



Exploring the Nexus of Financial Technologies, Financial Inclusion, and Blockchain in Islamic Finance within Digital Transformation

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ABSTRACT

Financial technology and continuous digital growth are having an influence on financial inclusion which has significant ramifications for the faith-based financial paradigm. The objective of this research is to investigate the relationships and effects of financial technologies in Islamic financing inside financial institutions within the framework of digital transformation and blockchain technology. The use of these advancements will significantly affect Sharia-compliant Islamic finance. This paper critically investigates the historical and current implications of Financial Technologies, financial inclusion, and Blockchain in Islamic Finance worldwide with a focus on banking, investing, and compliance with regulations. Using a comprehensive review of the literature, indexing journals, and empirical case studies, this research seeks to provide significant new insights on the development and status of several areas within the Islamic financial industry. In order to make Sharia compatible, it also examines how digitalization has altered the landscape. Furthermore, before they can considerably promote financial inclusion in many countries, the Islamic financial services industry and the junction of technology and Islamic finance still have a ways to go due to the scale necessary. The study's findings may serve as a guide for financial institutions, decision-makers, and other interested parties in order to maximise the potential of blockchain technology and other financial innovations in Islamic finance across a range of Islamic nations. Long-term, equitable economic growth will result from this.

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1. Introduction

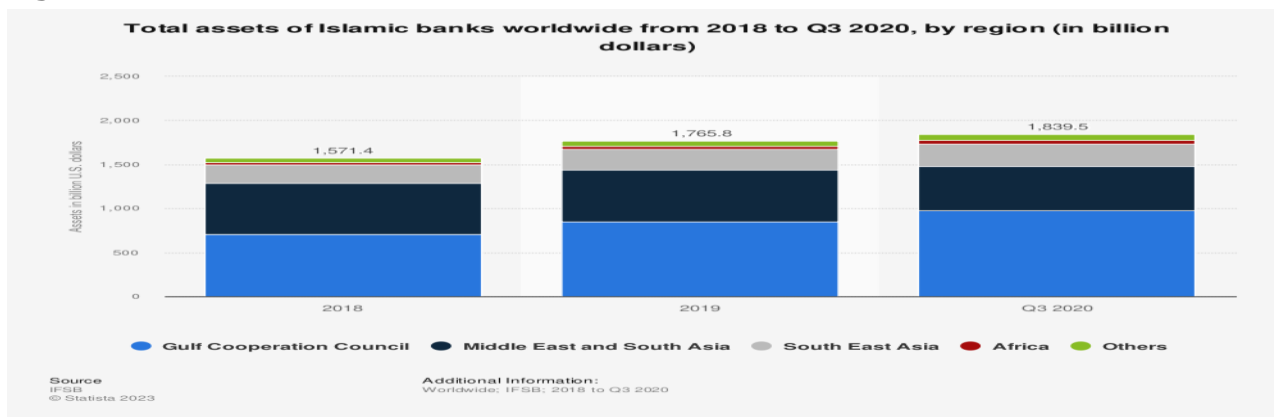
1.1. Islamic Finance in the Context of Worldwide: An Overview

Islamic finance, or Shari'ah compatible financing (SCF), is one of the sectors of the worldwide financial system that is growing the fastest. Even in countries where it is already well-established, the Islamic finance is expanding, breaking into new markets. A number of developing member countries (DMCs) in Central West Asia, South Asia, and Southeast Asia have begun to pass legislation and implement rules to allow the entry of Islamic financial products and instruments. A few DMCs aspire to establish themselves as the local hub for Islamic culture. The increasing prominence of Islamic finance in the domestic banking sector in major DMCs is a reflection of the industry's expanding relevance (Bank, 2016). To be more precise, goods that adhere to Islamic law, or Shariah, must be made by workers of Islamic banks. Global estimates indicate that by 2020, the Islamic banking sector would need up to one million specialists, notwithstanding its remarkable 20-year expansion (Farooqi & O'Brien, 2019; Kayani, 2023) states. Moreover, the research suggests that over 400 eminent Islamic

scholars possess expertise in Islamic financial theories and practises. It is estimated that just fifteen to twenty of these academics are more knowledgeable and experienced than the others. As a result, over 55% of board positions worldwide are held by the top 20 scholars. The situation in the Islamic microfinance industry is even worse when it comes to the availability of specialists in Islamic finance Dawood, Rahman, Majeed, Umair, & Idrees, (2023). Despite holding just over one percent of total Islamic finance assets, the main barrier to this specialist organization's growth is the lack of specialised training resources and expertise (Kayani, 2023).

The figure.1 displays the 1.84 trillion United States dollars in assets owned by Islamic banks in the year 2020, of which about one trillions were in the nations that make up the Gulf Cooperation Council. Nearly twice as much wealth as South East Asian nations was owned by the Middle East and South Asia combined, totalling another half a trillion dollars in assets Ullah, Rehman, Raman, (2023). This disparity was largely countered by the fact that Southeast Asia saw the most regional the sukuk issuance and the Total assets of Islamic banks worldwide from 2018 to Q3 2020, by region in billion dollars (Puri-Mirza, jan18,2023).

Figure 1

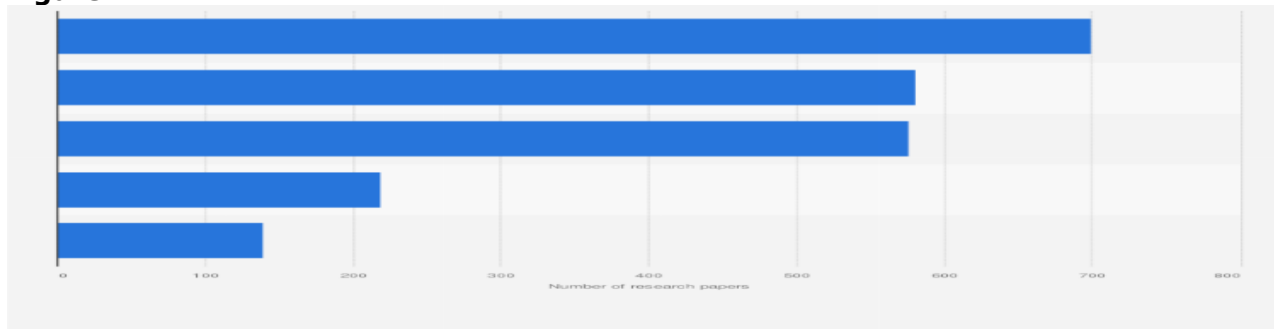


According to above figure the Islamic banking institutions are founded in compliance with Sharia the central tenet of Islam. It is well knowledge that investments in the following are restricted by Sharia:

- Traditional financial services or debt instruments that generate money through surplus or interest;
- companies that participate in activities that are banned by Sharia, such as alcohol and gambling
- Transactions that are volatile or speculative
- Turkey is classified as "Others" for the purposes of regional categorization. The countries of North Africa are categorised as "Africa," while Iran is categorised as "MESA."

Figure 2 explains about publications in the Islamic world .it shows that the 2019 saw the publication of 700 research articles on Islamic finance worldwide. Between 2017 and 2019, the Islamic finance research community produced 2,57 thousand research papers and over 1, 74,000 peer-reviewed journal publications. Fig is below

Figure 2



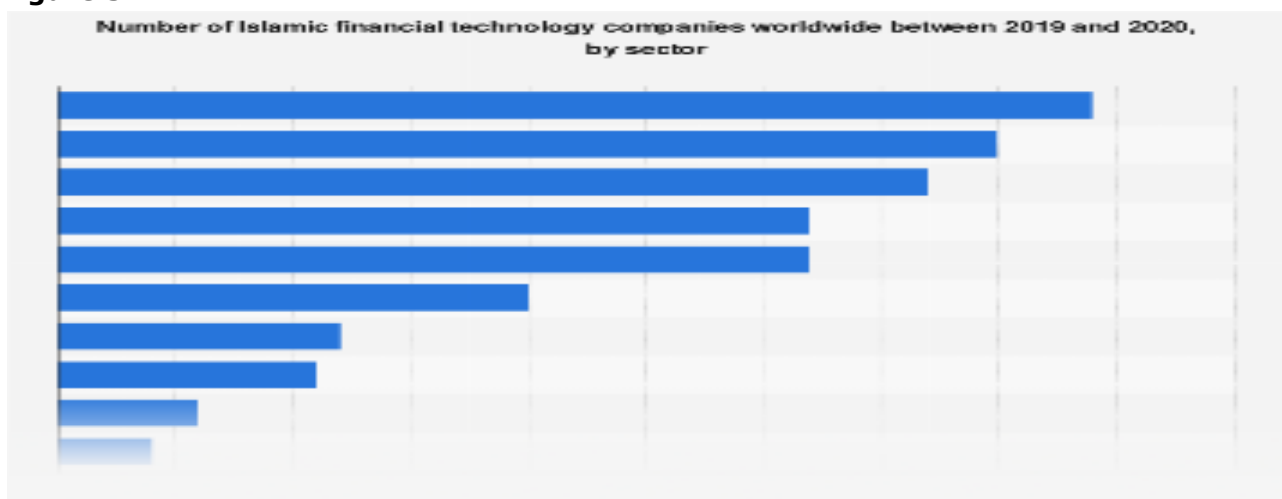
1.2. Overview of the Research

The intersection of block chain technology, digitalization Transformation and financial technologies along with financial inclusion in the setting of Islamic finance in Pakistan has given rise to a novel and ground-breaking topic of study. Over the last 10 years, these financial technologies have completely changed the global financial services industry by presenting new problems and upending long-standing practises. The emergence of financial technology, digitalization, and block chain has created a unique set of opportunities and challenges in Islamic states that support Sharia law since Islamic financial standards must be adhered to. This study offers a retrospective examination of this intriguing connection in order to provide insight on how these technologies have influenced and continue to improve Islamic Finance practices (Mhlanga, 2023). Islamic finance based on sharia places a strong focus on risk sharing, asset backing, and the ban on interest and speculative activity (gharar). Thus, to maintain adherence to these goals and benefit from innovation, the integration of emerging technologies into this particular financial ecosystem calls for careful thought. The \$2.4 trillion in worldwide assets under Islamic financing in 2019 is evidence of the industry's extraordinary development (IFSB, 2020). In this way, digitization has created new opportunities for financial accessibility and inclusion, and blockchain technology promises to improve the security and transparency of financial transactions (Ata et al., 2023). This study is important because it can provide us a thorough grasp of how financial technologies, digitalization, and blockchain have affected Islamic finance .This research aims to provide important insights into how these technologies have changed Islamic Finance practises and institutions while upholding the moral standards that guide the sector through a thorough analysis of the body of existing literature and empirical case studies. Financial institutions, legislators, and other stakeholders should find this research to be a useful tool in navigating the constantly changing field of Islamic finance and using the revolutionary potential of these technologies for long-term, sustainable growth.

1.2.1. Financial Technologies And Islamic finance

To function, Islamic finance requires financial technology. The Islamic financial ecosystem is more modern and dynamic than the mainstream one. Financial technology is one of the phrases that is utilised in the finance industry's research the most these days. The use of cutting-edge, modern technology to the banking sector is known as financial technology. In short, it's the delivery of financial services via innovative and state-of-the-art technology. In the latter half of the 2010s, the concept of financial technology reached its zenith (Haddad & Souissi, 2022)Financial technology has provided innovative and secure financial services in response to investors' increasing need for security. The need for more mobile and easily available financial services is another element propelling the advancement of financial technology (Anikina, Gukova, Golodova, & Chekalkina, 2016). Global count of Islamic financial technology businesses, broken down by industry, in 2019 and 2020.(December 21, 2022, Amna Puri-Mirza) Between 2019 and 2020, there were around 44. Islamic financial technology companies globally that were concentrated on using P2P and crowdfunding platforms to raise capital. The worldwide Islamic finance market has an estimated asset value of 2.88 trillion dollars.

Figure 3



According to Haddad (2023) the global financial crisis of 2008 served as the main impetus for the development of financial technology. With the onset of the global financial crisis, people started to lose faith in the banking system and started searching for other options that would provide them greater security while investing. The depth of the 2008 financial crisis led to the emergence of Islamic financial systems as a means of recovery (Smolo & Mirakhor, 2010). According to (Benković, Labus, & Milosavljević, 2023) innovations in finance are developing presently in the financial services industry since they are more genuine than earlier advancements. Islamic financial technology is defined as any financial technology that complies with the standards of Islamic financial institutions and is developed in line with sharia principles (Hassan, Rabbani, Jreisat, & Hossain, 2022). Examining the academic literature on Islamic finance technology is the aim of the project. Three primary categories exist within the field of Islamic financial technologies: legislation and regulation, sharia compliance with cryptocurrencies and blockchain, and potential and issues for Islamic financial technology (Hidajat (2020); Vladimir (2017)).

Thinking about This change is mostly the result of a small number of technologies, such as big data, mobile internet, blockchain, AI, ML, and other DLT technologies. With the exception of mobile banking, (Unal & Aysan, 2022) noted in their article that the majority of Islamic banks are using these technologies in a static manner. This technicality is mostly due to the widespread use of mobile banking infrastructure; alternative solutions that will be discussed later need substantial infrastructure and R&D expenses (M. A. Khan & Salah, 2018). Due to their early stage, these investments will actually have a low return on investment (Rahman, Ali, Idrees, Ali, & Zulfiqar, 2022; Li, Bai, Yu, Meo, Anees, & Rahman, 2022; Rahman, Bakar, & Idrees, 2019). However, in a volatile and cutthroat market, banks are hesitant to move substantial amounts of cash (Yudaruddin, 2023). As a result, existing research suggests that Islamic banks would prefer to work with start-ups and developing Financial Technologies rather than directly investing in Financial Technologies (Azarenkova, Shkodina, Samorodov, & Babenko, 2018). This is because emerging financial technologies and start-ups are safer to deal with or, in the event that they become successful, acquire. This increases the potential return on investment for Islamic banks when they use financial technologies and creates a welcoming environment for emerging Islamic financial technology firms. However, Islamic financial technologies have a considerably higher rate of adaption than traditional finance since they are also supported by Maqasid al-Shariah, one of the major pillars of Islam, which also supports digital transformation (Laldin & Djafri, 2019) Islam requires that Muslims' money be safeguarded worldwide, which means that financial services costs and friction must be reduced (Zhu, Fang, Rahman, & Khan, 2023).

Financial technology use is encouraged in Islamic banks since it is critical to reducing banking costs. Islamic Financial Technologies is also seen to be more transparent by its norms (Hassan et al., 2022). After the subprime crisis, there was a reduction in trust in the old system, which led to a notable acceleration in Islamic finance's growth. Users have switched, especially in the last 10 years, since Islamic banking is perceived as offering a more trustworthy environment in the financial industry because of Shariah's strict rules for moral business practises and transparency (M. F. Khan, 2007). In the ensuing three years, Islamic Financial Technologies may be able to attract more than 150 million new customers with this guarantee (Muneeza & Mustapha, 2021). The increase of Islamic Financial Technologies and banking clients, together with the increasing confidence of existing users, may be attributed to the burgeoning Muslim population globally. More over 3 billion Muslims will live in the world by 2060, and most Muslim countries will have had substantial economic growth (Zuhriatusobah & Rahayu, 2022). It follows that the growth of Islamic financial assets is expected to occur rapidly. There are some concerns with this upbeat assessment of Islamic Financial Technologies, though. Such quick growth in a startup company requires massive human resources, a strong regulatory base, and a well-defined government strategy (Aysan & Unal, 2021). Governments and educational institutions are therefore essential to the advancement of Islamic financial technologies in the future.

Indeed, in addition to the lack of skilled workers, there is a paucity of legitimate research in Islamic Financial Technologies (Qudah et al., 2023). Even though, as the paper's introduction notes, academic research institutions and universities have recently showed an increased interest in Islamic Financial Technologies, the sector is still relatively unexplored,

and empirical proofing is needed in many areas. Finally, financial technologies may be very beneficial to Islamic banking. But this rapidly spreading fire requires a significant and consistent supply of fuel to endure over time. Islamic Financial Technologies will be the future of Islamic finance if human resources, academic research, a wholesome atmosphere, a clear government directive, and legal foundations are provided.

1.2.2. Digital Transformation and Islamic finance

The banking industry is increasingly digital, which has enormous potential for businesses of all kinds. A few decades ago, the digital potential of the twenty-first century would have been considered mythical. As the Figure.4 illustrates that Global spending (in trillions of dollars) on services and technology related to digital transformation from 2017 to 2026. By 2022, it is projected that investments in digital transformation would reach 1.6 trillion USD. By 2026, it is anticipated that global spending on digital transformation would surpass 3.4 tr usd. The Statista projection is based on data for 2026 and the source's 16.4% compound annual growth rate from 2021 to 2026. It was projected that the market will expand at a rate that is exponential (Statista).

Figure 4

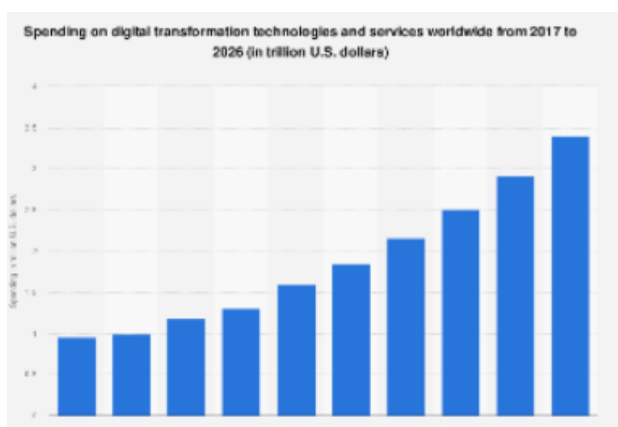
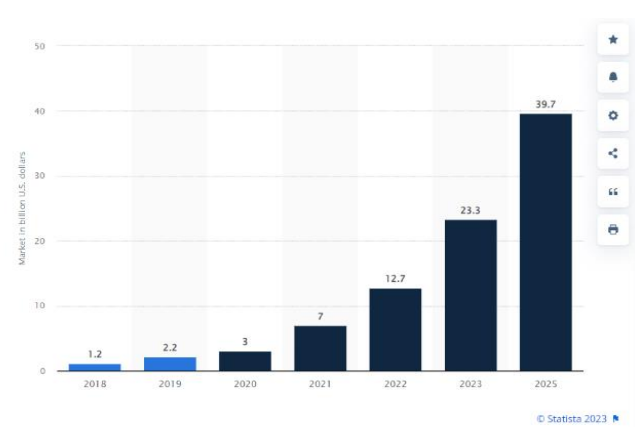


Figure 5



"Digital transformation" is the process of using digital technology to change non-digital business services and processes to digital ones. This involves, among other things, moving data to the cloud, automating processes, and using technological tools and devices for communication and cooperation. Next There are several reasons why digital transformation is spreading. Among them is the ongoing COVID-19 pandemic, which in 2020 has considerably quickened the rate at which businesses throughout the globe are undergoing digital transformation. Two further variables are the need to stay ahead of the competition and customer demand. All things considered, companies become more resilient when they use technology for digital transformation since it boosts their agility in responding to changing markets and stimulates innovation. In the next three years, over 150 million more customers are expected to use financial technology, thus businesses and researchers alike should be putting in a lot of effort to protect this potential (Jalal, Al Mubarak, & Durani, 2023). Digitization and financial technology would also assist institutions in preserving the legitimacy of their internal organisational structures. According to (Suzuki & Miah, 2022), the right digital transformation strategy will advance corporate practises that result in profound changes to the structure, operations, and interactions of firms. (Omarini, 2018) claims that in addition to enabling a thorough overhaul of present procedures and systems to make them more effective and efficient, the process of digital transformation in the banking industry helps clients have a better experience during the development process.

Digital transformation helps banks save money on operational costs by reducing the need for physical offices and labour while providing new service channels through electronic platforms (e-banking, virtual banking), electronic branch stores, and point of sale (Shin, 2019). Changes brought about by technological advancements in the commercial and environmental domains result in digital transformation. Changes in business processes can have an impact on a variety of connections, including those between an organisation and its clients, employees, and the market. Today, practically every aspect of life is impacted by the quick advancements in the digital realm. Imamuddin, Zaharuddin, Andryadi, Isnaniah, and

Artika (2022) has caused a shift in business models and the replacement of the existing corporate ecosystem with a new one that is more complex and dynamic. Significant adjustments have been made to processes, work practises, organisational structures, and business models in order to improve their adaptability to change as a result of the steady digital revolution of traditional banking. This fundamental shift is necessary for businesses to survive and grow, and it is directly linked to shifts in customer preferences and payment methods as well as the emergence of competitors that aren't banks.

Even though digitalization is still in its early stages, the COVID-19 pandemic has caused it to pick up speed. The main forces underlying the drive towards digital transformation include enhancing customer satisfaction, improving operational efficiency, and enhancing competitiveness. Among the technologies that have been implemented are artificial programming interfaces, digital and mobile wallets, and biometric identity.. (INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH AND ANALYSIS) The COVID-19 epidemic and the ensuing physical segregation and mobility restrictions that were implemented as preventative measures have increased the demand for the digitization of financial services, particularly those provided by insurance companies, or IBs. As an illustration, the majority of IBs have implemented a work-from-home policy that requires improved technical network security and remote access. About two thirds of IBs are undergoing digital transformation at different phases of the process. Despite differences in the precise phases of their execution, the fact that they have started is a good thing. Nonetheless, in their most recent budget, less than half of the IBs in this category set aside money for IT-related initiatives. As a result, change is expected to be both unavoidable and essential to the post-COVID-19 economic recovery. others IBs who started their digital transformation process prior to the outbreak are expected to have it relatively simple compared to others that had to respond.

Another important advantage of digitalization for financial organisations is the decrease in labour, time, and costs. As previously indicated, many Islamic financial institutions must make cost reductions in order to remain in operation because of their relatively thin profit margins. Cross-border payments and other foreign transactions create particularly challenging circumstances due to the greater expenses associated (Abdullah, Shahimi, & Ghafar Ismail, 2011).These companies can establish a seamless international financial centre more rapidly because of the creative options provided by blockchain technology—and bitcoin assets in particular. Furthermore, zakat is limited to eight primary areas as stated in the holy Qur'an (9:60). The poor, the indigent, the reverts, Muslim friends, slaves, debtors, lost travellers, and those who struggle for Allah are among these groups. Islamic charity applies limited funds, even though these categories are important pressure areas for social empowerment (Al-Ali, 2022).There are now several projects underway to employ blockchain technology for zakat collecting and fund administration. Actually, it is easier to distribute zakat correctly when it is received than it is to actually collect it. Some country are developing digital zakat distribution and classification systems to accurately identify persons in need and calculate the necessary payment amounts for each category(bin Khatiman, bin Ismail, & Yahya, 2021).

Consumers are increasingly opting for products primarily based on speed of payment as the marketplace intensifies considerably. According to (Weinberg, 2000) Since users usually only have to wait a few seconds for a click, they would not select a system that takes more than a few seconds to conduct transactions. Any organisation that used blockchain technology, digital systems, and several other ideas, such financial technologies, would vanish from the markets very soon (Oh & Shong, 2017). The risks connected to digitization are, in fact, discussed in the literature. The first and most significant risk facing a highly digitalized financial institution is that it will be exposed at every organisational level. Furthermore, it is challenging for institutions to build a strong foundation because financial technologies are still in their infancy and trends shift quickly (Chang et al., 2020). This is the primary justification for why major institutions form alliances with emerging financial technology firms or employ their services rather than building their systems exclusively on financial technologies. The institution's main line of business will be secure with this approach, even if the underlying tendencies continue.

1.2.3. Blockchain Technologies and Islamic Finance

Blockchain technology has attracted a lot of interest by addressing a crucial flaw in human nature. Blockchain technology has garnered significant attention and interest from a wide range of stakeholders globally. The newest developments in financial technologies are centred around blockchain and artificial intelligence. Artificial intelligence has shown beneficial in several sectors, including image processing, machine translation (M. A. Khan & Salah, 2018) chatbots and many more. Among the techniques employed in artificial intelligence include artificial neural networks, rule-based, statistical, and case-based reasoning. Blockchain technology and its underlying technological architecture have a number of obvious advantages. A blockchain is a configuration of connected blocks on a peer-to-peer network. Every block is connected with a cryptographic hash code to prevent single points of failure. The fact that the other nodes in a peer-to-peer network will keep running even if a few do not makes blockchain technology more user- and administrator-friendly (Mao, Deb, Venkatakrishnan, Kannan, & Srinivasan, 2020). The blockchain's digital technology, which enables a range of applications, is its second essential component. Transparency is another essential component of blockchain technology, enabling everyone to see and track transactions. One of the main features of the blockchain is immutability. Modifying the blockchain or the transactions on it is nearly impossible. Nevertheless, relatively few blockchain upgrades have been discovered. Numerous commentators have forecasted that blockchain technology would soon cause a disruption in the financial services industry. A blockchain is an ever-growing collection of blocks (Ahram, Sargolzaei, Sargolzaei, Daniels, & Amaba, 2017).

Each block contains information about the transaction, a date and time stamped, and the previous block's digitally encrypted hash code (Nakamoto, 2008). The ability of the blockchain to log transactions and its resistance to data alteration are its two most intriguing features. Thus, by enabling transparent and traceable transactions, blockchain technology may benefit Islamic banking and finance when applied properly. It may boost public trust in Islamic money transfers, deals, and activities. One of the key focuses of a Financial Technologies study on Islamic banking is determining if the agent is operating in the best interests of all interested parties (Ahmad & Halim, 2014). Nonetheless, most countries that provide Islamic banking still do not recognise smart contracts legally or have any regulations governing them. This study encourages the use of smart contracts as well as blockchain in the agent supervising process in order to guarantee transparency in every interaction for all the key players in Islamic banking, including donors, beneficiaries, government regulators, and Sharia Supervisory Boards in particular. (Lacasse, Lambert, & Nida, 2018). Even if we ignore their legality, blockchain-based monitoring mechanisms might be a useful tool in Islamic finance technology. Smart contract transactions can provide a record of ownership and assets and are immutable and identifiable. (Rahim, Mohamad, Bakar, Mohsin, & Isa, 2018).

According to Lawrence (2017), Islamic banking may be revolutionised and costs associated with using automated agreements rather than financial contracts and services can minimise replacement costs by as much as ninety-five percent. Giving back to the community is one facet of Islamic banking and finance. Contributors typically designate Islamic Finance and Banking representatives to handle this work and provide them with the authority to transfer funds for social causes in accordance with Shariah on their behalf. Agency theory is predicated on the idea that representatives in the banking and finance industries aim to maximise their welfare and income. Nonetheless, Every financial operations may benefit from the use of smart contracts, and their creation can streamline regulatory compliance and supervision processes (Lacasse et al., 2018). According to Evans (2015), an academic study examines the Blockchain management system as an accounting system. Bitcoin and other blockchain-based systems can be a reliable option for a range of payments. Peer-to-peer network connections in Bitcoins authenticate transactions. The transactions are kept on a distributed public network and are connected via encryption. The financial industry's use of blockchain technology is opening up new opportunities for a range of organisations on a daily basis. Muneeza and Mustapha (2021) looks into the usage of blockchain in the crowdfunding industry as one example of this. According to research, using blockchain technology in crowdfunding might help to resolve problems that have been reported on six crowdsourced websites. In the event that financing goals are not reached, fundraisers may choose to issue their own shares or employ smart contracts. Many intermediaries, a single money management organisation, high transaction costs, centralised database administration, and

duplicate payments are only a few of the challenges faced by traditional banking. However, these challenges can be overcome by employing a blockchain-based crowdfunding platform. Blockchain-based crowdfunding platforms may incorporate extra features like voting systems that let shareholders and the general public take part in business governance, and smart contracts may be used to spot fundraising frauds.

The use of digital currency can eliminate the need for a middleman, and identity management systems can stop identity theft (Zhu et al., 2023). Blockchain technology might lead to more efficient financial transactions. Financial institutions might save at least \$20 billion by utilising blockchain technology to reduce costs associated with cross-border payments, regulatory compliance, and settlement. Still, integrating blockchain technology with the existing financial institutions is a challenging task. Attempts have been made to incorporate blockchain technology with presently accessible digital solutions by means of third-party software. Further the figure below displays the global blockchain technology market's size in 2018 and 2019, together with projections for 2020 to 2025 (in billion US dollars). According to the research, the figures for 2019 through 2022 are projections based on an eighty-two percent annual growth rate throughout the course of the estimated time. According to forecasts, the worldwide market for blockchain technology is expected to expand rapidly over the next years, reaching an estimated valuation of more than 39 billion US dollars by 2025. Almost thirty percent of the current market capitalization of blockchain technology is attributed to the banking industry, which was among the first to invest in the innovation. (Statista Research Department, Sep 6, 2023).

It could offer a novel method for utilising blockchain technology in Islamic banking and financial services that adhere to Shariah. Blockchain-based methods may and should be used in Islamic finance transactions in order to boost global trust in the sector at this pivotal point. Like in the conventional financial sector, newer financial technologies and start-ups are welcomed by larger institutions or banks, who eventually merge with or acquire them. This also applies to the Islamic finance industry. Blockchain technology and cryptocurrencies facilitate crowdfunding, as well as quick transactions and the elimination of cross-border fees. National obstacles are removed via openness and lowering expenses, which also increases public trust in the fundraising group. Furthermore, although the centralised structure of these enterprises has been eliminated, worldwide reachability has achieved its peak with few legal constraints, no cross-border fees, transaction charges, or time delays. Blockchain is also used to detect fraud in crowdfunding and fundraising businesses by continually monitoring the record of transactions. By simplifying their processes, this blockchain technology feature might be beneficial to governments and other regulatory bodies. Digital currencies, especially those issued by central banks, can be used to track down the funding of terrorist organisations and uncover financial crime in other transactions.

1.2.4. Financial Inclusion and Islamic Finance

The process that "ensures the ease of access, availability, and usage of formal financial services" is known as financial inclusion. Financial inclusion appears to be a route that can enhance living standards and reduce poverty on a global scale. The impoverished in emerging nations have suffered much from informal financial services, which only serve to keep them mired in a never-ending cycle of debt. Sarma (2008a) defines financial inclusion as a procedure that guarantees the availability, use, and accessibility of formal financial services. It implies that every individual in society needs to be able to access financial services at a cost that fits their requirements and participate in the market. With its cutting-edge features, accessibility, and rapid growth, the financial technology sector is displacing the well-established financial services industry. For at least four reasons, profit-sharing-based financial services have a higher chance of promoting financial inclusion in rural regions than in contemporary metropolitan areas: (1) Small and transparent societies, like small rural communities, are likely to have lower levels of cheating; (2) Rural residents may choose financing based on religion because they view it more conservatively than urbanites; (3) Islamic-compliant financial institutions are an essential tool for integrating the rural population into the national financial system; and (4) Islamic banking may be more necessary in rural communities as a means of enhancing income redistribution. In rural places, Islamic MFIs or small-scale Islamic banks provide services.

Islamic financial inclusion in Indonesia demands more attention given the significance of the role that financial inclusion plays in socioeconomic development, particularly in terms of assessing and putting policies in place to improve inclusion in the contemporary digital era. It is important to make the most of Indonesia's chance to expand Islamic financial inclusion by leveraging the internet and financial technology platforms as a means of digitization. The financial services sector's digitalization through fintech presents a chance to boost financial inclusion, and the existence of Islamic fintech can bolster Islamic financial inclusion as well. A case study conducted in Malaysia revealed that fintech, particularly when used for investments, can boost financial inclusion. Individuals in Indonesia are drawn to the availability of Islamic fintech that is focused on investments because it often offers a larger profit share rate than other investment products. Although there is no set standard for measuring Islamic financial inclusion in Indonesia, other researchers have attempted to do this and discovered that the provinces of Yogyakarta and Bangka Belitung in Indonesia have the greatest degree of Islamic financial inclusion, while the island of Nus East the southeast has the lowest. Additionally, the foundations and terms of transactions in the Islamic finance's operating mechanism are followed in order to function in accordance with sharia principles. The fundamental tenet of Islamic finance is the equitable treatment of all people, especially social justice. These ideas are embodied in the Islamic finance model, which is closely linked to inclusive growth and offers a compelling substitute for traditional methods of funding expansion. The creation of a successful, just, and equitable economic and social system where everyone may fully realise their potential, protect and enhance their health, and actively participate in the socioeconomic advancement of society is the fundamental economic tenet of Islam. Islam places a strong emphasis on financial inclusion. Nonetheless, the concepts of risk sharing and income redistribution set Islamic banking apart from traditional finance. These characteristics allow Islamic finance to offer SMEs credit, micro financing, and micro-insurance, all of which contribute to the advancement of financial inclusion.

Figure 6 Illustrates that the Global Findex Database has been a leading repository of information on worldwide access to financial products and services, including transactions, savings, and financing, since 2011. Financial inclusion is a fundamental component of prosperity. The data provides knowledge about behavioural patterns that support financial resilience and include updated data on access to and usage of official and informal financial services, electronic payments, and 128 thousand people from 123 economies during the COVID-19 pandemic. The results also show that women and low-income persons have discrepancies in their utilisation and access to financial services. The information is only accessible till 2021.

Figure 6

Global account ownership increased from 51 percent to 76 percent between 2011 and 2021

Adults with an account (%), 2011–2021



Source: Global Findex database



The above figure tells about the following points.

- COVID-19 hastened the adoption of digital financial services. Around forty percent of individuals in developing nations (apart from China) who made a digital merchant payment using a card, phone, or the internet did so for the first time after the epidemic

started, and more than a quarter of those who paid a utility bill straight from an account did the same.

- In Sub-Saharan Africa, digital currency has become a vital tool for financial inclusion, especially for women, through mobile money transactions, savings, and borrowing. It also acts as a motivator for monetary ownership as well as usage and When faced with an unforeseen bill, around half of individuals in emerging economies could get more money within thirty days.

2. Methodology

The article's primary focus centres on the utilization of Scopus and Google databases to examine Islamic financial institutions in the context of Financial Technologies , blockchain, and digitalization. Initially, the search yielded a substantial collection of over 200 articles with relevant credentials, which was subsequently narrowed down to a more focused selection of 100 articles through manual curation. In the field of Islamic financial technology, 120 research papers were gathered for the study , 50 from the Social Science Research Networks (SSRN), 20 from Research Gates, Thirty from Google Scholar, and Twenty from different sources. The analysis scope is further limited to journal articles, serving as a valuable means to discern the prevailing trends in reputable indexed journals.

3. Discussion

Islamic finance institutions can gain a competitive edge, operational efficiency, financial inclusion, and customer-focused financial services by using digitalization. Diverse cutting-edge digital transformation channels, such as peer-to-peer models and payment systems, blockchain technology, cryptocurrencies, smart contracts, crowdfunding, cybersecurity, and cryptocurrency trading, may be employed by the Islamic financial sector. Digital transformation has recently been a top priority for the Islamic financial sector. Digital evolution is a critical strategic issue, according to a new study by the General Council for Islamic Banks and Financial Institutions, which polled Islamic bank management worldwide (CIBAFI 2018). Over half of the participants aim to expand or build digital branches in the near future. The majority of banks in the Middle East and Africa have initiated tech divisions and are collaborating with fintech firms. Islamic finance has continuously demonstrated that it can benefit the sector through its digital growth. Conversely, financial technology offer benefits such as reduced expenses, increased efficiency, and superior financial services and goods (Hassan et al., 2022). Overall, research indicates that there is a strong connection between Islamic banking and Islam's basic principles and the Financial Technologies that Islamic financial institutions invest in. Transparency, social benefit-focused investing, protecting human resources, protecting the natural world and human prosperity, and cutting labour, financial, and time expenses are some of the goals that Islamic banking and financial technology share.

Additionally, there's a likelihood that blockchain applications can accelerate financial inclusion initiatives. As a result, the rise of digital financial services points to a new strategy for offering a range of financial services to those who are economically and environmentally excluded in a sustainable manner. Financial technology like crowdsourcing, mobile payments, encryption, and microfinance are very helpful to the less fortunate populations. More specifically, new avenues for connecting with low-income individuals, families, and companies have been made possible by the growing use of blockchain technology and crowdfunding platforms. the Financial inclusion has become more important on a worldwide scale as a means of ensuring sustainable long-term economic growth, and regulators and policymakers working on the financial sector's development now prioritise it highly. The fact that this is the case illustrates how crucial financial inclusion is and how widely acknowledged it is as a requirement for both socioeconomic development and financially inclusive growth. Financial inclusion was identified at the 2010 Group of Twenty (G20) Summit as one of the cornerstones of the global development strategy. In an effort to support inclusive growth, financial inclusion has also grown to be a crucial component of many development organisations and multilateral development banks . The considerable distance, particularly in rural regions, between a community and a bank branch is one of the primary barriers to financial inclusion. However, one of the main obstacles to the financial inclusion objective is getting financial services to customers in rural areas. The geographical development is limited by weak infrastructure, outdated telecommunications technology, and stringent branch rules. Few commercial bank

branches per 100,000 people and low account penetration are seen in most Muslim countries (World Bank, Global Financial Inclusion (Global Findex) Database). Blockchain technology is consistent with Islamic teachings as Shariah views technology as always permissible. The use of technology establishes whether something is haram or halal. Upon further examination, it may be concluded that blockchain technology aligns with Islamic principles by encouraging transparency and irreversibility in economic dealings. Thus, blockchain technology might be highly beneficial to the Islamic banking industry in its efforts to provide Shariah-compliant services.

Furthermore, DLT-based technologies such as blockchain are becoming widely recognised in the Islamic financial industry. By assisting them in implementing Maqasid judgements into the way they operate, these advances may benefit Islamic financial institutions. A good illustration of this trend is Ethereum's recent decision to switch from the evidence of work idea to evidence of stake, which significantly lowers the needed energy use of mining. Blockchain technology offers a fresh viewpoint on the Financial Technology industry as it can be integrated with any existing Financial Technology tool. Blockchain technology innovation also benefits Islamic finance, which benefits banking and non-bank organisations equally. More than ever, blockchain and other DLT based technologies are at the forefront of research on Islamic banking. The study's findings imply that these technologies can meet Islamic finance's requirements for speed and efficiency far faster than conventional financial technology. The potential of Islamic Financial Technologies is greatly increased by the convergence of Shariah and Financial Technologies legislation, which also facilitates the simpler integration of new technical advancements into Islamic banking. The potential of Islamic Financial Technologies may also be maximised by combining the advantages that Financial Technologies provide with the expanding acceptability of Islamic finance. One noteworthy development in Islamic Financial Technologies has been the rise of startups in this field.

These startups aim to leverage technology in order to fulfil the particular needs of Islamic financing. Nizam and Bacha's 2017 research explores the Islamic Financial Technologies startup landscape and how it fosters innovation and competitiveness. These businesses have been able to grow thanks to venture capital funding and encouraging environments (El-Bialy, 2019). Increasing operational convenience and transparency is one of Shariah's main goals, and financial technology and blockchain are used to accomplish this. A genuinely Islamic business should protect its clients' assets and run effectively and openly. Sustaining Shariah compliance while a firm remains competitive in today's demanding marketplaces is more difficult. Smart contracts combined with Islamic Financial Technologies will assist reduce transaction costs by automating any level of transaction. Considering About Financial technology adoption in Islamic finance is reliant on the existence of regulatory frameworks. Mohieldin and Malouche (2016) are among the scholars who have examined the significance of legal frameworks that guarantee adherence to Islamic values while promoting innovation. According to research, sandboxes and rules designed specifically for Islamic Financial Technologies businesses can be useful tools for promoting innovation and expansion while adhering to Islamic standards (Laldin & Djafri, 2019). Furthermore, how Islamic finance evolves in the digital era will be greatly influenced by legislative frameworks and the expansion of Islamic Financial Technologies businesses. These results offer a strong basis for more investigation and the creation of approaches that harmonise technology with Islamic banking tenets.

Numerous experts believe that contracts based on blockchain technology combined with cryptocurrency assets will be the foundation of finance in the future. The overwhelming majority of Muslim countries today have abundant resources and a large population. They should invest more time and energy into learning about financial technology and digitization if they want to reach their full potential. The discussion that follows will provide a brief overview of emerging digital technologies and their applications across the financial services sector. More information on these digital technologies may be found in the table below. Artificial Intelligence (AI) is a branch of computer science that builds intelligent gadgets using machine learning and algorithms. In particular, FSIs benefit from AI's ability to expedite learning, decision-making, and the supply of useful predictive analytics. Financial services companies (FSIs) employ artificial intelligence (AI) for a variety of purposes, such as fraud detection, data-driven trading, usage-based insurance, credit scoring, and market and consumer

research. With the addition of visual components, audio, or any other sensory stimuli, augmented reality (AR) is a more enriched representation of the actual physical environment. FSIs can better understand complicated streams of data with AR's help since it offers strong data visualisation that facilitates fast decision-making.

Table 1: Applications of Digital Technologies to the Financial Services

Digital Technologies	Payment-Services	Investment and Trading	Insurance
Blockchain	Applicable	Applicable	Applicable
Biometric	Applicable		Applicable
Artificial Intelligence (AI)		Applicable	
Augmented Reality (AR)		Applicable	
Internet of Things (IOT)	Applicable	Applicable	Applicable
Big Data Analytics	Applicable	Applicable	Applicable
Cloud Computing		Applicable	Applicable

The research and analysis of quantifiable biological traits including the face, fingerprints, retina, and iris is known as biometrics. Biometrics rely on measured bodily attributes that are automatically verifiable for the purpose of authentication. Controlling fraud and identity theft is made easier when biometrics are used in financial transactions. The phrase "internet of things" (IoT) describes a system of linked objects that communicate with one another online. Using data collected from the use of various devices for financial transactions, financial service providers (FSIs) can have a real-time understanding of the finances and financing needs of their clients. Customer information will also help FSIs provide value-added services, financial support, and bespoke items, ensuring a win-win situation for all parties. The Internet of Things, or IoT, connects our digital information system, or "the internet," with human culture, or our "things." ZDNet was informed by Ashton, "That's the IoT." (Barker 2015). The term "cloud computing" refers to the "delivery of on-demand computing services, usually over the World Wide Web and on a subscription basis, ranging from uses to processing and storage resources (i.e., developing software platforms, servers, storage, programming, networking, artificial intelligence, standard office applications and etc.)".

4. Conclusion

Islamic financial technologies in financial inclusion due to digital transformation and blockchain technologies have a very bright future both in the Islamic world. Financial service Financial technology use in Islamic finance has several advantages, but it also has many drawbacks. Fintech applications must abstain from deceit, fraud, and other behaviours that might irritate users while upholding the Islamic values of equality, justice, and transparency. These concepts will protect both consumers and the community at large, while also encouraging just transactions and fair allocation of resources two goals of Islamic law. Establishing a suitable Sharia governance structure is necessary to guarantee that fintech operations adhere to Sharia law. Stated differently, in order to guarantee that fintech operates in a secure environment, regulators or authorities should evaluate Sharia compliance concerns in fintech operations and practises. Currently, Sharia-compliant fintech is not governed by any official rules or regulations. Regarding Islamic Financial Technologies, Blockchain technology presents a safer and more innovative way to do business. Blockchain technology increases transaction transparency and publicity for all users. Furthermore, smart contracts may be a useful instrument for all financial transactions, and their creation can streamline the regulatory and monitoring process. As According to (Awan, Ali, Rehman, & Idrees, 2023) the Islamic economic system is the best among all other system so just like that the Islamic finance and Islamic financial technologies are the best solution in today's digitalization transformation . The degree of Islamic financial inclusion is directly impacted by the digitalization transition of the contemporary digital era, but the presence of a sharia fintech service platform has a positive and substantial influence. It has been demonstrated that the existence of fintech can raise the degree of Islamic financial inclusion. Globally, Islamic financial services are becoming more widely available. Consequently, greater focus must be placed on measuring Islamic financial inclusion and its impact on policy, particularly in light of the economy's growing digitization, which has the potential to both present possibilities and risks for Islamic banking. Many individuals and enterprises still do not have access to financial services, despite the past

several decades having seen the growth of the financial sector in various Islamic countries. However, there is a dearth of information on Islamic financial services in general and Islamic microfinance in particular. Not only are Islamic financial services developing quickly in many Muslim countries, but there is still room for this industry to grow among the Muslim community, which is still relatively unbanked.

4.1. Future Directions

Future study should focus on constructing new fintech solutions customised to the special demands of Islamic finance, such as risk reduction, customer-focused services, and Shariah compliance regarding Financial Inclusion. In addition, researcher can do research into distributed and decentralised ledger technology, such as blockchain, has the potential to completely transform the recording and execution of financial transactions in conformity with Islamic law. The researcher can do study on financial technology use in Tourism. A researcher can do study on the implications and opportunities of the convergence of fintech and Islamic banking can be obtained by looking into how these factors interact with conventional financial indicators and influence decision-making procedures. Future studies ought to examine the social and environmental effects of advancements in tourism technology in order to guarantee inclusivity and sustainability in the growing travel industry. The Researcher Can use new nexus of variables in Islamic finance and apply different statistical analyses.

4.2. Limitations

There are a few things to take into account when analysing how financial innovations, including blockchain and digital transformation, affect Islamic financing inside financial institutions. The temporal difficulty presented by blockchain technology and the quickly developing financial technologies is that the technical landscape may alter all through the course of the study, which might have an impact on how the results are applied. The study's generalizability may be limited by unequal availability to thorough and standardised data on the use of these technologies across various Islamic financial institutions. In particular, ethical questions with the dissemination of private financial and technological data may create difficulties for the technique and restrict the study's applicability. Since a review of the literature serves as the foundation for this study, other statistical approaches may be used in the future. Furthermore, limited resources may affect the study's examination's breadth and depth. In order to preserve the integrity of their study and direct future studies in this intricate and dynamic subject, scientists must be willing to accept these constraints.

4.3. Recommendation and Policies

A set of strategic guidelines and rules emerges in the context of digital transformation, and blockchain technology in financial inclusion to help Islamic finance navigate the ever-changing financial technology landscape. To create a uniform regulatory framework that guarantees that financial technology complies with Islamic finance principles, regulatory bodies must, first and foremost, cooperate closely with Islamic scholars and fintech specialists. Shariah compliance, ethical issues, and risk management should all be covered by this framework. Financial firms utilising these technologies ought to implement robust cybersecurity protocols to protect confidential customer and financial information and foster confidence within the digital financial landscape. Furthermore, the Islamic finance understanding of the complexity of these technologies in the context of financial inclusion. So the Institutions need to consider forming alliances with technology providers to ensure the moral use of blockchain technology and other digital solutions. Policymakers can also offer incentives for fintech research and development that is explicitly targeted towards Islamic finance in order to foster innovation and long-term growth. Ultimately, encouraging global collaboration in the standardisation and regulation of these technologies will contribute to the development of a logical and well-accepted framework that will facilitate international trade and the expansion of Islamic banking in the digital era. These recommendations and regulations aim to strike a balance between devotion to Islamic banking principles and advances in technology in order to foster a strong and inclusive financial environment.

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