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Blockchain Sukuk Industry ..... A Revolution In The World Of Investment Sukuk - Wethaq Platform Experience As A Model-

صناعة صكوك البلوكتشين.....ثورة في عالم الصكوك الاستثمارية

– تجربة منصة وثاق نموذجا–

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Abstract

The research aims to study the basic concepts related to blockchain sukuk, and how blockchain technology contributes in activating the industry of investment sukuk and studying the experience of the wethaq platform;

It was concluded that blockchain applications in the sukuk industry would reduce the challenges it faces. The wethaq platform seeks to implement new technologies in the field of sukuk al-ijara using smart clauses and the corda protocol, which leads to increase transparency in the issuance and payment process, sharia auditing and simplification of procedures.

Keywords: Blockchain, Sukuk, Blockchain Sukuk, Wethaq Platform.

ملخص

يهدف البحث إلى دراسة المفاهيم الأساسية المتعلقة بصكوك البلوكتشين، وكيف تساهم تكنولوجيا البلوكتشين في تفعيل صناعة الصكوك الاستثمارية، مع دراسة تجربة منصة وثاق؛

تمّ التوصل إلى أن تطبيقات البلوكتشين في مجال صناعة الصكوك من شأنه أن يقلّل من التحديات التي تواجهها. وتسعى منصة وثاق إلى تطبيق تقنيات جديدة في مجال صكوك الإجارة باستخدام البنود الذكية وبروتوكول كوردا، مما يؤدي إلى زيادة الشفافية في عملية الإصدار والدفع والتدقيق الشرعي وتبسيط الإجراءات.

الكلمات المفتاحية: بلوكتشين، صكوك، صكوك البلوكتشين، منصة وثاق.

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1. INTRODUCTION

The fourth industrial revolution has led to structural changes in the contemporary financial environment, as blockchain technology is used in many areas of finance (banks, insurance, financial markets) and transactions are carried out directly from peer to peer, in full transparency without any mediation, as a result; the costs are reduced.

In the light of the digital financial world, the Islamic financial industry is trying to keep pace with the situation by adopting financial technology in its various fields. It creates methods, tools and products supported by artificial intelligence techniques and smart contracts in the blockchain network. Among these innovations we have blockchain sukuk or smart sukuk that are based on blockchain technology to organize, issue and structure sukuk in a transparent, reliable, simplified, and at the lowest possible cost. The experience of the wethaq platform is a unique experience in creating a coded market for investment sukuk, based on the principles of cryptography and smart contracts to simplify the structure of issuing sukuk in general and sukuk al-ijarah in particular. Based on what is mentioned above, the problem of this research has been formulated in the following main question:

What is meant by the blockchain sukuk industry? How does blockchain technology contribute in activating this industry?

The main question has the following sub-questions:

- What are the basic concepts that related to blockchain technology?
- How have blockchain technologies affected the financial markets?
- What is a blockchain sukuk? What are its advantages over traditional sukuk?
- How is blockchain technology affecting the industry of investment sukuk? How is it structured under this technology?
- How is the process of issuing and structuring sukuk al-ijara in wethaq platform (Capital Markets)?

To answer the main question and sub-questions, the following hypothesis was adopted:

The applications of blockchain technology in the investment sukuk industry (blockchain sukuk) have simplified the structure of the sukuk industry and reduced costs.

Research Importance: The research is of great importance, as it is one of the emerging topics in which the field of research is still young. Blockchain technology has affected traditional and Islamic financial aspects, including the investment sukuk industry. Despite the importance of this technology, its applications in the field of sukuk are still limited to a few global experiences. So we had to demonstrate the importance of this technology in activating the sukuk industry.

Research Objectives: This research aims to achieve the following points:

1- Knowing the theoretical aspect related to blockchain technology;
2- Realizing the effects of blockchain technology on financial markets in general, and the investment sukuk industry in particular;
3- Knowing the blockchain sukuks, their advantages, and their structure;
4- Learning how to issue and structure sukuk al-ijarah on wethaq;
5- Enriching the topic of research, considering that scientific studies in this area are very limited.

Research methodology: To study this topic, an analytical descriptive method that relies on data collection has been adopted for study and analysis, with a view to studying the topic in all its aspects. In order to achieve this objective, many references that were closely related to the topic were adopted in the interest of scientific objectivity.

Literature of previous studies: Among the previous studies we mention the following:

1- ***Sherin Kunhibava & others*** *(2021)* study entitled ***"Sukuk on blockchain: a legal, regulatory and Sharī'ah review"***: This study aimed to review the literature on sukuk in general and the basic concepts related to blockchain sukuk and the challenges they face in particular. It was concluded that digitization and issuance of sukuk via blockchain addresses some of the problems plaguing the industry, increases transparency, reduces costs and the number of middlemen. The risks facing this industry were also highlighted, which calls for cooperation between the various actors. (Kunhibava & al, Junuary 2021)

2- ***Osama Hamza*** *(2020)* study entitled ***"Smart Sukuk Structure from Sharia Perspective and Financing Benefits: Proposed Application of Smart Sukuk through Blockchain Technology in Islamic Banks within Turkey"***: The researcher has studied the fundamentals of traditional sukuk

in general and blockchain sukuk in particular. He proposed also a model for structuring blockchain sukuk in the biggest Islamic bank in Turkey. It was concluded that smart sukuk offer many advantages such as speed, transparency, accessibility and cost reduction. (Hamza, 2020)

3- ***Houssem eddine Bedoui*** *(2019)* study entitled *"**Contribution of Blockchain Technology to the Sukuk Industry**"*: Through this article, the researcher showed how the sukuk industry has benefited from blockchain technology and smart contracts and alleviated some of the challenges it faces. (Bedoui, 2019)

Research plan: This research consists of three main axes:

1. Blockchain technology and its impacts on financial markets.
2. Blockchain sukuk and their structure.
3. Wethaq platform: a global experience in the digitization of sukuk.

2. Blockchain technology and its impacts on financial markets

2.1. Blockchain Technology: A theoretical background:

2.1.1. The concept of blockchain and smart contracts: Blockchain and smart contract can be defined as follows:

- "Blockchain, or distributed ledger technology, is a digital, distributed, immutable transaction ledger that replaces a central authority (or 'middleman') with algorithms. By doing so it offers numerous opportunities for cost savings while opening new market segments for existing financial institutions and new players alike" (IFC, August 2017)
- "A decentralized database containing sequential, cryptographically linked blocks of digitally signed asset transactions, governed by a consensus model." (Sultan, 2018)
- As for the smart contract, it is defined as: "A smart contract is a contract between two or more parties that can be programmed electronically and is executed automatically via its underlying blockchain in response to certain events encoded within the contract." (pwc, 2017, p. 10)

In the event that the data that is necessary to execute the contract is located outside the blockchain, a third party known as **oracle** pushes this information to a specific location in the blockchain at a certain time, where the smart contract reads the data and acts accordingly (execution/non-execution). For example in the case of train cancellation Insurance, oracle

provides information on train arrival time (data is on the carrier's website). (pwc, 2017, p. 10)

From this, blockchain and smart contracts can be defined as follows:

The highest level of financial technology, in which the blockchain is considered as a global decentralized network, based on the implementation of smart contracts. The latter which represent electronic encrypted transactions that are executed automatically, based on encrypted information entered into the network, which leads to reduce costs, especially the costs of intermediaries.

Blockchain has a number of characteristics, which can be summarized in the following points: (Vanleeuwen & van de Ruit, July 2018)

- **Distributed/Decentralised**: There is no central authority governing the blockchain network, as each full node owns a copy of the entire chain, and the data is shared through the peer-to-peer network;

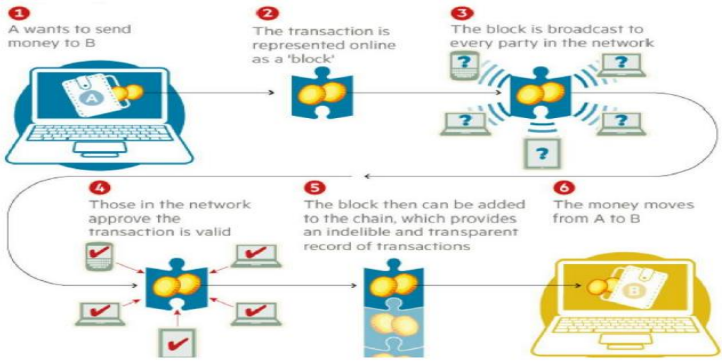
- Immutable/Unalterable/Permanent: Once a valid transaction is included in a given block, and the network reaches a consensus about the new state, the transaction or block cannot be changed, and stability is ensured by the hashing function, linking the successive blocks together, and through the consensus algorithm**;**

- Trust/Credibility: Trust is embodied in the majority that rejects illicit transactions or blocks, this feature also enables value transfer on the blockchain by eliminating potential double-spending;

- Transparent/Auditable: Each blockchain node has insight into all blocks and transactions. So everything that gets transferred to the chain is available for all to see;

2.1.2. How does a blockchain work?: How a blockchain works can be demonstrated by reviewing the following figure that explains how to complete a financial transaction using this technology.

Fig.1. How blockchain works



Source: (Crosby & al, October 2015, p. 7)

2.1.3. Types of Blockchain Systems: Blockchain systems can be divided into two main parts which are: (Houben & Snyers, July 2018, p. 15)

a- On an open, permissionless blockchain: Anyone can join or leave the network without the need to obtain approval from any central entity. All that is required is to own a computer and install the related software on it. There is no central owner of the network and software. The vast majority of cryptocurrencies currently in circulation rely on unlicensed blockchains such as bitcoin and litecoin;

b- On a permissioned blockchain: Transaction auditors are predetermined by the network administrator (who defines the ledger rules) in order to be able to join the network, allowing for easy verification of the network participants identity. Even though it requires participants to place trust in a central coordination entity to select trusted network nodes. This network, in turn, is divided into two parts: (Houben & Snyers, July 2018, p. 16)

- ✧ **Open blockchain**: it can be accessed and viewed by anyone, but only authorized participants of the network can create transactions or update ledger status;
- ✧ **Closed Blockchain:** Access is restricted. Only network administrator can create transactions and update ledger status.

2.2. Blockchain impacts on financial markets:

2.2.1. Disintermediation and disruption of the market maker function: Market makers play an important role in financial markets, through their work to provide permanent liquidity in the market and alignment between sellers and buyers. In a decentralized blockchain market place, matching is automatic and no middleman is required. However, in practice, financial

asset coding operators provide market making services to clients, thus replacing market makers' mediation with technology to maintain the middleman model in a crypto environment. But according to some participants in the securities industry, brokers are still useful in decentralized environments to execute large orders, which raises the question about the extent of decentralization desirable and whether appropriate incentives are in place for the emergence of a fully decentralized token market. (OCDE, 2020, p. 25)

2.2.2. Impact on prices: Trading in a symbolic environment improves transparency and reduces information asymmetries, which leads to fair price setting, which stimulates investors to increase their participation, raise market liquidity and improve competition conditions. However, it should be noted that the great transparency may not appeal to some clients, where anonymity and ambiguity are of value. (OCDE, 2020, pp. 30-31)

The basic argument for ledger applications in financial markets relates to the reduction in cost and operational efficiency that technology provides, and trading of coded financial assets allows the creation of an arbitrage opportunity which leads to price stability. (OCDE, 2020, p. 31)

2.2.3. Enhancing financial market liquidity: The use of blockchain technology increases market liquidity, as coding financial assets increases their number and diversity in the market and increases their level of liquidity. Blockchain, especially for assets and illiquid securities such as securities of small and medium enterprises, private investment funds or unlisted securities ... etc, provides an opportunity to improve the liquidity of these assets, and promotes the formation of additional capital, thus increasing the flow of funds to the investment necessary to finance companies, especially small ones, medium and the real economy. However, this requires preparedness of financial markets for this and the existence of interoperability or decentralized networks with a sufficient number of active nodes; (OCDE, 2020, p. 28)

2.2.4. Settlement and clearing: The clearing house in the financial markets works to mediate between the parties to ensure the completion of transactions and reduce the risks of the counterparty. In this, the central securities warehouses are used to record transactions. The blockchain allows for the maintenance of a single, shared and immutable ledger that is updated

at every step of the process, and can be accessed instantly by all parties involved. Commercial matching and recording of transactions in an automatic, unchangeable, transparent and semi-instantaneous way. The distributed ledger can function as a decentralized record of data, and a counterparty to all transacting parties. (OCDE, 2020, p. 32)

Blockchain technology can enhance efficiency in the settlement process, reduce complexity, and shorten the settlement period to real time (t + 0), instead of (t + 1) or (t + 2) as the ledger can reduce generative office costs and data discrepancy, making it easier reconciliation of data in the fastest time. (OCDE, 2020, p. 32)

3. Blockchain sukuk and their structure:

3.1. The concept of blockchain sukuk:

3.1.1. Definition of blockchain sukuk: The definition of blockchain sukuk differed as follows:

- "Blockchain sukuk is a novel concept in the world today. A simple way of describing such sukuk is that it is a financial instrument where the blockchain technology is used via smart contracts to execute functions in a transparent and reliable manner. There would be no difference in the underlying Sharia contracts used to set up blockchain-based sukuk and classical sukuk .The difference lies with the use of technology (blockchain technology) in structuring and executing the contracts whereby business rules are directly encoded into an underlying payment currency by smart contracts on a designed algorithm that enforces contract rules vis-à-vis payments and ownership transfer. (Kunhibava & al, January 2021)
- "The smart Sukuk structure has endeavored to use the Blockchain technology and boost efficiency, transparency, reduce the cost and make it possible for small and medium enterprises SMEs, social impact projects, groups and associations to issue their own Sukuk using the new technology. (Sa'ad, 2018, 24-25 October)
- "Smart Sukuk is a tokenization by collecting funds from investors in exchange for Sukuk Tokens representing an ownership portion of the Sukuk investment. The funds are automatically distributed back to the Sukuk Token holders via the blockchain according to the rules of the smart contract in Islamic Economics - without the need of conventional

banks or intermediaries." (HLC Smart Sukuk Platform, no date)

Based on this, blockchain sukuk can be defined as follows:

They are financial instruments based on the principles of Islamic law, using blockchain technology in the field of issuance, structure and settlement by means of encryption technology and smart contracts, which leads to reducing procedures and costs, especially mediation costs.

Blockchain sukuk are also known as **smart sukuks** or **sukuk chain**.

3.1.2. History of blockchain sukuks: The world's first smart sukuk or blockchain sukuk innovation goes back to Blossom Finance in Indonesia, as the company sought to change the traditional ways of issuing sukuk using blockchain technology. Blossom's blockchain sukuk uses Ethereum smart contracts to standardize and automate accounting, legal, and public payments for traditional sukuk offerings, all of which are fully supported by a legal entity licensed in the country of issuance (Hamza, 2020). ***Matthew J. Martin***, founder and CEO of Blossom Finance, is considered the first to launch the idea of blockchain sukuk under the name "Blossom's SmartSukuk™". In this regard, he says that smart sukuk remove barriers to socially impactful investments by making micro investments feasible, transparent and tradable. Just as container shipping reduced logistical costs and made global trade within the reach of nearly anyone around the world, tokenized assets reduce intermediation costs, making global finance more accessible regardless of size or boundaries. (World's First Primary Sukuk Issuance on Blockchain Closes, 2019)

3.1.3. The difference between blockchain sukuk and traditional sukuk:

The difference between traditional and smart sukuk can be explained in the following table.

Table.1. The difference between blockchain sukuk and traditional sukuk

blockchain sukuk	traditional sukuk
Adoption & Leadership of emerging technologies	Conservative approach to adopt new technologies
Super secure mobility and flexibility	Lack of flexibility and mobility
Adapts to cryptocurrencies	Based on traditional currencies
Turning to fintech companies, outsourcing non-core functions	Everything done in house – large headcount,capital and resources

Proactive participation in creation of regulation for new products	Compliance with existing regulation
Skills focused on technology fluency	

Source: (HLC Smart Sukuk Platform, no date, p. 9)

3.2. The role of blockchain in the industry of blockchain sukuk:

The advantages and roles of blockchain technology in the blockchain sukuk industry can be summarized in the following points: (Bedoui, 2019)

- The adoption of blockchain technology simplifies the structure of issuance of sukuk and trading processes, and improves regulatory oversight, because smart contracts help in standardizing and automating legal cost and accounting expenditures and payments related to sukuk;
- Through blockchain technology, it is possible to receive, manage and pay the capital collected by the sukuk holders, as well as the profit generated from the project, thus proceeds and coupons are automatically paid to the sukuk holders without the need for middlemen;
- Distributed ledger helps banks with their payments and business transactions and real-time money transfers for transactions as they happen;
- The adoption of blockchain and financial technology leads to the implementation of a new sukuk structure at the lowest costs due to the absence of fees for brokers;
- Avoid lengthy and uncertain legal procedures, which provides more efficiency, as smart contract simplifies back office operations, simplifies payments and shortens settlement times;
- The possibility of automatic implementation of the items mentioned in the sukuk documents (such as early termination of the sukuk), which will reduce the indirect expenses associated with issuing, settling and terminating the traditional sukuk;
- Blockchain is an easily distributed, unambiguous and stable database, which increases the transparency of the sukuk and their cash flow. It provides information for investors that can be referred to and analyzed during decision-making. Thus, the blockchain can solve the challenge related to the secession of sukuk from assets, as the owned assets and their performance are fully recognized and understood;
- Enables investors to exercise their rights as certificate owners, as the blockchain and smart contract provide a real-time record to sukuk holders,

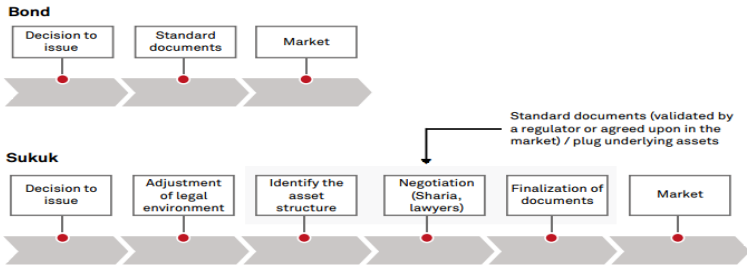
as a new block documents every transaction in the chain and provides accurate, real-time data;

- Blockchain is an effective tool for communication between investors and the originator, as it provides a technical solution;
- Technology is likely to push investors to change their investment strategy to buy and hold, increasing secondary market liquidity;
- The blockchain provides investors with reports of the social impact on their investments, thus knowing the effectiveness of the investments that have been made.

3.3. The structure of blockchain sukuk:

The following figure shows the stages of issuing bonds and sukuk.

Fig.2. Stages of bond and Sukuk issuance



Source: (S&P, 2020, p. 10)

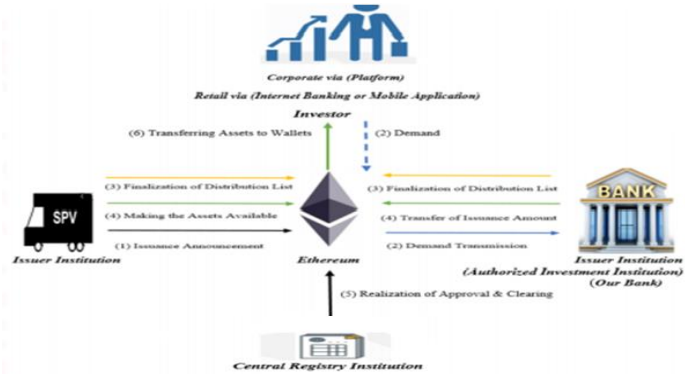
It is noticed from the above figure that the stages of the bond issuance process are more flexible compared to the sukuk that go through six stages until they are issued in the primary market, which made the process of issuing sukuk relatively expensive compared to traditional bonds, which made the blockchain help in simplifying the issuance structure, as it is done as follows:

3.3.1. Announcing the issue process: The special purpose company (SPV) announces the issuance of blockchain sukuk for sale to all investors through the platform. The SPV announces the issuance of blockchain sukuk for sale to all investors through the platform. The process is done as follows: (Hamza, 2020, p. 4)

- **Transfer the application**: Individual and corporate investors can purchase blockchain sukuk from the bank's branches through the mobile application or online banking services (the bank's website). Individual investor requests are passed through the blockchain;

- **Distribution**: After receiving the requests, the distribution lists are finalized by SPV and the bank;
- **The fair value of the coded sukuk**: the SPV equates to the sukuk codes in a **dinar token** account by the bank. The exchange of both transactions will be approved via the smart contract automatically by the central registration institution (Securities Clearing and Settlement Institution in Algiers Stock Exchange-);
- **Approval and registration process**: In order to complete the transaction, the smart contract is granted automatic approval through the central registry and the bank
- **Transferring the encoded sukuk to the clients' wallets**: After automatic approval through the central registry, the sukuk codes will be transferred to the clients' wallets. The next figure (03) illustrates this.

Fig.3. Blockchain sukuk issuance structure

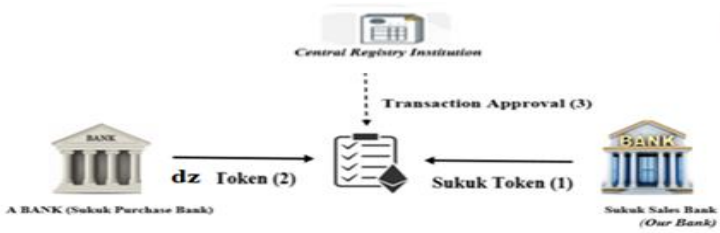


Source: (Hamza, 2020, p. 4)

3.3.2. Blockchain Sukuk Trading Process: Figure 4 shows how the trading of blockchain sukuk takes place, as:

- The bank transfers the request to sell the sukuk at a certain price and quantity to the network and the blockchain system;
- The bank that wants to buy the sukuk passes the request through the system and makes the **dz symbol** (Algerian dinar) available in its account;
- Under the smart contract, the settlement of the transaction is performed automatically through the securities clearing and settlement institution and the transaction is stored in the contract in the bank and securities clearing and settlement institution.

Fig.4. Blockchain Sukuk traded transaction structure



Source: (Hamza, 2020, p. 5)

3.3.3. Blockchain transaction settlement: On the settlement date, the dz symbol (Algerian dinar) is sent in the securities clearing and settlement institution to our bank via the smart contract. The coded sukuk are automatically transferred to the securities clearing and settlement institution;

- The bank provides the dz code in the account to purchase the sukuk in the securities clearing and settlement institution. The smart contract executes the transaction automatically;
- Transactions are recorded automatically in the securities clearing and settlement institution and our bank.

Fig.5. Blockchain transaction settlement

Source: (Hamza, 2020, p. 6)

4. Wethaq platform: a global experience in the digitization of investment sukuk

4.1. About Wethaq platform:

Wethaq (Capital Markets) is a limited liability company specializing in financial technology, registered with the Dubai International Financial Center (DIFC), and regulated by the Dubai Financial Services Authority (DFSA). (Wethaq, 2021)

Wethaq team worked in the second half of 2018 to prove the concept of (PoC), which aims to apply new technologies to the sukuk markets. Wethaq sought to verify the correctness of its assumptions of what would entail the issuance of ijarah sukuk using distributed ledger technology and smart clauses. (r3, June 2019, p. 2)

Wethaq is expected to obtain permission after reviewing the relevant

regulations and discussing details with the regional regulators. In April 2019, wethaq was granted an Innovation Test License (ITL) from the Dubai Financial Services Authority. After successful testing and implementation, wethaq will be upgraded to a license. (r3, June 2019, p. 17)

Wethaq aims, through the use of ledger technology in the sukuk market, to: (Michalopoulos, 2019)

- Have the ledger operate as a registry and central securities depository;
- 'Inter-operate' with other settlement infrastructures and payment gateways;
- Function within the existing regulatory framework;
- Have market participants, service providers and governance stakeholders interact with each other within the platform;

The wethaq platform was also designed in a practical manner that complies with the regulations, as: (r3, June 2019, p. 4)

- contractual relationships with, and duties towards, the fundraiser and other parties;
- regulatory permissions, such as the innovation testing license recently granted to wethaq by the Dubai Financial Service Authority;
- use of a permissioned distributed ledger for the facilitation of the sukuk issuance and administration and the efficient exercise by wethaq of its responsibilities;
- Wethaq will remain responsible to perform its various functions under the contracts and exercise its duties from a regulated perspective.

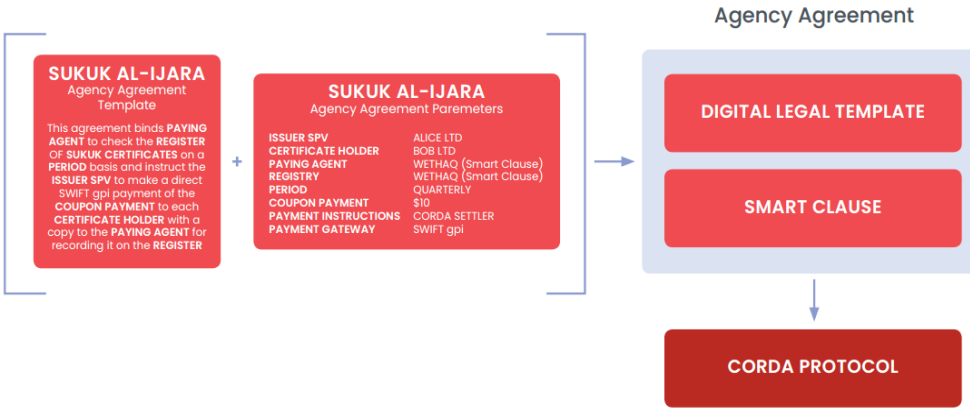
4.2. Wethaq platform and simplify the life of the sukuk producer:

Sukuk are usually and exclusively managed by banks and fundraisers, as the bank uses its expertise in structuring and distribution relying on its own and owned operations under a closed system. As for wethaq, it aims to simplify general coordination, standardize operations, and automate financial services of an administrative nature. In practice, upon completion of the smart conditions sheet (smart clauses), a negotiation is made with potential investors, to finally enter templates and documents with a full set of documents that are created, upon completion, the offer note and other transaction documents will have been posted in the ledger and presented to potential investors; (r3, June 2019, p. 5)

Wethaq platform hosts a system (Corda Protocol) to manage orders that is automated with pricing algorithms and supported by smart terms.

Wethaq works as a representative, payment trustee, account trustee and transfer agent. The following figure shows the digital legal model for sukuk al-ijarah for the wethaq platform. (r3, June 2019, p. 9)

Fig.6. The digital legal model for Sukuk Al-Ijarah for the Wethaq



Source: (r3, June 2019, p. 8)

4.3. Smart Clauses and the Corda Protocol:

4.3.1. Smart Clauses: Wethaq's smart clauses present an important aspect of automated fulfillment of obligations using a strict and formal programming language that is published in a distributed ledger outside of the control of any one party. This automation creates the following: (r3, June 2019, p. 8)

- The execution of contractual terms recorded on a distributed ledger reduces costs by removing the requirement for several 'trusted' financial institutions to manually conduct the relevant functions (whether through their own electronic systems or otherwise);
- There is certainty that the code will perform the obligations delegated to it as intended by the parties and beyond anyone's unilateral control;
- smart clauses can be programmed to 'self-execute' during the term of an agreement upon receipt of pre-defined data from a third-party source, known as an 'oracle'. For example, a smart clause could be constructed to connect to a data feed from a third party to benchmark the relevant reference rate (for instance, whichever interbank offer rate this may be), enabling dynamic performance based on real-world data.

4.3.2. The Corda Protocol: The public (unlicensed) distributed ledgers are a unique innovation in the history of financing, given operational

decentralization, settlement times, and access to global liquidity. However, ledger structures in organized capital markets must meet the functional and non-functional requirements of network participants, as most of the distributed general ledger data such as Ethereum was not originally created for use in commercial transactions, and it encounters complications when the underlying code rules are modified to suit foundation work**.** (r3, June 2019, p. 9)

Corda is a distributed ledger platform designed to record, manage, and synchronize financial agreements between organized financial institutions (Brown & al, 2016). corda is built together with teams from more than 40 of the biggest international banks, as a result of which corda is distinguished from other ledger technologies by: (Michalopoulos, 2019)

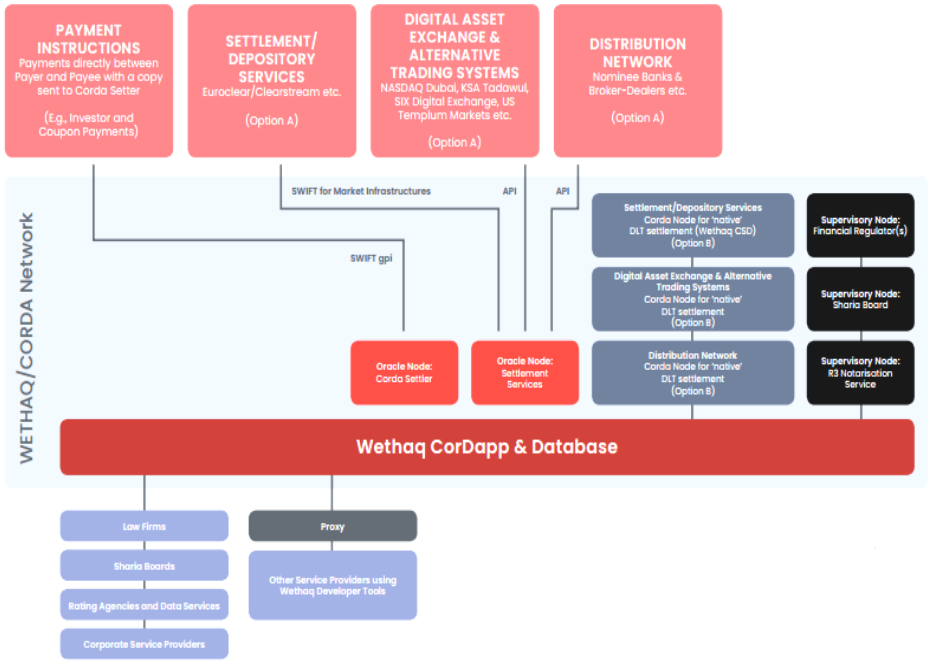
- Data privacy
- Well-defined identity layer
- Instant settlement finality
- Regulatory compliance
- Integration with legacy systems.

The following figure (7) illustrates the wethaq platform system and the corda protocol.

Wethaq platform can deal with the global corda system and take advantage of the new developments with the cash settlement function within the distributed ledger environment while preserving the unique structure of the Ijarah Sukuk. It will also integrate the wethaq platform with the corda settler, which is an open source CorDapp program that allows settlement of payment obligations arising from the corda protocol, through any means capable of providing cryptographic evidence of the settlement, whether inside or outside the ledger. (r3, June 2019, p. 9)

An initiative has also been announced by swift and r3 to strengthen corda settler by integrating swift gpi (Global Payment Innovation) as a payment gateway, which has a wider potential for efficient payments among market participants. This initiative will be able to track the flow of transactions in real time, allowing the licensed agent (wethaq) to monitor, track and audit the sukuk issuer /SPV. (r3, June 2019, p. 12)

Fig.7. The wethaq platform system and the corda protocol



Source: (Michalopoulos, 2019) (r3, June 2019, p. 10)

4.4. Compliance with the rules of Islamic law:

The wethaq platform aims to improve transparency in the sukuk market, and thus in line with the goals of Islamic law, as the distributed ledger keeps cash flow records in a transparent and easy way, and clarifies the source and timing of payments, as this supports transparency in the issuance and payment process and tracks the underlying assets and cash flows generated;

The possibility of employing smart clauses gives sharia bodies the opportunity to ensure compliance with the rules of Islamic law by building and mapping the requirements of sharia in the real world within the structure, and this can be done by following the prominent sharia guidelines for the basic transaction and embedding it in the digital contract, thus ensuring that the transaction is executed only when it is fulfilled. Sharia clauses, these self-executing clauses have the potential to automatically eliminate the need for human intervention and thus reduce the likelihood of non-sharia-compliant transactions. Moreover, sharia auditing processes can be engineered and automated using wethaq's smart clauses, and by doing so, it helps build competency in the sharia control system. For example,

forensic auditors or clients when necessary can access information via smart clauses, making the forensic investigation process easier.

All information including ownership, purchase and date of transfer of ownership is an integral part of compliance with Islamic law, and can be viewed in real time, moreover, once this data is recorded on the Wethaq platform, it cannot be changed or deleted. All of this helps provide an effective, safe and permanent sharia audit trail.

5. CONCLUSION

In this research, the applications of blockchain in the sukuk industry that resulted in the emergence of blockchain sukuks were studied in this research. We came to the following results:

- Blockchain technology has affected the financial markets through its impact on the work of market makers, on setting prices, increasing market liquidity and the method and duration of settlement and clearing of financial transactions;
- Blockchain sukuk is one of the finest in the art of financial innovation. It is based on the use of smart contracts and blockchain technology in the field of issuing, structuring and settling sukuk. The first issuance in the world dates back to Blossom Company in Indonesia;
- Blockchain technology brings about many advantages in the field of blockchain sukuk, as it increases transparency, reduces costs, avoids lengthy procedures, and enables automatic execution of contracts;
- The blockchain helps simplify the structure of sukuk issuance, whether in the area of issuance, the trading process and the settlement period;
- The experience of wethaq platform is a pioneering experiment in the field of digitizing sukuk al-ijara, as it seeks to use blockchain in the sukuk market by simplifying general coordination, standardizing operations and automating services of an administrative nature. It uses the smart clauses and the corda protocol.
- **Proposals:** Investment sukuk suffer from a set of challenges that blockchain technology can mitigate, but the practical experience has shown that the applications of this technology in the sukuk industry are still very limited, so the following must be done:
- Increasing reliance on this technology in the field of sukuk industry, due to its advantages;

- The necessity of cooperation between scholars of sharia, law, economics and technology to activate this technology in the field of sukuk industry;
- Spreading the culture of virtual dealing and the need to create confidence among dealers to enhance dealing across various platforms;
- Establishing the technological infrastructure in all countries of the world, especially developing ones, to ensure access to all markets and platforms.

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