

Smart Sukuk Structure from Sharia Perspective and Financing Benefits: Proposed Application of Smart Sukuk through Blockchain Technology in Islamic Banks within Turkey

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Abstract— Smart Sukuk structure is the new generation of Sukuk issuances structures. It uses Blockchain technology to allow more investors in both retail and corporate sectors to participate in Sukuk issuances. Through this technology, all financial institutions can issue their Sukuk. All types of documents and information related to the issuance of Sukuk are kept with the issuer's chains and the chains of the Central Registration Institution. Limited research was conducted on the transactions of smart Sukuk structures, such as Sukuk issuance model, traded Sukuk transactions and committed transactions market, from the Sharia compliance perspective and its financing benefits. This paper presents an in-depth study of the AAOIFI Standards, the decisions of Islamic Jurisprudence Academies and Sharia Boards, that related the Sukuk structures, applied in the Islamic bank of the paper's study society and the transactions of smart contracts from Sharia compliance perspective. On the other hand, this paper presents how to apply proposed smart Sukuk structures models that use Blockchain technology and smart contracts, within the largest Islamic bank in Turkey, in order to find out its financing benefits. The research findings indicate that from the Sharia perspective there are some issues in some applicable Sukuk models, such as the issue of capital guarantees. The use of Blockchain technology in smart Sukuk structures reflects several benefits on the financing markets, as it gives more capacity to access to more investors and markets, faster processing capability, transparency, invariance, and low transaction cost.

Keywords- *Smart Sukuk; Islamic Banks; Blockchain; Shari'ah compliant; financing benefits.*

I. INTRODUCTION

One of the biggest challenges for finance and Islamic finance in the next decade is using the tools of Fin Tech technology such as smart Sukuk. In the digital world, traditional financial practice will be left behind. Smart Sukuk Structures uses the blockchain technology and the smart contracts that have many advantages where contribute to enhancing transparency and eliminate fraud and speculations

in Sukuk transactions; it was also designed to avoid the involvement of intermediaries and reduce costs and make the transactions easier. Therefore many governments and financial institutions working on the use of this technology in some areas, including the issuance of Sukuk, which would contribute significantly to the creation of sources of financing and greater investment, expand the circle of participation, participation by individuals and SME

II. SUKUK

A. Sukuk Overview

Islamic financing mechanisms have different alternative forms and transactions from the conventional financial institutions in which they do not deal with interest. There are two alternative mechanisms of financing, equity financing or debt financing Starting by the equity financing there are two famous financing structures that are considered Sharia- compliant financing (partnership) and Musharaka (joint venture) where those contracts are based on the profit and loss sharing a principal. As for the debt financing alternative that are all sale contracts mechanisms namely Mudaraba are Murabaha (cost plus markup), Ijara (leasing), Istisna (construction). (Biancone & Maha, 2018).

Sukuk صكوك "linguistically" are identification document representing a financial right to its owner. While Sukuk are certificates of equal value representing undivided shares in ownership of tangible assets, usufruct and services or (in the ownership of) the assets of particular projects or special investment activity, however, this is true after receipt of the value of the Sukuk, the closing of subscription and the employment of funds received for the purpose for which the Sukuk were issued. (AAOIFI, 2017, p. 468).

The idea of Sukuk is based on the profit and loss sharing between the parties; that is each certificate gives its owner a share of the profits or losses that made from assets, projects or trade activities managed based on one of Islamic financial contracts depending on the nature of the contract.

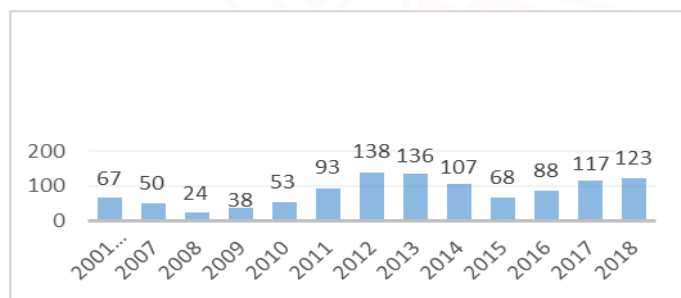
Sukuk are traded on the basis of Islamic Sharia; that is, the issuance and dealing of Sukuk are based on Islamic principles and rules in accordance with the standards of Islamic finance, it is worth mentioning that the first decision of the Islamic Fiqh (Jurisprudence) Academy of the Organization of Islamic Cooperation (OIC) legitimized the use of Mudaraba thought Seminar on the Mukarada (Mudaraba) Sukuk which held in Jeddah in August 1987. During last twenty years, Islamic finance industry has witnessed great popularity in the world, due to Sukuk industry that contributes to the process of financing, investment and development at the locally and globally levels. Perhaps the feasibility of investing in Sukuk, whether Sovereign and quasi-sovereigns Sukuk or Corporate, In addition, FIs Sukuk issuance, contributed to confidence of the investors and made it the first financing instrument in the Islamic finance industry. Depending on the particular needs of an institution, there are a variety of Sukuk structures based on various Sharia compliant contracts: profit sharing (Sukuk Al-Mudaraba), deferred-delivery purchase (Sukuk Al-Salam), lease of an asset (Sukuk Al-Ijara), joint venture (Sukuk Al-Musharaka), Sukuk Al-Istisnah (project based), and cost-plus asset purchase (Sukuk Al-Murabaha)...etc. (Blossom, 2018).

B. Sukuk Issuances

1) Sukuk Issuances (Globally)

Total global Sukuk issuance amounted to USD 123.15 billion in 2018. As illustrated in Chart 1A, global Sukuk issuance has shown a modest increase of +5% from USD 116.7 billion in 2017 to USD 123.15 billion in 2018. The steady issuance volume during 2018 was mainly due to sovereign Sukuk issuances from Asia, GCC, Africa and certain other jurisdictions while Malaysia continue to dominate the Sukuk market though share of countries like Indonesia, UAE, Saudi Arabia and to some extent from Turkey increased as well. (IIFM, 2019).

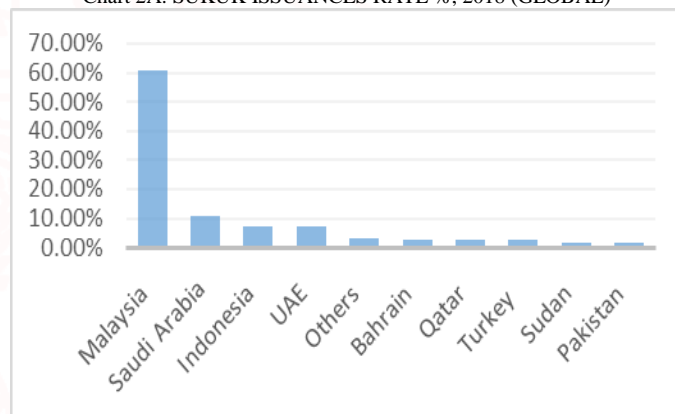
CHART I: TOTAL GLOBAL SUKUK ISSUANCES (JAN 2001 - DEC 2018) - ALL TENORS, ALL CURRENCIES, IN USD MILLIONS



Total Global Sukuk Issuance USD 1,101,502 Millions
Source: IIFM Sukuk database

Among the jurisdictions Malaysia is a market leader and a dominant player in terms of issuances as illustrated in Chart 2A, with market share of 60.84% as of 2018. Other jurisdictions in order of their approximate share in the global market are the UAE (7.21%), Saudi Arabia (10.7%), Indonesia (7.22%), Bahrain (2.8%), Qatar (2.6%) and Turkey (2.49%). The number of jurisdictions who are directly or indirectly issuing Sukuk are increasing year-over-year which in turn is keeping the Sukuk market progressive. (IIFM, 2019).

Chart 2A: SUKUK ISSUANCES RATE %, 2018 (GLOBAL)



Source: IIFM Sukuk database.

To analyze the Sukuk issuance globally in the recent years, as it's known Sukuk issuances are divided into several categories, which can be divided into international Sukuk issuances and domestic Sukuk issuances which include long-term, medium-term and short-term Sukuk, also according to the nature of Sukuk issuers, as quasi-sovereign Sukuk, corporate and financial institutions Sukuk.

In general, the figures indicate a decreasing rate of issuance of international Sukuk that is amounted USD 37,648 Billion in 2017 and USD 32,988 Billion in 2018. On the other hand, the rate of issuance of domestic Sukuk has increased, that is amounted USD 79,069 billion in 2017 while amounted USD 90,162 billion in 2018.

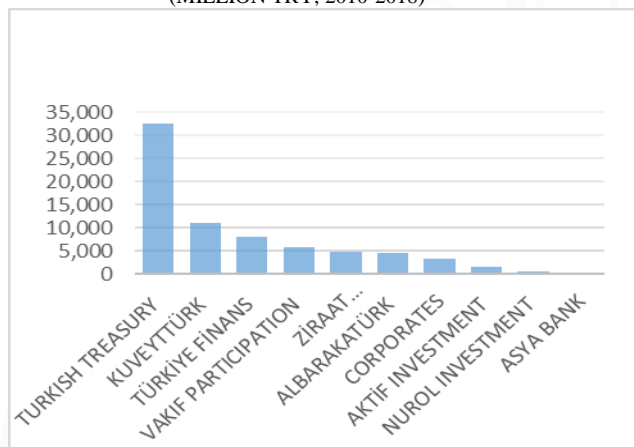
2) Sukuk Issuances (Turkey)

The share of participation banks in Turkey in the Turkish banking market is still 5% since 2010, although in the last years the Turkish government established three participation banks, Zırrat participation bank, Vakıf participation bank and recently Emlak participation bank. These banks started working with other participation banks Al-Baraka Türk participation bank which established in 1985, Kuveyt Türk participation bank which established in 1989 and Türkiye Finans participation bank which established in 2005, that can contribute to take part in Sukuk market, particularly the government is working to increase the participation banking sector to be 15% by 2025.

Sovereign Ijara (Leasing) Sukuk that issued by Turkish treasury (Domestic currency) between 2012 and December

2018, amounted TRY 32,600 Billion. While privat Sujuk issuances between 2010 and December 2018, Kuveyt Türk participation bank amounted TRY 11,114 billion, Türkiye Finans participation bank TRY 7,930 billion, Vakıf participation bank TRY 5,756 billion, Zırrat participation bank TRY 4,904 billion, AL Baraka Türk participation bank TRY 4,513 billion and Corporate sector amounted TRY 3,259 billion... etc. as illustrated in Chart 1B.

Chart 1B: TOTAL SUKUK ISSUANCE VOLUME IN TURKISH LIRA (MILLION TRY, 2010-2018)

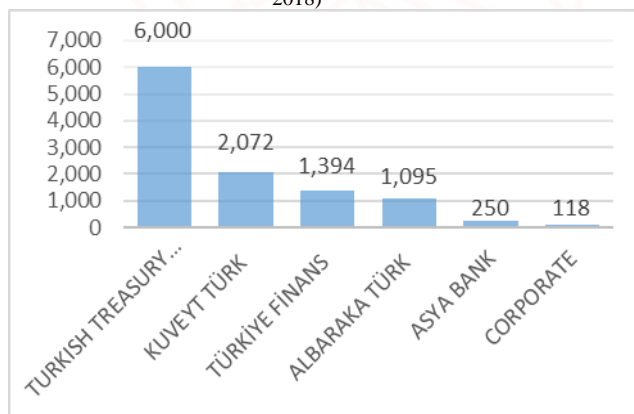


Source: Bloomberg

Sovereign Sukuk that issued by Turkish treasury (USD currency) between 2012 and December 2018, amounted approx. USD 6,000 billion. While privat issuances between 2010 and December 2018, Kuveyt Türk participation bank amounted USD 2,072 billion, Türkiye Finans participation bank USD 1,394 billion, AL Baraka Türk participation bank USD 1,095 billion... etc. as illustrated in Chart 2B.

Note: In 2017, Turkish treasury started issuing sovereign Sukuk based on Euro currency, while in 2018 it issued sovereign Sukuk based on gold. (TKBB, 2019).

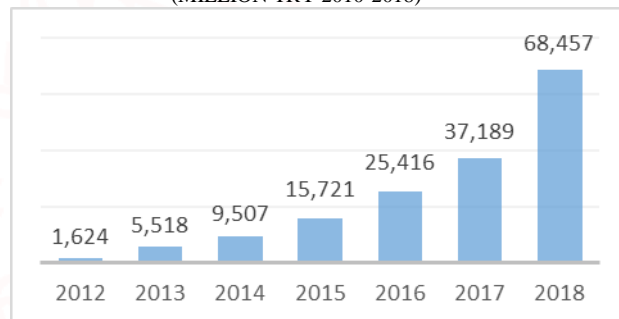
Chart 2B: THE TOTAL FOREIGN CURRENCY DENOMINATED SUKUK ISSUANCES OF THE ESTABLISHMENT IN TURKEY (USA MILLION, 2018)



Source: Bloomberg

In general, the figures indicate to an increase in the rate of issuance Sukuk in Turkey that is amounted TRY 37,189 Billion in 2017 and TRY 68,457 Billion in 2018, which means the Increase by more than 64% in one year as illustrated in Chart 3B.

Chart 3B: DOMESTIC TURKISH LIRA SUKUK ISSUED VALUME (MILLION TRY 2010-2018)



Source: Bloomberg

III. SMART SUKUK

To understand the meaning of smart Sukuk and its work mechanism we should know the concept of smart contract and Blockchain technology.

What is the concept of Smart contract and Blockchain?

A. Smart Contract

Is “computer code that, upon the occurrence of a specified condition or conditions, is capable of running automatically according to pre-specified functions? The code can be stored and processed on a distributed ledger and would write any resulting change into the distributed ledger.” (Commerce, 2018). Nick Szabo stated, “I call these new contracts “smart”, because they are far more functional than their inanimate paper-based ancestors. No use of artificial intelligence is implied. A smart contract is a set of promises, specified in digital form, including protocols within which the parties perform on these promises” (Szabo, 1996).

B. Blockchain

Is a specific type of distributed ledger technology (DLT) transactions? “The transactions are ordered and grouped into blocks. It can be defined as a platform whereby peers can exchange values using transactions without the need for a central trusted arbitrator” (Bashir, 2018).

In another way, Blockchain is a computer code or protocol that allows many participants of a same network to record information on a single shared ledger, where every participant can see the same data and information that inserted. Blockchain technology system has several

advantages which are not found in the traditional transactions, where it characterized by transparent, distributed (decentralized), validated, incorruptible, unalterable and efficient database. This type of technology became as a real revolution in several financial areas, including the Sukuk issuance transactions. So all types of documents and information related to the issuance of Sukuk kept with the issuer's chains and the chains of the Central Registration Institution.

Smart Sukuk has different features from the conventional Sukuk; it is obvious that Sukuk markets are the most favorable in Islamic Finance. However, it is also clear which normally issued by powerful institutions and government agencies, therefore Sukuk become very costly in terms of issuances. 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. The world first innovation in smart Sukuk introduced by blossom finance, the facility endeavored to change the conventional ways of Sukuk issuance using the Blockchain. The blossom's smart Sukuk uses Ethereum Blockchain smart contracts in other to strengthen the efficiency and make it a globally acceptable Sukuk. The main significance of Smart Sukuk is standardizing and automating the accounting, legal and overhead payments of conventional Sukuk offerings all these will fully backed by a licensed legal entity in the issuing country (SA'AD, 2018)

The adoption and implementation of this new technology would help to simplify the Sukuk issuance and trading processes and improve regulatory oversights. This is possible because Ethereum smart contracts can help in standardizing and automating the legal, accounting and payment overhead of the Sukuk structure ((i) Identifying the asset and structure; (ii) Negotiating (Sharia, Legal); and (iii) Finalizing the documents. (Damak, 2018).

C. Smart Sukuk Structures

1) Sukuk Issuance Model Structure, Based on Blockchain;

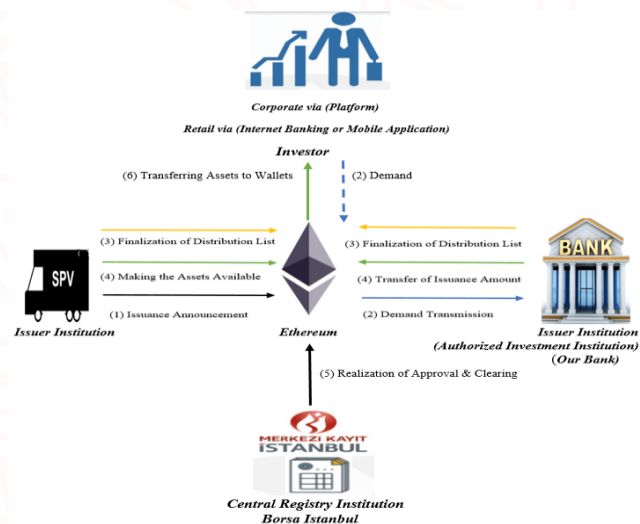
The proposed smart Sukuk issuance structure goes through several stages, as illustrated in figure (I) and as the following stages.

- Sukuk Issuance Announcement: SPV Company announces the issuance of smart Sukuk for sale to all the investors via the platform.
- Demand Transmission Process: In order to overcome the cultural adaptation process, individual investors will be able to pass their demands to buy smart Sukuk from the bank branches via bank mobile application or internet banking (the website of the bank). The demands of individual investors have been passed via

Blockchain in the background; On the other hand, corporate investors will also forward their demands directly to the authorized investment institution (The bank) via the platform.

- Finalization of Distribution List: After the demand collection process is completed, distribution lists are finalized by the SPV Company and the bank. (Due to the distribution process taking into consideration certain criteria, some clients can make part of the demand holder).
- Equivalent value of Sukuk Tokens: SPV company equivalents Sukuk Tokens to Turkish Lira via platform at the clearing day; Equivalent value of Sukuk Tokens are made available in Turkish Lira Token account by the bank. The exchange of both transactions via Smart Contract will be automatically approved by the Central Registry Institution (RCI).
- The approval and registration process: In order to complete the clearing transaction, the smart contract will be given automatic approval through the central register institution and the transactions will be registered in the nodes in both the central register institution and the bank.
- Transfer Sukuk tokens to clients' wallets: Following the automatic approval process through the central registry Institution, the relevant Sukuk tokens will transferred to the wallets of the clients.

FIGURE I. SMART SUKUK ISUUANCE STRUCURES



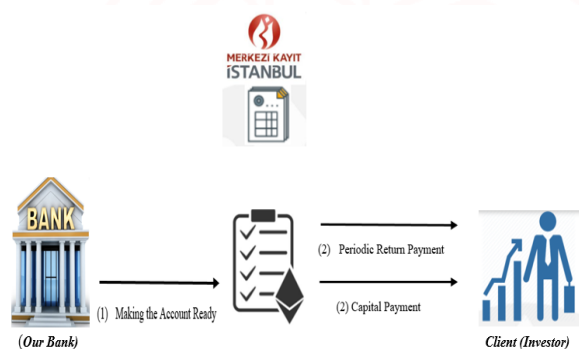
2) Sukuk extinguishing (Itfaa) Model Structure, Based on Blockchain.

Figure (II) shows the proposed structural of Smart Sukuk Extinguishing (Itfaa) stage.

On the day of Sukuk extinguishing (Itfaa Sukuk) transaction, paying periodic return and principal amount of Sukuk.

- The bank makes the Turkish Lira token available to cover the Itfaa amount that is the periodic payment and principal amount.
- On the value date, the system automatically makes the payment to the client accounts. In the same time, Sukuk tokens are also deleted from the system.

FIGURE II. SMART SUKUK EXTINGUISHING (ITFAA TRANSACTION).

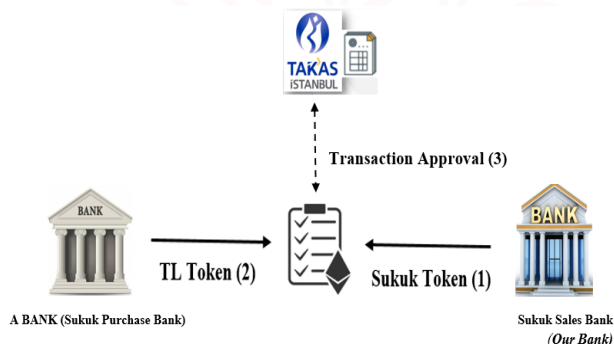


3) Sukuk Traded Transaction, Based on Blockchain;

Figure (III) shows the proposed Smart Sukuk traded transaction structure.

- Our Bank transmits its request from the Blockchain system to the network through the system to sell Sukuk in its portfolio at a certain price and quantity.
- A Bank, which wants to buy the Sukuk, passes the demand from the system and makes the TL token available in its account.
- By Smart Contract, the clearing of transaction is performed automatically via settlement bank (Takas Bank) and the transaction is stored in the nodes in our bank and settlement bank (Takas Bank).

FIGURE III. SMART SUKUK TRADED TRANSACTION STRUCTURE

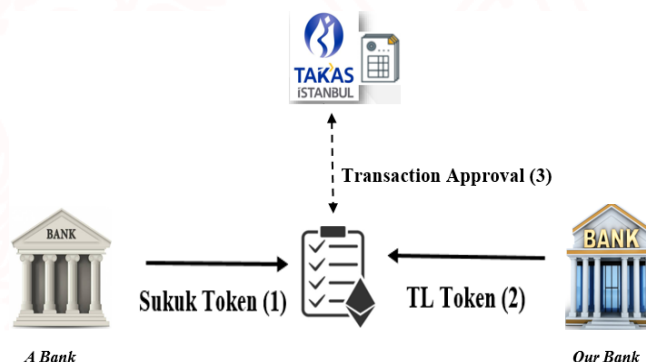


4) Committed Transactions Market, Based on Blockchain; Clearing Date of the Transaction.

Figure (IV) shows the first stage of trading smart Sukuk in committed transaction market.

- A Bank transmits its demand from the Blockchain system to the network through the system to sell Sukuk in its portfolio over a certain date, price and quantity.
- Our Bank, which wants to buy the Sukuk, passes the demand from the system and makes the TL token available in its account.
- By Smart Contract, the clearing of transaction performed automatically via settlement bank via settlement bank (Takas Bank).

FIGURE IV. CLEARING DATE OF THE TRANSACTION (FIRST STAGE)



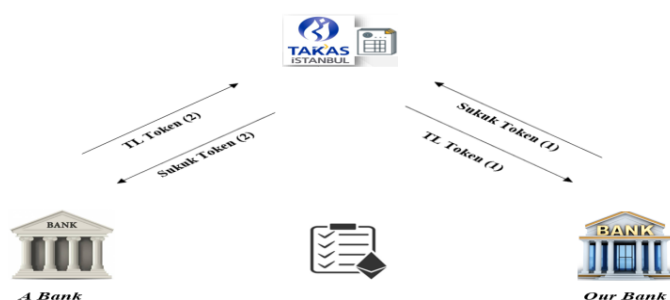
A Bank: Investment institution which sales with buy back commitment.
 Our Bank: Investment institution that buys with resale commitment.

5) Clearing Date of Committed Transaction.

Figure (5) shows the second stage of clearing date of committed transaction.

- On the date of value, the TL (Turkish Lira) token in settlement bank (Takas Bank) has sent to our bank via smart contract; the relevant Sukuk token is an automatically transferred to the settlement bank (Takas Bank).
- A Bank makes the TL token available in the account to purchase the Sukuk in settlement bank (Takas Bank), and Smart Contract automatically executes the transaction. The transactions are registered to the nodes in settlement bank (Takas Bank) and our bank.

FIGURE V. CLEARING DATE OF COMMITTED TRANSACTION (SECOND STAGE)



IV. ADVANTAGES & DISADVANTAGES

Through the proposed Sukuk issuance structures and Sukuk trading structures, there are many advantages and some expected disadvantages.

A. Advantages

The advantages of using these Sukuk structures can be summarized in the following points: Access to more investors and markets, fast processing capability, Transparency and invariance, low transaction cost, more effective audit and reconciliation system, minimize operational processes (documentation, signature, etc.), transactions open 24/7, will create an opportunity for the Sukuk market to grow.

B. Disadvantages

Immature technology, high capital cost, cultural adaptation, lack of regulation, Software errors.

V. SHARIA PERSPECTIVE & ISSUES

In General Smart Sukuk works by smart contract of Blockchain technology with its digital ledger, which are some protocols that are programmed by humans and it has many advantages such as more transparent, Incorruptible, decentralized, robust, unalterable, efficient, reduces the cost of transactions... etc. All of these advantages could facilitate transactions in convenient way and hence would contribute to wellbeing. that achieves the Maslaha, as well as the digital ledger in smart contracts designed to protect against fraud and this is one of the five pillars of the Maqasid Al-sharia (purposes of sharia), which is the protection of Al-Mal (property). The Prophet (PBUH) said, "Make things easy and do not make them difficult, cheer the people up by conveying glad tidings to them and do not repulse (them)" (Al-Bukhari). Also regarding sharia compliance, auditing smart contracts characterized as more effective audit and reconciliation system. However, Smart contracts of smart Sukuk should guide by the broad principles of Sharia by avoiding the prohibited elements in the transactions. Sharia issues in smart Sukuk could be a few noticed that can avoid when make the programming its protocols, "The certificates may be traded through any known means, that do not contravene the rules of

the Sharia, such as registration, electronic means or actual transmission by the bearer to the purchaser" (AAOIFI, 2017). For example, will be no option of cancellation or amendment but in some contracts as Mudaraba contract, where any of the Mudaraba contracting parties has the right to terminate the contract individually (Iqala). Therefore, there should be an agreement stressing that once the smart contract is actualized and automated, there will be no termination, amendment or cancellation of the contract (SA'AD, 2018). In the conventional Sukuk which based on debt such as Sukuk of Mudaraba or Wakala contract if the profits are less than the anticipated return, the issuer/obligor stands ready with a liquidity facility to make up the shortfall, but "the certificate holders own the assets of Mudaraba and the agreed upon share of the profits belongs to the owners of capital and they bear the loss, if any". "The certificate holders own the assets represented by the certificates with its benefits and risks, and they are entitled to the profits, if any". (AAOIFI, 2017). In Mudaraba Sukuk contract, the profit value are sharing between the investor and issuer. If the investor could not make profit or may lose, in this case the issuer will not get its profit or incentive. Smart Sukuk can be the solution of these obstacles related to the conventional Sukuk issuances in terms of its compliance to the Sharia.

VI. CONCLUSION

Blockchain technology and smart contract considered as real revolution in the financial life. Smart Sukuk is becoming the future for Sukuk issuances in the Islamic finance industry. Because of the advantages of this technology, it may contribute to the spread of Sukuk more widely, which leads to the creation of more sources of Islamic finance. In Turkey, the government is working to increase the Islamic (participation) banking sector to be 15% from the banking sector by 2025. The use of this technology in the issuance of Sukuk will contribute to the growth of the Islamic (participation) banking sector in Turkey effectively. The proposed smart Sukuk structures are designed to meet the Sukuk issuance and its trading processes, as well as have taken in consideration the cultural aspect and investment environment of individuals and corporate sector. Smart contracts of smart Sukuk should guide by the broad principles of sharia by avoiding the prohibited elements in the transactions. The advantages of smart contracts could facilitate transactions in convenient way and hence would contribute to wellbeing and other positive things. Sharia issues of smart Sukuk could be a few noticed that can avoid when make the programming its protocols. Perhaps the challenges that are facing smart instruments and smart contracts in general are to find legislation that will regulate their work, and adapt to the use of this technology in daily life.

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