Blockchain in Post-Trade

Opportunities, Challenges And Case Stories

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Blockchain & DLT

- Blockchain/DLT & Its Components
- Is it Hype?
- Criticality to businesses?
- Investments in Blockchain
• It started as a transaction ledger to securely record transfers of the alternative currency “Bitcoin”

• A Clever combination of existing technologies (P2P networking, distributed timestamping, cryptographic hashing functions, digital signatures, and Merkle trees, among others) that have in some cases existed for decades.

• One of the most hype technologies since the internet.
Blockchain works in 5 main components

- Cryptography
- Peer to Peer (P2P) Network
- Consensus Mechanism
- Ledger
- Validity Rules
Deloitte’s 2018 global blockchain survey

- 43% believed Blockchain is critical to their business and it is in top 5 strategies.
- 29% believed blockchain very important to their business and investigating possibilities.
- 84% believed that Blockchain and DLT is a more secured technology compared to current technologies.

McKinsey Fintech survey 2017,

- 50% of participants believe that post-trade services are the most driven Fintech innovation.
Sources: Global Blockchain Benchmarking Study – University of Cambridge – Sep 2017
Blockchain Implantation in Trade & Post-Trade

- Possibilities & Benefits
- Streamlining processes in trading cycle & post trade
- Centralized vs. Decentralized
- Tokenization & Smart Contracts
- Implementations: Cases & Pilots
Opportunities: Exchanges & Financial Institutes

• Keeping corporate records
• Making corporate actions processes more efficient
• Revamping post-trading operations of exchange-traded equities
• Trading and settling OTC derivatives
• Facilitating loan syndication
• Tracking repo transactions and re-hypothecation
• Trading short term debt
• Automation of KYC and AML Compliance

Regulatory Approvals
Securities
Subscription
KYC, AML & CTF
Investing
Collecting Payments
Allotment
Registrar
Listing
Disclosure
Corporate Actions
Rights & Voting
Pledge
Trading
Reconciliation & DVP
Trade acceptance
Clearing & Settlement
Payments
Repo
Surveillance
Lien
Reporting
Opportunities: Exchanges & Financial Institutes

Automation of post-trade events will make it:

- more efficient
- Faster
- Cheaper
- less intermediaries
- less counterparty and operational risk
- streamlined real-time settlement
- improved liquidity
- supply chain optimization
- increased transparency
- Inclusion of new asset classes
Streamlining processes

Possible Benefits to Post trade:
- Reducing reconciliation & data management costs
- Flexible settlement timing
- Automated clearing
- Direct ownership
- Traceability and transparency
- Increase security and resilience
How blockchain works for CSD & CH

Centralized Ledger

Distributed Ledger
Tokenization & Smart Contracts

Role of tokenization of assets and fiat money

Tokenization (Token): the process of digitally representing an asset or ownership of an asset. Such assets can be currencies, commodities, securities or properties.

Role of smart contracts

Smart contracts are computer programs written on the distributed ledger. These computer programs are pre-written logic stored in, and executed by the nodes in the Securities Market applications of smart contracts that are currently being explored include trading of securities, settlement and clearing, corporate actions, and management of margin positions and collateral.
Australian Securities Exchange

Using DLT to record shareholdings and manage the clearing and settlement of equity transactions in Australia
Euronext (Netherlands)

LiquidShare for SMEs improving the transparency, speed, and security of post-trade operations

Deutsche Börse AG (Germany)

Prototype for the settlement of securities in delivery-vs.-payment mode for centrally issued digital coins or digital securities.

Bolsa de Madrid (Spain)

Part of a Spanish multisector network developing blockchain-based identification network

Euroclear (Belgium)

Partnership with itBit to create Bankchain, a distributed ledger settlement service for the London bullion market
DTCC
(USA)
LiquidShare for SMEs improving the transparency, speed, and security of post-trade operations

TMX Group
(Canada)
Development of a blockchain-based prototype to power a new service offering from Natural Gas Exchange to optimize the NGX gas settlement process
Tokyo Stock Exchange (Japan)
Cooperation with IBM testing a trade confirmation prototype for trading and settlement in low liquidity markets

NSE National Stock Exchange (India)
Trial allowing participants to access KYC data information in real time

Moscow Exchange (Russia)
Developing e-voting for shareholders via blockchain

Abu Dhabi Securities Exchange (UAE)
E-voting system
Strate
(South Africa)

Agreement with NASDAQ to deliver an e-proxy voting system based on blockchain.
Barriers to Blockchain Investments

- Barriers to invest in Blockchain
- Challenges facing Post-Trade
- Legal challenges
- The need to integrate with banks (cash leg)
# Blockchain Investment Barriers

<table>
<thead>
<tr>
<th>Barrier</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulatory issues</td>
<td>39%</td>
</tr>
<tr>
<td>Implementation—replacing or adapting to legacy system</td>
<td>37%</td>
</tr>
<tr>
<td>Potential security threats</td>
<td>35%</td>
</tr>
<tr>
<td>Uncertain ROI</td>
<td>33%</td>
</tr>
<tr>
<td>Lack of in-house skills/understanding</td>
<td>28%</td>
</tr>
<tr>
<td>Not a current business priority</td>
<td>22%</td>
</tr>
<tr>
<td>Lack of compelling application of the technology</td>
<td>22%</td>
</tr>
<tr>
<td>Technology is unproven</td>
<td>20%</td>
</tr>
<tr>
<td>Concerns over sensitivity of competitive information</td>
<td>20%</td>
</tr>
<tr>
<td>No barriers</td>
<td>6%</td>
</tr>
<tr>
<td>Other/Not assessed</td>
<td>2%</td>
</tr>
</tbody>
</table>
Trade finality is a major concern in post trade settlement.

Management of the cash leg of transactions

Recourse mechanism

Position and collateral netting

Counterparty risk management is a challenge as DLs main value comes through disintermediation. The trust is not yet made in Blockchain ecosystems.

If smart contracts requires actions outside the system, the counterparty and systematic risk are greater.

DLT shared ledger are immutable, therefore, transaction cannot be modified and cancelled creating challenges on how mistakes can be handled.
• Chain of transactions are available to all.
• Lack of robust anti-fraud, KYC and AML tools.
• Transaction reconciliation between different DLs maybe challenging due to difficulty in transposing different consensus protocol.
• Enabling common wallet for various DLs in difficult.

PRIVACY AND SECURITY

BEHAVIORAL AND TRANSITION RISK

• Risk of lack of cooperation due to different interest of different financial institutions.
• Integration with current non Blockchain systems maybe challenging.
• Absence of solution to record fiat currency create interoperability challenges to manage cash ledger.

SETTLEMENT RISK

Trade finality is a major concern in post trade settlement.
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TRADE FINALITY

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### Performance
- Many applications demonstrated poor scalability, high transaction processing delay, and latency issues.
- Slower than conventional databases due to the calculation-intensive cryptography component.
- Smart contracts are not fault-tolerant and there are chances for coding issues.
- Risk of DL size become unmanageable when financial institutions act as full nodes.

### Interoperability
- Lack of consensus on policy and data interoperability.
- Data exchange protocol and formats are not mature enough. Rival Blockchain technologies can undermine system interoperability.
- Transaction reconciliation between different DLs maybe challenging due to difficulty in transposing different consensus protocol.
- Enabling common wallet for various DLs in difficult.

### Standardization
- Lack of industry alignment on certain key design points.
- Lack on common DL and network protocols.
- Lack of consensus on effective international standards and versions of Blockchain.
REGULATORY AND GOVERNANCE

- Lack of regulatory clarity
  - dispute resolution mechanism, responsible regulatory agencies and their coordination mechanism,
  - Legal standing of documents,
  - liability ownership,
  - definitions,
  - territorial requirements and
  - regulatory reporting

- Existing regulatory framework may limit the adaptation of Blockchain (privacy mandates, market infrastructure, product intervention powers, etc)

- Compliance with current regulations and requirements may be challenging for Blockchain such as AML, CFT, etc.

- Lack of common and transparent governance structure for Blockchain.
Legal barriers for Post-Trade

- Regulators resistance
- Responsibilities Owner
- Data Protection
- Legality of Records
- Legal definitions
- Confidentiality
- Legality of Digital money
- Governance
Legal barriers for Post-Trade

- Regulations changes required to match the changes in the processes and data structure.
- Regulators are not yet incentivized to change as blockchain and DLT may not fit the purpose.
- Difficulty of reducing intermediaries’ layers as intermediation is required to play certain roles in the process to reduce risk and segregate functions.
- The immutability of the Blockchain system does not fit the regulators and their power to modify and cancel transactions in the system.
- Immediate settlement is not preferred and exchanges moving out of T+0.
Legal barriers for Post-Trade

- In centralized systems, owners of data are the ledger owners. Who will be the owner of the ledger in distributed ledger?
- Whether it will remain as a sole responsibility of the CSD or the group of Blockchain network validators?
Legal barriers for Post-Trade

- Chain of transactions will be available to all.
- Territorial restrictions on where data physically located.
## Legal barriers for Post-Trade

<table>
<thead>
<tr>
<th>Topic</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulators resistance</td>
<td>Are Blockchain/DLT records legal and enforced?</td>
</tr>
<tr>
<td>Responsibilities Owner</td>
<td>Are smart contracts enforceable?</td>
</tr>
<tr>
<td>Data Protection</td>
<td>How systems link these digital tokens and smart contracts with the actual assets especially if these assets are controlled out of the system?</td>
</tr>
<tr>
<td>Legality of Records</td>
<td>Positions in DLT need to be recognized as collateral under the applicable law.</td>
</tr>
<tr>
<td>Legal definitions</td>
<td></td>
</tr>
<tr>
<td>Confidentiality</td>
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<td></td>
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### Legal barriers for Post-Trade

<table>
<thead>
<tr>
<th>Topic</th>
<th>Description</th>
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<tbody>
<tr>
<td>Regulators resistance</td>
<td>• definition of trade finality, final ownership of securities and electronic records as proof of ownership.</td>
</tr>
<tr>
<td>Responsibilities Owner</td>
<td>• DLT can only guarantee probabilistic finality,</td>
</tr>
<tr>
<td>Data Protection</td>
<td>• How probabilistic finality fits the current regimes?</td>
</tr>
<tr>
<td>Legality of Records</td>
<td>• Can DLT constitute proof of Legal ownership of security? whether a position in a DL constitutes full title or another form of entitlement.</td>
</tr>
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Legal barriers for Post-Trade

- Financial data are considered very sensitive and always protected by many privacy protection regulations.
- Transaction parties must be invisible.
- Zero proof concept not yet implemented
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<table>
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<tr>
<td>Regulators resistance</td>
<td>How regulations deal with digital money and cryptocurrencies being the best possible solution to link the securities leg with cash leg.</td>
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<td></td>
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<td>Legality of Digital money</td>
<td>Central banks digital money. How fast banks issue digital money (may need regulations)</td>
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Central banks digital money. How fast banks issue digital money (may need regulations)
Legal barriers for Post-Trade

- Cross boarder DLT, whose regulations apply?
- Provisions on the liability of the respective parties
- Rules to approve/reject authorized participants
- Correction mechanisms
- Applicable law in case of disputes
- How to address conflicts of interests in operating and participating in a DLT network
- Protecting privacy and confidentiality of sensitive data
- Legal enforceability of smart contracts and tokens
- Standardizing the technology
Issuers

Raise money from investors for projects (creation of securities)

Investors

Allowing securities to be traded by investors (Exchange and Trading)

Brokers

Need brokers to deal with investors

Central Bank

Need banks to collect the funds

Banks

Clearing house to reduce counterparty risk and ensure DvP

Central depository to safeguard the registrar

Custodians

Need custodian to ensure DvP with brokers and protect assets

CMA regulator

Protections and regulating

Lenders

Lenders give liquidity by pledging securities

CSD & CH

Platform to exchange securities (Price & Quantity)

Need banks to settle cash
In summary:

• Legacy structure which took century to highly regulate and intensively structured to build trust in the system can not be replaced at once with exactly opposite principle.

• Does it fit for the purpose? a question need answer to move forward into blockchain investments.

• Regulations are not kept in pace with the technology. Lots of changes in the regulation needed to allow such technology to work in such sector.
THANK YOU!

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References:


