The next big step: Blockchain implementation and its’ effect on consumers’ experience

London, 19 February 2020
# Logistics (r)evolutions

<table>
<thead>
<tr>
<th>Value Chain and Logistics:</th>
<th>1.0</th>
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<td><strong>Fragmented</strong></td>
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<td>Primarily managed locally</td>
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<td>“Birth” of the industry post World War II</td>
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<td><strong>International expansion</strong></td>
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<td>Cross-border trade and globalization.</td>
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<td>The rise of the container</td>
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<td><strong>Specialization and consolidation</strong></td>
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<td>Companies specialize in certain fields followed by consolidation efforts;</td>
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<td>Emergence of express delivery services, 3rd / 4th party logistics providers (3PL/4PL) and track and trace</td>
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<td><strong>Synchronized and integrated</strong></td>
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<td>Platforms for certain activities; integration of suppliers</td>
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<td>Internet of things systems, marketplaces (5PL), initial warehouse automation and automated port terminals</td>
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<td><strong>Intelligent and automated</strong></td>
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<td>Data and artificial intelligence supports further automation and decentralization of value chains</td>
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<td>Networks of connected vehicles and sustainable platform logistics (6PL)</td>
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Getting technical

Blockchain is a shared, public ledger of records or transactions that is open to inspection by every participant but not subject to any form of central control.

In technical terms, blockchains are peer-to-peer distributed networks that are cryptographically secure, append-only, tamper-resistant (extremely hard to change) and updateable only through peer consensus. Blockchain technology and distributed ledger technology (DLT) are often used interchangeably but strictly speaking, blockchain is an architectural subset of DLT and shares the same principle of enabling distributed control over the evolution of data without a central party.
Blockchain work at the World Economic Forum

- How Technology Can Unlock the Growth Potential along the New Silk Road (2017)
- Trade Tech – A New Age for Trade and Supply Chain Finance (2018)
Different ways to handle trust

**Today: Individual ledger** - Each party holds their own ledger
- You trust known parties and transactions are stored in individually controlled ledger
- Direct interactions without middleman
- One to one connection

**Today: Centralised Ledger** - A middleman trusted by both parties bridge trust between parties unknown to each other
- The middleman controls the interaction history, identities and interface
- The middleman controls the value chain
- Great if the business eco-system can agree on a trusted middleman

**Blockchain: Distributed ledger** - Independent blockchain nodes verifies legitimacy of transaction and stores the transaction in a shared immutable ledger
- What I see is what you see - Remove duplication, inconsistency and the need for reconciliation of records
- The “business eco-system” controls the value chain
Blockchain’s single value proposition is Decentralization

- If you are not replacing a trusted third party or preventing one from emerging do not use blockchain
- But, blockchain is also the incumbents’ protection against disintermediation by digital platforms

Key take away: Blockchain offers a competitively, politically and commercially neutral alternative to centralized platforms

You can get equally security levels on centralized solutions

But, the emergence of blockchain has made it possible to build decentralized solutions with a security level that matches centralized technologies

Blockchain does hardly offer additional security for central solutions but equal security for decentral solutions

“Blockchain applications are providing **new ways of exchanging data in a secure manner** and may change the way information is shared. Industry consortia are recognizing the value of blockchain beyond cryptocurrencies and are building platforms that intersect with international supply chains, some focussed on transport logistics, some on trade finance, some on goods provenance and traceability [...] recording data such as commercial invoices, consignment and shipping data, container logistics information and bills of lading as well as permits and declarations for national regulators”. In a few rare cases, a single platform might hold all the authoritative data about a single consignment and its related commercial and logistical data, [...] however, this most likely the exception [...] therefore making interoperability and discoverability a challenge”.
Implementation

13 areas to be worked through when implementing blockchain

<table>
<thead>
<tr>
<th>Ecosystem</th>
<th>Consortia Set Up</th>
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<tbody>
<tr>
<td>Digital Identity</td>
<td>Interoperability</td>
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<td>Security</td>
<td>Blockchain Structure</td>
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<td>Data Protection</td>
<td>Personal Data and GDPR</td>
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<td>Emerging Trends &amp; Development</td>
<td>Data Integrity</td>
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<tr>
<td>Tax, Risk, Audit</td>
<td>Legal &amp; Regulatory Compliance</td>
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Source: World Economic Forum
The next wave of innovation will come from turning attention outward into the business ecosystem.

Digitization is about optimizing the business ecosystem.

A business ecosystem enables various parties to expose their capabilities and leverage the capabilities of others, driving higher levels of business value.

Managers need to think beyond company boundaries about ecosystem achievability when considering which value levers to pursue and consequently which stakeholders to involve.

Blockchain allows to building a shared platform.

Ecosystems can derive value from blockchain in 3 categories with multiple underpinning levers: cost efficiency, product sustaining innovation and market creation.

Source: World Economic Forum
Case 1: Several components can drive digitization across the supply chain ecosystem following the concept of GTID

1. Digital global trade identity (GTID)
   Reducing waste through eliminating thousands of entries to be maintained in different systems and countries

2. Global trade single window (TSW) interoperability platform
   Leverage existing national TSWs by including cross-border electronic data exchange of all information at limited cost

3. Platform system for global shipping
   A system that brings end-to-end supply chain visibility and helps to digitize and automate paperwork filings for imports/exports

4. Blockchain/Distributed Ledger Technology
   The technology offers neutrality opportunities but its feasibility for global interoperability requires validation

Source: Trustworks
Principles for an inclusive digital global trade identity (GTID)

GTID requires global collaboration, based on principles designed for neutrality and inclusivity. The World Economic Forum GTID White Paper recommends a model that supports these principles. A neutral partner such as the Forum can ensure:

- A digital Global Trade Identity infrastructure where business and governments can manage their own identity without relying on a third party
- A system that allows each party to present the verifiable identity credentials they prefer, while the receiving party can use its own internal business rules and regulations for validating the trustworthiness of the presented identity credentials
- A GTID that supports businesses of any size to enable inclusive global trade
- That no single entity controls important components of the GTID, protecting it from political influence

Country investments are assumed to be very limited

GTID supports also countries with a low digitization level

Case 2: Digital letter of credit

INITIATION
Letter of credit (LC) creation and transmission to all participants on the same day

1. Exporter sends invoice and his account details to the importer
2. Importer prompts Bank A to issue LC, via an app or online (confirms with his DL password and exporter’s account details)
3. Bank A checks importer’s credit worthiness and creates an LC as a smart contract on the DL, linked to both the importer and exporter via their account details
4. Both exporter and Bank B are notified when the LC is created on the DL

SHIPPING AND PROCESSING
Transmission of shipping proof to all participants in real time

5. Importer
6. Exporter sends goods via ShipCo D, providing exporter’s account details
7. ShipCo D updates LC on DL with validated proof of shipping, using its DL private password, triggering execution of smart contract conditions (e.g., partial payment)
8. ShipCo C triggers DL status update when goods arrive

SETTLEMENT
Simultaneous validation of shipping proofs and payment via distributed ledger platform

9. Bank A and Bank B instantly receive shipping proof update from the DL, and LC’s status is automatically updated based on smart contract conditions
10. Importer, confirms payment on app or online account via his DL password
11. Seller gets notified that he has received the payment on his account
12. ShipCo C releases good to Importer, once status on DL states importer has fulfilled all obligations (e.g. payments)

Note: Account details refer to DL user’s public key and password refers to DL user’s private key
Source: Bain & Company
Case 3: Belt and Road Initiative (BRI)

1. New market opportunity
   - Digitization helps SMEs to access new markets and expect to boost GDP in BRI region by ~4%-7%
   - SMEs will use real-time market data to create market intelligence
   - Blockchain (DLT) has the potential to reduce counterparty risk and minimize fraud

2. Sharing economy
   - Digitization brings more sharing economy opportunities in knowledge and assets
   - Blockchain (DLT) will provide improved visibility into assets/liabilities and reduce information asymmetry

3. Talent demand in digitization
   - Up to ~0.5 Mn new employment opportunities will be created along BRI routes due to digital skills demand
   - New career paths for young people will emerge especially for countries that suffer with high unemployment

4. FDI opportunities
   - Information/IT services is the fastest growing segment in China's outward FDI flow in 2010-15
   - Increased FDI will promote greater financial transparency and economic stability

Source: Bain & Company)
Case 4: Decentralized project management

- Creating a recognised single version of the truth, subject of privacy laws

- DLT ensures that the project data can be trusted, e.g. how much time is spent on tasks, to capture benefits

- Although the **same can be achieved with a centralized cloud-based project management suite**, there is a risk of losing some of that data due to downtime from the cloud host or tampering

- Blockchain creates data redundancy thanks to the availability of multiple nodes — in case your node is temporarily down as a result of transitioning your software and data

Based on a report by McKinsey & Co large capital projects typically cost 80% more than budgeted and run 20 months late. Little is known about whether they hit the other (policy) objectives. Applying blockchain to a large-scale commercial real-estate development project in the Amsterdam’s harbour

Blockchain-enabled project management system to make the building development life cycle more efficient focusing on registering transactions at legally binding moments, where accuracy and an audit trail are essential

This includes timely information, unambiguous communication, and fewer mistakes

Discipline is ensured through evenly distributed incentive to register facts on-chain: Either you won’t get what you ordered, or you won’t get paid

Stakeholders have more time to spend on discussing creative design and building method options

Case 5: HerenBouw harbour real estate project

Case 6: Briq secure construction documentation

- Capture and secure a construction project’s documentation in a blockchain ledger that parties can navigate and hand over to the owner as a deliverable.
- “Digital twin” of a new office construction, with a room-by-room inventory of every asset so that each product or specification can be found in a building.
- This includes paint colours, ceiling fixtures, LED bulbs, door hardware — plus manuals, warranties, and service life in a countdown clock that building owners can monitor.
- 95% of building construction data gets lost on handover to the first owner.
- Any improvements and refurbishments to the building can be documented; building owners get a living ledger of everything that has happened with the building — from a construction standpoint.

Case 7: Platform system for global shipping

Ambition: Bringing to market a platform system for global shipping connecting the entire supply chain ecosystem

1 Shipping information pipeline
Will provide **end-to-end supply chain visibility** that enables all actors involved in a global shipping transaction to securely and seamlessly exchange shipment events in real time

2 Paperless trade
Will **digitize and automate paperwork filings** for the import and export of goods by enabling end users to securely submit, stamp and approve documents across national and organizational boundaries
Case 8: Automation through smart contracts

- A **smart contract is a code that runs atop of a blockchain**. It contains specific condition parties agreed. Once those conditions are met, the smart contract will automatically execute or implement itself.

- The project owner could set smart contracts that will only notify the **construction** crew to come on the scheduled date after the concrete is delivered to the site. Of course payments are executed as well.

- If the concrete is not delivered, then the crew subcontractor would not need to commit to that scheduled date. This reduces idle labor and, in turn, help control the budget of the project. Likewise, the subcontractor can deploy resources elsewhere.
Blockchain impact on consumers

1. **Product authentication**
   Blockchain’s digital ledger record creates a chain-of-custody and provides the consumer with a complete product history.

2. **Supply chain visibility**
   Blockchain provides a picture of the supply chain network, in real time, and allows producers to track raw materials end-to-end – from sourcing till the arrival of final products.

3. **Product transparency**
   A recent study shows that 54% of consumers want as much information about their products as possible. Consumers can verify the entire life-cycle of a product.

4. **Warranty management**
   Blockchain provides consumers with a simple way to track, maintain, transfer, and make claims on their warranties.

Source: Blockchain: 4 Ways it Benefits Consumers [https://www.business2community.com/strategy/blockchain-4-ways-benefits-consumers-02018517](https://www.business2community.com/strategy/blockchain-4-ways-benefits-consumers-02018517)
### 4IR technologies come in stacks

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<th>New technologies</th>
<th>Pre-transaction</th>
<th>Transaction processing</th>
<th>After transaction</th>
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<tr>
<td><strong>Product selection</strong></td>
<td><strong>Data entry</strong></td>
<td><strong>Workflow management</strong></td>
<td><strong>Document check</strong></td>
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<tr>
<td><strong>Optical character recognition (OCR)</strong></td>
<td>Text recognition from trade documents to minimize data entry</td>
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<td><strong>Artificial intelligence (AI)</strong></td>
<td>Intelligent and personalized marketing: Offer new product sales or client promotions based on insights on clients’ needs and behaviors</td>
<td>Populate fields with text extracted from documents (integrate OCR with transaction process)</td>
<td>Validate/reduce data with cross-references, machine learning</td>
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<td><strong>Advanced analytics (AA)</strong></td>
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<td>Contextual filtering: Identify suspicious or unusual activity and block suspicious transactions based on predictive indicators</td>
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<td><strong>Robotic process automation (RPA)</strong></td>
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<td><strong>Internet of things (IoT)</strong></td>
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<td><strong>Distributed ledger technology (DLT)</strong></td>
<td>Replace documentation, checks, data entry, validation, with single digital record</td>
<td>Real time verification and reconciliation; workflow executed as per smart contract conditions; replace payment and funds transfer with cryptocurrency</td>
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Source: Bain & Company
Thank you