Blockchain Applications

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Blockchain — New Architecture

- Peer to peer network on top of the internet

- Businesses have <u>no</u> master ledger of all their activities.
  Records are distributed across units; How to reconcile?
  Stock Transaction: Settlement- Ownership transfer of the stock.
                            Many Intermediaries; Each takes a cut!

- Blockchain adoption — Novelty/complexity — Important Factors
  Core Principles — Distributed Database, Peer-to-peer transparency,
                            Irreversibility and computational logic.

- Start with single-use applications!

Reference: Iansiti and Lakhani(2017): The Truth About Blockchain,
Harvard Business Review

Supply Chain Management

Blockchain – May require a closed, private, permissioned with limited players.

Major Entities – Actors (Manufacturers, Retailers, Customers)

          – Certifiers

          – Standards Organization (Fairtrade etc)

          – Registrars (providing unique identifies to the actors)

Five Key data points – Nature of the Product

          Quality

          Quantity

          Location

          Ownership

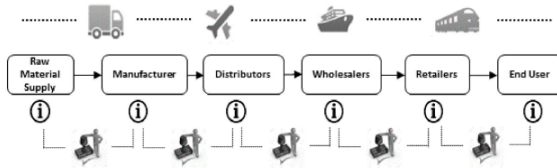Smart contract – Involves Network interaction between actors

          – certification

          – can affect production process
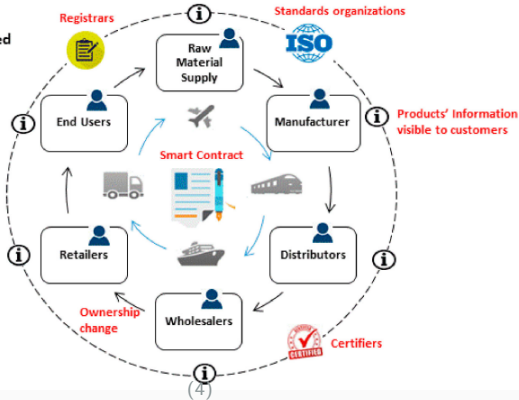
Sustainable supply chains

Reference: Saberi, S., Kouhizadeh, M., Sarkis, J., & Shen, L. (2019). Blockchain technology and its relationships to sustainable supply chain management. International Journal of Production Research, 57(7), 2117-2135.

Supply Chain

Raw Material Supply → Manufacturer → Distributors → Wholesalers → Retailers → End User

Blockchain-based Supply Chain

Registrars

Standards organizations — ISO

Raw Material Supply

End Users

Manufacturer

Products' Information visible to customers

Smart Contract

Retailers

Distributors

Ownership change

Wholesalers

Certifiers

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Propositions for Future Work

P1: Implementing blockchain technology in supply chains decreases opportunistic behaviour.

P2: Blockchain technology facilitates trading in a trustless environment. This concept is likely to transform the current trust-based theories in supply chain management.

P3: Supply chain governance structures characteristics need to be further evaluated for effectiveness in understanding blockchain-based supply chains.

P4: Information processing theory play a more important role in understanding the blockchain-based supply chain. Information processing theory needs further advancement to help evaluate and understand blockchain-based supply chain phenomena and nuances.

P5: Operational relationships, due to transparency, visibility, smart contracts, and distributed relationships of blockchain technology will have improved performance outcomes and not necessarily require strategic formal coordination and supply chain integration.

P6: In order to support the development and understanding of blockchain technology in the supply chain, interdisciplinary investigations are needed to build theories and designs for blockchain technology.

Corporate Governance and Blockchains

- Greater transparency of ownership
- Ledger of call transactions; is this viable? What if a manager sells his stocks?
- Improvements in Liquidity
- Impact on institutional investors
- Impact on Managers; no back-dating of payments
- Impact on Microstructure; investor identity?
- Voting in Corporate Board Elections
- Real Time Accounting
- Governance of Blockchains!!
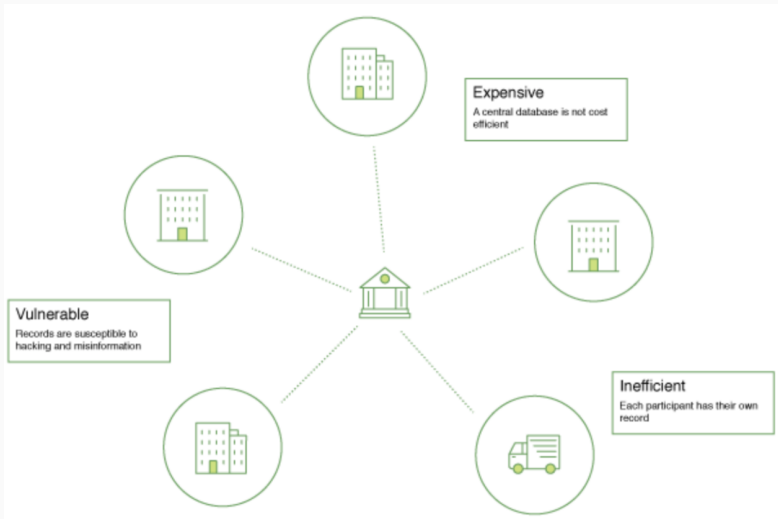
Figure 1: Business networks today.

Figure 2: Optimal business networks.

Blockchain in the Industry

Finance

- Cross currency payments
- Trade Execution

Public Sector

- Asset registration
- Citizen identify

Retail

- Supply chain
- Loyalty programs
- Information sharing

Insurance

- Medical history
- Claim processing
- Claims file

Manufacturing

- Logistics
- Provenance
- Maintenance logging

Example: Finance

Oct 18, 2017: **Bank Consortium to Launch Joint Venture for Blockchain Trade Platform** (Source: Coinbase)
To ease European domestic cross-border trade. The framework will connect a buyer, seller, banks and intermediaries to simplify transaction management and tracking.
Participating banks:

- Banco Santander
- Deutsche Bank
- HSBC
- KBC
- Natixis
- Rabobank
- Societe Generale
- UniCredit

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Example: Supply Chain

Blockchain Food Safety Alliance

Walmart is using company App groceries can be traced back to the supplier. This is meant to reduce foodbourne illness and reduce recalls.

Currently Walmart is using a pilot version of the technology.

Walmart teamed up with IBM, Nestlé, Dole, Tyson Foods, Kroger to launch Blockchain Food Safety Alliance.

Example: Finance

Oct 16, 2017: **JPMorgan Launches Interbank Payments Platform on Quorum Blockchain** (Source: Coinbase)

Participating Banks:

- JP Morgan
- ANZ
- RBC

Quorum is Ethereum-based blockchain. Improvements include:

- Private
- Permissioned
- Data is encrypted
- Relevant data is sent to relevant peers only (this is the regulatory requirement).

Number Of transactions Per Day
Source: blockchain.info

BITSTAMP   COINBASE   ITBIT   KRAKEN   MTGOX