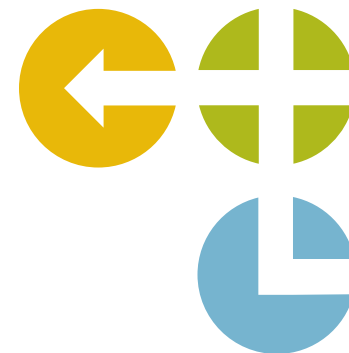


MIT Center for Transportation & Logistics

Blockchain in Supply Chains

Dr. Inma Borrella, Mr. Ken Cottrill, Mr. Jim Rice

Blockchain in Supply
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MIT Center for
Transportation & Logistics

Agenda

- Brief introduction to MIT CTL
- Understanding blockchain
- Why all the excitement?
- Application to supply chains
- Challenges
- The way forward

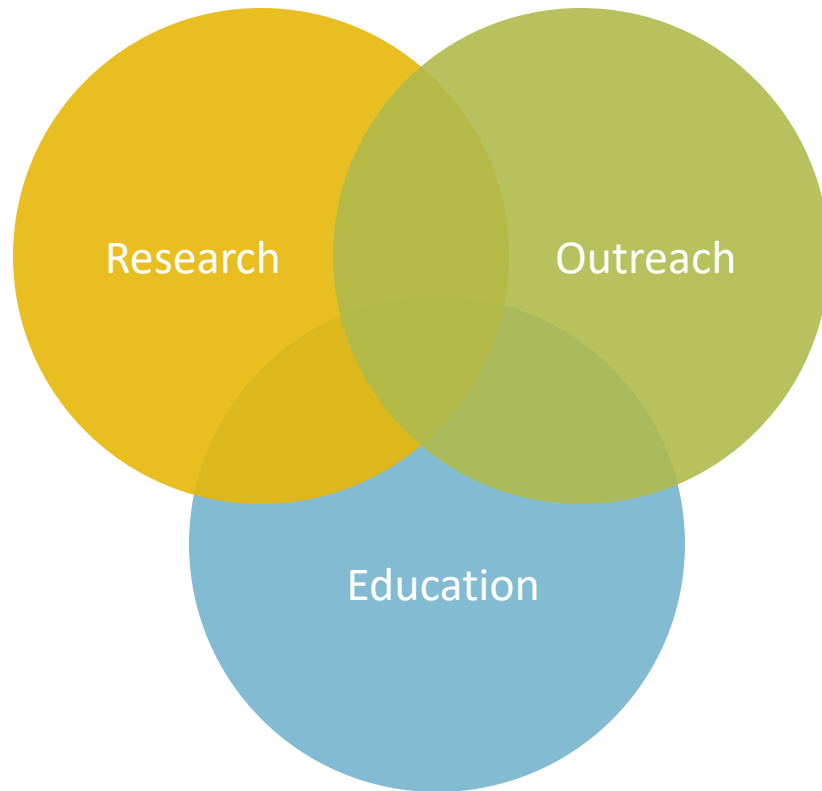
This presentation was shared during a webinar organized by MIT CTL on 7 June 2018 for a practitioners audience.

The purpose of this webinar was to provide a general overview of blockchain technology and discuss some potential applications to supply chain management.

AN INTRODUCTION TO MIT CTL

WHAT IS MIT CTL

“Create supply chain innovation and drive it into practice.”



- \$15M Research Budget
- 15 Full-Time Researchers
- 20+ Active Research Projects
- 60+ Faculty & Researchers Across MIT

- 4-Tier Partnership Model
- 50+ Member Companies
- Industry-Driven Workshops & Symposia

- Supply Chain Management Program (Residential & Blended)
- MicroMasters in Supply Chain Management
- Executive Education
- PhD in Logistics

MIT GLOBAL SCALE NETWORK



- 6** Centers of Excellence
- 10+** Educational Programs
- 80+** Researchers & Faculty
- 150+** Corporate Partnerships
- 170+** Current Students
- 1000+** Alumni Worldwide

1 Global Network

MIT CENTER FOR TRANSPORTATION & LOGISTICS (MIT CTL)

- Location: Cambridge, MA
- Founded in 1973
- Education:
 - Residential and Blended Master's Programs offer 2 degrees:
 - Master of Applied Science in Supply Chain Management
 - Master of Engineering in Supply Chain Management
 - PhD Program
 - MicroMasters Program in Supply Chain Management
 - 3 Continent Program



MIT CTL CORPORATE PARTNERS



UNDERSTANDING BLOCKCHAIN

A definition of blockchain

Blockchain is

a **data structure**,

that stores data **chronologically** in **blocks** which are **chained** together in a continuously growing series,

and operates as a **distributed digital ledger** where participants must reach **consensus** to record any new input.

Timeline

- 2008 White paper by Satoshi Nakamoto, “Bitcoin: A Peer-to-Peer Electronic Cash System”
- 2009 Bitcoin released, Hal Finney completes 1st bitcoin transaction for 10 BTC
- 2011 First use of the term ‘blockchain’
- 2014 Blockchain 2.0
- 2015 Ethereum platform and programming language running on a blockchain, smart contract applications
- 2015 Hyperledger project announced by Linux to advance industry collaboration using blockchains and DLs permissioned blockchains
- 2016 Growing number of blockchain pilots in Supply chain

WHY ALL THE EXCITEMENT?

Potential Capability, Leverage, Appealing Philosophy....and Hype

Processing capability

Near real-time access to data (after verifying)

Near tamper-proof

Increasingly low cost to access

Enable leveraging other technologies

Smart contracts

IIoT

Radical underlying philosophy

Distributed consensus

Open source

Transparency

Community



TECHNOLOGY

The Truth About Blockchain

by Marco Iansiti and Karim R. Lakhani

FROM THE JANUARY-FEBRUARY 2017 ISSUE

“Blockchain is not a disruptive technology, which can attack a traditional business model with a lower-cost solution and overtake incumbent firms quickly.

Blockchain is a foundational technology: It has the potential to create new foundations for our economic and social systems.”

Blockchain as just one component in a system of methods and innovations that disrupts?

APPLICATION TO SUPPLY CHAINS

Blockchain for business

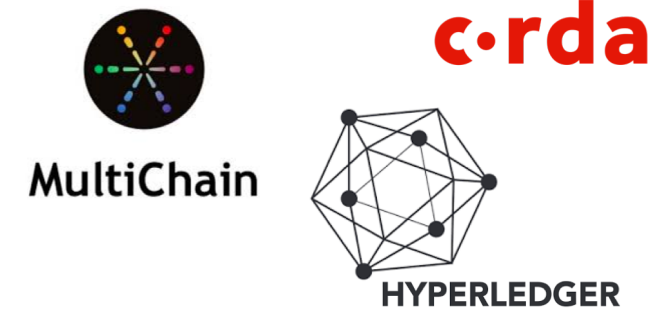
Elements

- **Network** – businesses and organizations that share transactions and information
- **Assets** – not only money (physical assets need to be digitized)
- **Ledger** – to record relevant data (but maintaining confidentiality)

Private or permissioned blockchains

- Smaller private network
- Participants need to be authorized
- More efficient

open-source blockchain platforms



blockchain as a service



Blockchain capabilities

Consolidate

Data consolidation can speed up processing time in supply chains.

E.g. Bills of lading

Verify

Verification of product or process characteristics can take less time and be more effective.

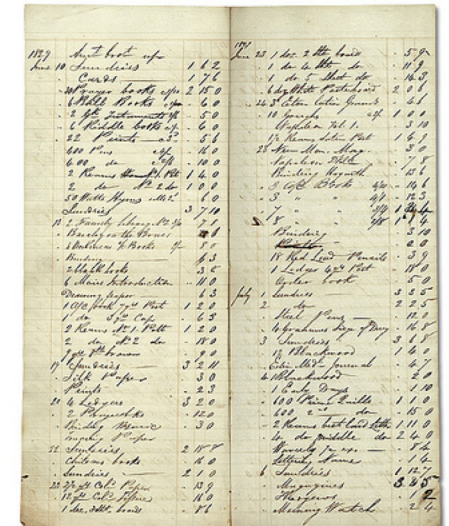
E.g. Fight counterfeit

Visualize

Visualization of supply chain real-time situation can lead to process improvement and quick identification of issues.

E.g. Real-time optimization

**A single version
of the truth**



Application 1 - Traceability

Oct. 24, 2017

'Fish Fraud' Is Rampant.

THE WALL STREET JOURNAL

May 2, 2018

E. Coli Outbreak Turns Deadly With a Fatal Case in California

The New York Times

Aug 3, 2015

U.S. Firms Struggle to Trace 'Conflict Minerals'

THE WALL STREET JOURNAL

Oct 20, 2017

Daimler hits Amazon with new lawsuit over 'counterfeit' auto parts

REUTERS

June 20, 2011

Managing Risk in Booming 'Global Bazaar' of Food and Drugs

The New York Times

WHY IS IT RELEVANT?

Counterfeit and fraud

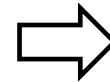
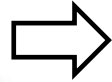
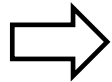
Health and safety hazards

Quality assurance

Intangible attributes

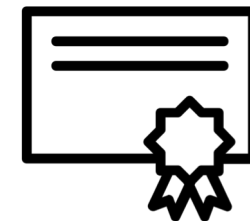


Diamonds



TRACR
DE BEERS

Historical ledger of the diamond from mine to finger



- To underpin the Kimberly Process
- To reduce synthetic stones fraud

PROVENANCE

Registration of a new fish



unique ID



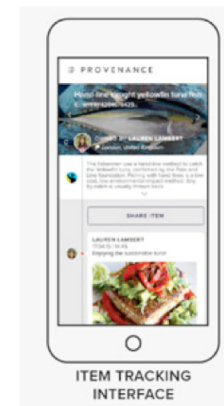
Transformation of the product

Smart contract for mass balance check



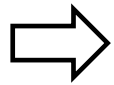
Blockchain as an audit layer on top of data management system

Product history available to end consumer

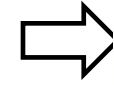
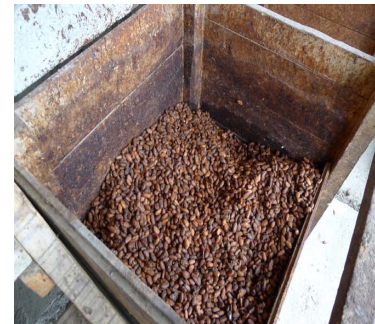
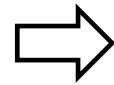




SUPPLY CHAIN TRANSPARENCY



Farmer
Co-op



Application 2 – International trade

WHY IS IT RELEVANT?

Automate unwieldy
paper documentation

More secure, faster
transactions

Potential to cut costs

14 May 2018

HSBC says it's made the world's first trade finance transaction using blockchain

CNBC.com

APRIL 19, 2018

250 Corporates Join ICICI's Trade Finance Blockchain Platform

CCN

May 15, 2018

FedEx is Testing Blockchain Tech for Critical Cargo Shipments

CCN

JANUARY 16, 2018

Maersk, IBM to launch blockchain-based platform for global trade

Reuters

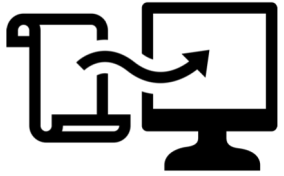


HSBC Example

- Shipment of soya beans from Argentina to Malaysia for Cargill, involving HSBC and ING
- Claimed to be world's first **commercially viable** trade transaction using blockchain
- First time a **single blockchain platform** used; not multiple systems
- Used Corda platform developed by consortium of some 100 banks
- Exchanged info needed for LOC in **24 hours**
- Traditional LOC paper trail takes **5 to 10 days**
- All parties linked on the platform so no need for paper reconciliation
- Future possibilities: execute payment via smart contract/IoT signals

CHALLENGES

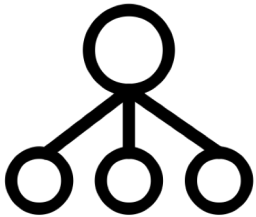
Challenges



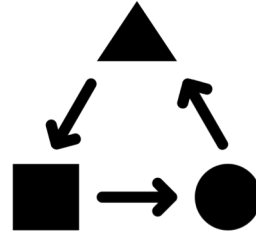
Digitization and digitalization
Human error/mischief



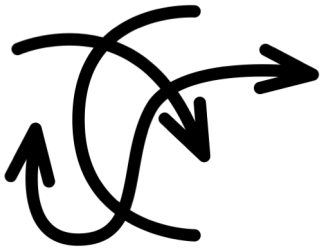
Creating the ecosystem
Incentives to participate



Governance
Data confidentiality
Data ownership



Interoperability
Transaction cost and speed



Complexity
Lack of understanding
Lack of standards

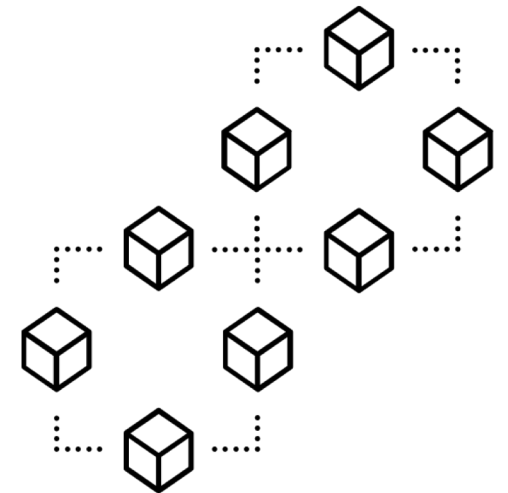


Legal obstacles (particularly for smart contracts)
Uncertain regulation

THE WAY FORWARD

The way forward

- Become familiar with blockchain
 - Understand the basics
 - Keep up with the continuously changing landscape
- Gauge the activity in your industry
 - What are your peers doing?
 - Consider joining an industry initiative
- Consider a use case but....
 - Be clear – what is your objective?
 - Compare ‘before’ and ‘after’ processes to identify potential benefits
 - Decide - Is blockchain what you need? Or is it just one component among others in an innovative solution?



THANK YOU

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