Digitalization of trade documents and the use of blockchain technology in origin-requirements and trade documentation

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I. Quick Intro to Blockchain

Blockchain $\neq$ Bitcoin
Decentralized
Peer-to-peer
Distributed
Highly secure
Tamper-proof
Automation
Linked
Digital
Time stamped
Cryptography
Highly secure
DECENTRALIZED AND DISTRIBUTED

Traditional centralized ledger

Distributed ledger

Source: Ganne E. (2018), Can Blockchain Revolutionize international Trade?
Amy sends an asset to Bob

**Traditional Approach**

Amy → Amy's Bank → Bob's Bank → Bob

**Blockchain Approach**

Amy → Bob
1. **Transaction submitted or requested**
   - Can involve documents, contracts, cryptocurrency, etc.
   - The data are “hashed” and encrypted.
   - Possibility to encrypt documents.

2. **The transaction data T are broadcast to the peer-to-peer network.**

3. **Validation (by authorized nodes only in the case of permissioned blockchains).**
   Validating nodes take the transaction from the transaction pool and combine it with other transactions in a block. Block validated based on the consensus protocol of the blockchain.

4. **Validated block added to the chain and linked to the previous block in a permanent and unalterable way.**

Source: Ganne (2018)
KEY FEATURES

- Automation
- Time-stamping
- Peer-to-peer Transfer of assets
- Greater security

TRANSPARENCY
TRUST
TRACEABILITY

Smart contracts
DIFFERENT TECHNOLOGIES

BLOCKCHAIN VS DISTRIBUTED LEDGER TECHNOLOGIES
# Different Types of Blockchains

<table>
<thead>
<tr>
<th>BLOCKCHAIN TYPES</th>
<th>Read</th>
<th>Write</th>
<th>Commit</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>Public permissionless</td>
<td>Open to anyone</td>
<td>Anyone*</td>
<td>Bitcoin, Ethereum</td>
</tr>
<tr>
<td></td>
<td>Public permissioned</td>
<td>Open to anyone</td>
<td>Authorized participants</td>
<td>Sovrin</td>
</tr>
<tr>
<td>Closed</td>
<td>Consortium</td>
<td>Restricted to an authorized set of participants</td>
<td>Authorized participants</td>
<td>All or a subset of authorized participants</td>
</tr>
<tr>
<td></td>
<td>Private permissioned (&quot;enterprise&quot;)</td>
<td>Fully private or restricted to a limited set of authorized nodes</td>
<td>Network operator only</td>
<td>Network operator only</td>
</tr>
</tbody>
</table>

DIFFERENT DEGREES OF DECENTRALIZATION

Source: Ganne (2018)
### DIFFERENT CHARACTERISTICS

Based on November 2017 data. Source: Ohnesorge (2018)

<table>
<thead>
<tr>
<th>Cryptocurrency</th>
<th>Average transaction fee in USS</th>
<th>Average transaction time</th>
<th>Transaction capacity per second</th>
<th>Energy efficiency</th>
<th>Additional features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Bitcoin</td>
<td>7.32</td>
<td>9-10 minutes</td>
<td>7</td>
<td>Low (PoW blockchain)</td>
<td></td>
</tr>
<tr>
<td>2. Ethereum</td>
<td>0.22</td>
<td>14 seconds</td>
<td>20</td>
<td>Low (PoW blockchain)</td>
<td>Supports smart contracts</td>
</tr>
<tr>
<td>3. Bitcoin Cash</td>
<td>0.32</td>
<td>9-10 minutes</td>
<td>50</td>
<td>Low (PoW blockchain)</td>
<td></td>
</tr>
<tr>
<td>4. Ripple</td>
<td>0.00000024 (+ IOU fee)</td>
<td>3.5 seconds</td>
<td>1,000</td>
<td>High (Voting-style algorithm)</td>
<td>Enables IOU transactions in any currency</td>
</tr>
<tr>
<td>5. Litecoin</td>
<td>0.15</td>
<td>2 minutes</td>
<td>56</td>
<td>Low (PoW blockchain)</td>
<td></td>
</tr>
<tr>
<td>6. Dash</td>
<td>0.30</td>
<td>2-3 minutes</td>
<td>(4,000)</td>
<td>Low (PoW blockchain)</td>
<td></td>
</tr>
<tr>
<td>7. NEO</td>
<td>None (+ variable fee)</td>
<td>A few seconds</td>
<td>1,000</td>
<td>High (Po blockchain)</td>
<td>Supports smart contracts</td>
</tr>
<tr>
<td>8. IOTA</td>
<td>None</td>
<td>No data available</td>
<td>500-800</td>
<td>Rather high (PoW Tangle)</td>
<td>Especially suited for IOT devices</td>
</tr>
<tr>
<td>9. Monero</td>
<td>2.43</td>
<td>2 minutes</td>
<td>1,700</td>
<td>Low (PoW blockchain)</td>
<td>Advanced privacy features</td>
</tr>
<tr>
<td>10. NEM</td>
<td>0.21</td>
<td>30 seconds</td>
<td>(3,000)</td>
<td>High (Po blockchain)</td>
<td>Integrated reputation system</td>
</tr>
</tbody>
</table>
Trade is labour- and paper-intensive and involves multiple actors

II. A GAME CHANGER FOR TRADE DOCUMENTATION?

Source: Tradelens
Increase access to single source information needed to efficiently deliver and managed finance and trade insurance

Real-time visibility of inbound and outbound operations

Improve customer service and reduce network integration costs and revenue leakage

Reduce paperwork and improve risk assessment

Receive real-time and accurate updates on vessel arrivals, improve utilization of assets

Identify and proactively manage unexpected events, reduce surcharges and stockouts

Obtain access to greater death of real-time information with less work, improve customer satisfaction

Increase access to single source information needed to efficiently deliver and managed finance and trade insurance

Source: Tradelens
DLT projects in trade

Source: Ganne et al. (2019), Blockchain and DLT in Trade: A Reality Check
Certificates of origin

How it Works

Exporter or Forwarder applies for eCO online
Out of 15 countries & counting

Electronically received & reviewed by Chamber of Commerce

Approved by Chamber; eSigned, Stamped & Returned

Received electronically by Exporter or Forwarder

eVerification by Customs upon Import
Into 203 countries

Source: EssDocs
Benefits of Smart eCO on Blockchain

1. **Prevent forgery and fraud**
   Using blockchain technology to prevent the reproduction and modifications to data of a digital asset.

2. **Low cost of implementation**
   No subscription fees and ease of implementing tamper-proof printing.

3. **Embedded smart certificate capabilities**
   Fingerprinting, dynamic certification, product linking.

4. **Simple and convenient verification of authenticity**
   Intuitive verification process through scanning of QR code.

5. **Distributed database without the dependence on a single source of truth**
   Improving trust through a decentralized infrastructure, creating a single source of truth. 

Chambers → Exporter

Smart Certificate → Computer/Mobile Devices

Importer/Other Users
Certificates of origin

Singapore International Chamber of Commerce launches world’s first blockchain-based e-Certificate of Origin

And more...

Kenya
United Kingdom
South Korea
Australia
UAE/Dubai
US
NAFTA/CAFTA Proof of Concept – To “test the feasibility of the technology for receiving CO data and conducting FTA origin certifications”

Benefits found:

→ Almost instantaneous communications between CBP and trade, improved documentation of receipt, and expedited processing for CBP.

→ Other benefits included:
  Eliminated manual documentation requirements and duplicative data entry;
  Potential issues captured early on;
  Full data (CO, entity data, etc.) received with initial submission of entry summary;
  Enhanced targeting;
  Easier access to importer/more direct communication; and
  Easier access to back-up documentation when required.
Great potential to reduce costs

... but technology is only a tool

Source: Steemit
Key issues to address

- Recognition of e-signatures & e-documents
- Need for a cross-border approach
- Regulatory issues (e.g. GDPR)
- Legal recognition of blockchain transactions
- Challenges for customs: multiple nodes / interoperability
Beyond cost reductions

• Can one day Blockchain replace certificates of origin?

→ Would require:
  - End-to-end supply chain visibility
  - Agreement on key data elements
• Great potential

• Need to develop the right policy environment to promote blockchain use

• Need for an international approach
Thank you for your attention!

To know more:

**PUBLICATIONS**

- Can Blockchain revolutionize international trade?

**EVENTS**

- 2018 Blockchain research workshop: [https://www.wto.org/english/res_e/reser_e/workshop_blockchain_271118_e.htm](https://www.wto.org/english/res_e/reser_e/workshop_blockchain_271118_e.htm)

- 2019: Global Trade and Blockchain Forum [https://www.wto.org/english/res_e/reser_e/workshop_blockchain_21219_e.htm](https://www.wto.org/english/res_e/reser_e/workshop_blockchain_21219_e.htm)