Article

Blockchain Technology from Maqasid Shari'ah Perspective

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Abstract

The world has undergone a major shift in technology and blockchain is one of the current technologies that is of interest. The application of this modern technology contributes to the development of societies and helps in accomplishing many financial and non-financial transactions. Many may be worried and hesitant of this technology in terms of its reliability, sustainability and legality from the Shari'ah perspective. This paper is an attempt to examine it from the perspective of Maqasid Shari'ah. This study aims to reassure and encourage institutions and countries to adopt and apply blockchain technology as well as to clarify its positive characteristics from the perspective of Maqasid Shari'ah. The method used in this paper is qualitative research. This study has clarified the perspective of Maqasid Shari'ah on blockchain technology by focusing on four key aspects i.e. facilitation, security, transparency and anti-monopoly.

Keywords : Blockchain; fintech; Islamic finance; maqasid shariah.

الملخص

لقد شهد العالم تحولا كبيرا في التكنولوجيا، كما أن "البلوكشين" هو من أحد التكنولوجيات الحالية التي تحظى بالاهتمام. ويساهم تطبيق هذه التكنولوجيا الحديثة في تنمية المجتمعات ويساعد على إنجاز العديد من المعاملات المالية وغيرها. وقد يشعر الكثيرون بالقلق والتردد إزاء هذه التكنولوجيا من حيث موثوقيتها واستدامتها ومشروعيتها من منظور الشريعة. هذه الورقة هي محاولة لفحصها من وجهة نظر مقاصد الشريعة. وتهدف هذه الدراسة إلى طمأنة المؤسسات والبلدان وتشجيعها على اعتماد وتطبيق هذه تكنولوجيا، فضلا عن توضيح خصائصها الإيجابية من منظور مقاصد الشريعة. والطريقة المستخدمة في هذه الورقة هي البحث النوعي. وقد أوضحت هذه الدراسة وجهة نظر مقاصد الشريعة بشأن تكنولوجيا البلوكشين بالتركيز على أربعة جوانب رئيسية هي التيسير والأمن والشفافية ومكافحة الاحتكار.

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الكلمات المفتاحية: تكنولوجيا البلوكشين؛ شركة التكنولوجيا المالية؛ التمويل الإسلامي؛ مقاصد الشريعة.

Introduction

For centuries various industries, companies and businesses have been built on a simple principle – trust (Kückelhaus, 2018). Moreover, all online transactions currently depend on trusting someone as a certain trusted authority to inform us of reality, such as an email to confirm that the email has been sent, or bank to tell us that the money has been transferred. These examples indicate that our life depends on a third party for the privacy and security of our digital assets. While this is the case, the third entity remains precarious because it can be compromised, hacked or manipulated. As a result, there is need for the blockchain technology to handle this difficult situation (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2015).

As noted in the literature, another big change is coming to the world through blockchain technology and cryptocurrency, especially in terms of the money and finance. A real revolution will occur through blockchain technology in the financial sector, which will eliminate some jobs, such as brokers, and may provide new job opportunities (Pree, 2016). Thus, private investors, governments and technology developers consider this technology as the subject of intense and rising attention. It could be used to treat a lot of the political, economic and social issues that are faced by many countries today (Zambrano, 2017). It allows a distributed consensus where all present and past online transactions can be verified at any time later without disclosing the privacy of digital assets and parties involved.

The anonymity and distributed consensus are very important features of blockchain technology. It is a revolution in the digital world and will become the new engine of growth in digital economy (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2015). Therefore, it is important to pay attention to the blockchain at the present time because of its various roles (Jutila, 2017). Moreover, the financial sectors are more likely to get benefits from the blockchain technology and attract the attention of a wide range of actors, rather than disappearing due to it (Zambrano, 2017).

From the Islamic point of view, the *Muslim* world is responsible for organizing and reorienting future progress in the context of these global realities. Blockchain technology also contributes to global development and approaches that can enhance human life and make it more prosperous and rewarding. Objectives of Islamic Laws (*Maqasid Shari'ah)* is one such tool which will provide a solid foundation for deep-rooted reforms and development in all aspects of life. Objectives of Islamic Laws (*Maqasid Shari'ah)* is linked in all respects and serves as a yardstick

for measuring the appropriateness of modern science, and its conformity with the global aims, values and principles of Islamic Laws (*Shari'ah)* (Lamido, 2016).

In most of the developing countries, the application of blockchain technology is still rare. Many governments and institutions in developing countries remain uncertain about the application of this new technology (Jutila, 2017). This is due to their lack of knowledge about the technology since many believe that it is not important or still hard to utilize. Therefore, high and expensive costs are paid to facilitate their transactions. In addition, there is public perception of blockchain with regard to security and lost funds which led to avoidance of ideas relevant to this technology.

Moreover, some researchers have indicated the disadvantages of this technology without discussing its advantages. Since the blockchain is still new and requires further research from the perspective of Islamic Laws (*Shari'ah)* in order to facilitate a better understanding of it (Alzubaidi & Abdullah, 2017), this paper attempts to reassure everyone that the technology is necessary with several benefits to communities. This study also illustrates that blockchain could contribute to economic development, enhance human life, and make life more rewarding and prosperous; whereas the function of Objectives of Islamic Laws (*Maqasid Shari'ah)* is to preserve the balance of all aspects of human life. The study also explains Objectives of Islamic Laws (*Maqasid Shari'ah)* vis a vis this technology in terms of facilitation, security, transparency, and anti-monopoly.

Literature Review

Blockchain

Blockchain could be defined as a distributed ledger technology (Kückelhaus, 2018) or digital events (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman, 2015). It records transactions on a permanent and secure basis for parties, and the databases are shared and executed between them (Kückelhaus, 2018). In brief, blockchain can be considered as having essential qualities as the transparent, decentralized, distributed and chronological database of transactions, which is sometimes called the ledger (Pree, 2016).

The emergence of blockchain is linked to cryptocurrency; as such, the historical stages of both blockchain and cryptocurrency are similar. The idea of digital money was set long before blockchain with a major server trusted to prevent double spending (Chaum, 1983). It was the first usage of this technology in the field of digital currency. Afterwards, it expanded to include other areas than financial and continues to grow; whereas, the concept of distributed computing has been around since 1990 (Kückelhaus, 2018).

At the beginning, blockchain technology was ignored by experts and technicians. This disregard continued until 2014, when it was considered a stand-alone technology and was recognized by innovators after it proved effective in the

financial and other sectors; and shortly after this, the venture capitalists recognized it (Zambrano, 2017). The blockchain technology has become an interesting application for many individuals who have turned to it after the controversy over the cryptocurrency which gained notoriety on the global marketplace. But it has been clearly criticized as rather having limited application (Back, et al., 2014). The history of the blockchain is very short but characterized by rapid development which underlies the technology of digital currencies (Kückelhaus, 2018).

There are different types of blockchain technology, but the differences among them could be seen through the type of problem that they can solve (Pilkington, 2017). Specifically, there are two main types of blockchain as shown in Table 1 below. The table shows that each type of blockchain technology has different characteristics. To explain this clearly, we can divide it into two prime points:

Table 1
Types of Blockchain Technology

Type	Accessibility	Restriction	Modification	Reliability	Verification	Interested Stake holders
Public	Permissionless	Open to all	Impossible after verified	Used by many parties	By anyone without getting permission	Public sectors: -Government
Private	Permissioned	Stringent control and more restricted	Easy to alter the rules or revert transactions	Guarantee d	Must get a specific permission	Private sectors: -Companies -Financial institutions

Permissionless Blockchain (Public)

This category of blockchain is open (Kückelhaus, 2018) and allows anybody to join the network (Pree, 2016). According to Buterin (2015), each user of the internet has access to the public decentralized ledgers and it is less restricted than the private blockchain. In terms of the modification or cancellation, it is impossible to change the transactions and contracts of any documents after the verification (Buterin, 2015). Anyone can be a verifier to perform without getting prior permission (Pree, 2016). It may encourage the innovation faster where many parties can use it and obtain the effects of a network (Kückelhaus, 2018). In terms of data storage and verification, it is stored on each computer in the network and the transactions are verified by all nodes (Pree, 2016). The advantage of this type of blockchain is that both anonymous and pseudo anonymous actors can be accommodated (Pree, 2016). Examples of this type of blockchain are Ethereum and Bitcoin.

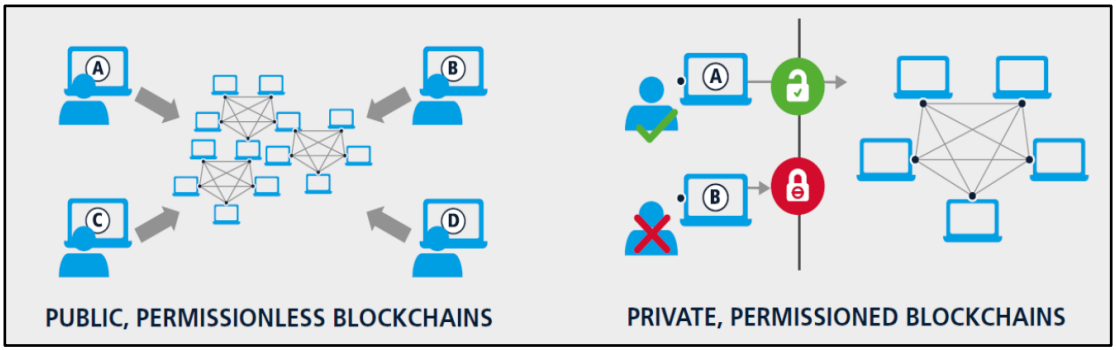

Figure 1. Public and Private Blockchain
Source: Kückelhaus (2018)

Permissioned Blockchain (Private)

This type of blockchain has a specific permission where an authority allows you to verify the system (Pree, 2016). In this type of blockchain, accessibility to the information, reading records or even changing the blockchain are more tightly guarded. Even though the permissioned blockchain is more restricted than the permissionless blockchain, the reliability is still guaranteed (Buterin, 2015). As indicated by Pree (2016), this type of blockchain needs a small number of participants for operation. A group of users can collaborate and return the transactions or change the rules easily because of the small numbers. According to Buterin (2015), the read-permissions are either public or restricted in the private blockchain and a central locus will be monitoring a write-permissions to make decisions. It is easier to change the term and information in the private blockchains than in the public blockchains because the control belongs to someone. The scalability is one of the advantages of the private blockchains (Pree, 2016). Example of this type of blockchain are ripple, corda and Hyperledger.

For more clarity, the access permission to the information in the blockchains is the major distinction between these two types of blockchains (Buterin, 2015); that is, ensuring anonymity or the extent of decentralized information? according to Allison (2015) and Brown (2014). The government tends to choose public permissioned blockchains to provide specific services for citizens (Zambrano, 2017). However, private permissioned blockchains are adopted by the private sector, such as companies and financial institutions because of advantages such as privacy protections (possibility to store confidential information securely) and strict access controls which may support a closed ecosystem of participants (controlling the access to the information) (The Economist, 2015). Therefore, selection of public or private blockchains may depend on the individual needs of each type (Kückelhaus, 2018).

Structure (Mechanism)

For centuries, governments, banks, and companies have been using traditional ledgers to record transactions and document databases (Boucher, 2017). Traditional ledgers were owned by one entity (group or institution) and controlled by a particular

administrator (e.g. an accountant) (Kückelhaus, 2018). An accountant or entity is a trusted third party with a central authority through which to manage changes and ensure that they are legitimate. Using this, information is not fully visible to users (Boucher, 2017).

In contrast, the blockchain provides the same functionality as a traditional ledger, but without centralization (Boucher, 2017). This means that it can only be updated with the consent of all network participants. No administrator can make changes on its own, because it is distributed among a network of participants and all changes are subject to scrutiny (auditable) (Kückelhaus, 2018). The blockchain eliminates the intermediary role (third party) permanently. To illustrate how the modern blockchain works, see Figure 2 below:

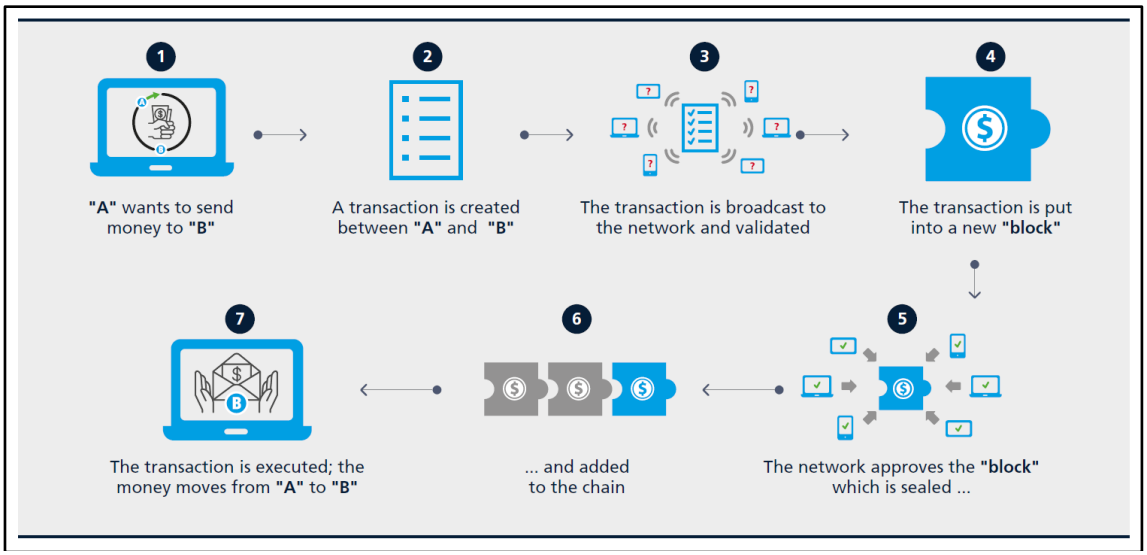

Figure 2. Blockchain Operation
Source: Kückelhaus (2018)

The blockchain technology works based on thousands of nodes (The Economist, 2015) that can go and come as they please in the network (Nakamoto, 2008). As such, the functions of this technology work via a peer-to-peer network (e.g. computers). New blocks are created through the mining process by specialized nodes or miners (The Economist, 2015). Mining is a compilation of each new transaction that is recorded along with other new transactions in a 'block.' The new transaction will be added as the latest link in a long 'chain' of historic transactions. The blockchain ledger held by all users is formed by this 'chain' (Boucher, 2017).

These miners work together to solve mathematical problems (puzzles) and compete with each other to be the first solver which creates a valid block to add to the blockchain (The Economist, 2015). Miners are incentives to solve difficult puzzles to update the blockchain (The Economist, 2015) through creating a valid block and adding it to the chain (Boucher, 2017). The miners receive a certain amount of rewards for each transaction. The creation takes some steps to complete and confirm a new block. In terms of currency transactions, many miners verify and supervise

all transactions (The Economist, 2015). They confirm the change when the transaction is valid, but they reject it if a discrepancy is found (Boucher, 2017).

According to Peters and Panayi (2016), the blockchain is a database or a chronological ledger which records all transactions by a network, and all accepted transactions which occurred since the birth of the blockchain are contained in the chain. In general, data are exchanged in the blockchain-based system only through powerful cryptographic technologies which make some transactions non-duplicate and some replicas. The accessibility of the stored data is obtained by enforcing specific permissions. Public and private keys are used to ensure privacy and confidentiality (Kückelhaus, 2018).

Advantages and Disadvantages of Blockchain Technology

Generally speaking, technology has two sides; the first side is advantages and the other side is disadvantages. Some resources are used set up the advantages as the characteristics, and the disadvantages as challenges. As such, the researcher turns to explain both sides—advantages and disadvantages—and shows which side impact more compared to the other. While there are many advantages of the blockchain technology, its unique combination of the features and characteristics are as follows:

Figure 3. Advantages of Blockchain Technology
Source: Authors' own

1. Decentralization. In a blockchain technology, maintaining data consistency in distributed network is done by the consensus (Zheng, Xie, Dai, Chen, & Wang, 2017). With decentralization, there is a disintermediation which removes the need to manage transactions or recording documents by a central controlling authority. Moreover, there is a collaboration that all parties work together without third party (Grech & Camilleri, 2017). The decentralization creates durability, reliability, and longevity because it does not fail in a single failure (Boersma & Bulters, 2017).
2. Persistency and Immutability. Any invalid transactions would be rejected by the miners because miners can discover any block that contains invalid transaction immediately. By this technology, the transactions can be validated quickly. It is impossible for transactions to be removed or deleted after included in the blockchain (Zheng, Xie, Dai, Chen, & Wang, 2017) and cannot be modified once it has been written, recorded, and stored permanently (Grech & Camilleri, 2017). The process with immutability cannot be altered; thus, their immutability is guaranteed (Boersma & Bulters, 2017).

3. Data Transparency and Trust. The transparency allows users to conduct transactions together with knowledge that each one has ability to enter into that transaction (Grech & Camilleri, 2017). Thus, every user has a controlled access to the database, leading to the creation of a single source of truth. This provides a confidence that everyone uses the most recent, reliable, and accurate databases (Kückelhaus, 2018).
4. Security. The technology of the blockchain provides security mechanisms which do not allow anyone to breach the transactions. All messages and transactions are cryptographically signed and ensure essential security, effective risk management, and data integrity. This may prevent hacking, data compromise, and data manipulation (Kückelhaus, 2018).
5. Smart Contracts. The manual processes could be guided by using a type of self-executing computer program which is called a smart contract. A smart contract comes under the blockchain-based system. It has the ability to enforce the rules and process steps of the stakeholder-agreed actions automatically. Moreover, pre-specified and agreed actions occur automatically when contract conditions are met; and the smart contracts become fully autonomous once launched (Kückelhaus, 2018).
6. Faster and Lower Costs Transactions. This technology has the potential to reduce the cost and time of transactions radically (Boersma & Bulters, 2017). The speed of blockchain is capable of completing transactions in fewer than 15 seconds (Canada, 2016).

Despite the great advantages of blockchain technology, it also has some disadvantages and challenges discussed as follows:

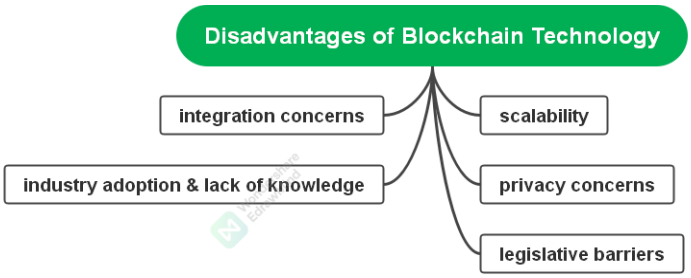

Figure 4. Disadvantages of Blockchain Technology
Source: Authors' own

1. Scalability. All transactions must be stored in each node to validate them on the blockchain. This process makes blockchain bulky because of increasing transactions every day (Zheng, Xie, Dai, Chen, & Wang, 2017). This issue is the block size that may possibly result in unwanted effects because there is not enough space to store data and it takes too long to check it completely (Bruyn, 2017). According to Bruce (2014), this problem can be solved through storage optimization of blockchain, where the old transaction records are removed (or forgotten) by the network. Also, by providing servers with large spaces which

can be stored in it and check the complete chain to tell others whether the chain is valid or not (Bruyn, 2017).

2. Security and Privacy Concerns. The blockchain cannot ensure transaction privacy because each public key is visible for all (Meiklejohn, et al., 2013). Public and private keys can preserve a certain amount of privacy where the users operate these keys without any real identity exposure (Zheng, Xie, Dai, Chen, & Wang, 2017). Despite strong encryption of the security, the major important factor which impacts the public's decisions is the security concerns with sharing personal data using blockchain systems (Boersma & Bulters, 2017). If someone controls more than half of the network, he can use it improperly by adding false information to the blockchain (The Economist, 2015). To solve the privacy leakage, Biryukov Khovratovich and Pustogarov (2014) present the IP addresses idea that provides pseudonyms to users while they transact among themselves for anonymity in blockchain. Also, controlling over half of the network is impossible due to the massive size of the network (Jutila, 2017).
3. Industry Adoption and Lack of Knowledge. Changing from legacy systems and integrating with new systems and practices will be difficult at first to obtain stakeholder commitment (Kückelhaus, 2018). Lack of knowledge is one of the biggest challenges that faces the blockchain. Few people understand the basic functions of the blockchain and how it works (Morabito, 2017). Therefore, those who work in the IT field should promote a culture of embracing new opportunities from blockchain technology because anything that adds value should be adopted by society (Kückelhaus, 2018).
4. Integration Concerns. The fear of integration with modern technology, such as the blockchain, comes from the merging of the new system with the old system (The Economist, 2015) because this integration may change the industries that rely on trust, such as banks (Boersma & Bulters, 2017). The blockchain as a first application or technology may change the work of banks and the financial sector around the world (Martinovic, 2017). This means that banks will disappear from existence and the role and function of banks in the world will end. As such, there is reason why people are reluctant to change. The answer to this fear is that a sudden change from an old system which the company or organization works with may not be useful. The change should be gradual to reassure people that the new technique is effective (The Economist, 2015).
5. Legislative Barriers. The existence of strict regulations and laws in countries can hinder the use and development of blockchain technology (Jutila, 2017). This is because the adoption of this technology is subject to the approval of national governments (Boersma & Bulters, 2017). Therefore, an agreement must be reached by governments and organisations to regulate the use of blockchain and govern the fundamental rules of the new network to avoid instability (Kraft, 2016) (Lewis, Larsen, & Goh, 2016). All the challenges mentioned above are not insurmountable. In order to overcome these challenges, standards and governance of the blockchain will be required by organizational bodies to determine standards and agreements in each industry (Kückelhaus, 2018). The

adoption of the blockchain technology will be possible by agreement from the whole community (The Economist, 2015).

Scholars' View of Blockchain Technology

Since the early discussions about the blockchain technology began with the emergence of cryptocurrency, they were focused on cryptocurrency from the *Shar'iah* perspective and there were multiple views about its permissibility and prohibition.

To date, there is no concrete *fatwa* about the permissibility or prohibition of the blockchain technology, and there is no detailed discussion of *Shari'ah* ruling on the blockchain technology as an independent technology on its own. Perhaps this is because everyone agrees to the permissibility of blockchain. Detailed research and reading into the existing references that discuss this technology show that research in this area is still limited. While there is little in the existing literature about its legitimacy, it is still possible to maintain that people are aware of the importance, usefulness and positive aspects of this technology.

Some of the views that support the blockchain technology from the *Shari'ah* perspective are briefly discussed here. According to Abu-Bakar (2017), the blockchain technology may be like a boon to *Shari'ah* requirements of disclosure and transparency. In addition, Evans concludes that blockchain technology conforms to the requirements of the *Shari'ah* (Evans, 2015). Furthermore, the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) has granted a certificate of credit to Stellar Development Foundation, a specialist in interconnection systems between banking and finance by blockchain technology. "There is no problem relying on the blockchain technology in the financial sector, but the main thing that was under consideration was the use of the virtual currency," says Mansour Ahmed, assistant general manager of AAOIFI (Ali, 2018). From the foregoing discussion, it is clear that there is a consensus by scholars that this technology is compliant with the *Shari'ah*. It could also be used to serve and develop societies.

Objectives of Islamic Laws (Maqasid Shari'ah)

In this section, the concept, characteristics and categories of *Maqasid Shari'ah* will be mentioned to be proportional to the research as the paper is looking into the Objectives of Islamic Laws (*Maqasid Shari'ah)* that exist in the blockchain technology. Through all of this we can examine the characteristics of the blockchain technology to determine the extent to which it matches the intended *Shari'ah* objectives. Abu Hamid al-Ghazali (1937) defines *Maqasid* by explaining five main objectives of human life based on the *Shari'ah*; these are protection of religion, life, intellect, progeny and property. He stated:

> "The very objectives of the Islamic Laws (*Shari'ah)* is to promote the well-being of people, which lies in safeguarding their faith (*din*), their lives (*nafs*),

> their intellect (*'aql*), their posterity (*nasl*), and their wealth (*mal*). Whatever ensures the safeguarding of these five serves public interest and is desirable, and whatever hurts them is against public interest and its removal is desirable." (al-Ghazali, 1937).

There is a consensus among the scholars that *Maqasid Shari'ah* is concerned with the global goals of Islam, wise purposes and divine secrets (Lamido, 2016). Objectives of Islamic Laws (*Maqasid Shari'ah)* has many features, such as securing public interests (*jalb al-masalih*) to prevent them from harm *dar' al-mafasid,* and maintaining universal interests to serve humanity (Dusuki & Bouheraoua, 2011).

According to Ibn Ashur (2006), there are two main categories of Objectives of Islamic Laws (*Maqasid Shari'ah)* as explicated by Islamic scholars. The first category is general objectives (*maqasid 'ammah*), and the second one is specific objectives (*maqasid khassah*). Al-Shatibi, the *usul al-fiqh* scholar, has divided the general objectives (*maqasid 'ammah*) into three sub-categories. The first category is *daruriyyat* (essentials) which includes the five objectives of Islamic Laws (*Shari'ah)* which people basically depend on which are religion (*din*), life (*nafs*), intellect (*'aql*), posterity (*nasl*), and wealth (*mal*). All of these objectives are very important to human life and if any of them are ignored, the *fasad* (disorder and chaos) will prevail in this world and there will be obvious loss in the hereafter. The second category is *hajiyyat* (needs) which refers to interests that leads to suffering when negligence occurs, but not overall disruption of life. *Hajiyyat* is considered as provisions which aim to remove the difficulty and hardship in addition to facilitating and making life easy. The third category is *tahsiniyyat* (embellishment) which indicates the fulfillment that leads to improvement, completeness and perfection in the behavior and customs of people at all levels of achievement.

The other category of *Maqasid Shari'ah* is the specific objectives (*maqasid khassah*) which focus on specific disciplines like *mu'amalat* (Islamic transaction), family law, and etiquette of conduct and behaviour. According to Ibn Ashur, the specific objectives consist of methods (*kaifiyyat*) meant by the lawgiver to achieve beneficial goals for human beings or to maintain the public interest related to their own conduct. The goal here is to prevent the pursuit of personal interests from undermining the established public interests, owing to disinterest, useless desires and whimsical errors (Ibn Ashur, 2006).

Although scholars have defined the framework of each of the general and specific objectives, they are interdependent. In fact, there is a lot of overlapping and integration between each of the two objectives of Islamic Laws. Therefore, dealing with any of the objectives separately will be somewhat naive. Both categories thus constitute a key framework governing human life in this world in order to obtain maximum happiness in the hereafter (Dusuki & Bouheraoua, 2011).

Research Methodology

This research is based on the qualitative research method as an approach to answer the study's research questions, and to realize its objectives by utilizing literature review and interviews to generate confirmations and evidences.

The data collection is based on primary and secondary data. The primary data, such as interviews, are data collected afresh and for the first time, and are thus original in nature. The secondary data are data from previous studies, the library, internet and theory resources, such as books, reports, online newspapers, websites and journal articles. The secondary data are those which have already been collected and are available (Kothari, 2004).

The sample selection of primary data was selected from lecturers in International Islamic University Malaysia (IIUM), whereby one lecturer is from the Institute of Islamic Banking and Finance (IIBF) and the other lecturer is from the Kulliyyah of Information and Communication Technology (KICT). The codes used to refer to each interviewer are code (A1) to refer to the KICT lecturer, and code (A2) to refer to the IIBF lecturer (Muhd. Rosydi Muhammad, personal communication, September 5th 2018; Abdulmajid Obaid Hasan Saleh, personal communication, September 4th 2018). The interviews were conducted face-to-face. In addition, the semi-structured interview technique was used by the interviewer to collect the interview data. A semi-structured interview is a popular qualitative data collection approach because of its accessibility, flexibility and intelligibility. The adoption of the semi-structured interview also calls for guided and prepared interview questions intervened with probes to draw elaborated responses (Qu & Dumay, 2011). The questions for the semi-structured interview are as follows:

1. Is the blockchain technology effective in securing information and data?
2. How effective is the blockchain technology?
3. What are the positive and negative aspects of the blockchain? Which aspects are more as compared to the other?
4. Are there any challenges in using the blockchain?
5. To what extent does the blockchain match with the Maqasid Shari'ah?
6. Does Maqasid Shari'ah exist in the blockchain technology?
7. Under what category of Maqasid Shari'ah does this technology fall?

Studying the concepts of the blockchain technology has allowed the researcher to offer clear perceptions about the technology, its mode of operation, and the desired benefits through its advantages and disadvantages. Also, the conceptual framework of *Maqasid Shari'ah* gives a clear picture of the extent of interests of Islamic Laws and the development and preservation of societies. Through all this research, the paper aims to discover the perspective of Objectives of Islamic Laws (*Maqasid Shari'ah)* in this technology by focusing on its application for society. In addition, this study evaluates the technology from the *Maqasid Shari'ah* perspective by clarifying the extent of facilitation, security, transparency and anti-monopoly that

may be achieved through the direction taken by countries, institutions and companies to apply this modern technology.

Discussing and Criticism

This section discusses Objectives of Islamic Laws (*Maqasid Shari'ah)* which could be observed in the blockchain technology. The application of *Maqasid Shari'ah* in the blockchain technology could be observed based on four key features of blockchain. The discussion of each feature is presented in terms of its concept together with evidences from the Holy Book (*Qur'an)* and Prophetic Texts (*Sunnah).* This paper tries to illustrate under which category of ultimate goals (*maqasid)* each feature is placed. The interviewees' views are also used to support the discussion.

The Application of Objectives of Islamic Laws (Maqasid Shari'ah) on Blockchain Technology

Through the literature review, Objectives of Islamic Laws (*Maqasid Shari'ah)* is a tool that provides a solid foundation for deep-rooted reform and development in all aspects of life to preserve the balance in life. Objectives of Islamic Laws (*Maqasid Shari'ah)* has a significant role in developing society through the achievement of happiness for the communities by providing the best for humans to facilitate their lives. In particular, *Maqasid Shari'ah* focuses on the five essential issues that are considered important and necessary for human welfare. In this regard, the blockchain technology and its application plays a major role in facilitating and simplifying several matters in various financial and non-financial fields.

> "At this moment, blockchain is a very trusted technology. The people in the banking industry are looking forward to adopting it. Also, the non-financial field can get the benefits of this technology; for example, the government can manage the critical data of the citizen (e.g. the ownership of land and medical data). This information is almost impossible to change and that is basically the main idea of blockchain." (A1)

(A1) also added that:

> "Since this technology has been applied, no one has complained about it yet. Its good effects are clear, and the world receives only accurate information. Everything now depends on technology communication and this requires a strong system, such as the blockchain." (A1)

Based on the literature review, it could be said that Objectives of Islamic Laws (*Maqasid Shari'ah)* is commensurate with the advantages of this technology and using it to relieve and solve problems and hardship. Blockchain is therefore considered as a need (*hajiyyat*) for people to facilitate their lives, while for some it is considered as an essential (*daruriyyat*) for the preservation of wealth. Even if this technology is categorized under embellishment (*tahsiniyyat*), it will contribute to uplifting the progress level of welfare in society.

"Placing the blockchain under daruriyyat, hajiyyat, or tahsiniyyat could depend on industries like the financial sector, which should be the first sector to adopt the blockchain-based systems because they need to protect their data; but for other industries they are yet to reach the level of daruriyyat, maybe they are still under hajiyyat or tahsiniyyat." (A2)

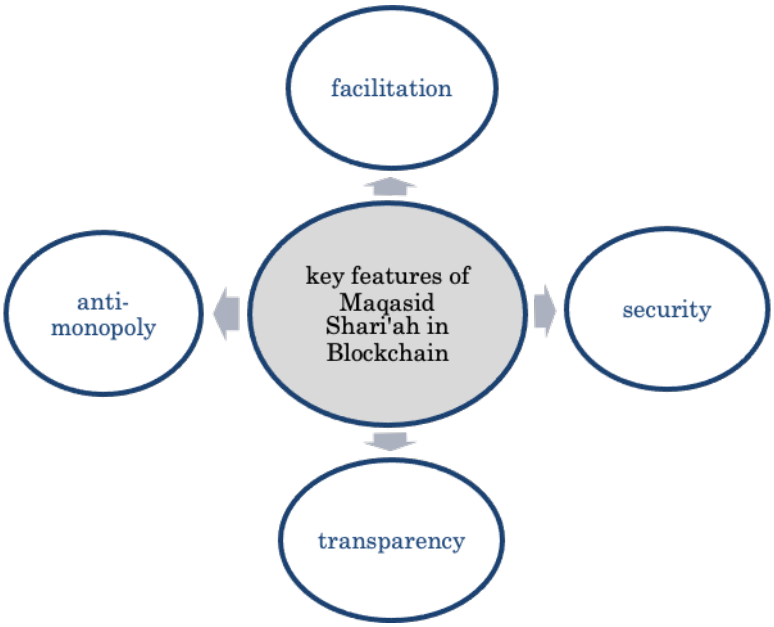

Figure 5. Key Features of Maqasid Shari'ah in Blockhain
Source: Authors' own

The next section will determine the appropriate category of *Maqasid* that blockchain may fall under. Objectives of Islamic Laws (*Maqasid Shari'ah)* can be observed in many aspects of blockchain , but this study focuses on the four key features: facilitation, security, transparency and anti-monopoly which are discussed as follows:

1. Facilitation

Facilitation is one of the ultimate goals (maqasid) of religion and is a general description of Islamic Laws (Shari'ah) in its rulings, beliefs, ethics, transactions, origins and branches. Allah says:

"Allah intends for you ease and does not intend for you hardship." (Al-Baqarah: 185).

The Prophet (PBUH) stated: ٥ake things easy and do not make them difficult, cheer the people up by conveying glad tidings to them and do not repulse (them)). [Sahih Bukhari, 1:636-637].

Among the facilitation aspects of the technology is the acceleration of transactions, saving time and money, and helping people to complete more transactions in less time.

As (A2) stated:

> "The facilitation has an economic dimension as it shortens international business transactions very significantly within a specified number of seconds." (A2)

According to (A1),

> Blockchain can be used in education to facilitate the issuance of certifications: "In the case of Malaysia, there is a proposal by the ministry of education to produce degree scroll developed using the blockchain systems to avoid many issues (e.g. fake certification), this could help to check any certificate from any university and facilitate the administration of education to be faster and easier." (A1)

All these facilities are located under *hajiyyat* (needs), where people can minimize their hardships and problems by using this technology, which, in turn, contributes to the well-being of the society.

As (A2) said:

> "We can put it under hajiyyat because we need it to facilitate the processes to make our life easier. It falls under the hajiyyat (needs) because people need to save time and accelerate the completion of transactions; the more easy and simple the transactions, the more useful and better because time is valuable as the jurists said." (A2)

If this technology is not applied, the transactions may increase in tandem with the expansion of cities and the density of the population, making it more difficult to conduct transactions in all sectors - something which can be seen and observed today.

2. Security

Privacy and confidentiality are important to individuals, and they are maintained through security. People want to protect their confidentiality and the security of the information they have, whether it involves financial or family matters. By reviewing the financial aspect as one of the usages of this technology, it was found that Islam's focus on the protection of money and wealth falls under one of the five ultimate Objectives of Islamic Laws (Maqasid Shari'ah) because it is considered a vital part of life as mentioned in the Holy Book (Qur'an):

وَلَا تُؤْتُوا السُّفَهَآءَ اَمْوَالَكُمُ الَّتِيْ جَعَلَ اللّٰهُ لَكُمْ

> And do not give the weak-minded your property, which Allah has made as means of sustenance for you. (Al-Nisa: 5).

The process of money transfer is safe, and the money holder can save his money and prevent it from being stolen, hacked, or lost. The security feature is one of blockchain's hallmarks that provides security mechanism via user verification, which disallow hackers from entering into the transactions via blockchain (Li, X et al., 2020). All messages and transactions are cryptographically signed, ensuring essential security, effective risk management, and data integrity. This may prevent hacking, data compromise and data manipulation.

> "We are in the field of IT, this is among the best technology that offers the security features. It is very critical nowadays because the movement is really protected from one point to another point over the network." (A1). "Banks suffer from breakthroughs and hackers; this technology will help with privacy."(A2)

There are many features of security and the inability to modify data is an important feature. Meanwhile there is also discussion on the challenges with regard to security:

> "One of the blockchain's advantages is its irreversibility relating to security; after submission and verification you cannot go back and change. Some consider it as a disadvantage because if you make a mistake with the system using blockchain, you cannot change it back. In terms of losing a private key, from the operational perspective they view it as a disadvantage because in the case of death, no one can claim the money or data, but from the technological perspective it can be said that it is an advantage to have a private key which cannot be shared with others; it confirms the meaning of security as no one else can access the data." (A1)

The respondent (A1) offered these arguments:

> "These few expectations may happen in the security and it does not make sense that we cancel all the features because of these expectations. The advantages are bigger and more than disadvantages." (A1)

Some indicate that hacking incidents have occurred in cryptocurrency using blockchain, and this issue shows that we should avoid any transactions through blockchain technology. This argument was supported by the interviewer (A1):

> "The hacking incidents occurred for some cryptocurrencies using a normal system developed using normal technology. They hacked the wallet that was not developed using the blockchain. But the cryptocurrency which is developed using the blockchain cannot be hacked. It does not happen up till today as far as I know. Even if hacking happens, the money cannot be taken out from the wallet. They can keep or transfer the wallet, but fiscally nothing can happen." (A1)

Thus, from this perspective, blockchain technology is one of the essentials of the ultimate goals (*maqasid)* that is indispensable to people if they are fully relied upon. *"It is a necessity"* as (A1) said. It provides protection for money and wealth in addition to the high degree of security or encryption for each individual's personal information.

> "Money stolen due to its unprotected condition is not called theft because protecting money is one of the necessities of maqasid. So, it falls under daruriyyat" (A2). "The blockchain can facilitate the transaction of money and comes under protection of the money (mal). Moreover, it can help people in the case of emergency by protecting their medical data which can be accessed from anywhere - this comes under protection of the life and soul (nasl). Additionally, it may fall under the protection of posterity (nasl) by keeping the birth certificate and DNA of all persons to avoid any wrong relationship in the case of marriage." (A1)

Some countries have already moved to implement blockchain technology and if it is used all over the world, it would be difficult to abandon it later,

According to (A2):

> The security can be applied in various Maqasid fields to protect the integrity of data using the blockchain. For example: there are many Quranic applications, and anyone can simply develop the apps and hack or change the words and meaning of the Quran. The blockchain helps to protect these Quranic apps, then it would come under the protection of the religion (al-din). This is true for the websites with the content of fiqh, aqidah, hadith, and tafsir. All these things are going to be really secure and it falls under protection of the religion (al-din). (A2)

3. Transparency

Transparency means providing accurate and reliable information for all activities at all levels to ensure the highest accuracy. The contracting parties in Islam have the right to access relevant information and decisions. Therefore, clarity is required in transacting contracts to avoid any cheating or deception that may occur. The pursuit of a policy with full clarity and the presentation of all important facts on which the interested parties depend is necessary to make the transactions valid and executed honestly and transparently. Islam emphasizes total clarity, honesty in words and deeds. This is indicated in the Holy Quran: (O you who have believed, fear Allah and be with those who are true). [Al-Taubah: 119].

The Prophet (PBUH) calls for truthfulness in many prophetic sayings: ((It is obligatory for you to tell the truth, for truth leads to virtue and virtue leads to paradise...)) [Sahih Muslim, 45:136].

Honesty in all affairs leads to clarity and transparency. One of the conditions for the validity of a contract is clarity which is described as accuracy by jurists. This technology can be considered as a contract because it involves transactions between two parties. Transparency is achieved in the blockchain, since it allows participants to verify transactions and ensure the accuracy of information, resulting in confidence and reassurance to users that they can access all the details of the information.

> "The transparency is another advantage of blockchain because the other simple definition of the blockchain is the public ledger technology where in the contacts of cryptocurrency with digital coins, everyone can see what happens. The processes and transactions will be visible to everyone." (A1)

Also (A1) reiterated:

> "Accuracy contributes to the characterization, transfer and utilization of financial accounts. If things are accurate, they are clearer and more remote from suspicion as they are difficult to hack." (A1)

It is true that blockchain technology provides more transparency without compromising its privacy. The transparency is only for both contracting parties to view and verify the details of the transaction before it is duly executed (Chod, J et al., 2020). Therefore, there is no room for concealing important data related to the contract prior to its transaction. As for privacy, only those who hold the private key can do the verification and submission in the blockchain technology system. It means that only authorized personnel can perform the transaction process in the blockchain. The data related to all the contracting parties will be duly encrypted with special codes available to only certain permitted parties (Le Nguyen, B. et al., 2020). The transparency and privacy fall under the necessities that people need in their lives because without them, injustice occurs when people consume one another's wealth; injustice will prevail and lead to distrust. (A2) argues that:

> "The transparency falls under the tahsiniyyat (embellishment) because Islamic law urges perfection and this is part of accuracy." (A2)

4. Anti-Monopoly

Monopoly is the confinement of what people need, whether food or other necessities, which causes harm to them. Therefore, monopoly is considered injustice, and it is prohibited in Islam because the interest of the people will not be protected. The Prophet (PBUH) said: ((No one hoard but the sinner)). [Muslim, 22:162].

Monopoly could be associated with the banks. The banks have the status quo for quite a long time in determining the fees and charges to the retail customer. This is similar to monopoly if there are no stringent rules and regulation set by the central bank for the banks to comply with.

"Hence, it becomes increasingly clear that blockchain technology can entirely eliminate the need for not only banks, but all sorts of intermediaries involved in all sorts of transfers, be it capital or personal. Blockchain will also help in eliminating all the expenses that a client pays to the intermediaries; in this case, banks.

When a migrant worker, for instance, sends money home to his country, intermediaries that facilitate such transfers take hefty fees from the amount remitted. Transaction fees for international remittances are around 9% on an average globally. It would become so much better for everybody if we would have less people to deal with and more money to spend. Blockchain is the way to go forward to bring this into reality".

> "No more need for the third party and the intermediaries when applying the blockchain" (A1). According to (A2), "Commercial brokerage and the third party consumes time, effort and money. This technology helps to get rid of this third party and it is very useful for people to accelerate their transactions." (A2)

There is the argument that many people will lose their jobs and this may cause unemployment if this latest technology is applied. The jobs of institutional and

individual intermediaries such as lawyers, bankers and brokers will be redundant and eliminated.

(A1) says in response to the argument:

> "You cannot blame the blockchain because other technologies will create the issue as well. It is not going to be a big issue because we are talking about how we are going to make our transactions better using the blockchain technology. It cannot be simply stated that blockchain has the disadvantage of making people lose their jobs, I do not think so." (A1)

Furthermore, (A2) answers this argument:

> "This is a weak argument because there are other things that have not been activated and we need labourers/ workers because the manpower can be activated in the practical field but not in the electronic field." (A2)

If the brokerage or service fee from the bankers and lawyers could be cut for the sake of the people, the blockchain technology is the best solution since it fosters the transaction between buyer and seller without the need for an intermediary or mediator. Besides, the elimination of the service fee of lawyers and bankers means people can save their money and subsequently use it for other purposes.

Nonetheless, if the banks and lawyers want to stay relevant to the heart of society, they need to master and grasp the blockchain technology to expedite the transactional process. The bankers and the lawyers have to provide competitive fees and charges as compared to the other blockchain technology providers. As a result, the end customer will enjoy lower fees and charges by the blockchain providers including the bankers and lawyers. Eventually, monopoly by certain groups will be abolished.

In fact (A2) says:

> "Preventing monopoly comes under hajiyyat (needs) that facilitate the interest of people because mediation may complicate the business process, but this technology helps to break the monopoly issue and makes everyone familiar with the business process." (A2)

Conclusion

Technology has changed the way people live, at the same time the operations of business and industries have been changed significantly with the emergence of new technologies. Blockchain technology is one of the most outstanding technologies which rapidly changes and impacts on the political, cultural, social and economic life of our society. The research on the new technology was started because of its many features and advantages, such as reliability, security, transparency and others. It may be applied in a very wide range of financial and non-financial sectors around the world.

This research paper suggests that blockchain concept is in line with *Maqasid Shari'ah* in terms of facilitation, security, transparency and anti-monopoly.

It is concluded that the blockchain technology could be categorized under *hajiyyat* (needs) in terms of facilitation, security and anti-monopoly. The findings show that it should be placed under the category of *daruriyyat* (essentials) with respect to security which protects the religion (*din*), life (*nafs*), posterity (*nasl*) and wealth (*mal*). The transparency feature could be categorized under embellishment (*tahsiniyyat*).

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