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A study on the impact of blockchain technology on Islamic financial system: Challenges and opportunities

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Abstract
The Technological innovations quietly affect the conventional and non-conventional financial sectors. Fintech revolution restructures the financial industries operations. Since 2008, the blockchain technology has been developed and rapidly gains the attention among the world especially in the Islamic finance decision makers and policymakers. The adoption of blockchain technology in Islamic Fintech is remarkable and confronts numerous challenges and questions on the basis of feasibilities and also an uptick growth rate in Islamic financial assets. Several financial institutions or organizations endeavour to implement the disruptive technologies as reducing risk and time costs through the decentralised and keeping open book ledger system. So this work is entitled as A Study on the impact of blockchain technology on Islamic Finance System; challenges and opportunities. In addition, this paper also exposes emerging literature reviews on blockchain technology in the Islamic financial system and also find out the various positive and negative impacts of Distributed ledger technology in the Islamic finance sectors, so it will literally assist the financial industrialists, academicians and policymakers to understand the processes, application and challenges of blockchain technology in the Islamic finance sectors. It will literally draw a path way towards investors, businessmen and laymen with detailed information.

Keywords: Bitcoin, Blockchain technology, Islamic fintech, Smart contracts, financial technology

Introduction

The technology has been boom in the 21st century. Several financial sectors have been exploring the feasibilities, obstacles and challenges in the Fintech revolution. The blockchain technology which is a disruptive and innovative technology eases the financial services. The term Fintech has been used in both conventional and non-conventional financial sectors (Rabbani, 2020) [46]. It was used since the early period of the 21st century and became more relevant in the late of 2010 (Haddad, 2019) [27]. The financial services are subjected to risk in management and high levels of transactional cost, so the financial sector triggers seeking a new system which has cost minimizing strategies for the financial institutions. Fintech can provide an efficient way for financial transactions (Anikina *et al*., 2016) [6]. The lack of trust in the financial institutions caused various problems and crises (Abdelsalam *et al.* 2020) [56]. After the technological development in the financial industries is enclosed with trustable sources and transparency (Rabbani, 2020) [46]. Moreover, the emergence of blockchain technology is due to a significant change in the financial world as it is decentralised and keeping an open book ledger system (Aysan *et al.* 2021) [1].

Islamic financial institutions welcome Fintech innovations. Islamic financial ideologies rely on Transparency and ethical business can be obtained through distributed ledgers (Gomber, 2018) [26] as the key characteristics of blockchain technology. The concept of blockchain proposed in the late 1980 and early 1990 periods. In 1989, Lelie Lamport introduced the paxos protocol which is the first type of blockchain technology. It seems to find consensus models to reach an agreement on a single result between a groups of participation in a network of nodes.

In 2008, the unknown person or organisation Santhoshi Nakamoto developed blockchain technology on the basis of Bitcoin. Smart contacts are used in the field of trade and Islamic finance. Contractual agreements have pivotal designation in the commercial and financial transactions. The Islamic sharia instructs on writing in all contractual agreements and whole

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financial dealings. The technological developments shift the traditional mode of writing contracts to the digital mode in terms of codes. It has a more efficient and less risky way of doing business, financial services and also eliminates errors and frauds. Each smart contractual agreement is traceable and productive in nature (Mohammed, 2017) [37].

The Islamic financial principles are enclosed with social finance as risk sharing, social justice and social well-being, this sector introduced several social financing methods, such as Zakath (obligatory charity), Swadaqa (voluntary charity) and waqf (perpetual endowment) (Biancone & Radwan, 2019) [57]. Islamic financial institutions operate on the basis of Islamic Sharia principles. It encompasses the avoidance of riba (Usury), Gharar (fraud), risk, uncertainty, speculations and Halal (permissible) activities. These principles are underlying on Profit and loss sharing and risk sharing mechanisms. In the Risk sharing principle, the lender must share the risk with borrowers but the interest rate replicates the Risk sharing system in conventional financing systems and it's also guaranteed the lender an extra credit return payment but Islamic finance prohibited interest payment and works on Profit and loss sharing system.

Review of literature
The technological innovations quickly disrupt the financial sectors. Each technological updates enhances the scope and feasibility in the financial sector. Several academic studies are done for the Fintech development. Since 2008, the blockchain technology has been developed and flourished the Fintech revolution especially in Islamic finance sectors. Recently, the academicians actively discussed on the blockchain technology in the aspect of Technological (Barnes & Xii, 2019; Benitez et al. 2020 & Boateng, 2020) [14, 13, 15] and application components such as cryptocurrencies (Bèik et al. 2019; Mohsin & Muneeza, 2019 & Ayedh et al., 2020) [12, 38, 8], Sharia law (Tanjung et al. & Mohammed, 2018) and management (Zulaikha & Arif Rusmita, 2019) [55].

Islamic financial sector welcomes technological innovations and Islamic Bank can enhance their intervention with Fintech and accelerate such Innovative actions and projects in the financial industries (Aysan & unal, 2021) [1]. The discussed the blockchain technology in the Islamic finance sector and elucidated such obstacles and applications but it merely focused on the application of Halal market. Another paper confirms the opportunities in waqf, zakath and sukuk on the basis of disruptive blockchain technology (Alaeddin et al. 2021) [58]. Rabbani (2020) [46] contributes sharia compliant crypto currencies Using blockchain technology. While using block chain technology the transactions are Islamic nature but this can only be checked after the operations (Chong et al. 2021) [17]. The Inadequate academic studies are the key obstacles of Islamic Fintech innovations (Haddad. 2020) [59]. Moreover, several studies rely on conceptual framework rather than application levels so this paper quietly focuses on the impacts of blockchain technology on Islamic financial sector in terms of challenges and opportunities.

Methodology
In this study, it's take a Qualitative Approach by referring Journals, articles, and books and statutory Reports.

Objective
▪ To understand the Fintech on Islamic Financial Sector
▪ To understand a blockchain based Islamic financial system
▪ To Understand the challenges and opportunities

Findings and Discussion
Blockchain Technology
The blockchain technology was proposed in 2008 and implemented through Bitcoin which is a crypto currency in 2009 (Nakamoto, 2009) [60]. It's a public ledger which records all the transaction information as blocks and continuously grows, when a new block is appended. Each block is enclosed with the transaction to solve the double spending problems. It is characterized with decentralisation which eliminates the third parties and mediators, persistency and anonymity. It integrates several technologies, cryptographic hash and digital signature which is distributed consent. The distributed ledger technology allows various services such as digital assets accumulation, remittance and online payment (Peter et al., 2015) [61]. The blockchain can simply refer to the combination of number technologies such as public key cryptography, distributed ledgers, consensus mechanism (Maldonado, 2018) [62]. It can also resist data modification and track the transaction.

Blockchain technology has significant changes after the internet revolution (Efanov et al. (2018) [22] and it has been adopted in the various sectors such as economic, health and military to redesign hi tech paradigm. Several government and non-government institutions endeavour to increase the investment in the blockchain technologies. The high level of business projects which will have value added and grown slightly over $360 billion and surge to more than $3.1 trillion are expected in 2030 (Kandaswamy et al., 2016) [63]. The Institute for Business Management (IBM) stands for the adoption of the blockchain technology faster than originally anticipated, their research found that nine in ten government organisations intended to make investment in blockchain technology. The blockchain can be used as an asset registry, inventory and exchange including every area of finance, economics and money (M. Swan, 2015) [39]. Several research scholars demonstrate blockchain technology as a genealogical tree but can't elucidate in an efficient manner (X. wu & W. sun, 2018) [52]. It has several functions such as peer to peer transaction, cryptography, ledger and hash for data protection and deterring hackers.

The encryption is the process of. Converting plain text into incomprehensible texts which is known as Cipher text, Decryption is the reverse operation of it. The encryption algorithms used to generate the hash function which illustrate the size of data to a fixed size. The values created by hash functions are known as Hash values which allow the verifications. However, it isn't able to reverse operation as it requires restructuring of new plain texts.

The blockchain stands for the crypto currencies which stands for the decentralisation of money and payments. It is merely concerned with transfer of assets beyond the currency. If A initiated a transaction to B then the transaction is requested by the network node. The request and user status are authorised by the network using

cryptographic algorithms. The verified transactions were stored in block. Once a block reaches a certain level of transactions then another block generated automatically, after the block is appended with older blocks making it a permanent part of blockchain, simultaneously all the network nodes are updated with minutes (Puthal *et al.* 2018) [20] (Li *et al.* 2017) [53] & (L. L Chang *et al.* 2017) [64]. The encryption methods guarantee security, decentralisation and efficiency. This technology is a highly wired relationship with 'Trust' which is the baseline of Islamic finance and Blockchain technology. The sharia prohibits contractual uncertainty and other decisive methods. The Fintech also created an environment of trustworthiness which embodied with Islamic contractual agreements. The Lack of human involvement on distributed ledger technology make the contractual agreements more efficient and free from standing errors and delay or disputes (Hussein, 2019) [65].

Types
Blockchain can be classified as public, private and hybrid (Sulthan *et al.* 2018) [66].

Public: it has no single owner and is visible by anyone. The consensus processes open to all participants in the ledger so any one can take part without needing permission. Bitcoin, Ethereum and Lite coins are the examples of public blockchain technology (Abojeib & Habib, 2019) [76].

Private: it's another type of blockchain technology. It's also known as permissioned blockchain. It has a single owner or centralised organisation with restrict nodes. They have the power of control, read and write. It has more restrictions and are not distributed (Abojeib & Habib, 2019) [76].

Hybrid: it's also known as consortium and federated blockchain. These are public only to a specified group and the consensus process is controlled by the specified individual. The copies of the blockchain are distributed among the entitled participants so it's partially decentralised. It operates specific groups or organisations. It had such advantages such as reducing the cost of the transaction, providing more privacy and the transaction done faster than public blockchain, which means it had high scalability. (Abojeib &Habib, 2019) [76].

Fintech in Islamic Finance
The blockchain technology has a negative impact on risky nature in the transaction which creates uncertainty that violates the basic core Islamic financial principles. This technology is also used for the transaction of gambling, drugs, Money laundering and others. However, the government literally curbs the money laundering through the Travel Rules, so it can be prevented through the systematic regulatory functions of blockchain technology. There are three basic principles in the Islamic Fintech. Namely, the prohibition of Riba or Usury, prohibition of Gharar (fraud), prohibition of Maysir (Gambling).The first policy of Islamic Fintech is the prohibition of Riba or Usury.
In the conventional banking system, it assumes credit profit to the lender which is paid by the borrower. In other words, it's an extra amount of money than the principle amount, so

the blockchain can expel Usury or riba payments on the third parties by depleting their intervention in the financial services. The second policy is the prohibition of Gharar. It can simply refer that it discloses all the information or conditions in Trade and contracts for the execution of trade and agreements. In the case of Blockchain technology, it only triggers whether the pre-determined conditions are satisfied but the blockchain encompasses with uncertainty in terms of code. The code miners are rewarded Bitcoin for successful mining operations. Thus, several cryptocurrencies are subjected to uncertainty in the financial system as its volatile nature. The blockchain can record the entire data in public distributed ledgers as blocks which can't make any change with any individuals but it's only subjected to changes with majority consensus of existing nodes in distributed ledger technology (Al Wosabi, 2018) [7]. The prohibition of maysir (Gambling) is another Islamic finance principle. The Islam prevents all kinds of gambling and games of chances. The risky activities are enclosed with games of chance but all risk taking activities not caused to the prevention. There are three types of risk. First, there is a risk which correlates with entrepreneurs, so it is known as entrepreneurs Risk which is permissible in Islam. The second type of risk is a part of life which correlates with catastrophic events which aren't forbidden in Islam but the last one is forbidden in Islam. It's a risk that arises from uncertainty not part of everyday life. In the adoption of blockchain subjected with this type of risk. It provides Bitcoin to the miners for the execution of transactions. Bitcoin is a crypto currency which has a highly volatile nature and is forbidden in Islam, so the cryptocurrencies are key obstacles to the Islamic Fintech implementation, so there is a need for modified framework works on the blockchain applications. The blockchain must be rewarded with digital currencies which stand on legally tender for the execution of transactions.
Presently, the Fintech has become a global concern by providing various benefits for stakeholders such as transaction speed, accessibility, and transparency that develop the financial industries. (Nor *et al.* 2021) [41]. It also generates new business model application, process and product. The adoption of blockchain technology encourages the formation of Islamic financial Technology to provide optimal customer services, cost cutting operations, transparency and consistency in interoperability.

Opportunities and Challenges
The blockchain based Islamic fintech has significant impacts. The word 'impact' can segment to positive and negative terms. The positive impacts ease the financial operations smoothly and negative impact creates the complexities.it is a system of open book which record publicly and is saved as blocks but it is highly transparent and secured, so the ways of implication in Islamic financial institution are laudable and enhance the dignity of Islamic financial procedures. It will increase the scope in the field of contractual agreements, Sukuk Issuance, Storage system as cloud storage model, Zakath, Takaful (Islamic insurance), Halal investment and Halal market sector, Auditing and Assurance sector and know your Consumer (KYC) procedure etc. The adoption will reduce economic costs in terms of transportations, capital carrying costs, opportunity

cost and transactional cost etc., Such regulatory function, legislative actions, technological implications, scalabilities of government interventions, interoperability functions and technological standards are negatively effect in the financial sector as the implementation of blockchain technology due to inadequate government assistance and funds for execution and senseless intervention of government legislatives, Such positive and negative impacts are given below.

Smart contract

A smart contract is a complex set of software codes which is designed as cryptographically to automate execution and settlement of contractual agreements. In other words it's a set of codes which is self-executed under the pre-determined conditions that are triggered. The program only triggered automatically and processed only whether the given specified conditions are met. The concept of smart contract was firstly proposed by the American Computer scientist Nick Szabo in 1998 after the invention of the virtual Gold bit in 1998. It works for facilitating the exchange of properties and everything of value, reducing the cost of trade, Avoiding the able of documents and cost of corresponding and communication, eliminating of the third parties and their costs and resolving the problem of trust.

It's a reliable system of recording all the processes of financial transactions and services. It works on the objective of establishment of contract law through the electronic commerce to design business practices through computer programmes on the internet among strangers (Dickerson *et al.* 2019) [67]. The contractual agreements are pioneering the trade and commerce which record mutually agreed upon terms of execution and dispute resolution. The Islam ensures the great importance to the contractual agreements through the Qur'anic verse;

"O believers! When you contract a loan for a fixed period of time, commit it to writing. Let the scribe maintain justice between the parties" (2.282). It enjoin Muslims to put contacts in writing, fairness and accountability,so the Muslim reply on the Islamic legal institutional framework, the Islamic scholar act as mediator in commercial disputes. The possessing written records expose the efficiency and transparency of the commercial dealings and envisage the trust, equality and fairness among the parties. Smart contract on the distributed ledger (Blockchain) have ensured high level of transparency, productivity and reduce the transactional cost. More of the financial enterprises explore this technology for the various applications across the banking and financial services and insurance services.

While the adoption of smart contracts in Islamic finance sectors will make efficient financial sector in the global economy. It could execute in three channels. First of all, it will reduce the element of uncertainty (Gharar). The contractual agreements only executed, whether the pre-determined conditions are met, so this system will safeguard from such faded uncertain conditions and Natures and also abridged the level of risk. Secondly it can diminish administrative and legal cost on the financial transactions in terms of operational and counter party risks. It's also an immutable, securely verified and eliminates the complexities. Thirdly the transaction can be made easily and quickly as a key feature of the decentralisation of the

distributed ledger technology, each transaction is traceable and irreversible which eliminates the risk of moral hazards among participants and also performed automatic verification without the intervention of third parties.

Cloud storage

The cloud storage data model can illustrates as a model where the digital data stored and retrieved across multiple serves in possibly and geographically different locations and managed by the host. It is also used as a logical memory model that allows providers to store data on multiple servers in several locations in a way of transparency. The financial institutions have large quantities of data on the basis of transactions, contracts and legal tenders. The inefficient storage capacity causes financial disputes among the participants and consumers, so through the cloud storage system which is characterized with blockchain technology can mitigate these financial disputes and discourses by ensuring the storing of data and it will safeguard the second party's financial rights.

One of the biggest attractions of the blockchain technology on Islamic finance is that the banks will have high level of accessibility into a cloud storage system. It will reduce all types of financial conflicts and assist the participants or consumers to maintain their partnership as intensive security. The highly elaborated cloud storage system includes the sophisticated features of data backend cloud storage system as Google Docs often this kind services for Google drive, so consumers can track the previous data and details of financial services through this sophisticated system. In short, the implementation of cloud storage on Islamic financial system will reduce the high level of trust, traceability and security of the data.

Zakath

"Zakath" which is derived from the word "zaka" which means purity and growth. It's established on the motive of socio economic security, poverty eradication and philanthropy. The Al Mighty (Allah) defined the zakath as a compulsory act upon each individual who met the Nisab (pre-determined condition of Sharia). Several types of zakath exist in terms of trade (Mal) and body (Fithr). The Qur'an clearly earmarked the recipients of zakath as "The alms are meant only for the poor and the needy and those who are in charge thereof, those whose hearts are to be reconciled, and to free those in bondage, and to help those burdened with debt, and for expenditure in the Way of Allah and for the wayfarer. This is an obligation from Allah. Allah is All-Knowing, All-Wise." (9:60). so the zakath must be distributed through these channels. There are various zakath collaborating institutions to ensure the zakath payment. Although there is inadequacy in supply of zakath payment as instructed movements of zakath payment system which is encompassed with independent individual decisions. It will smash the Islamic glory and conceal the claimed payments.

The zakath is one of the pillars of Islam with the idea of transferring the ownership of the specified quantity of money or commodity from someone to another one on the basis of such legitimate criteria (Abojeib & Habib, 2019) [76]. The blockchain technology provides vibrant and significant changes in the zakath payment system. The

zakath must be institutionalised for the better implementation of zakat circulation in the economy. Using this distributed ledger technology as a cost effective solution will be able to strengthen the management system to feasible and ensure better services, besides it will highly influence the participants (Majid & Esradi, 2021) [41]. It can also easily track the eligible participants, and ensure their payment details. The zakath administration using this technology will diminish the cost of distribution, legal and administration as entire process characterized with auditable, immutable and trackable (Salleh *et al*., 2019) [69] it's means that the whole process of zakath administration is transparent, easy to find out the errors and possible to bridge the gap immediately.

The implementation of blockchain technology in zakath institution which works as non-profit organization will enhance reliability and security among the participants. Zakath is not only an agreement of contributors with the zakath institution but also a contract between the zakath institution and recipients, thus the competence should be confronted at all levels of adoption (Razimi *et al*., 2016) [70].

Smart Sukuk

"Sukuk" plays in Islamic financial market as a capital instrument. It's a model of crowdfunding to Islamic institutions for infrastructure and business development. Smart Sukuk is a most significant structure for future Sukuk issuance. It's based on the zero interest rate system. The concept of smart sukuk is derived on the basis of distributed ledger technology (Blockchain). It will quietly enhance the level of Islamic Sukuk which means sharia compliant bonds. The smart sukuk can be used in small and large enterprises, social impact projects and groups to improve the efficiency, transparency and reduce the administration costs (Elasrag, 2019) [23]. However, the smart Sukuk varies from the conventional bonds which is based on the coupon rate which means interest rate. It's tradable in the secondary Market (stock exchange) on the profit motives but non-conventional Sukuk operates on the profit sharing payment or ownership of assets. It is securitized which means tradable in the secondary Market but not on the basis of interest payment on loans and sale of the debts. It involves a way to securitize Islamic mode of financing such as profit and loss sharing, so the government seeks the funds for financing projects and execution of infrastructure development without worry interest payment but it's subjected to high level of legal complexities and overall cost issues, So there are different types of Sukuks which are backed with sharia compliant contacts for the objective of institutions such are profit sharing (Sukuk al - Mudarabah), deffered - delivary purchase (Sukuk al salam), lease of assets (Sukuk al ijara), joint venture (Sukuk al Musharaka), project based (Sukuk al istinsha) and cost plus asset purchase (Sukuk al Murabaha). These types of sukuks safeguard the government and non-government institutions from the bad debts and extra payment in terms of credit payments (Elasarag, 2019) [23].

The "blossom finance" which is the first Blockchain based Sukuk in the world. It's clearly proven the feasibilities and significance of a distributed ledger technology in sukuk Market. It eliminates the upfront fees or cost to organizations or institutions which are ordinarily practiced in the Sukuk Market but it only incurred 20% of the share of

investor's profit which is known as carried capital interest, only if the investor gains the profit, so it's exactly based on the Islamic sharia principal which profit and loss is sharing collectively. The blossom finance sukuk are operates on the Ethereum blockchain technology and it encodes rules and regulations directly to the underlying payment without any intermediaries. Therefore the application of Blockchain technology in the Sukuk market will deplete the third parties or intermediaries and it will reduce the cost of issuance, make the payment quickly, and also the funds are allocated automatically among the investor when there is gained.

Takaful (Islamic insurance)

It's a key Islamic financial instrument and non-profitable organisation to ensure personal safety in terms of health and trade. The word 'Takaful' means insurance to mankind. The Qur'anic verse connotes the need and significance of it, through the chapter five Allah commands that "Help one another in furthering virtue and Allah consciousness, and do not help one another in furthering evil and enmity" So it can simply be defined as it's perceived as cooperative insurance where members contribute a certain amount of money into a common pool. The main distinction between conventional and unconventional insurance (Takaful) is payments are made on the intention of Tabarru or Gift, elimination of uncertainty and interest. It operates on the basis of wakala and Mudarabah and constitutes Sharia supervisory bodies. The whole investments are based on Sharia laws and regulations and don't work on the profit motives but it bears one another's burden.

The implementation of block chain will depletes fraud due to smart contracts and makes efficient financial dealings by reducing the cost of savings and administration. It also automates processes of Micro insurance and makes a quick transaction with risk free and mitigating fraud and uncertainty of all parties. In a nutshell, it automates claims and resolves the disputes with authentic proofs. Distributed ledger technology finds out and rejects the double claims of insurance and also validates all the specified conditions and policies. In hospitality, it can confirm the health insurance in an authentic manner by evaluating the legitimate medical records (Mohammed & Ali., 2010) [68].

Halal investment and Halal Market

The investment has a key role in maintaining the equilibrium level of the economy. The incremental rate of investment will open new edges of employment and economic opportunities. Every individual tries to invest which has low level of risks and a high level of return without considering whether it belongs to sharia compliant sectors or not. The decisions are taken on the basis of profit motives. The bad investment will make an insolvent and stagnant nature of economy.

In Islamic finance, every transaction should be compliant to the Sharia principal. The Islam has given great importance to investment sectors and provides laws and regulations. An investor must be considered all the principal of Sharia so it's too complicated for someone who hasn't clear and well knowledge in Islamic principles to take an investment decision, So Using the blockchain technology will assist to ensure Halal (allowed) investment in an economy. This distributed ledger technology can easily track and validate

the purpose and value of the investor and sectors by encrypting and analysing the Halal certification so it can't be manipulated or modified by anyone. Halal which means the permission. The halal market is simply defined as it's a place where the buyers and sellers gathered for buying and selling the Sharia compliant products.

According to statistical data, the global Halal market reached at 13.8% growth rate and expected 14.6% growth in 2026 (GHM, 2022) It seems that there is a high level of incremental growth in halal market. The consumer consciously seeks the trust on Halal market as an authenticity of Halal certification. The blockchain technology applications pave a new economic structure in the market system. It can curb the level of production with respect to the consumer demands and clearly identify and regulate the demand and supply of products by maintaining the volatility in price index. In addition, it is able to trace and track entire details of the manufacturing and production process which can enhance the trust in halal market. The halal certification only issued those products are satisfied with the pre-determined condition of Sharia and it easily tracks the non Halal products as the transparency and automated process, so it can create a global Halal market. Moreover, the application of Blockchain technology in Halal market eliminates consumer trust upon the Halal retailers and make direct trust upon the production sectors. Every Halal product has unique identification number in terms of numerical and alpha, which can track entire details at just scan or search. So this disruptive innovative technology can enhance highly quality products and make a product to transparent and make assurance to all consumers. The Tieman & Darun (2017) [71] stated a discussion which had held in Malaysia Pahang (Malaysia) with Capitan of food industry on 18 May in 2017. This large discussion group unveiled such inherent problems and challenges on traceability in terms of ability to verification of products and organization of products recalls, transportation and warehousing which correlates the storage system, unbroken chain which means that an end to end chains in integrity of products and consumers, the different Halal interpretation among Islamic jurisdiction and Lack of integration of information. All these are clearly and absolutely replicates with this block chain technology. It had an intensive potential to resolve and restructure the Halal market in an efficient manner.

Auditing and assurance
The recording of the financial transactions and financial movement is colossal activities and auditing of financial contracts, documents are too complex. Presently, the entire process of accounting and auditing is taken by Chartered professional Accounts. The highly expensive margins will be subjected to hike in price of products and services. An auditor is required to obtain clear information for auditing in a consistent and required format (Debitte, 2017) [19]. The inconsistency and dishonesty of chartered accountant professionals badly effects the continuous growth of entrepreneurship. The blockchain technology can makes a significant change in the auditing system. It takes record and audit automatically as an automated feature. The right network report (2017) states that the distributed ledger technology self-promises in auditing and immutable records

can reduce the complexities in the auditing process and also eliminates all trouble on the manual data extraction, pre - audit preparation and time consumes.

Know your customer (KYC)
Knowing your customer (KYC) is one of the application processes for access in any financial institution. The Identity details are collected by the third parties to offer financial services and prevent impersonation, financial fraud, money laundering and financial terrorism (Moisev, 2019) [40]. The banks need KYC to provide credits, debits, investment and mutual funds. While a consumer approaches a back for credit payments, the bank seeks the entire KYC documents. The application of the blockchain technology in the KYC process can reduces the time of transactions, easily and trigger the contract or loans or mutual funds in a self-automated system. If A requests a loan then the request will be sent to the certified node B. It will automatically evaluate the documents after having taken consent of B. Then A will be programmed as a smart contract.

Government intervention
The blockchain technology does not have a wired relationship with the government and third parties. Bitcoin is one of the cryptocurrencies which work on the basis of blockchain technology. It was banned in various nations such as China, Russia and etc. as decentralised features. It can depletes the whole intervention of third parties so it can reduce transaction costs, simultaneously it makes transactions quickly. Nonetheless, the government can send bad signals markets, to policy makers and law execution agencies, so it's heavy handed actions on private sectors which causes economic doldrums. The government regulations will cease the problematic private explosive actions and decision and shore up the economy from the economic stagnation, macro and micro Economic challenges.

Technological challenge
The technological infrastructure is needed for Fintech development. Islamic financial institutions have been booming in the Fintech revolution. The consumer potential has a wired relationship with Fintech development. The inadequate network connection and signal have been challenged. In fact, the awareness of benefits of using technology will spread the cost of technology and its usages in the society. (Alaeddin & Altounjy, 2018) [72]. Moreover, the implementation of such Innovative distributed ledger technology is expensive and complicated. It's a secured system with a high level of operating costs, mining cost and the shifting costs from old mechanisms to the updated technology (Schmid & Wagner, 2019) [74].

Regulatory challenges
It's the greatest obstacle to the adoption of the blockchain technology. The systematic regulatory functions can prevent the infractions (Albayati, 2020) [3] and regulations are key essential to the implementation (Peter & Panayi, 2016) [43].
The entire financial transaction works on the principle of the trust upon the third parties which is the basic element of regulatory bodies, so the unclear regulatory functions effect negatively on entrepreneurs and layman. In the case of

blockchain technology, the regulation is backbone of protection to reduce ambiguities (Wunsche, 2016) [51]. Each regulatory policies and laws are essential to understand who are authorised the transaction in the blockchain technology (Viriyasitaval & Hoonsopon, 2019) [50].

Scalability
The scalability of blockchain have been questioned. The scalability simply refers that it is determine the network potentiality on the base of how many transactions processes, how quick it can process and the number of nodes. The implementation of the technology will increases the entrance of new participants to this sector, so the scalability is a huge concern. Bitcoin is a crypto currency which works on the blockchain technology. The duration of transaction in a second is three to seven but in Ethereum blockchain it's done about fifteen to twenty per second. The emergence of large participants will stuff the process as inadequacy to save more users, so the scalability of block chain will exist as challenge. It can mitigates through the advanced technological developments, limiting transactions of individuals and introducing Sub blockchain connectors which can connected with main blockchain as double blockchain system.

Interoperability
It's simply referring as exchange of data between the blockchain networks. It's another challenge of blockchain technology. This system is mostly maintained in isolation and does not communicate with the peer network and they can't transmit or receive the various information through this ledger system.

Lack of standard
The complexities in process and regulations are being obstacles to the implementation in the finance sectors. The all participants are approach a financial institution with abundance of trust. Lack of standard will negatively impacts on the financial institutions in terms investment, deposit and intervention. It's too complex to study the structures and not to easily understand the processes and possibilities to a layman and it had not specified vision. Standardization has a vital role in moulding the blockchain technology as potential. It was well developed and strengthened by the fourth industrial revolution. The Inadequate level of standardization negatively affects the financial industries, so it can recreate and modify through two fold strategies by convection which can be created throughout the practices, behaviour changes and configuration, by Negotiation which means that agreed formally among the stakeholders in activities and actions.
The blockchain technology relies on decentralisation which means there are no dedicated entities to take the responsibilities for monitoring to disseminate standard implementation. Moreover, there are such projects as Polkdot and interledger which are taken to alleviate the technical standards and focus on the solution designed to facilitate across protocol interaction. The ecosystem participants should identify the value of blockchain for their needs and where standards may accelerate. The enhancement of roles of users and general techniques will create technical standards (Duval *et al.* 2008; Hawkin &

Richard, 2007 & Schmidt & Charles M, 2017) [21, 28, 48] the co-ordination and collaboration among standard settings organisation can ensure and eliminates the gap of standardization. The government can take assistance and curbs through the specialised boards and working class groups. The identification where standardization is premature and where standardization is unnecessary is quietly a bridge the gap in very quickly. (Desmukh *et al.* 2020) [75].

Conclusion
In nutshell, the technological innovations have pivotal role in the socio economic dynamics especially in the financial sector. The adoption of blockchain technology in Islamic financial institution is laudable and innovative actions. This paper only focused on the significant challenges and opportunities in Islamic financial institutions. It's literally exposes that the adoption of blockchain technology create quickly transactions, abundance of mutually trust and reduce the financial costs by removing the intervention of third parties and altering the digital currency which have legally tender to the cryptocurrency based rewards, it will create sharia compliant Distributed ledger technology. In fact the technological challenges in terms of programming and operation of distributed ledger are existing, so more the researchers and academics are needed to quest new level of feasible solutions of technological challenges and find out new level of opportunities in the Islamic financial sectors.

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