Digital Asset Program

3rd Digital Asset Industry Forum
20th December 2019
Speakers
3rd Industry Forum

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Cambridge Centre for Alternative Finance

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SET Digital Asset Program
A step-by-step approach for holistic Business Case evaluation

WHY
Mission model

FROM
Current operating model

WHAT
Business model

Value model

TO
Target model

HOW
Implementation model

WHEN
Blueprint: Capital market infrastructure

FROM WHAT HOW MUCH WITH WHOM

Sprint 1 Sprint 2 Sprint 3 Sprint 4 Sprint 5 Sprint 6
Agenda

1 – Recap: Purpose and relevance of program
2 – Capital Market Blueprint for Digital Assets
3 – Regulatory hurdles and legal assessment
4 – Conclusion and next steps
5 – Q & A
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1 – Recap: Purpose and relevance of program
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Exchanges / CSDs are rapidly moving into DLT...

In 2017, Liquidity Alliance united and launched LA Ledger leading to their first PoC awaiting regulatory approval for DLT based collateral platform.

In March, Deutsche Boerse Group and HQLAx formed a cooperation for deploying blockchain-based securities lending.

In 2018:
- In December, ASX announced to deploy a new DLT-based solution replacing the current post-trade system of equities (CHESS).
- In October, DTCC successfully tested a clearing and settlement platform with over 100 mn. trades per day.

In 2019:
- In April, MOEX used DLT-based e-voting on their own AGMs (in 2018 and 2019).
- In December, International Exchange announced a funding of over USD 180 mn. for Bakkt digital asset platform project.
- In Q3 2018, CLS went live, a netting solution FX product for internal netting and settlement of FX trades not settling through the standard.
- In October, the LSE invested in blockchain startup Nivaura.

1 - Recap: Purpose and relevance of program

In October, SET announced Digital Asset program (1st Industry Forum).

In October, NSE tested DLT-based e-voting for listed companies.

In December, HKE and Digital Asset announced a partnership for DLT-based post trade processing.

In April, tokenized equity of the company 20/30 was issued on a test environment of LSE’s Turquoise platform.

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In October, phase 3 of DLT-PoC project „Jasper” was completed. Blockchain has been proven feasible.
We expect DLT to begin restructuring capital markets value chains within the next two to three years. That will pose fundamental questions for the roles of existing incumbents. A considered, engaged strategy is essential for firms hoping to shape DLT, rather than be shaped by it.”

"EBF believes that the DLT has the potential to contribute positively to citizens’ welfare and economic development. It has a considerable impact on banking industry infrastructures, roles and functions of financial intermediaries, back office related securities processes, communication, interoperability and competition."

"Distributed ledger technology (DLT) will fundamentally change the financial sector, making it more efficient, resilient and reliable.

Waiting for ‘perfect’ DLT solutions could mean missing an opportunity to help shape it. To understand how DLT can address challenges in the financial sector requires both research and real-life applications and pilots.”
Distributed Ledger Technology has already reached a level of maturity where it would be negligent for organisations to ignore it.
Four reasons to adopt DLT in the Thai capital market
The advantages of Distributed Ledger technology compared to centralised data bases

- Drastically reduced costs of reconciliation
- Eliminated counterparty risk by using DLT
- Improved regulatory reporting
- Digital processes and process automation

The application of DLT will drastically reduce transaction costs, increase process efficiency and improve compliance leading to greater financial inclusion and potentially to global competitive advantages for Thailand.
Four reasons to adopt DLT in the Thai capital market

The advantages of Distributed Ledger technology compared to centralised data bases

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- Eliminated counterparty risk by using DLT
- Improved regulatory reporting
- Digital processes and process automation

Settlement time + transaction costs + transaction risks = efficiency
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Design principles for Blueprint

Relevant guiding principles

**Separate roles from stakeholders**
Roles describe related functions (e.g. technical, business, etc.) Roles are defined independently of existing stakeholders.

**Leverage existing value chain**
The relationship between existing stakeholders is kept, not necessarily disintermediated.

**Propose highly regulated governance structure**
Digital capital markets require regulated players and financial products to ensure customer safety and interest.

**Promote efficiency gains and cost reductions**
Allow for fully digital processes and change collaboration model for issuing and managing customizable products using DLT.

- Define roles and assign them to stakeholders
- Regulation and compliance ensure product safety
- Customer-first approach ensures market’s interests
- Streamlining processes reduces costs
Blueprint Thai Capital Market

Transitioning to a new model of collaboration between Stakeholders

Moving from a mainly bilateral, sequential way of communicating and exchanging information...

...to a shared communication / information exchange model enabled by DLT

New roles required for Digital Asset infrastructure
Blueprint Thai Capital Market
Leveraging / maintaining existing relationships between Capital Market stakeholders

Existing relationships will not change, but collaboration (exchanging information) will be improved through DLT

Provide Custodians with required infrastructure to store Private Keys for Digital Asset Accounts

Enable compliant issuance processes by providing Smart Contracts in order to tokenize financial instruments

Facilitates consensus across different stakeholders and governs the Digital Asset Registry / Contract Registry

May monitor transactions of Digital Assets and Cash-on-Ledger in real-time

Issue 100% collateralised Cash-on-Ledger for on-chain settlement (Delivery vs. Payment)

Control access to capital market infrastructure and provide regulatory compliant on-boarding

New roles required for Digital Asset infrastructure
Focus on relevant Capital Market Business Cases
Assessing the impact and feasibility of DLT based on specific business requirements

**Mutual Fund Registrar**
Shared and decentralised infrastructure for **streamlining back office activities** related to the management and administration of mutual funds.

**Donation Platform (conceptual)**
A platform that allows a completely transparent and **fully automated tokenization and transfer of donations** to track their transfer from donor to recipient.

1 Business Cases currently not on SET’s roadmap. Business Case has been selected to evaluate interoperability of Digital Asset Infrastructure as a Service for non capital market Business Cases.

**Intra-group Settlement**
Increasing efficiency between stakeholders being involved in the **settlement process of securities** through a **common infrastructure**.

**Fundraising**
Providing a **primary market for the issuance of tokenized securities** (digital assets) and introducing new settlement mechanisms for digital assets.

**Digital Asset Infrastructure as a Service**
Providing **key infrastructure elements** such as Digital Asset Custody to internal and external stakeholders to help enabling new DLT-based business models.
Impact of DLT Business Cases on existing value chain

Changes in roles of existing stakeholders

1. Issuance
   - Issuers are expected to **significantly benefit** from a reduction in issuance costs and improved direct access to the capital market.

2. Trading
   - Brokers will **still play a vital role** in the capital market, mainly in price discovery and executing transactions. They will be **able to source liquidity** through an improved capital market structure.
   - Trading venues will remain unchanged, matching counterparties and facilitating price discovery. Mainly the settlement process will change by **settling trades “on-chain”** by providing signed transaction data to the Ledger.

3. Clearing
   - By substituting delivery vs. payment with Smart Contracts Atomic Swaps there is **no longer the need for the CCP to clear a transaction**. However, for Derivates CCPs might still be relevant.
Impact of DLT Business Cases on existing value chain
Changes in roles of existing stakeholders

Ownership of Digital Assets will be recorded in a Distributed Ledger, thereby opening the market for other issuance platforms and eroding the existing monopoly of CSDs in Capital Markets. However the role of a CSD has advantages, e.g. providing highly regulated oversight over Digital Assets.

The definition of safekeeping of assets will change through enforcing ownership through private keys. Shared registries recording ownership lead potentially to an erosion of the primary role of Custodians and Sub-Custodians. However, Custodians may perform the role of providing access to Digital Asset accounts and ensuring correct asset servicing operations.

Investors are expected to benefit the most from the application of Distributed Ledger Technology in capital markets. Their costs are expected to diminish drastically through more efficient processes. Access will be improved through smaller ticket sizes. In addition peer-to-peer trading between Investors will be facilitated by DLT.
Impact of DLT Business Cases on existing value chain
Changes in roles of existing stakeholders

<table>
<thead>
<tr>
<th>Donor</th>
<th>Charity</th>
<th>Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Donor</td>
<td>Recipient</td>
<td>Banks</td>
</tr>
</tbody>
</table>

**Donors** are expected to massively **benefit** from lower administration and transaction costs of processing the donations as well as **full transparency** of the donation flow significantly **reducing the risk of misappropriation of funds.**

**Recipients** are also expected to benefit from Distributed Ledger Technology allowing more donations to arrive through **lower administration costs** of processing the payments. In addition donations are also expected to arrive at the **recipients quicker** through the use of Cash-on-Ledger.

**Banks** will still be required for providing fiat accounts as **bridge** between Cash-on-Ledger and the existing fiat currency network. However, through the use of Cash-on-Ledger there will be **fewer transactions** resulting in **less revenue** for Banks.

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**Diagram Notes:**
- **1** Digital Asset Infrastructure as a Service
- **2** Intra-Group Settlement
- **3** Mutual Fund Registrar
- **4** Donation platform
- **5** Fundraising

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**Page 18 – Capital Market Blueprint for Digital Assets**
Impact of DLT Business Cases on existing value chain
Changes in roles of existing stakeholders

In the future the Mutual Fund Registry will be performed by a Distributed Ledger instead of the Transfer Agent. As part of the issuance process the allotment and oversight over Mutual Fund units may be taken over by Fund Accounting in the future.

Fund Accounting will be improved on by far more efficient processes for reconciliation and exchanging information with other stakeholders such as custodians, selling agents and Brokers. The result will be cost savings through streamlining back- and middle office activities.

Similarly to Fund Accounting, Fund Managers will benefit from streamlined and more efficient processes in their back- and middle office, which is also expected to lead to costs savings.

Digital Asset Infrastructure as a Service
Intra-Group Settlement
Mutual Fund Registrar
Donation platform
Fundraising
Blueprint Thai Capital Market
Digital Asset Infrastructure as backbone for Thai capital market

Eliminates the need for CSD as central asset registrar

Cash-on-Ledger Registry

Digital Asset Custodian

Fund Manager

Recipient

Merchant

Eliminates the need for CCP in cash transactions and enables near time settlement of digital asset transactions

A Distributed Ledger with shared information between participants eliminates the need for a Transfer Agent for Mutual Funds

Co-validates transactions

Digital Asset Infrastructure as a Service

Shared infrastructure layer providing key services for different Business Cases

Network Node
December 20th 2019

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Do digital assets refer to a known legal concept that determine a regulatory perimeter?

Does X correspond to a legal concept (e.g. money) which would determine the regulatory perimeter?

Law
- Is X a thing?
- How is title to X transferred?
- What is the proper law applicable to X?

Regulation
- Does the issuer of X need to issue a prospectus?
- What regulator has oversight over X?
- Does an exchange trading X need to comply with KYC/AML procedures?
The majority of digital assets pertain to existing legal concepts

A digital unit of data in a shared system jointly maintained and updated by multiple parties that (i) can be directly controlled by the asset holder via cryptographic keys, and (ii) may represent a set of rights.

Digital assets are (i) expressive, (ii) controllable via cryptographic keys, and (iii) compatible.
From a legal perspective, the real innovation springs from cryptoassets

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Digital assets are (i) expressive, (ii) controllable via cryptographic keys, and (iii) compatible

A digital token that (i) has no formal issuer, (ii) is exclusively issued and transferred via open, permissionless DLT systems, and (iii) plays an indispensable role in the economic incentive design of the underlying distributed ledger or application such that separating the asset from the underlying network would impair the system as a whole.

Cryptoassets fall outside the scope of SET’s Digital Asset Initiative, hence we will leave them aside and focus on digital assets that are not cryptoassets in the remainder of this presentation.
A conceptual framework to identify potential legal and regulatory considerations

The framework is composed of four major dimensions that are used to identify legal and regulatory considerations. These dimensions are not mutually-exclusive and are, initially, analysed on their own.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rights</td>
<td>What types of rights are associated with the asset? Is there a counterparty that can be held liable? How are disputes in the case of disagreements resolved?</td>
</tr>
<tr>
<td>Representation</td>
<td>What form(s) does the asset take (i.e. how is it represented)? What legal and regulatory implications may particular representations have?</td>
</tr>
<tr>
<td>Issuance</td>
<td>How, by whom, and according to what schedule are new asset units created? Through which mechanism are these new asset units distributed, and to whom?</td>
</tr>
<tr>
<td>Transferability</td>
<td>Through what means can asset ownership be transferred from one party to another?</td>
</tr>
</tbody>
</table>
A conceptual framework: fundraising example

The framework is composed of four major dimensions that are used to identify legal and regulatory considerations. These dimensions are not mutually-exclusive and are, initially, each analysed on their own.

- **Rights**: The token references a financial asset and gives its holder interest rights, as well as the right to redeem the token in exchange for the underlying.
- **Representation**: The underlying asset is represented in the form of a digital token issued on the SET platform, an initially closed shared registry.
- **Issuance**: New asset units are created by the asset tokeniser on behalf of the issuer. They are issued as a one-time event. Tokens are distributed during a sale opened to qualified investors.
- **Transferability**: Asset ownership transfer is exclusively initiated by the token holder. Initially, a single entity will be responsible for unilaterally updating the ledger.
Dealing with digital assets: common assumptions

Tokenisation, in the fundraising use case for instance, implies (i) a signifier (the token) and (ii) the rights (e.g. interests, delivery of the underlying) that is signified by the token. The creation of a token implies a conceptual and operational bridge between the underlying asset and its token avatar.

“By purchasing the token I am entitled to the underlying asset and associated rights.”

“By acquiring the token, I am recognised as the owner of the token.”

“By knowing the private key, I possess the token.”

“If a secondary market exists, I can decide to sell my token on a trading venue.”
These assumptions raise key legal questions

1. Does dealing with the token mean dealing with the asset and associated rights?

2. Is a digital token recognised as an object of property rights?

3. What alternative concepts to physical possession are available?

4. Are property rights being transferred effectively when transferring the corresponding digital token?
How have other legal systems addressed these key legal questions?

1. Does dealing with the token mean dealing with the asset and associated rights?
How have other legal systems addressed these key legal questions?

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Wyoming’s Amendments to the Uniform Commercial Code
How have other legal systems addressed these key legal questions?

3. Are there alternative concepts to physical possession?

4. Are property rights being transferred effectively when transferring the corresponding digital token?
Regulatory implications for new roles

- No specific licensing regime
- Technical and cybersecurity requirements
  - Insurance of funds
  - Key management policies
- Licensing regime?
- Requirements of contract formation
  - Security auditing
  - Safeguard mechanism
- Legal validity of electronic register?
- Mandated registration requirements

- E-money license?
- Legal documentation
- Legal relationship with smart contracts

- Data privacy law
- Similar risk profile assessment framework
- No additional AML requirements

New roles required for Digital Asset infrastructure
Implementing with legal certainty: the way forward

Definition

- Revision of the Emergency Decree
- Focus on substance rather than form

Property rights

- Clarification on the legal recognition of purely digital objects is needed

Intermediaries

- Avoid, to the extent possible, parallel regimes for “conventional” and digital assets
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December 20th 2019
Outlining the next steps
A Business Case specific implementation approach
Next steps to further explore Business Cases
Prioritisation and timeline

1. Completion of Digital Asset Program

2. Focus on PoCs for Fundraising and Digital Asset infrastructure as a Service at the beginning

3. Completion of PoC for Fundraising including issuance of Investment Tokens, Cash-on-Ledger and DvP through Smart Contracts

4. Completion of PoC for Digital Asset infrastructure as a Service providing key services for other Business Cases to be developed

Q4/2019
- Fundraising platform
- Digital Asset Infrastructure as a Service

Q1/2020
- Focus on PoCs for Fundraising and Digital Asset infrastructure as a Service at the beginning

Q2/2020
- Completion of PoC for Fundraising including issuance of Investment Tokens, Cash-on-Ledger and DvP through Smart Contracts

Q1/2021
- Completion of Digital Asset Program

Q4/2020
- Focus on PoCs for Fundraising and Digital Asset infrastructure as a Service at the beginning

Q3/2020
- Completion of PoC for Digital Asset infrastructure as a Service providing key services for other Business Cases to be developed
### Hurdles to adoption of Business Cases

#### Major implementation risks for Business Cases

<table>
<thead>
<tr>
<th>Risk / Issue</th>
<th>Description</th>
<th>Measures to mitigate risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Suitability of technology</strong></td>
<td>Limited choice of suitable platforms with the potential risk of vendor lock-in through lacking alternatives.</td>
<td>Closely monitor the market for updates / changes in existing technologies</td>
</tr>
<tr>
<td><strong>Regulation and Legislation</strong></td>
<td>In specific areas there is uncertainty about compliance of Business Cases potentially preventing / delaying them from Go-Live.</td>
<td>Actively engage with Regulator and educate through selected Business Cases.</td>
</tr>
<tr>
<td><strong>Operational risks of transition</strong></td>
<td>Existing business cases intended to run in parallel to existing infrastructure requiring resources. DLT is relatively new to stakeholders</td>
<td>Build separate divisions splitting implementation of DLT platforms and operations for existing systems</td>
</tr>
<tr>
<td><strong>Lack of standards and governance</strong></td>
<td>New governance and compliance models for innovative Business Models need to be developed to reduce governance risks</td>
<td>Allow for flexible and distributed role design and engage with stakeholders to find define new market structures</td>
</tr>
<tr>
<td><strong>Interoperability between different platforms</strong></td>
<td>Currently different platforms are being used by different stakeholders in Thailand (e.g. Fabric, Ethereum, Corda, etc.)</td>
<td>Engage during design phase with other stakeholders to allow for information exchange between different platform</td>
</tr>
<tr>
<td><strong>Sourcing key development skills</strong></td>
<td>Globally key development resources and know-how for DLT platforms are scarce</td>
<td>Engage with partner(s) to share know-how and educate own resources</td>
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#### Risk Matrix

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<tr>
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<th>Middle</th>
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4 – Conclusion and next steps
Conclusion 3rd Digital Asset Industry Forum

Distributed Ledger Technology has reached a maturity level for production ready applications and globally major players are rapidly transitioning into production mode. The time is now!

The engagement with stakeholders throughout the program underlined the enormous interest in Thailand and helped shaping the design of analysed Business Cases. PoCs will be the first step of transitioning into production whilst in parallel addressing showstoppers in existing legislation.

It is not a question “if” Distributed Ledger Technology will drastically change capital market structures. The only question is “when” and “how” exactly. A common approach regulating and implementing DLT could improve efficiency of the Thai capital market and lead to global competitive advantages for Thailand.
Thank you!

20th December 2019