digital currencies can support sustainable and diverse projects (Rabbani et al., 2020).

A study by Supriadi et al. (2024) revealed that blockchain technology has the potential to reduce the dangers of corruption, money laundering, and illicit activities within the Islamic financial system. Furthermore, utilising blockchain technology in decentralised finance ensures equitable access to participation in the economic ecosystem, thus promoting the inclusion of minority populations. According to Supriadi et al. (2024), at least three Islamic financial products and instruments could utilise the blockchain system through smart contracts: sukuk, takaful and Islamic social funds. Supriadi et al. assert that the successful growth of sukuk relies on standardising Shari’ah interpretation and providing clear legal documentation. Hassain (2024) asserts that smart contracts in Islamic finance will enhance global financial efficiency through three channels. First, they will reduce uncertainty (Gharar) by executing agreements only when conditions are met, minimising unforeseen risks. Second, they can lower administrative and legal costs by eliminating complexities through their immutable and secure nature. Third, transactions will be faster and easier due to the decentralised nature of distributed ledger technology, making each transaction traceable and irreversible. This safeguards against moral hazards and allows for automatic verification without third-party intervention (Hassain, 2024). Farhan, Ismar, and Dharma (2024) state that Sukuk issued through blockchain can be traded using a smart system for automation, as shown in Table 3.

Table 3: The Use of Smart Contracts in Sukuk

Deployment	To deploy the contract, specify the total supply, <i>Sukuk</i> Price, and maturity date. The issuer must use the constructor function to initialise it.
Purchase of <i>Sukuk</i>	Potential investors can buy <i>Sukuk</i> by sending the correct amount of Ether for the number of <i>Sukuk</i> they wish to purchase.
Distribution of Profits	The publisher can use the profit distribution function to allocate profits to all <i>Sukuk</i> holders based on the number of <i>Sukuk</i> they own.
Principal Return	After the maturity date, the issuer may return the principal to all <i>Sukuk</i> holders using the return principal function.
<i>Shari’ah</i> Compliance	The <i>Shari’ah</i> Compliance check function verifies transactions according to <i>Shari’ah</i> principles. A more detailed implementation of <i>Shari’ah</i> compliance logic can be added to this function.

Source: Farham *et al.* (2024)

According to Hassain (2024), Takaful (Islamic insurance) means insurance for humanity. Hassain further adds that the Qur'an in Chapter five emphasises cooperation where Allah commands, "Help one another in furthering virtue and Allah consciousness and do not help one another in furthering evil and enmity." In this sense, this concept is cooperative insurance, with members contributing to a common pool. The main difference between conventional and Takaful insurance lies in payments made with the intention of *Tabarru* (charity), eliminating uncertainty and interest. Takaful operates on *wakala* (agency) and *Mudarabah* (profit-sharing) principles and is overseen by *Shari'ah* supervisory bodies. Investments adhere to *Shari'ah* laws, emphasising collective support over profit motives (Hassain, 2024).

A study conducted by Farhan *et al.* (2024) found that blockchain technology can help reduce fraud, manipulation, and cyberattacks while increasing trust among customers and *Shari'ah* authorities through greater transaction transparency. However, they emphasise that there are significant challenges to overcome, including immature regulatory frameworks, the need for robust infrastructure, and a lack of understanding of this technology among customers. They highlight the importance of collaboration between Islamic banking institutions, regulators, and other stakeholders to fully realise the potential of blockchain technology. In the same vein, Hassain (2024) asserts that implementing blockchain technology can further reduce fraud by utilising smart contracts, which make financial transactions more efficient and lower costs associated with savings and administration. Additionally, it can automate microinsurance processes, enabling quick transactions while reducing fraud and uncertainty for all parties involved. In summary, it streamlines claims processing and resolves disputes with verifiable evidence (Hassain, 2024). Furthermore, the use of blockchain in social fund management aims to create a single data source that stakeholders can reference. Smart contracts facilitate easier access for contributors, such as Muzaki and Wakif, enabling them to monitor the distribution of social funds effectively (Supriadi *et al.*, 2024).

DISCUSSION

The integration of blockchain technology into Islamic banking offers promising opportunities to address several inefficiencies and challenges within the financial ecosystem, particularly in South Africa. Blockchain's features of transparency, decentralisation and immutability are inherently aligned with the ethical and operational requirements of Islamic finance. These features ensure compliance with *Shari'ah* principles by fostering trust, reducing *gharar* (excessive uncertainty), and supporting ethical investments. As highlighted in the literature, blockchain can enhance the issuance and management of *Sukuk* (Islamic bonds) through smart contracts, which streamline compliance processes, reduce administrative costs, and ensure real-time adherence to Islamic guidelines (Kunhibava *et al.*, 2024; Ayodeji, 2024).

Moreover, blockchain technology holds the potential to significantly advance financial inclusion. Its decentralised structure allows for low-cost, efficient financial services delivery, aligning well with the objectives of Islamic finance, which seeks to promote social equity. The ability to use mobile platforms to offer these services is particularly relevant in South Africa, where smartphone penetration is high despite limited access to traditional banking infrastructure. Rabbani, Khan and Thalassinis (2020) emphasise that blockchain-enabled microfinance platforms could empower underbanked populations by providing accessible and affordable financial services that comply with Islamic principles. This aligns with the broader goals of Islamic finance to create an inclusive financial ecosystem that caters to diverse socio-economic groups.

However, despite these benefits, significant challenges impede the widespread adoption of blockchain in South Africa's Islamic finance sector. The regulatory environment presents a key hurdle. The existing frameworks, such as anti-money laundering (AML) and consumer protection regulations, are not yet tailored to accommodate the decentralised and innovative nature of blockchain technology. Furthermore, the lack of a *Shari'ah*-compliant regulatory framework

complicates the development and implementation of blockchain-based solutions. Regulatory hesitancy, particularly from the South African Reserve Bank (SARB), reflects concerns over the security and classification of digital assets, which must be addressed to unlock blockchain's potential in Islamic finance (Elasrag, 2019; Kholvadia, 2016).

Infrastructural and socio-cultural barriers further exacerbate the challenges of adopting blockchain in Islamic finance. Limited digital literacy among consumers and high costs associated with establishing blockchain infrastructure hinder adoption, particularly in resource-constrained environments. Additionally, awareness of Islamic financial products remains low among South African Muslims, with many prioritising affordability and convenience over *Shari'ah* compliance. These factors suggest that educational initiatives are critical to improving understanding and acceptance of blockchain-enabled Islamic financial services (Ackermann & Jacobs, 2008; Saini, Bick, & Abdulla, 2011).

Addressing these challenges requires a collaborative and strategic approach. Regulatory sandboxes, as proposed by Kholvadia (2016), can provide controlled environments where Islamic financial institutions can experiment with blockchain applications while ensuring compliance. Partnerships with international organisations, such as the Accounting and Auditing Organisation for Islamic Financial Institutions (AAOIFI), can help establish standardised protocols for blockchain applications, enhancing trust and global compatibility (Unal & Aysan, 2022). Furthermore, adopting permissioned blockchain models that are scalable and cost-effective can mitigate technical and financial barriers, facilitating broader adoption among South African institutions and consumers.

To this end, it is believed that blockchain technology offers transformative possibilities for Islamic banking in South Africa by enhancing transparency, compliance, and financial inclusion. However, its successful implementation depends on addressing regulatory, infrastructural, and socio-cultural challenges through education, collaboration, and innovation. By aligning blockchain's unique capabilities with *Shari'ah* principles, South Africa can establish a resilient, inclusive, and sustainable Islamic financial ecosystem that benefits both Muslim and non-Muslim communities.

CONCLUSION

The integration of blockchain technology into Islamic banking in South Africa has the potential to transform the sector by aligning innovative technological solutions with *Shari'ah* principles. The transparency, decentralisation, and immutability of blockchain create opportunities to enhance compliance, reduce risks, and improve operational efficiency in financial services such as sukuk, takaful, and waqf management.

Historically, the incorporation of technology into religion was viewed as an external activity that should not interfere with the essence of belief. However, it has now proven capable of supporting and extending the principles of *Shari'ah*. This convergence not only upholds the belief in God but also reinforces humanity through ethical practices and financial inclusivity.

Nevertheless, the successful adoption of blockchain in Islamic banking requires addressing several challenges, including regulatory alignment, infrastructural barriers, and gaps in digital literacy. There is a need to create collaboration among regulatory authorities, financial institutions, and *Shari'ah* scholars, and using blockchain's unique capabilities, South Africa's Islamic banking sector can advance toward a more sustainable, equitable, and innovative financial ecosystem. Ultimately, this convergence could strengthen local Islamic finance and position it as a model for ethical finance on a global scale.

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