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

London, 19 February 2020

Logistics (r)evolutions

Value Chain and Logistics:

| 1.0	2.0	3.0	4.0	5.0
Fragmented	**International expansion**	**Specialization and consolidation**	**Synchronized and integrated**	**Intelligent and automated**
Primarily managed locally	Cross-border trade and globalization.	Companies specialize in certain fields followed by consolidation efforts;	Platforms for certain activities; integration of suppliers	Data and artificial intelligence supports further automation and decentralization of value chains
"Birth" of the industry post World War II	**The rise of the container**	**Emergence of express delivery services, 3rd / 4th party logistics providers (3PL/4PL) and track and trace**	**Internet of things systems, marketplaces (5PL), initial warehouse automation and automated port terminals**	**Networks of connected vehicles and sustainable platform logistics (6PL)**

What is blockchain

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.

Distributed Database

Distributed Ledger Technology

Blockchain

Source: World Economic Forum
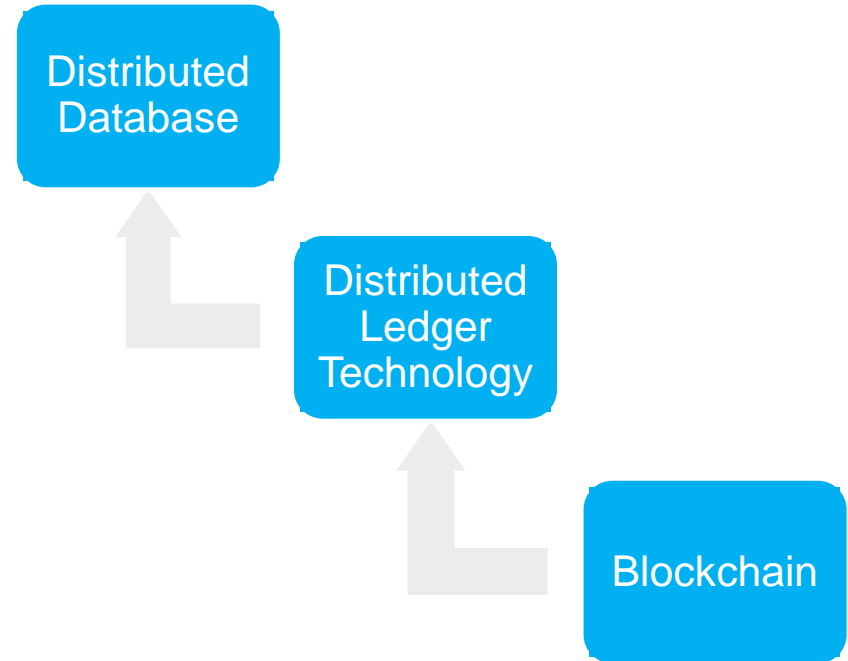
Blockchain work at the World Economic Forum

- 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)
- Inclusive Deployment of Blockchain for Supply Chains: Part 1 – Introduction (2019)
- Inclusive Deployment of Blockchain for Supply Chains Part 2 – Trustworthy verification of digital identities (2019)
- Inclusive Deployment of Blockchain for Supply Chains: Part 3 – Public or Private Blockchains – Which One Is Right for You? (2019)
- Inclusive Deployment of Blockchain for Supply Chains: Part 4 – Protecting Your Data (2019)

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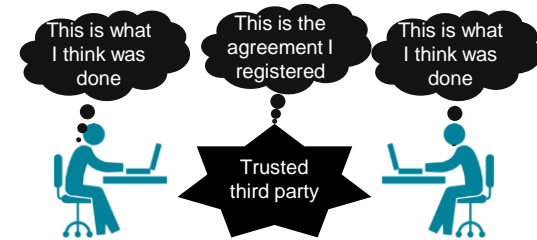
Blockchain: Distributed ledger - Independent blockchain nodes verifies legitimacy of transaction and stores the transaction in a shared immutable ledger
- What I see is what you see - Remove duplication, inconsistency and the need for reconciliation of records
- The "business eco-system" controls the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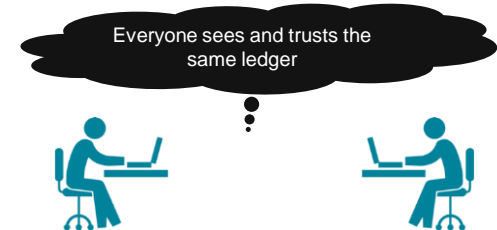
Blockchain's single value proposition is Decentralization

- 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 disintermedation by digital platforms

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

UBER
Largest taxi service owns no taxi vehicles.

facebook
Largest media company creates no content.

You Tube
Largest entertainment company produces no content.

Alibaba.com
Largest global retailer has no inventory, and no stores.

Google
Leading software & services brand monetizes people, not software.

airbnb
Largest hospitality company owns no real-estate.

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

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

UN/CEFACT

"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 impemeting blockchain

Ecosystem	Consortia Set Up	Consortia Governance
Digital Identity	Interoperability	
Security	Blockchain Structure	
Data Protection	Personal Data and GDPR	
Emerging Trends & Development	Data Integrity	
Tax, Risk, Audit	Legal & Regulatory Compliance	

The rise of the ecosystem

- 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

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

Ecosystem platforms

Partners

Customers

Employees

Ecosystems Platform

Customer Experience Platform

Data and Analytics Platform

Information Systems Platform

IoT Platform

Things
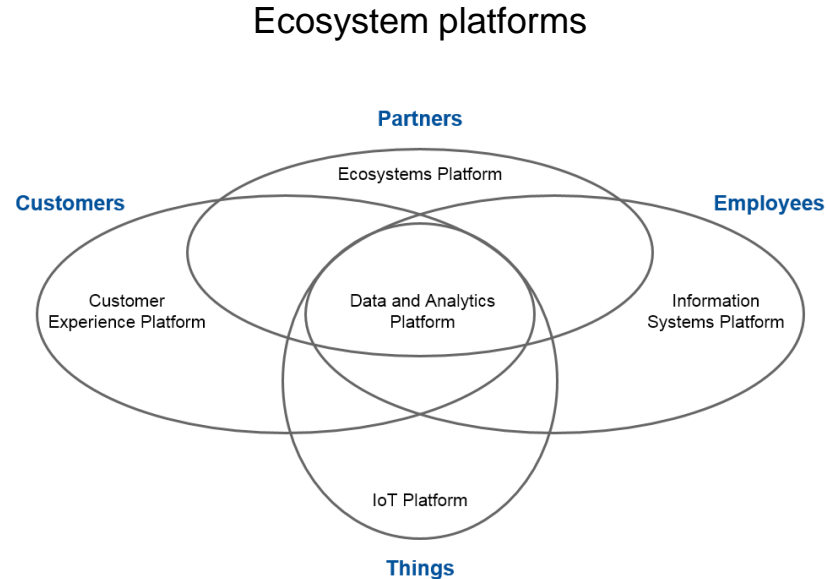
Principles for an inclusive digital global trade identity (GTID)

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**
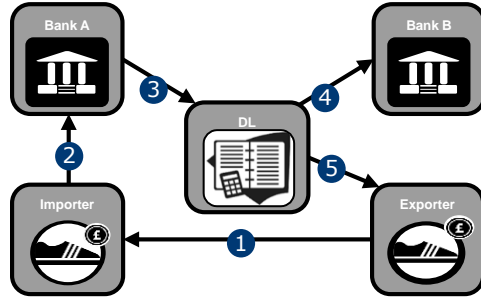
Country investments are assumed to be very limited
GTID supports also countries with a low digitization level

Principles for an inclusive digital Global Trade Identity

Global trustworthiness — Any government and business should be able to verify the trustworthiness of a legal entity's GTID and allow each legal entity to have internal rules for trust validation.

Support any digitization level — Countries and businesses can benefit from the GTID irrespective of their level of technology and digitization readiness

No lock-in — There should not be a lock-in to any one entity for any important system functions or processes. There cannot be a single entity controlling critical parts of the GTID.

Viable and sustainable — The system is sustainable as a business and is resilient to shifting political priorities.

Enable participation — The model should enable all types of companies, including small and medium-sized enterprises, to more effectively participate in international trade and enhance their competitiveness

Self-managed — Each government and business must fully manage its own identity; e.g. it will not be politically acceptable to have a third party managing a government's GTID.

Independence of jurisdiction — Each jurisdiction decides how much trust they will put into each GTID.

Cost-effective — The required investment must be affordable for any country irrespective of its economic development and for any business irrespective of its budget and technological readiness.

Politically neutral — The infrastructure must be politically neutral and support national policy frameworks, meaning that no single country/region/organization can control the infrastructure.

Competitively neutral — The GTID model should not give a competitive advantage to any one organization.

Figure 1

Case 2: Digital letter of credit

INITIATION

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

SHIPPING AND PROCESSING

Transmission of shipping proof to all participants in real time

SETTLEMENT

Simultaneous validation of shipping proofs and payment via distributed ledger platform

Questionable whether **Bank B's checking is still required**

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.
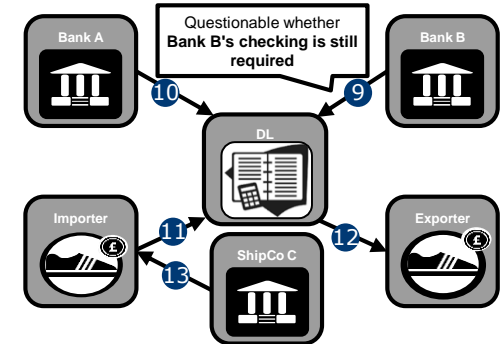5. Both exporter and Bank B are notified when the LC is created on the DL

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

9.
10. 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

11. Importer, confirms payment on app or online account via his DL password

12. Seller gets notified that he has received the payment on his account

13. 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

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

Case 5: HerenBouw harbour real estate project

- Based on a report by McKinsey & Co large capital projects typically cost 80% more than budgeted and run 20 months late. Little is know 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- focussing 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 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
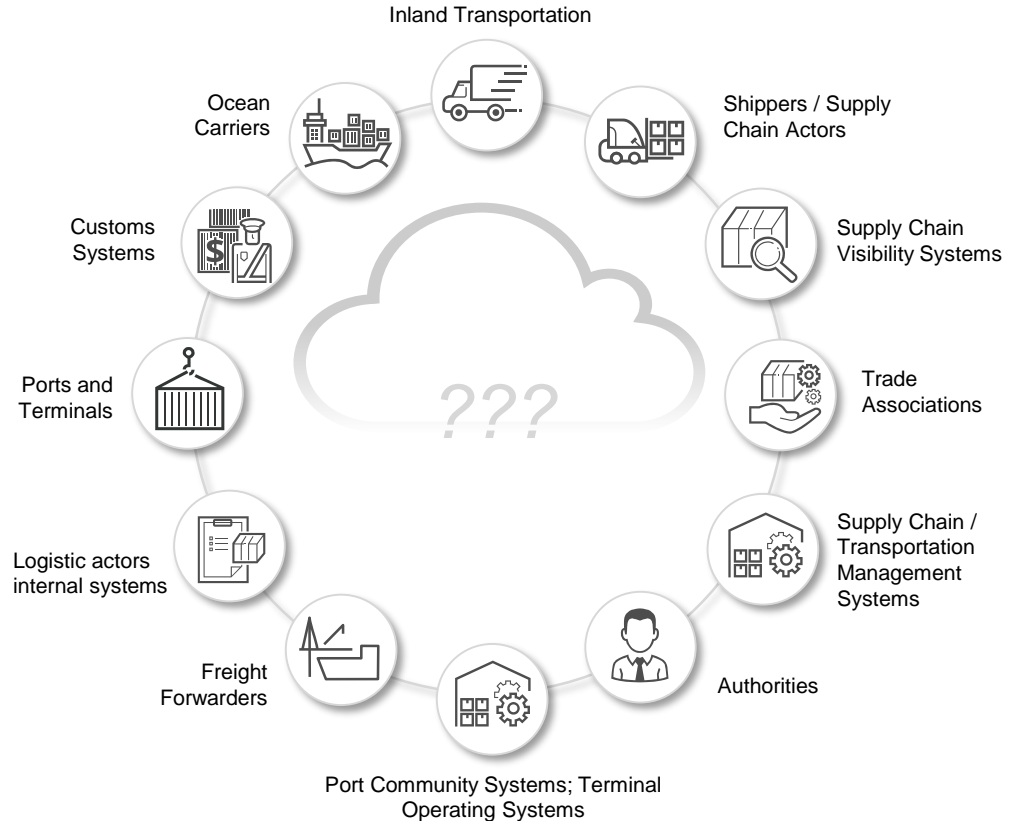
Case 7: Platform system for global shipping

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

Inland Transportation

Ocean Carriers

Shippers / Supply Chain Actors

Customs Systems

Supply Chain Visibility Systems

Ports and Terminals

Trade Associations

???

Logistic actors internal systems

Supply Chain / Transportation Management Systems

Freight Forwarders

Authorities

Port Community Systems; Terminal Operating Systems

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

4IR technologies come in stacks

New technologies	Pre-transaction		Transaction processing			After transaction	
	Product selection	**Data entry**	**Workflow management**	**Document check**	**Compliance check**	**Problem resolution**	**Client mgmt. information system**
Optical character recognition (OCR)		**Text recognition** from trade documents to minimize data entry		**Check for completeness of documents** based on transaction/ product type	**Scrape documents** for AML keyword hit		
Artificial intelligence (AI)	**Intelligent** and **personalized marketing**: Offer new product sales or client promotions based on insights on clients' needs and behaviors	**Populate fields** with text extracted from documents (**integrate OCR with transaction process**)		**Validate/remed-iate data** with cross-references, machine learning	**Contextual filtering:** Identify suspicious or unusual activity and block suspicious transactions based on predictive indicators	**Intelligent problem resolution:** Track individual error rates and flag users in need of remediation	
Advanced analytics (AA)		**Enhanced KYC** (e.g., web scrape)	Efficient process and productivity **monitoring, and** predictive analytics to **detect patterns**				Reports enable enhanced **operational and strategic decisions**
Robotic process automation (RPA)			**Bridge data flow and communication:** Integrate data from different systems into single interface				
Internet of things (IoT)			**Ease of tracking** goods and documents; **dynamic pricing and financing** triggered by shipment events; **automated payments release** based on "smart contracts"			**Track document locations:** Track goods (location, volume, quality)	
Distributed ledger technology (DLT)	Create smart letter of credit as **smart contract** on distributed ledger - auto notifications	Replace documentation, checks, data entry, validation, with **single digital record**	Real time **verification and reconciliation;** workflow executed as per smart contract conditions; replace payment and funds transfer with **cryptocurrency**				

Thank you