
SAKKX
WHITEPAPER

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SAKKEX is an open management platform for investment Sukuk, preserving security and privity by design.

The blockchain-based ecosystem puts forward the standardization and automation of Sukuk data processing and life cycle management, enabling to significantly lower the entry barriers into the Sukuk market.

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This paper is subject to change. It will be amended from time to time to include continuous feedback to questions received from further findings. Any amended versions of this paper will be published on the SAKKEX website; only the most recent version of the paper published on the website is the relevant white paper.

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Economics without ethics is a caricature.
Ethics without economics is a fairy tale.

—Jakub Bożydar Wiśniewski

INTRODUCTION

Since it became widely available in the 1990s, the Internet, especially, has become a critical enabler of social and economic change, transforming access to information, facilitated greater collaboration between governments, businesses and citizens, and offering as well new ways of addressing development challenges. This marked the beginning of the digital economy, which growing impact has been central to the emerging information society, affecting both developed and developing countries. Indeed, the penetration of digital technologies is arguably the most potent force for transformation of our time. It is the Fourth Industrial Revolution, and it is contributing to the inception of new economic models. Beside the AI (Artificial Intelligence), the sharing economy is one of these groundbreaking models in which people and organizations connect online to share knowledge, goods and services: the peer-to-peer exchange; it simply replaces the need for third-party to provide trust for financial, contract, and voting activities. The core technology behind this model is the blockchain.

Blockchain is a digital ledger technology that allows for keeping track of transactions in a distributed and trusted fashion. Despite being considered in its infancy, the cryptographic ledger blockchain technology is catapulting the digital economy to a new frontier of decentralized business applications.

On the other hand, and almost at the same time as the emergence of the internet, the world's first Sukuk had been issued in 1990 by Shell MDS in Malaysia. Indeed, Sukuk reconcile the concept of securitization and Islamic commercial law on the provision and use of financial instruments in a risk-mitigation structure. A standard Sukuk issuance involves the securitization of project assets by a company, where a syndicate of banks forms the primary capital source.

Once a niche financial instrument, investment Sukuk have become since 2001 a mainstream alternative source of capital for corporations and sovereign entities. The total global Sukuk issuance has increased from USD 87.9 billion in 2016 to USD 116.7 billion in 2017, an impressive jump of around 32 % in volume.

Nevertheless, despite the impressive growth in the number and volume of Sukuk issuance, the complexity of Sukuk structure, the costs of setup and issuance, the slow-paced standardization and the spectre of Shariah non-compliance risk remain core impediments to the growth of the Sukuk market.

Based on these facts, there is an arguably strategic opportunity to leverage these core impediments with the blockchain technology.
Accordingly, the mission of SAKKEX is to build and offer a blockchain based Sukuk management and exchange platform that has to facilitate:

- An efficient issuance processes
- An efficient settlement processes
- The broadening of the investor and issuer base
- The emergence of a liquid secondary market
- The strengthening of the regulatory framework
- The fostering of the standardization of investment Sukuk

This paper aims at giving a general overview of the concepts of Sukuk and the extent to which the blockchain technology will be a catalyst in making the issuance and management of Sukuk more affordable and more accessible to other actors other than sovereign entities and large multinationals.

Accordingly, it includes an examination of Sukuk and an overview of the global Sukuk market as well as the current key imperfections in the Sukuk market and other issues.

It also gives a critical analysis of the necessity to implement the mechanics and lifecycle of Sukuk on a decentralized, trusted, and fraud resilient cryptographic ledger system.

The paper demonstrates how the SAKKEX ecosystem, built on the Stellar Consensus Protocol (SCP), will use the features of blockchain smart contracts together with the core concepts of Sukuk to deliver a robust, ultra-secure marketplace where the demand and supply side of the Sukuk market can profit from an infinitesimal fraction of setup and management costs.

WHAT ARE SUKUK?

The term Sukuk is a plural Arabic name for Islamic financial certificates and is similar to a bond in Western finance. The singular of this term is sakk and means, in classical Arabic, “to strike” or “to hit”, as in to strike or imprint one’s mark on a document or tablet, and, as a derived term means “minting coins”.

In May 2003, Sukuk was officially defined by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI) as 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. In this standard, Sukuk have been designated as investment Sukuk in order to distinguish them from shares and bonds.

THE SUKUK MARKET

In 1990, Malaysia became the first country to issue Sukuk, with a small amount of USD 30 million by Shell Malaysia. Sukuk have become extremely popular since 2001 and the capital raised through Sukuk has manifoldly increased. In 2004 it was USD 6.7 billion whereas in the first six months of 2005, the total reached USD 6.2 billion.

The global Sukuk issuances during 2017 stood at USD 116.7 billion which is an increase of around 32 % over the 2016 issuances of USD 87.9 billion. According to Standard & Poor's [1], the issuance volumes in 2018 is expected to hover at USD 70 billion-USD 80 billion. The first ever green Sukuk worth USD 250 million was issued by Quantum Solar Park based in Malaysia. [2]

From 2010 to 2015, 61 % of worldwide issued Sukuk were performed by sovereign entities and 24 % by large corporate entities. In 2016 and 2017 these quote parts for the corporate entities were respectively reduced to 11 % and 8 % while the one for sovereign entities further increased respectively by 77 % and 85 %.

Sukuk has thus far limited to sovereign, quasi-sovereign entities and large institutions due to the high issuing costs and greater legal and operational complexities.

- Sukuk are becoming a mainstream asset class in the global financial system.
- Financial innovation and tax reform in major international financial centers have made Sukuk largely comparable to conventional bonds.
- Apart from Islamic investors, Sukuk are increasingly appealing to conventional investors as a way to diversify their investment portfolios.

1 https://www.spratings.com/documents/20184/86957/Global+Sukuk+Market+Outlook+2018/d1b1aa9b-187f-44c0-8d9c-c1109f5c6890

2 https://www.ifsb.org, http://aaoifi.com
http://www.iifm.net/about_iifm/iifm-annual-Sukuk

In terms of Sukuk structure, characteristics and participants, there is a difference between international and domestic Sukuk markets; hence, the popularity of various Sukuk financing structures also differs between the two markets.

The domestic market forms around 77.6 % of the entire Sukuk market. It consists of longer tenor as well as short term Sukuk denominated in over 26 different currencies.

The international Sukuk market, though it forms just under 22.3 % of overall global Sukuk issuances since 2001, is the real attraction and driver of the Sukuk market. Denominated in USD and other stable currencies, the international Sukuk issues are being issued in longer tenors which include up to 30 years. [3]

[3] https://www.ifsb.org, http://aaoifi.com
http://www.iifm.net/about_iifm/iifm-annual-Sukuk

CURRENT KEY IMPERFECTIONS

ASSET IDENTIFICATION

A standard Sukuk issuance involves the securitization of project assets by the entity that is looking to raise funds. The assets to be securitized, which serve as the primary source of payment in the Sukuk, are initially identified, evaluated and valued. Evaluation and valuation will focus on the credit quality of those assets, particularly the likelihood that payments will be made as and when required pursuant to the terms of the documents relating to those assets.

Therefore, the main challenge is to well verify the tangibility and economic value of an asset that meet shariah requirements and, at the same time, offer attractive returns to both the users and suppliers of capital.

SAKKEX enables the digitalization of the outcome of this process. The identified asset will be represented as a cryptographic asset in form of a token. All documents that confirm the existence, the ownership and the value of the asset will be digitalized, signed with the appropriated digital signatures of all involved parties, referenced to the parent asset token and stored on the SAKKEX blockchain with a timestamp that cannot be tampered. Furthermore, the digitalized asset can be shared with and approved (voting) by any allowed third party. (Sharia board and Sukuk investor i.e.)

Once an asset is securely tokenized, its management and exchange costs drastically decrease. SAKKEX provides the core infrastructure to represent and reference an asset as secure tokens, thus valuable digital assets.

COMPLEX STRUCTURING AND COSTLY ISSUANCE PROCESS

The initial structuring and issuance costs of Sukuk are likely to be higher than a standard security. Indeed, Sukuk are complex instruments to structure as they require extensive and costly legal and ethical advice and a lot of different skills and resources to make it work. The total costs of arrangement and issuance are between 5 % to 8 % of the Sukuk value. From a financial intermediation perspective, the nature of Sukuk investment and its innovative features demand sophisticated screening and monitoring. The asset-based/asset-backed nature of Sukuk also renders complex and extensive contracting.

These contracts include:

- Master Agreement
- Master and Supplemental Declaration of Trust
- Agency Agreement Program
- Agreement Purchase Undertaking
- Deed Sale Undertaking
- Deed Redemption Undertaking
- Deed Change of Control Undertaking
- Deed Corporate Service Agreement

Basically, the complexities inherent in a given process can be simplified by standardizing some well identified elements of that process.

In this regard, SAKKEX offers a decentralized processing platform pulsed by augmented smart contracts that leverage the issuance costs by standardization and automation.

SAKKEX proposes the templating of contracts, the tokenization of Sukuk certificates and the modeling of Sukuk in a standard data format.

Through the templating of contracts, SAKKEX enables the reusability of documents and contracts. It further enables the validation, vote, exchange and trade of contracts by interested parties.

Through the tokenization of Sukuk certificates, SAKKEX setup a new frontier for the issuance and management of financial assets. The tokenization of Sukuk by a blockchain platform significantly reduce the tasks of an SPV (special purpose vehicle) in the issuance, distribution and redemption of Sukuk certificates. The cost for transactions and settlement are also reduced with the use of smart contracts.

By the modeling of Sukuk with a makeup language like the novel Sukuk Description Language (SKDL: pronounced eskadel), SAKKEX defines a new benchmark of standardization in the Sukuk industry.

The SKDL is a single, harmonized format containing all the key data at tranche level of Sukuk.

SAKKEX exclusively processes Sukuk in this format and produces a SPP (Sukuk Processing Passport) document that aims at facilitating the cross-border distribution, trade and settlement of investment Sukuk.

Harmonization will be the game changer in the Sukuk industry.

LIMITED DIVERSITY OF ISSUERS AND INVESTORS

As aforementioned, Sukuk have been, until recently, far limited to sovereign, quasi-sovereign entities and large institutions due to the high issuance costs and greater legal and operational complexities. The pool of investors is most of the time limited to syndicated banks and few underwriters.

One of the main purposes of SAKKEX is the drastic reduction of issuance cost and complexities, thus lowering the entry barriers for private companies and actors other than sovereign entities and large corporations.

SAKKEX uses the advantage provided by the blockchain technology to securely issue and manage Sukuk based upon the SAKKEX vectorized issuance system (SVIS).

Through SVIS, SAKKEX is able to automatically issue and allocate under specific defined criteria (time, amount and quantity) certificates for domestic and international Sukuk to different types and profiles of investors.

Through SAKKEX's decentralized and fraud-resilient platform, the investor base is extended to all internet users while the entry barriers for issuers, like small and medium private companies, are much lower.

Through SAKKEX, the Sukuk issuers will be able to launch micro-, and mini Sukuk while small investors will be able to trade and settle Sukuk on the underlying exchange platform.

ILLIQUID SECONDARY MARKET

The secondary market is the place where existing Sukuk are traded among investors. Sukuk that are offered first in the primary market are then traded between each other on the secondary market. The trade is carried out between a buyer and a seller. In this process, the issuing company is not involved in any way.

In the Sukuk industry, the typical buy-and-hold investment strategies and limited diversity of Sukuk investors produce illiquid secondary markets and inhibit efficient price discovery.

The more issuers adhere to the platform, the more vivified will the secondary market become.

i.e.: A sovereign entity could issue a Sukuk with a dedicated tranche for small investors in order to boost a domestic secondary market while another tranche would be dedicated for the international market.

SAKKEX makes the technical and logistic infrastructure available with a particular focus on its native vectorized issuance and blockchain based settlement system.

SAKKEX provides the most affordable electronic marketplace for issuance and trading of micro- and mini Sukuk. That will to an extent induce the entrance of new actors like micro-finance, micro insurance institutions, asset management companies and family offices.

SLOW PACED STANDARDIZATION

The modern Sukuk industry is still evolving and relatively young comparing to the conventional finance industry. Nevertheless, the issue of standardization is mainly due to the varying Shariah interpretations, which has constrained universal recognition of whether a financial practice is Shariah-compliant or not. In order to address the issue of standardization and ramp up the automation of Sukuk processing, SAKKEX splits the all information related to Sukuk in 2 distinct categories of data: the quantitative and qualitative data.

Therefore, SAKKEX puts forward its novel Sukuk description language (SKDL); a generic data model that outlines the structure of the quantitative data of any Sukuk undertaking in one or several files.

SKDL is intended to enable, automate and enhance the electronic interchange of Sukuk information in a standardized format. SPP (Sukuk Processing Passport) is a standard document produced by SAKKEX that contains all the qualitative and quantitative data needed to facilitate the cross-border distribution, the trade and the settlement of investment Sukuk. SPP simplifies the lifecycle management of Sukuk prospectus.

Furthermore, SAKKEX standardizes and automates the issuances and management of corporate Sukuk events related to Sukuk trade and settlement as ISO 20022 messages. [4]

[4] https://www.iso20022.org

SAKKEX SOLUTION PORTFOLIO

SOLUTION

Consequent cost reduction through algorithmic data standardization and process automation.

—SAKKEX Team

Actually, there is not a fixed and precise cost to arrange, issue and manage Sukuk. All these costs are subject to the agreed terms in swap contracts.

However, the empirical evidence from the costs of the last 200 issued international Sukuk (until December 2017) indicates a capped total cost ranging from 5% to 8% of the Sukuk value.

Consequently, SAKKEX aims to reduce these costs by using a mathematical model based on the law of exponential decay.

Assume $c_{max} = \alpha.V_{sukuk}$ the maximum and $c_{min} = \beta.V_{sukuk}$ the minimun cost percentages of a sukuk investment where V_{sukuk} is the value of the sukuk.
By extrapolating the law of exponential decay, we can infer the cost function of sukuk as:
$c_s(x) = c_{min} + (c_{max} - c_{min}).e^{-r(x)}$ (1)
where r(x) is SAKKEX cost reduction index function.
$r(x) = (r_{A_i} + r_{S_j}).x = r_{index}.x$
where r_S and r_A are respectively the SAKKEX standardization and automation index with $i, j, \in [0.1, 0.9]$

By arranging (1)

$$c_s(x) = c_{min}.\left(1 + \frac{c_{max} - c_{min}}{c_{min}}\right).e^{-r_{index}.x} \quad (2)$$

and with derivation of [2]

$$\frac{dc_s(x)}{dx} = -r_{index}.\underbrace{c_{min}.\left(1+\frac{c_{max}-c_{min}}{c_{min}}\right).e^{-r_{index}.x}}_{c_s(x)}$$

$$\frac{dc_s(x)}{dx} = -r_{index}.c_s(x)$$

by integrating both sides of this differential equation of first order:

$$\int_{c_{min}}^{c_{max}} \frac{dc_s(x)}{c_s(x)} = -\int_{x_0}^{x} r_{index}.dx = -r_{index}.(x-x_0) = -r_{index}.\delta(x)$$ [3]

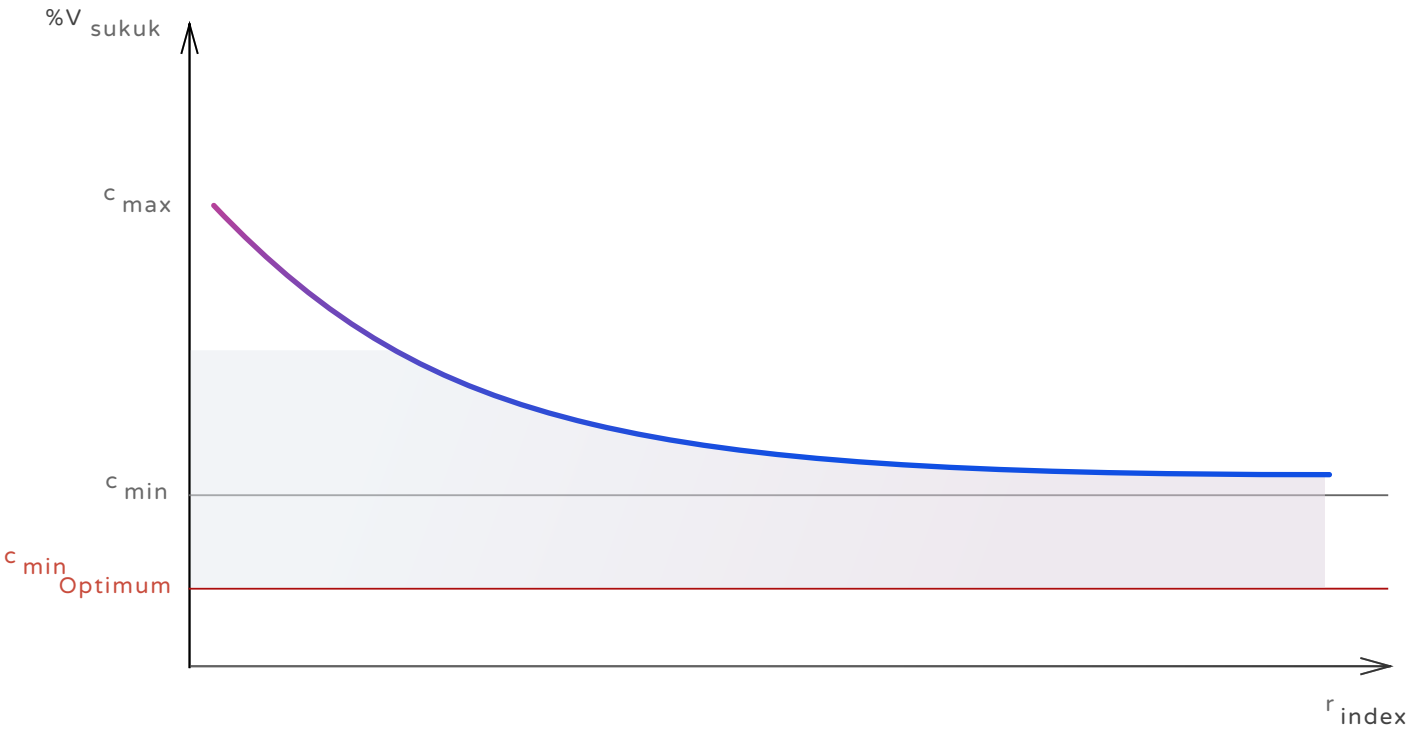
and with discretization of [3], we can infer the index of standardization and automation which is paramount for the cost optimization function;

$$\ln\frac{c_s(r_{A_i},r_{S_j})}{c_{max}} = -(r_{A_i}+r_{S_j})$$

where

$$c_s(r_{A_i},r_{S_j}) = V_{sukuk}.\left(1+\frac{\alpha-\beta}{\beta}\right).\beta.e^{(r_{A_i}+r_{S_j})}$$

$c_s(r_{A_i},r_{S_j})$ is the Sukuk cost optimization function that is also used to calculate the amount of PULS tokens required to manage the entire lifecycle of Sukuk, from issuance to closing.



The optimized cost of a Sukuk undertaking is a key performance indicator in SAKKEX with $c_{max} = \alpha.V_{sukuk}$ and $c_{min} = \beta.V_{sukuk}$ being the market benchmarks, therefore adjustment variables in SAKKEX:

$$C_{optimized_{(i;j)}} = V_{sukuk}.\left(\alpha - \left(1 + \frac{\alpha - \beta}{\beta}\right).\beta.e^{(r_{A_i} + r_{S_j})}\right)$$

In reducing the agency costs including the arrangement, issuance and accounting costs, SAKKEX paves the way to widen the Sukuk issuer base.

USE CASES: SCENARIO 1

How SAKKEX v1 helps in drastically decreasing the total cost of Sukuk being issued in 2018

According to Standard & Poor's [5], the issuance volumes in 2018 is expected to hover at USD 70 Billion - USD 80 Billion.

[5] https://www.spratings.com/documents/20184/86957/Global+Sukuk+Market+Outlook+2018/d1b1aa9b-187f-44c0-8d9c-c1109f5c6890

$c_{max} = \alpha.V_{sukuk}$ = 8 % * 80 * 10^9 = USD 6.4 Billions

$c_{min} = \beta.V_{sukuk}$ = 5 % * 80 * 10^9 = USD 4 Billions

$c_s(r_{A_i}, r_{S_j})$ = 80 * 10^9 * (1+0.03/0.05) * 0.05 * $e^{-(0.5+0.5)}$
= USD 1.56 Billions cost reduction by the average level of standardization and automation in the SAKKEX platform.

$C_{optimized_{(0.5\cdot0.5)}}$ = 6.4 * 10^9 - 1.56 * 10^9 = USD 4.84 Billions would be the maximum cost for Sukuk in 2018.

It indicates that by using SAKKEX under the current Sukuk market conditions, the maximum cost will drop to 6,02 % from 8 %.

Although, it will be more challenging to significantly decrease the legal costs, there are still potentials to reach $c_{min_{Optimum}}$ with machine learning.

USE CASES: SCENARIO 2

How SAKKEX v1 helps in decreasing the total cost of a Sukuk of USD 100 millions

$c_{max} = \alpha.V_{sukuk}$ = 8 % * 1 * 10^8 = USD 8 Millions

$c_{min} = \beta.V_{sukuk}$ = 5 % * 1 * 10^8 = USD 5 Millions

$c_s(r_{A_i}, r_{S_j})$ = 1 * 10^8 * (1+0.03/0.05) * 0.05 * $e^{-(0.5+0.5)}$
= USD 1.95 Millions cost reduction by the average level of standardization and automation in the SAKKEX platform. The maximum cost will then drop to 6,05 % from 8 %.

We are able to accurately conclude that the first release of SAKKEX scheduled for Q3 2019 will drop the maximal cost of issuing investment Sukuk from 8 % to 6 %.

The release 2 (v2) of SAKKEX which will be powered by advanced machine learning features will further reduce these costs.

SOLUTION

Issuance and management of micro- and mini Sukuk to widen the base of issuers and investors

—SAKKEX Team

Since the issue related to higher issuing and management costs could be resolved through a high level of standardization and automation, the SAKKEX platform can be used to issue micro and mini-Sukuk.

The concept of micro and mini Sukuk in SAKKEX is tightly linked to GDP and the purchasing power parity.

$$Price_{Sakk_{(current\ year)}} = f(GDP_{PPP}\ per\ Capita_{(current\ year-1)})$$

GDP per capita is calculated by dividing GDP by midyear population. GDP is the total market value of all final goods and services produced in a country in a given year.

To make meaningful comparison, PPP is used to compare economies and incomes of people by adjusting for differences in prices in different countries.

GDP = C + I + G + (X - M) where

C = Personal consumption expenditures in a country's economy
I = Total country's investment including business capital expenditures
G = Government spending
X = Total exports
M = Total imports

Therefore, SAKKEX sets a linear pricing model that is simply based on the purchasing power parity basis divided by population.

However, the lowest and highest ranked GDP in the world are used to respectively calculate the current minimum and maximum price of micro and mini Sukuk certificate:

$$Price_{min_{Sakk}} = \frac{World\ lowest\ GDP_{PPP}\ Per\ Capita_{(current\ year-1)}}{100}$$

$$Price_{max_{Sakk}} = \frac{World\ highest\ GDP_{PPP}\ Per\ Capita_{(current\ year-1)}}{10}$$

By referring to this benchmark we can define:

- Micro Sukuk as any kind of rated or unrated permissible Sukuk which unit price is:
  $Price_{min_{Sakk}} \leq Price_{Sakk_{(current\ year)}} < USD\ 1000.00$
- Mini Sukuk as any kind of rated or unrated permissible Sukuk which unit price is:
  $USD\ 1000.00 \geq Price_{Sakk_{(current\ year)}} \leq Price_{max_{Sakk}}$

By issuing and managing the complete lifecycle of micro and mini Sukuk, SAKKEX paves the way to widen the investor base because investing in Sukuk will be much more affordable for private investors and small savers as well.

SOLUTION

Inducing the secondary market through the automated trade lifecycle management of rated and unrated Sukuk

—SAKKEX Team

Through the introduction of micro and mini Sukuk, SAKKEX aims at inducing the involvement of new classes of investors and issuers. The more Sukuk certificates are affordable the more liquid the secondary market will be.

Since SAKKEX is built on top of the Stellar digital ledger network, the trading, the exchange, the settlement and the clearing of investment Sukuk are performed in the same bulk of transaction within 5 seconds.

Therefore, SAKKEX by design makes it possible to list domestic Sukuk of any size, thus making them internationally available and also manages the full trade lifecycle of these Sukuk without further costs for the issuers.

New sovereign and corporate entities from emerging and developing countries are entering the Sukuk market while the internet penetration rate [6] is growing even faster in Asia and Africa.

All these facts constitute a unique opportunity to accompany these newcomers in efficiently and cost effectively issuing, managing and trading their Sukuk in the international market.

[6] https://www.internetworldstats.com/stats.htm

SAKKEX ECOSYSTEM

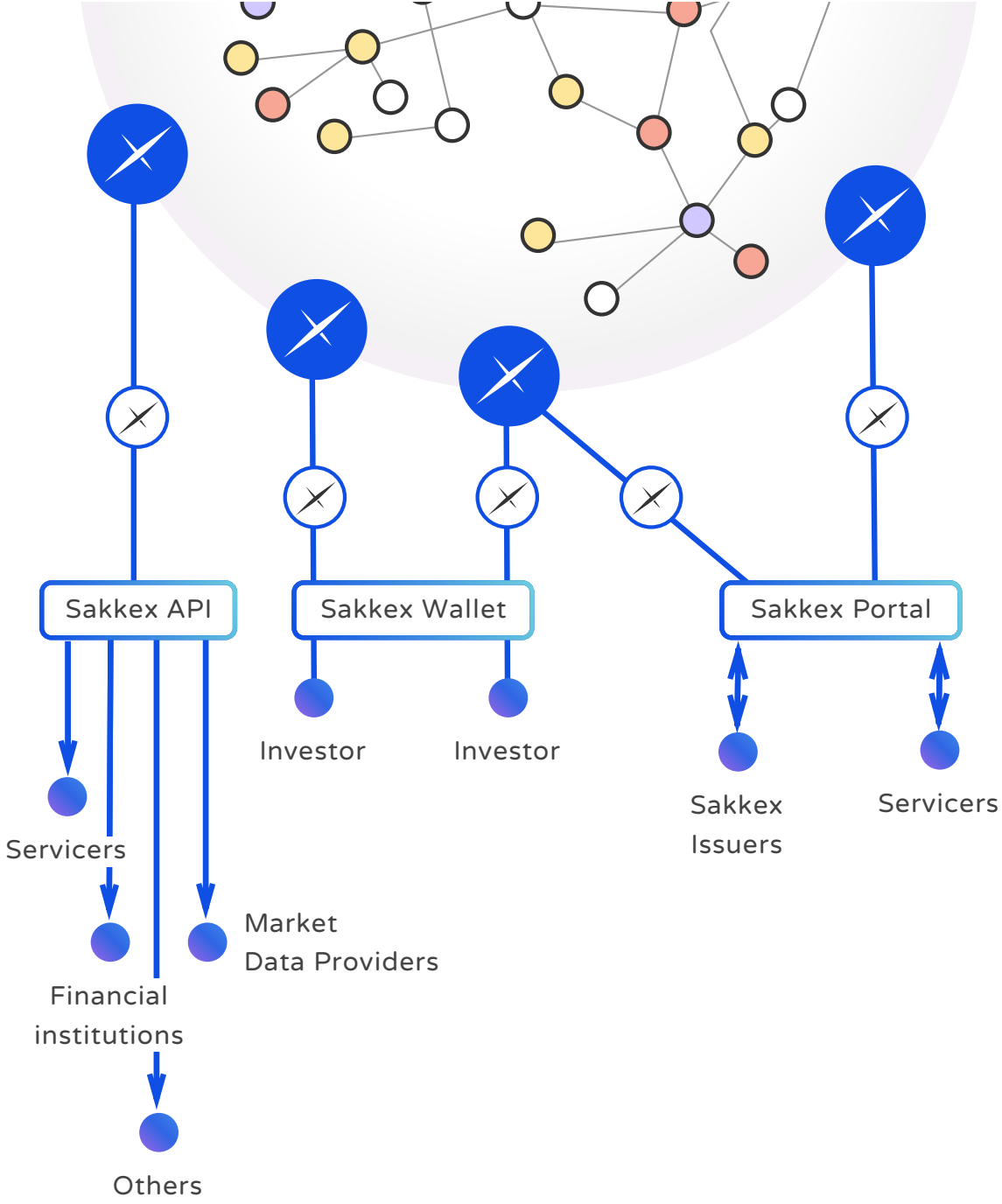
The SAKKEX platform is a new generation of business applications being built on the well-proven Stellar network. [7]

Unlike traditional applications where the business logic runs on centralized systems, SAKKEX is operating on the Stellar decentralized digital ledger, within which business transactions are exchanged and stored with strong cryptography.

These transactions are public viewable, verifiable, very fast and highly cost efficient. The Stellar blockchain, together with the underlying Stellar Consensus Protocol, which by itself is an implementation of the federated byzantine agreement (FBAS), enables SAKKEX to be a trustful, secure, fraud-resilient and censorship-resistant platform.

In these regards, SAKKEX strives to become the most harmonized and cost-efficient operating environment in the Sukuk market.

[7] https://www.stellar.org/developers/guides/get-started/



SAKKEX uses the worldwide available stellar digital ledger network to:

- Tokenize and digitally sign Sukuk contracts
- Store these contracts and their signatures
- Create and manage Sukuk notes and certificates as token
- Sign and store Sukuk data and certificates reference document in a decentralized storage facility
- Trade and exchange tokenized Sukuk through stellar tokens

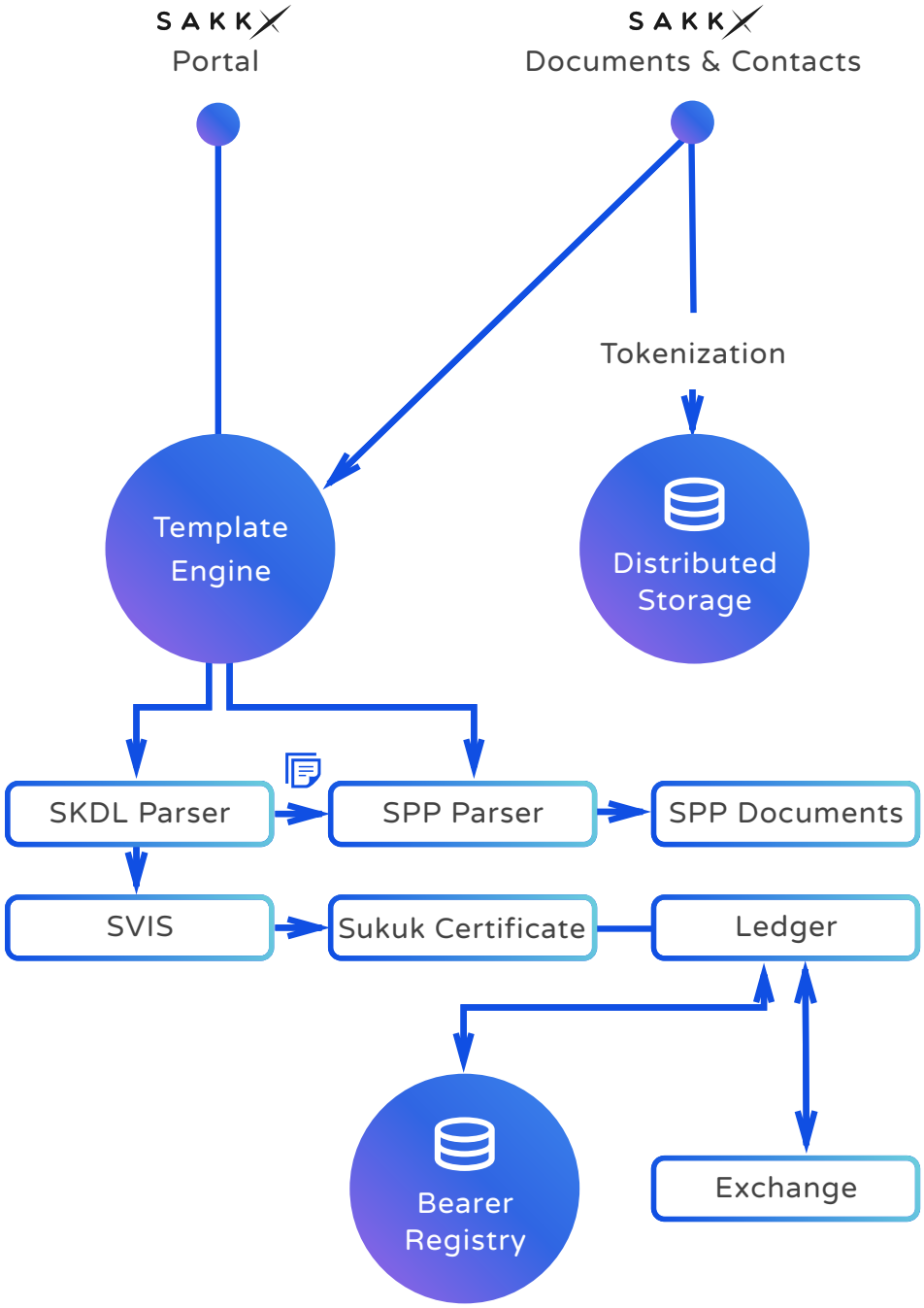
The basic idea behind using blockchain and digital ledger technology in the Sukuk industry is that the contractual clauses (such as collateral, master agreement, delineation of property rights, etc.) can efficiently be embedded in a decentralized peer-to-peer network, in such a way as to:

- Give zero cheating opportunity to a breach of contracts
- Drastically reduce the management, operational and reputation risk related to the reliance on third parties

SAKKEX uses all the strengths and features of the Stellar Consensus Protocol. These include:

- Decentralized control—Anyone is able to participate and no central authority dictates whose approval is required for consensus.
- Low latency—Nodes can reach consensus at timescales humans expect for web or payment transactions i.e., a few seconds at most.
- Flexible trust—Users have the freedom to trust any combination of parties they see fit. For example, a small non-profit may play a key role in keeping much larger institutions honest.
- Asymptotic security—Safety rests on digital signatures and hash families whose parameters can realistically be tuned to protect against adversaries with unimaginably vast computing power.

SYSTEM OVERVIEW



TOKENIZATION SYSTEM

The tokenization is the process by which an identity or asset (documents, certificates, notes, etc.) is replaced with a surrogate value, that has no intrinsic meaning called a token.

The tokens created and managed by SAKKEX are cryptographic tokens that encompass:

- A Sukuk undertaking
- The identity of participants of a Sukuk undertaking
- The verification confirmation of the underlying asset of a Sukuk undertaking
- The Sukuk certificate or notes (a SAKK)
- The tranches of a Sukuk
- Value of transactions on SAKKEX

5 main blockchain features enables SAKKEX to:

1. Manage SAKK token (stellar token id: SAKK) – they represent the direct ownership of the underlying assets no matter how complex the structure of the Sukuk is.

2. Simplify the issuance, exchange and settlement of Sukuk certificates by tokenization. Using a token based on the stellar blockchain makes this token transferable and tradable on an increasing number of decentralized marketplaces around the world.

3. Trigger business transactions at low cost with PULS tokens (stellar token id: PULS) – These tokens represent the tradable and transferable utility token required to execute any transactional operations on the SAKKEX platform. This is the fee used to cover the operation costs of the platform.

4. Efficiently manage the identity of the platform users through blockchain address validation and the stellar compliance protocol

5. Sign and refer to digital assets (reference documents, contractual papers, attachments) through digital signatures

SPP AND SKDL PARSER

This component parses all data required for the processing and electronic exchange of Sukuk into JSON-LD files. JSON is a useful data serialization and messaging format. JSON-LD is a JSON-based format to serialize Linked Data. In the context of SAKKEX, JSON-LD is primarily intended to be a way to use Linked Data and to efficiently store the interrelated references of Sukuk documents in the blockchain.

Indeed, SKDL enables SAKKEX to aggregate all key transactional data of any Sukuk undertaking in a set of interrelated files and in a descriptive format that is recommended by the World Wide Web Consortium (W3C).

The Sukuk Processing Passport (SPP) is a SKDL document with a stylesheet. This enable to have a harmonized document structure of a Sukuk undertaking, that enhances the creation of prospectus in several languages in different countries, thus the cross-border trading of Sukuk.

VECTORIZED ISSUANCE SYSTEM

The SVIS Component uses a vector space to depict the key data needed for the issuance of SAKK token; Sukuk certificates. This information includes the amount, characteristic and conditions of each Sukuk slice.

An issuance algorithm is then applied to the vector space. This approach enables SAKKEX to speed up the issuance and allocation of thousands of SAKK tokens in relatively short time while targeting different investor classes. The settlement is automatically updated on the decentralized digital ledger.

Prior to any issuance the Pulse calculator calculates the total PULS token required to perform a transaction on the platform. Each issuance is related to a bearer and referenced in the built-in Sukuk holder registry, while the balance of SAKK is not only verifiable on the blockchain but also visible in the bearer wallet.

The SVIS enhances the capabilities of stellar smart contracts to an extent that fully encapsulates the complex business and transaction logics behind the issuance and trading processes of Sukuk.

The SVIS component contribute to significantly reduce the operational costs and risks associated with the issuance and management of Sukuk certificates.

USE CASE

The government of Malaysia issues an investment Sukuk with 4 tranches (A, B, C, D).

A and B are large slice and rated by 2 leading credit ratings agencies.

C and D are unrated. For A and B slices, the government targets the international and domestic market, but C and D are reserved for the domestic market and dedicated for small savers and small private companies.

The SAKK token will be then generated according to the criteria defined in the Sukuk undertaking.

DISTRIBUTED DIGITAL LEDGER SYSTEM

The SAKK balances of any Sukuk certificate holder is reflected in the ledger system. Indeed, SAKKEX uses all the features provided by the stellar ledger which represents the state of the Stellar universe at a given point in time.

It contains the list of all the accounts and balances, all the orders in the distributed exchange, and any other data that persists.

A specific feature of the Stellar ledger is the use of asynchronous private public key encryption. That means, every participant needs a key pair to identify and sign transactions. These transactions are stored in the ledger. [8] A wallet software and a key pair are needed in order to have a view on a stellar ledger.

Although this is very common in modern distributed systems, SAKKEX provides also a convenient online ledger where participants can view and manage their assets. Since this area is very sensitive regarding security, SAKKEX uses state of the art multi factor authentication and offline private key storage technology (cold wallet).

DISTRIBUTED STORAGE SYSTEM

DSS is an embedded distributed file-storage system that is available within the SAKKEX platform and is available with fine grained access management for saving digitalized and signed Sukuk documents and contractual paper.

Blockchain technology is used to agree and sign a hash value that uniquely identifies such a document.

[8] https://www.stellar.org/developers/guides/concepts/ledger.html

The document itself will only be referenced on the blockchain, but will not be published for the sake of security and privity. This component not only enables storage services, but also paves the way for the more complex decentralized reporting and archiving of Sukuk market data.

DIGITAL EXCHANGE SYSTEM

The Stellar network acts as a decentralized distributed exchange. That enables SAKKEX to provide a robust, scalable, secure and decentralized first and secondary market for Sukuk. The Stellar ledger stores both balances held by participants accounts and offers that participant accounts make to buy or sell Sukuk certificates.

USE CASE

The government of Malaysia issues an investment Sukuk with 4 slices (A, B, C, D).

A and B are large slices and rated by 2 leading credit ratings agencies. C and D are unrated.

For A and B slices, the government targets the international and domestic market, but C and D are reserved for the domestic market and dedicated for small savers and small private companies.

Use case continues on next page ...

Pre-Orders can be placed on SAKKEX.

By dedicating the slices C and D SAKK token to smaller actors, the government induce the promoting of the secondary market for Sukuk.

Although not rated by any international rating agencies, the slices, C and D, will be listed on the worldwide accessible and secure digital exchange. By this, the government of Malaysia will access a wider international investor base from just a single decentralized platform at less costs.

SAKKEX enables the trading of Sukuk certificates on a single decentralized exchange system while targeting different audiences.

The tokenization of Sukuk certificates as SAKK token also facilitates the trading and exchange of these token on the stellar distributed exchange platform.

ESCROW MANAGEMENT SYSTEM

SAKKEX enhances the multi-signature features granted by stellar smart contracts. Smart contracts can be defined to provide a trustless escrow lock of a two-party transaction to release a trade when both sides have posted their payments.

In this way, SAKKEX acts as a digital surrogate of an SPV in a Sukuk undertaking. This fact has huge implications for the Sukuk industry because it will enable to lower the entry barriers into the Sukuk industry for small business enterprises, micro finance institutions and other actors. Instead of paying huge costs to third parties like trustee and payment service, one needs just some PULS Token to initiate a fully digitalized, ultra-secure, transparent and trust service.

USE CASE: SCENARIO 1

At the due date for the periodic payment of Sukuk, this component sends a bulk payment order to a bank or other financial service in order to pay the Sukuk certificates holders. Another use case scenario is to issue Sukuk certificates against payments.

USE CASE: SCENARIO 2

This system acts as a transfer agent by issuing Sukuk certificates against payment in any currency, and also forwards the payment to a financial institution, while updating the balance of SAKK holding in the stellar ledger: the settlement and clearing are performed on the fly, within seconds at minimal transaction costs.

The escrow management system reduces the reliance on third parties, thus the agency costs of any Sukuk undertaking. [9]

SUKUK EVENT MANAGEMENT SYSTEM

Some corporate events related to a Sukuk undertaking will be notified as ISO 20022 [10] messages to the respective stakeholders.

SAKKEX intend to implements these corporate actions with respect to:

- Sukuk periodic payment
- Collection of payment
- Sukuk redemption
- Corporate Action notification
- Corporate action instruction
- Corporate action cancellation

[9] https://www.stellar.org/developers/guides/concepts/multi-sig.html

[10] https://www.iso20022.org

SAKKEX CLIENTS

SAKKEX WALLET

The wallet is a light client that can run on mobiles devices and also on computer desktops.

It allows market participants to interact with the distributed exchange system of SAKKEX. In this regards a user will need to open an account and activate it with PULS token. Once an account is open and validated the wallet owners can view their holding in Sukuk certificates (SAKK token) and the related financial value.

Furthermore, the wallets owner will be able to buy and sell SAKK and PULS token. The wallet is also enhanced with a notification system that highlights the essential information and events of the Sukuk market.

The wallet owners will be the sole holders of the corresponding encryption keys.

SAKKEX PORTAL

This is a web application that encompasses the features of a wallet while providing a graphical user interface with the ability to:

- Create a Sukuk undertaking on SAKKEX
- Calculates the PULS token required to launch a Sukuk
- Upload documents
- Structure a Sukuk investment: properties, constraints, issuance and payment criteria, target market

- Setup the vectorized issuance system
- Create and parametrize the escrow services
- Create and manage bulk orders
- Create and manage Sukuk investment portfolio
- Participate to consensus voting (shariah committee)
- Monitor Sukuk transactions on the ledger
- Manage Sukuk events
- Manage data of Sukuk certificates holders
- Manage management appointees

No special technical skills are required to use SAKKEX clients.

INTEGRATION API

SAKKEX exposes a rich set of APIs enabling a secured and loose integration to legacy information systems and others financial software systems.

In this regard, SAKKEX will in time provide secured application programming interfaces in order to make easier for the market participants to connect some parts of the SAKKEX platform with their multi-vendor or hybrid environments.

These API includes:

1. **Payment management (PM API)**
   This API allows to interactively connect to payment services or financial institutions. Therefore, cash collected from Sukuk redemptions will be automatically transferred to these services.

2. **Order management (OM API)**
   The OM API allows the integration of SAKKEX decentralized exchange platform with existing asset and portfolio management tools. It also enables to check the status of orders, the positions and the balances of accounts.

3. **Event management (EM API)**
   This API allows to subscribe to event streams and to receive notifications.

4. **Analytic management (AM API)**
   The analytic management API aggregates all transaction data stored in the ledger in order to deliver a coherent and concise market data for the Sukuk industry. These data can be made available for financial market data provider, rating agencies, etc.

BUSINESS MODEL & TOKEN ECONOMICS

REVENUE MODEL

SAKKEX is an open platform that does not require a specific license fee to operate. It is available for any screened participants following a KYC process.

However, any transaction in SAKKEX is triggered by a service token called PULS. It is a utility token that is required to perform any transactional operation on the SAKKEX platform.

The PULS calculator of SAKKEX enables to prior determine the amount of service tokens required to launch and manage an investment Sukuk undertaking.

The computed amount is subject to the characteristic of each Sukuk and determined through:

- The amount of Sukuk certificates to issue
- The tenor (duration until the maturity) of Sukuk
- The redemption cycle (monthly, quarterly, semiannual, annual)
- The number of investors of the Sukuk

TRANSACTIONS AND SUKUK MARKET PARTICIPANTS REQUIRING PULS TOKEN

Transactions	PULS Token amount	Sukuk market participants
SAKKEX account activation	10	all
Tokenization of existing Sukuk	computed	Issuer, Trustee SPV
Issuance of new Sukuk	computed	Originator, Issuer, Trustee, SPV
Periodic redemption of Sukuk	computed	Issuer, SPV
Final redemption of Sukuk	computed	Issuer, SPV
Listing of existing Sukuk on the digital exchange	computed	Issuer, SPV
Listing of new Sukuk on the digital exchange	computed	Issuer, SPV
Sales or Transfer of SAKK tokens	computed	Sukuk Investors
Sales or Transfer of PULS tokens	computed	all

The PULS token is a Stellar blockchain asset. SAKKEX chooses Stellar because it is today the most mature, stable and suitable blockchain platform for the financial industry.

Another useful feature of PULS tokens is the advantage of relying on existing infrastructure built around them, such as exchange listings.

However, the PULS token buyers and holders which are not participants of the Sukuk market are also incentivized to acquire PULS tokens by exchange or over the counter (OTC) from the SAKKEX PULS pool.

They will be directly compensated by selling their PULS tokens to Sukuk market participants and exchanging the tokens between themselves.

Lastly, SAKKEX takes a percentage of the PULS tokens to pay the Stellar network and other partners (content providers, etc.).

The PULS token prices might be subject to higher volatility and liquidity constraints, which may create a challenging environment for using PULS tokens. This is especially true when one wants to make it a prerequisite for companies to buy tokens on an exchange in order to use the SAKKEX platform.

In that case SAKKEX will adjust the amount of PULS tokens per transaction based on the market value of the token. The market value will be determined by pegging the exchange rate every quarter based on the average token price during the period in question.

The exchange rates will be determined by the needs of the market and based on the trade data of the PULS Token.

The SAKKEX platform will accept Stellar Lumens (XLM), Bitcoin (BTC) and Ethereum (ETH) as crypto currencies for the selling of PULS Token. However, buying PULS Token with fiat currencies as EUR, USD will be possible through SAKKEX Partners and Stellar anchors.

INCENTIVE

SAKKEX aims to list PULS Token on all mayor Stellar exchanges by 2019 Q1. That will offer a variety of benefits:

- Firstly, being listed on an exchange has the potential to provide liquidity to PULS token holders and users of the platform, allowing them to purchase and sell tokens.
- Secondly, listing the PULS Token on multiple exchanges will give the potential for broader circulation, recognizability, and more dynamic prospects for value appreciation in the Sukuk industry.

- PULS token holders will be rewarded with a monthly inflation payment of 1 %.
- SAKKEX Partners will be rewarded with PULS Token as incentive, thus enabling them to decrease their transactions costs or to resell their tokens on the market.

PARTNERSHIP

Since SAKKEX is a free open platform solution, it is expected to be operated by known responsible operators which are legal entities fulfilling all requirements needed to domestically and/or internationally operate in the Sukuk market.

These selected and trusted entities will assume the legal responsibility for their business on the platform. These entities are free to run their own nodes if they decide to.

- SAKKEX will enable Sukuk promoters to arrange their Sukuk with less cost than it is today and to access a large pool of investors of any size and across the globe.
- SAKKEX will enable Sukuk issuers to automate the issuance and life cycle management of Sukuk on a secure and transparent basis.

- SAKKEX will enable Sukuk investors to finally access to domestic and international Sukuk of various issuing entities from their smartphones at anytime and anywhere.
- SAKKEX will enable financial auditors to directly perform their tasks and due diligence via the worldwide accessible full automated digital ledger platform.

Therefore, the SAKKEX Development Team will strive to conceal a trusted partnership with:

- Financial asset managers
- Lawyers
- Trustee and Fiduciary companies
- Microfinance institutions
- Other players of the capital market

ROADMAP

Q4 2019
- Rollout stable version core modules
- Rollout stable version core Sakkex Wallet App & portal
- Rollout stable version core integration API
- Launch of the very first mini-sukuk

Q3 2019
- Partner Onboarding
- Roadshow: Malaysia, Bahrain, UAE, Germany, UK
- Launch of the secondary market platform
- Introduction of Sukuk Events

Q2 2019
- Launch of beta version of Sakkex wallet
- Rollout RC Sakkex portal
- Rollout RC core modules

Q1 2019
- Launch alpha version of Sakkex Wallet App
- Development of Sakkex Portal
- Development of VIS module
- Development of Integration API
- Launch beta version of core
- Introduction of PULS token on main exchange platform

Q4 2018
- Specification of SKDL & SPP
- Development of core modules
- Implementation of SKDL & SPP parsers
- Creation of PULSE (PULS) Token
- Creation of SAKK (SAKK) Token
- Development of Sakkex Wallet App

Q3 2018
- Proof of concept
- Solution design
- Platform prototyping

Q2 2018
- Refinement of need assessment
- Exploration of technology
- Proof of technology

Q1 2018
- Sukuk market analysis
- Need assessment

PULS TOKEN SALES & DISTRIBUTION

The total amount of PULS token ever created is 10 billion. It guarantees that sufficient transaction tokens will be available for the Sukuk market.

The initial amount of tradable PULS token is 2 billion on which:

- 50 % will be available for sales
- 5 % for bounty
- 6 % for business partners
- 4 % for advisors
- 15 % for the development team
- 20 % reserve

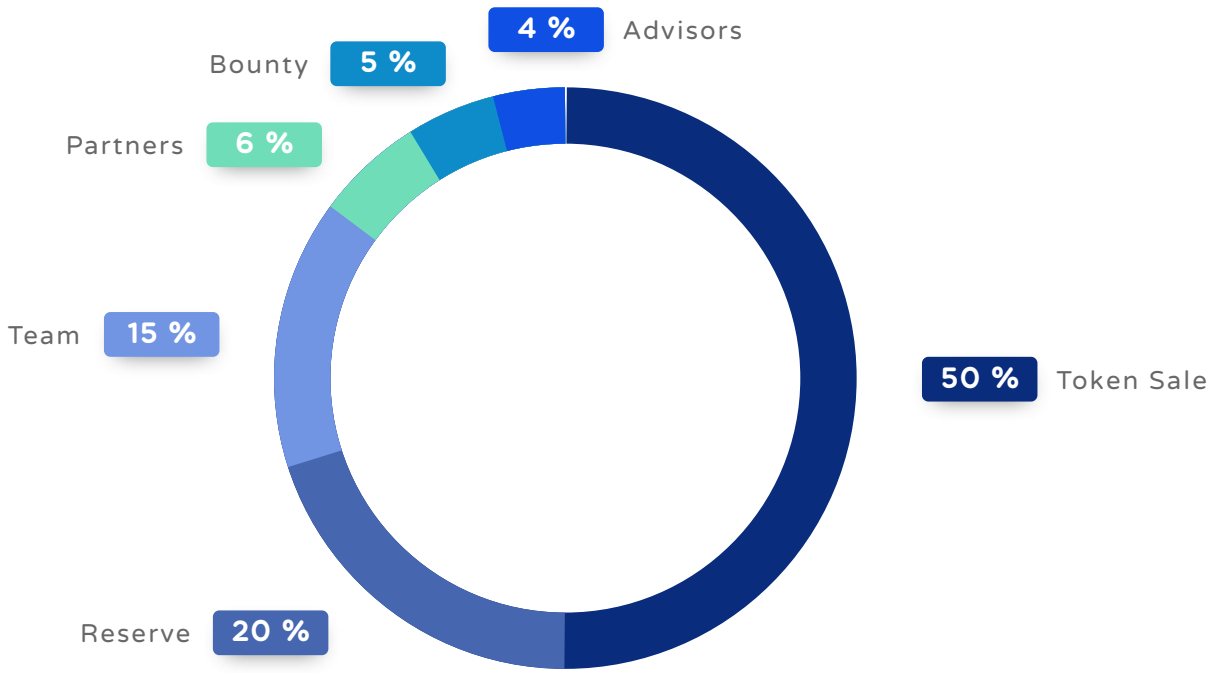
The rest amount of 8 billions of locked PULS tokens will be used for the monthly inflation payments of 1 % to PULS token holders.

The unit price of a PULS token is EUR 0.10 and the minimum amount for sales is 100 tokens.

The official token sales will start at January 14th, 2019 and span over 4 stages:

	Stage 1 Innovators	Stage 2 Early Adopters	Stage 3 Early Majority	Stage 4 Public
Time schedule	14.01.2019 28.02.2019	01.03.2019 15.04.2019	16.04.2019 31.05.2019	01.06.2019
Bonus	30 %	20 %	10 %	0 %

TOKEN DISTRIBUTION



ALLOCATION OF FUNDS

The funds collected from the token sales will be used for:

- Research & Development: 58 %
- Marketing: 20 %
- Operations: 12 %
- Legal & Compliance: 10 %

GOVERNANCE

As a DLT company bringing new efficient and cost-efficient processing and management approaches in one of the rising markets in the financial industry, the SAKKEX Development Team considers it necessary to adequately position the project and its technological platform in a way that will guarantee the long-term success of the project.

LEGAL & REGULATORY FACTOR

The SAKKEX Development Team will align prior to the envisaged token launch with any regulatory requirements for DLT and Fintech companies in Germany, Luxembourg and Estonia.

This way, the SAKKEX Development Team is always striving to build a solid reputation of a trusted and responsible player for the Sukuk market participants.
In this context, several critical factors will be addressed.

ECONOMICAL FACTOR

The SAKKEX platform is meant to be used in cooperation with sovereign entities and companies operating in the financial market or particularly in the investment Sukuk market.

The SAKKEX Development Team will build up partnerships with the leading international not-for-profit organization primarily responsible for development and issuance of standards for the global Islamic finance industry (AAOIFI, IFSB) in order to develop a symbiosis where their issued standards will be leveraged with the SAKKEX platform.

Together with the expertise and network of the advisors from different important spheres like finance, agriculture, mining, construction, transportation, government services and blockchain industry, it is expected that SAKKEX will multiply its resources and development impact. It is expected that SAKKEX will make it easier and cheaper for developing countries to become active players in the investment Sukuk market.

TECHNOLOGICAL FACTOR

Being a high-tech solution in the investment Sukuk market, the SAKKEX ecosystem must always be developed at the cutting edge of technology. By collaborating with universities and institutions, the SAKKEX Development Team will make every effort to ensure its technological progress.

Additionally, by implementing the platform on top of the Stellar Network, which is the first DLT having obtained the shariah compliance certificate, the SAKKEX Development Team sees further technological advantages for the Sukuk market over distinct distributed ledger technologies.

OTHER FACTORS

Over time, all responsibilities related to the SAKKEX ecosystem and its reserve will be transferred to the SAKKEX Foundation, a not-for-profit organization.

By Q3 2019 the initial version and architecture will have been implemented and deployed. From then on, the continuous evolution of the SAKKEX ecosystem will be maintained by the SAKKEX Foundation.

Until that time, SAKKEX will seek for international recognition as the primary technical standardization consortium in the Sukuk industry, by partnering with the leading international not-for-profit organization, primarily responsible for development and issuance of standards for the global Islamic finance industry (AAOIFI) and the Islamic Financial Services Board (IFSB).

CORE TEAM

In order to achieve these ambitious goals, the SAKKEX Development Team consist of an amazing group of people that share the same vision. These people from different horizons and different life and professional experiences have joined their efforts, creativities and expertise in order to design, implement and run a state-of-art solution that the Sukuk market is still awaiting.

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THE SUKUK INDUSTRY

COMMON TYPES OF SUKUK

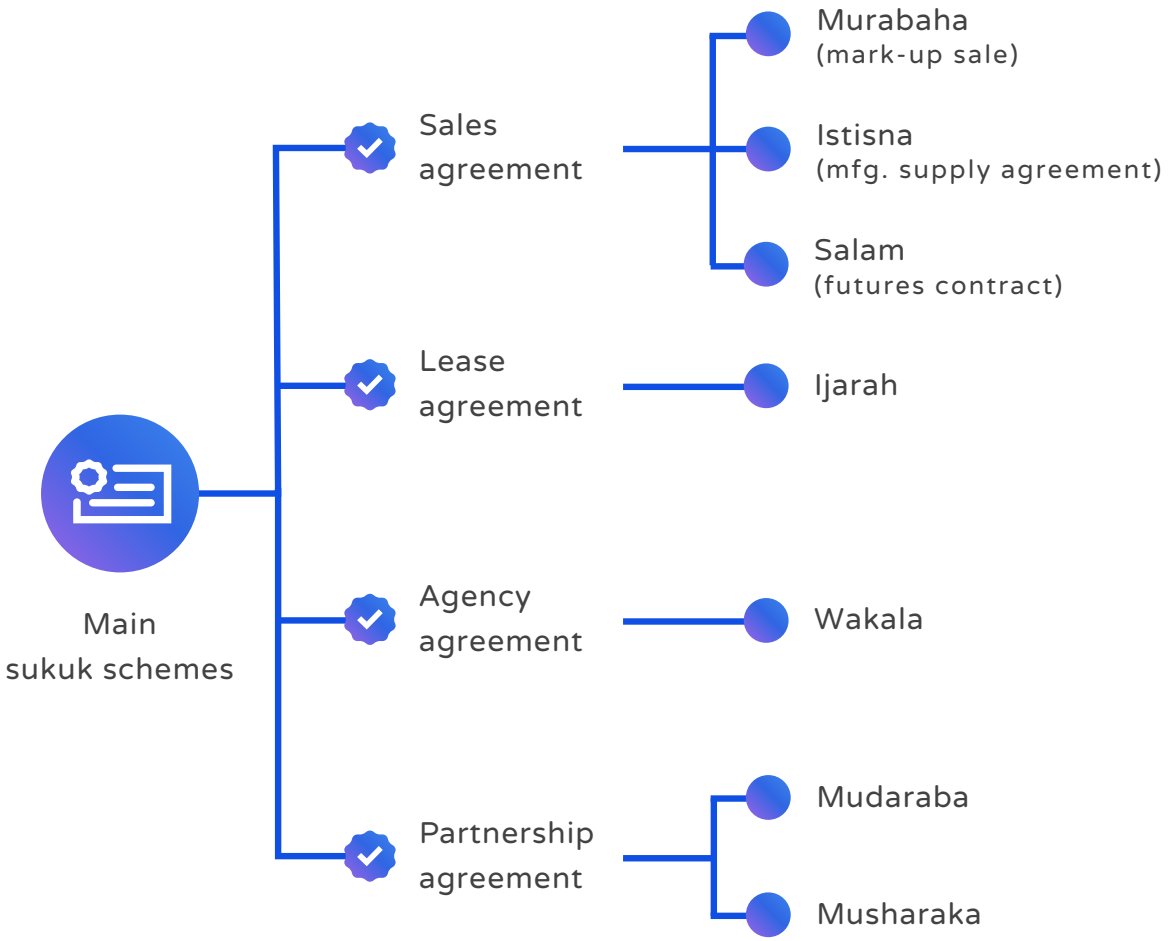
- Investment Sukuk are certificates of equal value issued in the name of the owner or bearer in order to establish the claim of the certificate owner over the financial rights and obligations represented by the certificate.

- Investment Sukuk represent a common share in the ownership of the assets made available for investment, whether these are non-monetary assets, usufructs, services or a mixture of all these plus intangible rights, debts and monetary assets. These Sukuk do not represent a debt owed to the issuer by the certificate holder.

- Investment Sukuk are issued on the basis of a Shari'ah-nominated contract in accordance with the rules of Shari'ah that govern their issuance and trading.

- The trading of Investment Sukuk is subject to the terms that govern trading of the rights they represent.

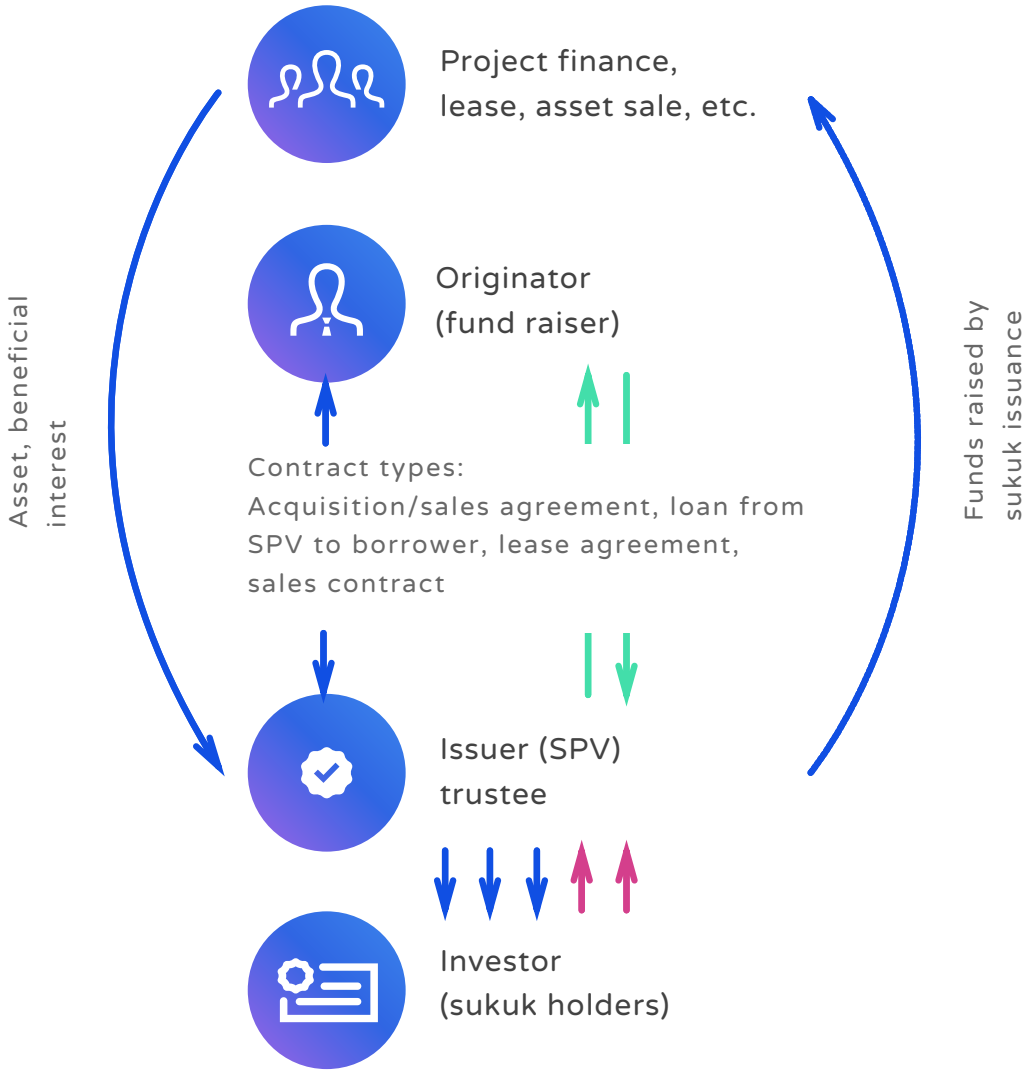
- The owners of these certificates share the return as stated in the subscription prospectus and bear the losses in proportion to the certificates owned (held) by them.



The common types of Investment Sukuk include

- Certificates of ownership in leased assets
- Certificates of ownership of usufructs (Ijara Sukuk)
- Certificates of ownership of usufructs of existing assets
- Certificates of ownership of usufructs of described future assets
- Certificates of ownership of services of a specified party
- Certificates of ownership of described future services
- Salam certificates (Salam Sukuk)
- Istisna'a certificates (Istisna'a Sukuk)
- Murabahah certificates (Murabahah Sukuk)
- Musharakah certificates (Musharakah Sukuk)
- Participation certificates
- Mudarabah Sukuk
- Investment agency Sukuk
- Sharecropping certificates (Muzara'ah Sukuk)
- Irrigation certificates (Musaqat Sukuk)
- Agricultural certificates (Mugharasah Sukuk)

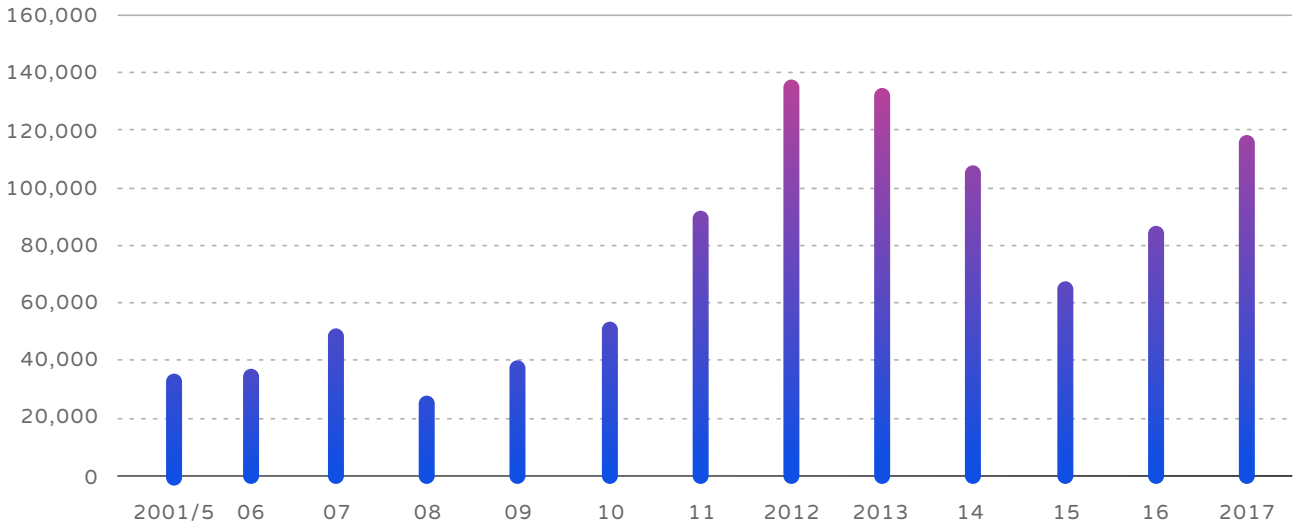
GENERAL MECHANIC OF SUKUK



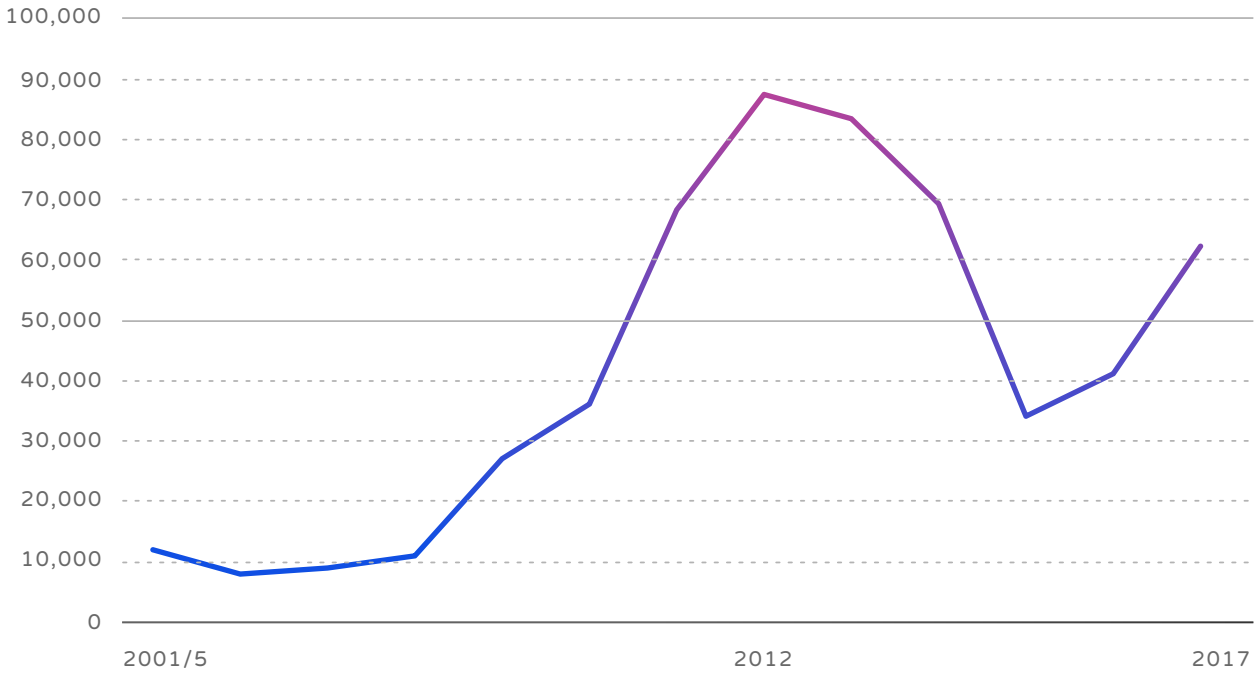
Sukuk issuance Profit distribution Redemption proceeds	Funds Sukuk redemption	Asset buyback Buyback process

SUKUK MARKET OVERVIEW

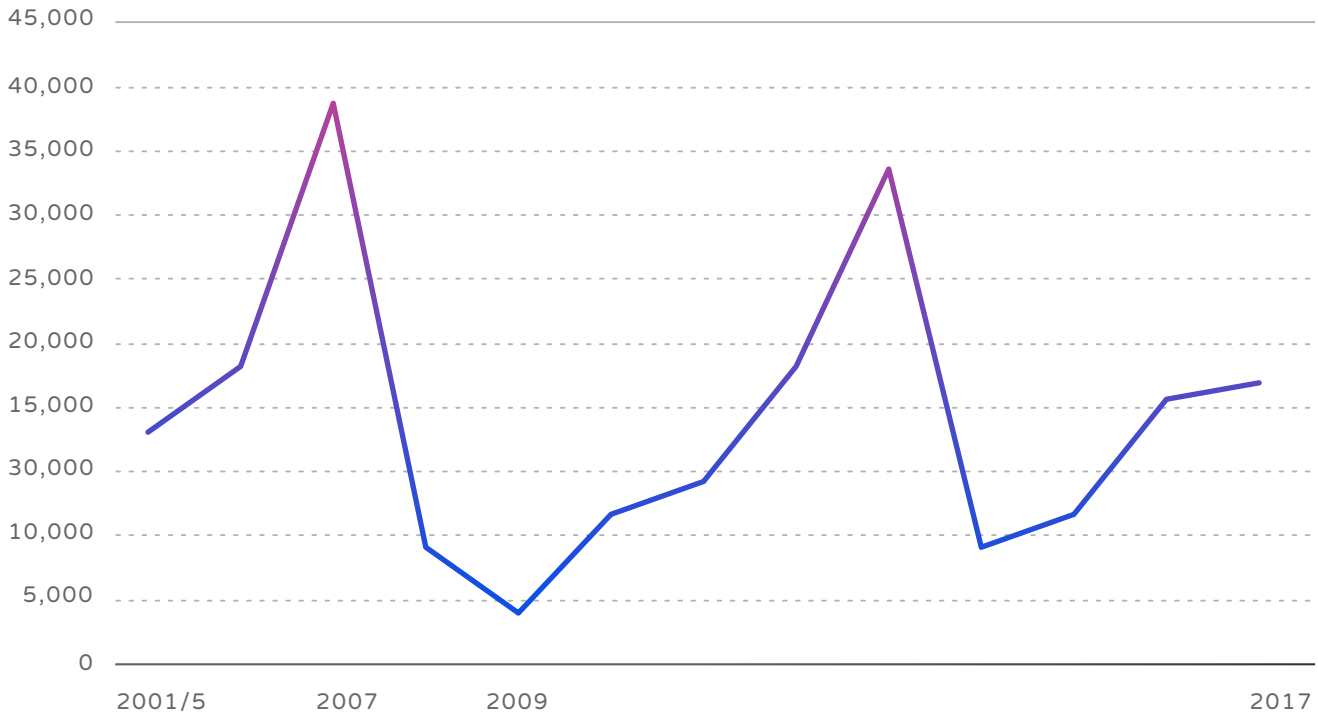
TOTAL SUKUK ISSUANCE IN 2017 IN USD MILLIONS



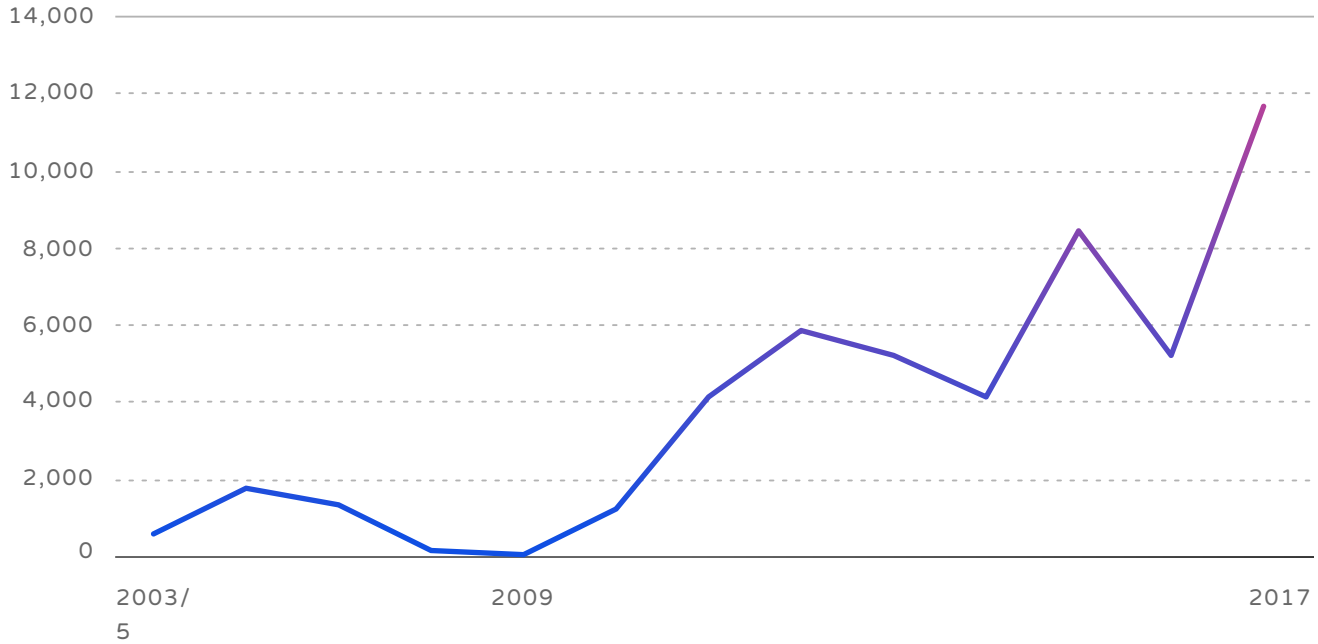
TOTAL SUKUK ISSUANCE IN 2017 IN USD MILLIONS (SOVEREIGN BODIES)



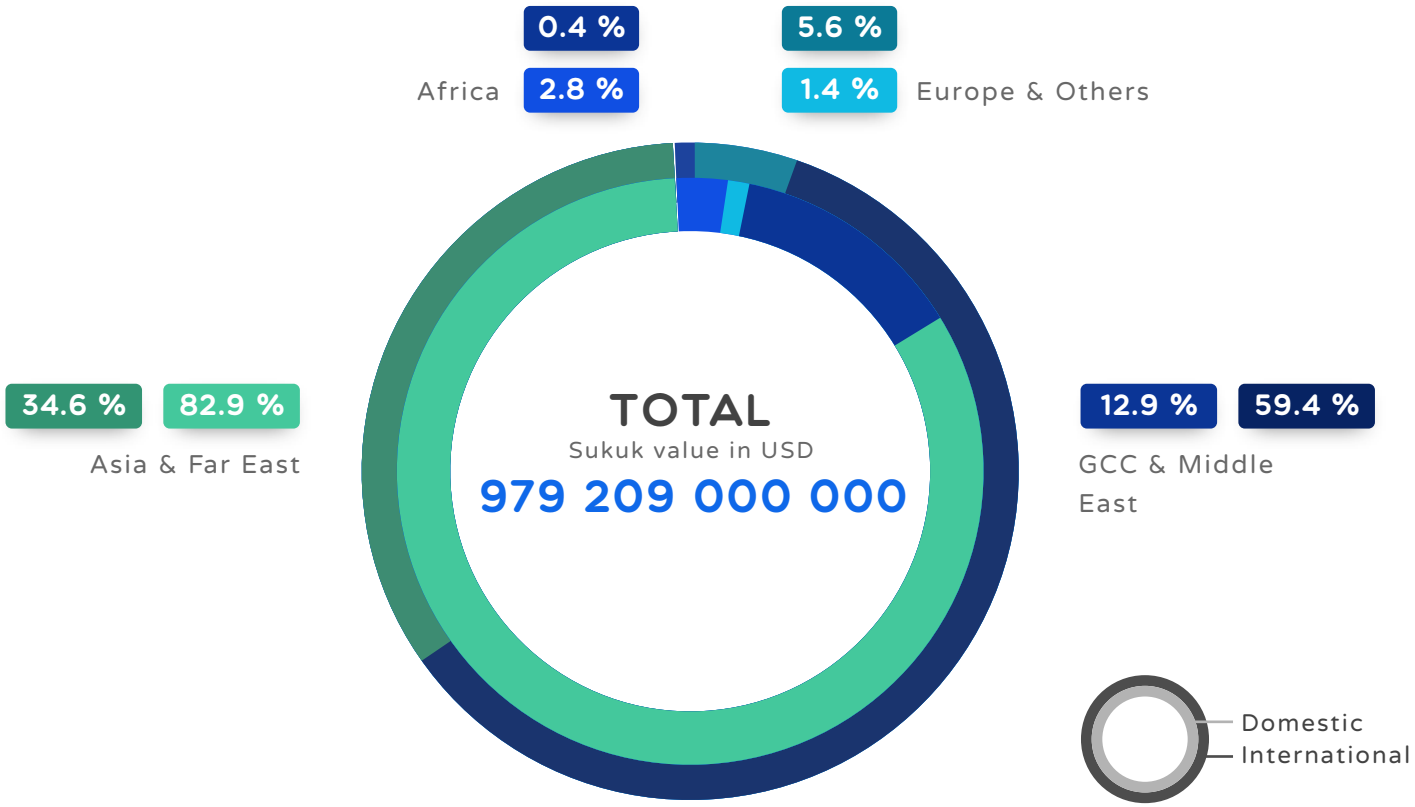
TOTAL SUKUK ISSUANCE IN 2017 IN USD MILLIONS (CORPORATES ENTITIES)

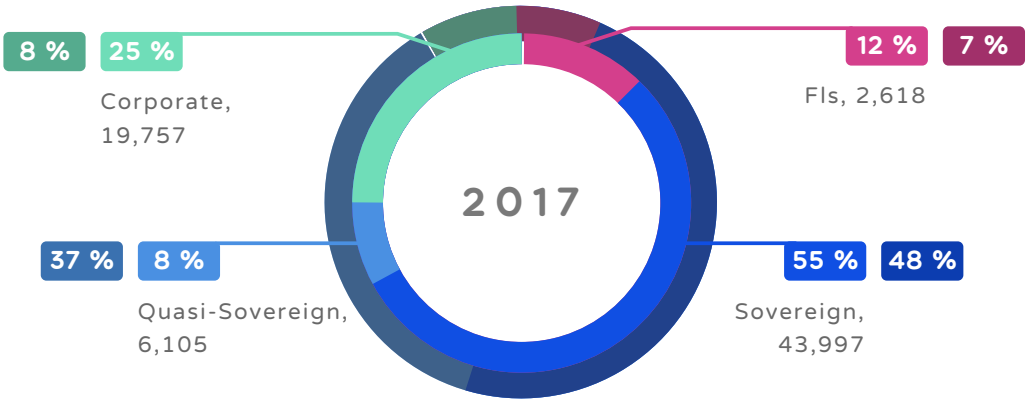


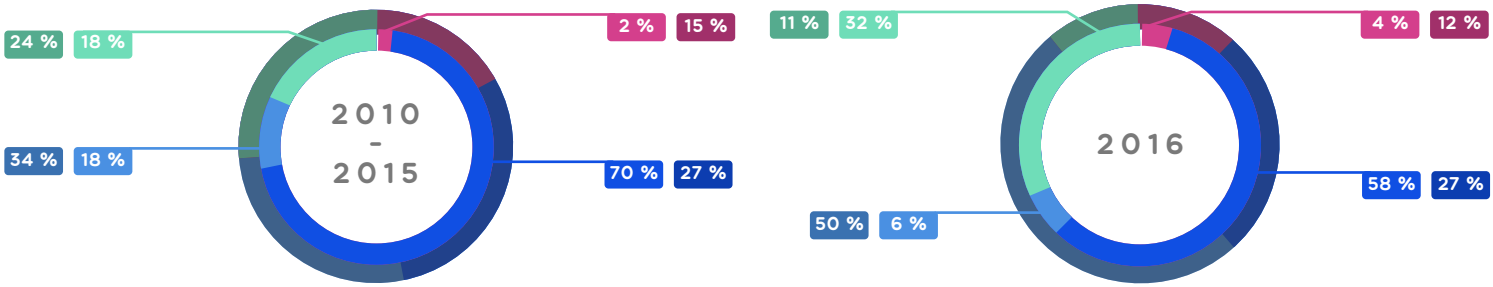
TOTAL SUKUK ISSUANCE IN 2017 IN USD MILLIONS (FINANCIAL INSTITUTIONS)



DISTRIBUTION INTERNATIONAL & DOMESTIC SUKUK ISSUANCE 2010 -2017 IN USD MILLIONS







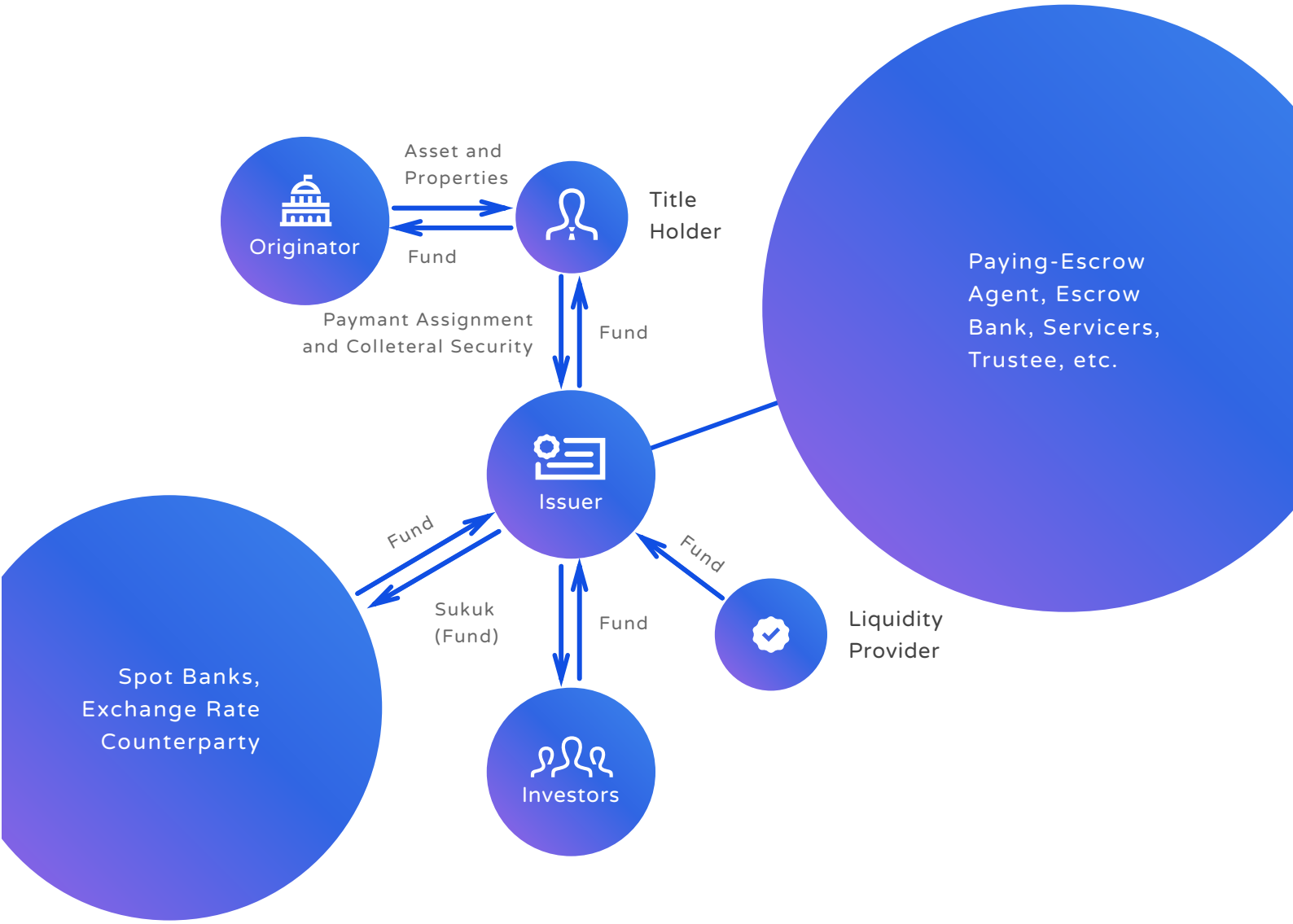
MARKET PARTICIPANTS

The key parties involved in the issuance and management process of Sukuk include:

- The originator, who is the corporate or government raising funds
- The lead bank or lead arranger, who is responsible for advising the issuer, designing, and monitoring the Sukuk contract
- A recognized Shariah advisor or committee, who are formally appointed to screen and certify the Shariah compliance of Sukuk issuance
- Investment bankers, who assist in structuring the transaction and underwriting and placing the Sukuk
- The issuer of the Sukuk certificates or notes issued in respect of the securitized assets, which is usually a special purpose trust, corporation, or other entity often referred to as the issuer SPV
- Sukuk investors who invest by buying Sukuk certificates or notes; mostly there are a syndicate of banks (commercial and investment banks)

Other parties could be involved according to the structure and size of the Sukuk; these include:

- Legal counsel, who assist in structuring the transaction and provide legal opinions to the ratings agencies and the transactional participants



- A servicer who collects payments due on the Sukuk for a fee and remits those payments to the Sukuk holders or a trustee for the benefit of the Sukuk holders
- A servicer who collects payments due on the Sukuk for a fee and remits those payments to the Sukuk holders or a trustee for the benefit of the Sukuk holders
- Eventually a credit enhancer, such as a mono-line insurer, surety company, bank, or other entity who provides credit support through an insurance policy, letter of credit, guarantee, or other assurance to the effect that there will be a source of funds available for payments on the Sukuk as they become due
- The rating agencies, who assess the credit quality of the Sukuk

CONCLUSION

In this paper, the vision and functions of the SAKKEX platform have been systematically described, as well as the technology upon which it is based. We empirically proved how the platform will contribute in enhancing the standardization and automation of data processing and business process of investment Sukuk.
We also demonstrated how the level of standardization and automation will

- Significantly decrease the issuance and management costs of investment Sukuk
- Lower the entry barriers for new issuers particularly from the emerging and developing countries in the Sukuk market
- Widen the investor basis by being able to list any kind of rated or unrated Sukuk on a decentralized digital exchange platform that is worldwide accessible and anytime available

Furthermore, we were able to show that the more Sukuk issuers enter the market due to low entry barriers, the more PULS Tokens will be required to generate and manage SAKK Tokens, thus making of the PULS Token a valuable digital asset whose holders could sell them to Sukuk issuers or other digital asset managers.

We also outlined how the internet penetration [11] in emerging and developing countries will widen the Sukuk investor and base and how the worldwide accessibility of the SAKKEX platform will contribute in making domestic and international Sukuk internationally available.

Finally, we introduced a novel concept of Sukuk product: the micro and mini Sukuk which unit prices are capped within a computed range and based upon the purchase power parity of a country. We intend to dissertate this concept in a separate document because the subject is beyond the scope of this paper.

The SAKKEX platform is intended to be operated in a regulated environment because the SAKKEX Development Team is confident that the platform is a disruptive solution that will be used by participants from the financial market. Therefore, the SAKKEX platform strives to be a trusted, transparent and reliable platform for the participants of these regulated markets.

[11] https://www.internetworldstats.com/stats.htm

Nevertheless, despite our expertise, we are grateful that we could learn more from some experienced, and generous people.

First and foremost, we, the SAKKEX Development Team gratefully acknowledges the critical contribution of some highly talented subject matter experts for advising us with critics and suggestions.

Words cannot describe how grateful We are to:

DR. ALY KHORSHID

Dr. Aly Khorshid, the seasoned teacher of one of our teammates and an internationally recognized Islamic finance practitioner and subject expert, for his availability and for being generous with his time and advices to make this paper more concise and objective. From him, we learnt for the first time in 2010-2011 what Islamic Finance and Sukuk were about.

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JED MCCALEB

Jed McCaleb, the visionary, pioneer and architect of the Stellar Network. Without his endeavor and subsequent achievement, we would have had to design and implement a dedicated, secured and tailored peer-to-peer network in order to tokenize and exchange financial assets. However, the Stellar Network on which the SAKKEX platform operates, gives us the strategic opportunity to rather focus on the business logic than spending many years in addressing technical and security complexities.
Stellar Network is currently in our opinion the most mature and the best decentralized digital ledger tailored for the financial industry.

http://jedmccaleb.com/

DR. SCOTT MORRISON

Dr. Scott Morrison, simply the best ingenious mentor any software engineer in the field of Islamic finance should meet. His constructive comments and feedbacks help us to be more quantitative in our approach and give us the valuable opportunity to improve and address some critical legal and regulatory factors. Thank you for helping us connect the dots.

https://www.brookes.ac.uk/templates/pages/staff.aspx?wid=&op=full&uid=p0085528

DISCLAIMER

LEGAL AND REGULATORY CONSIDERATIONS

The information set forth in this paper may not be exhaustive and does not imply any elements of a contractual relationship.

The content of this paper is subject to change in line with the ongoing research and development of the SAKKEX platform, hereinafter together referred as “Project”. However, there is no obligation to update this paper or to provide the recipient with access to any additional information.

This paper does not constitute investment, legal, tax, regulatory, financial, accounting or other advice, and is not intended to provide the sole basis for any evaluation of a transaction on acquisition of PULS, hereinafter referred to as “Token(s)”.

The SAKKEX platform and its managed tokens are not available to all persons. Participation may be subject to a range of steps, including the need to provide certain information and documents.

There are 2 distinct Token classes managed in the SAKKEX platform:

- PULS Tokens are utility tokens needed to perform any transaction on the platform. It can be bought during the initial token offering and later on exchange platform. It can be sold or/and transfer to real Sukuk market participants or other interested parties

- SAKK Tokens are generated security token in the SAKKEX platform that are exclusively created and managed by verified, responsible and compliant financial Sukuk promoters and issuers for their customers and/or partners

SAKK tokens are equivalent to investment certificates, a regulated product in many jurisdictions and therefore not available for purchase in the ITO.

PULS tokens (as described in this paper) are not intended to constitute securities or any other regulated product in any jurisdiction.

This paper does not constitute a prospectus and is not an offer document of any sort nor is it intended to constitute an offer or solicitation of securities or any regulated product in any jurisdiction.

Although it is planned to let this paper reviewed and approved by the competent regulatory authority of the republic of Malta, it has not yet been reviewed by any regulatory authority in any jurisdiction.

Prior to acquiring the Tokens, a prospective purchaser should consult with his/her own legal, investment, tax, accounting, and other advisors to determine the potential benefits, burdens, and other consequences of such a transaction.

Certain statements, estimates and financial information contained in this paper constitute forward-looking statements or information.

Such forward-looking statements or information involve known and unknown risks and uncertainties which may cause actual events or results to differ materially from the estimates or the results implied or expressed in such forward-looking statements or information.

Tokens are not being offered or distributed to, nor can be resold or otherwise alienated by their holders to, citizens of, natural and legal persons, partnerships, having their habitual residence or domicile, location or their seat of incorporation in a country or territory where transactions with digital tokens are prohibited or in any manner restricted by applicable laws or regulations.

If such a restricted person purchases Tokens, that person has done so on an unlawful, unauthorized and fraudulent basis, and in this regard shall bear any negative and/or legal consequences.

Each purchaser of Tokens is reminded that this paper has been presented to him/her on the basis that he/she is a person to whose attention this paper may be lawfully presented in accordance with the laws of the purchaser's jurisdiction.

It is the responsibility of each potential purchaser of Tokens to determine if the he/she can legally purchase Tokens in the purchaser's jurisdiction, and whether the purchaser can then resell the Tokens to another purchaser in any given jurisdiction.

No representations or warranties are made as to the accuracy or completeness of the information, statements, opinions or other matters described in this paper or otherwise communicated in connection with the project.

Without limitation, no representation or warranty is given as to the achievement or reasonableness of any forward-looking or conceptual statements. Nothing in this paper is or should be relied upon as a promise or representation as to the future.

This paper is provided in an official English version only. Any translation is for reference purposes only and is not certified by any person. If there is any inconsistency between a translation and the English version of this paper, the English version prevails.

RIGHTS, FUNCTIONALITY OR FEATURES

The SAKKEX Tokens (Tokens) may only have the rights, uses, purpose, attributes, functionalities or features, on the SAKKEX platform as described in this paper.

LACK OF DEVELOPMENT OF MARKET FOR THE TOKENS

Because there has been no prior public trading market for the Tokens, the Token Sale may not result in an active or liquid market for the Tokens, and their price may be highly volatile.

Even if the Tokens are tradable in a secondary market, in practice, there may not be enough active buyers and sellers, or the bid-ask spreads may be too wide.

The Token holders may not be able to exit their token holdings easily. In the worst-case scenario where no secondary market develops, a Token holder may not be able to liquidate his/her Token holdings at all.

The exchanges or platforms that facilitate secondary trading of the Tokens may not be regulated by any applicable laws.

TOKENS VALUE

The Tokens do not hold any ownership rights to SAKKEX Development Team's assets. Traded price of the PULS tokens can fluctuate greatly within a short period of time. There is a high risk that a PULS token holder could lose his/her entire payment amount. In the worst-case scenario, the PULS could be rendered worthless.

The SAKKEX Development Team is not and shall not be responsible for or liable for the market value of the Tokens, the transferability and/or liquidity of the Tokens and/or the availability of any market for the Tokens through third parties or otherwise.

The SAKKEX Development Team is not obliged to provide the token holders with a refund related to the Tokens for any reason, and the token holders will not receive money or other compensation in lieu of the refund.

No promises of future performance or price are or will be made in respect to the Tokens, including no promise of inherent value and no guarantee that the Tokens will hold any particular value.
Therefore, the recovery of spent resources may be impossible or may be subject to foreign laws or regulations, which may not be the same as the private law of the token holder.

SOFTWARE WEAKNESSES

The concept of token smart contract which creates the mechanism of creation and distribution of the Tokens are based upon the Stellar Smart Contract of the Stellar Network. There is no representation and warranty that the process for creating the Tokens will be uninterrupted or error-free. There is an inherent risk that the Stellar Network and the SAKKEX platform could contain weaknesses, vulnerabilities or bugs causing, inter alia, the complete loss of the Tokens.

LOSS OF PRIVATE KEYS

The Tokens purchased by Buyer may be held by Buyer in Buyer's digital wallet or vault, which requires a private key, or a combination of private keys, for access. Accordingly, loss of requisite private keys associated with such Buyer's digital wallet or vault storing the Tokens will result in loss of such Tokens, access to Buyer's token balance and/or any initial balances in blockchains created by third parties. Moreover, any third party that gains access to such private keys, including by gaining access to login credentials of a hosted wallet or vault service the buyer uses, may be able to misappropriate the Buyer's Tokens. The SAKKEX Development Team or any related parties are not responsible for any such losses.

LACK OF THE TOKENS SECURITY

The Tokens may be subject to expropriation and or/theft. Hackers or other malicious groups or organizations may attempt to interfere with the SAKKEX platform and Tokens in a variety of ways, including, but not limited to, malware attacks, denial of service attacks, consensus-based attacks, Sybil attacks, smurfing and spoofing.
Furthermore, because the SAKKEX platform rests on the Stellar Network, there is the risk that the Stellar Smart Contracts may contain intentional or unintentional bugs or weaknesses which may negatively affect the Tokens or result in the loss of the Tokens, the loss of ability to access or control the Tokens. In the event of such a software bug or weakness, there may be no remedy and holders of the Tokens are not guaranteed any remedy, refund or compensation.

RELIANCE ON THIRD PARTIES

The SAKKEX platform may rely, in whole or partly, on third parties to adopt and implement it and to continue to develop, supply, and otherwise support it. There is no assurance or guarantee that those third parties will complete their work, properly carry out their obligations, or otherwise meet anyone's needs, all of might have a material adverse effect on the platform.

CHANGES

The SAKKEX platform is still under development and may undergo changes over time. Although the SAKKEX Development Team intends to implement the features and specifications set forth in this paper, changes to such features and specifications can be made for any number of reasons, any of which may mean that the SAKKEX platform does not meet expectations of buyer of the Tokens.

RISK ASSOCIATED WITH OTHER APPLICATIONS

The SAKKEX platform may give rise to other, alternative projects, promoted by unaffiliated third parties, under which the Tokens will have no intrinsic utility and value.

FAILURE TO OBTAIN, MAINTAIN OR RENEW LICENSES AND PERMITS

There may be various statutory requirements obliging the SAKKEX Development Team to receive licenses and permits necessary for carrying out of its activity in different jurisdictions, there is the risk that new statutory requirements may be adopted in the future.

Requirements which may be imposed by these authorities and which may require the SAKKEX Development Team to comply with numerous standards, recruit qualified personnel, maintain necessary technical equipment and quality control systems, maintain appropriate filings and, upon request, submit appropriate information to the licensing authorities, may be costly and time-consuming and may result in delays in the commencement or continuation of operation of the SAKKEX platform.

BURDENSOMENESS OF APPLICABLE LAWS, REGULATIONS, AND STANDARDS

Failure to comply with existing laws and regulations or the findings of government inspections or increased governmental regulation, could result in substantial additional compliance costs or various sanctions, which could materially adversely affect the business of the SAKKEX platform User and the development of the platform as well. The SAKKEX Development Team operations and properties may be subject to regulation by various government entities and agencies, in connection with ongoing compliance with existing laws, regulations and standards.