TRL **THE FUTURE OF TRANSPORT**

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BLOCKCHAIN, INTERNET OF THINGS & BIG DATA: SHAPING TOMORROW'S DISTRIBUTION ENVIRONMENTS

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Department of Logistics, Operations, Hospitality and Marketing

Logistics, Supply Chain and Transport Undergraduate:

Logistics and Supply Chain Management(NOVUS)

Transport and Logistics Management
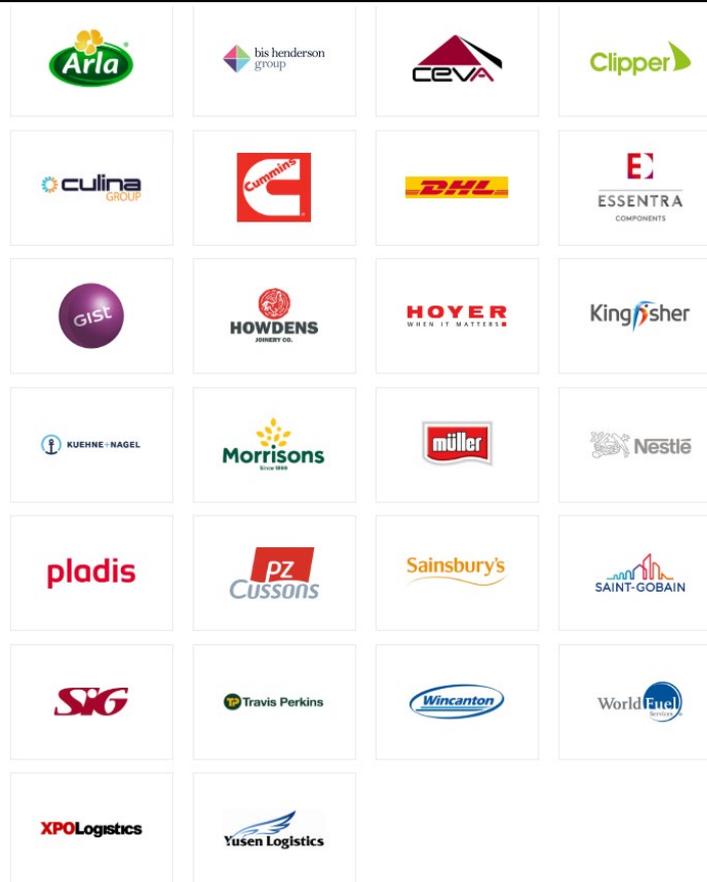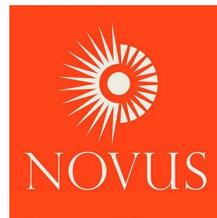
Air Transport and Logistics Management

Travel and Tourism Management

Postgraduate:

Logistics and Supply Chain Management MSc

Operations and Supply Chain Management MSc

Focus for today

- Understanding Blockchain, IoT and Big Data technology trends

- Discussing applications of these technologies within the logistics environment

- Challenges in implementing these technologies

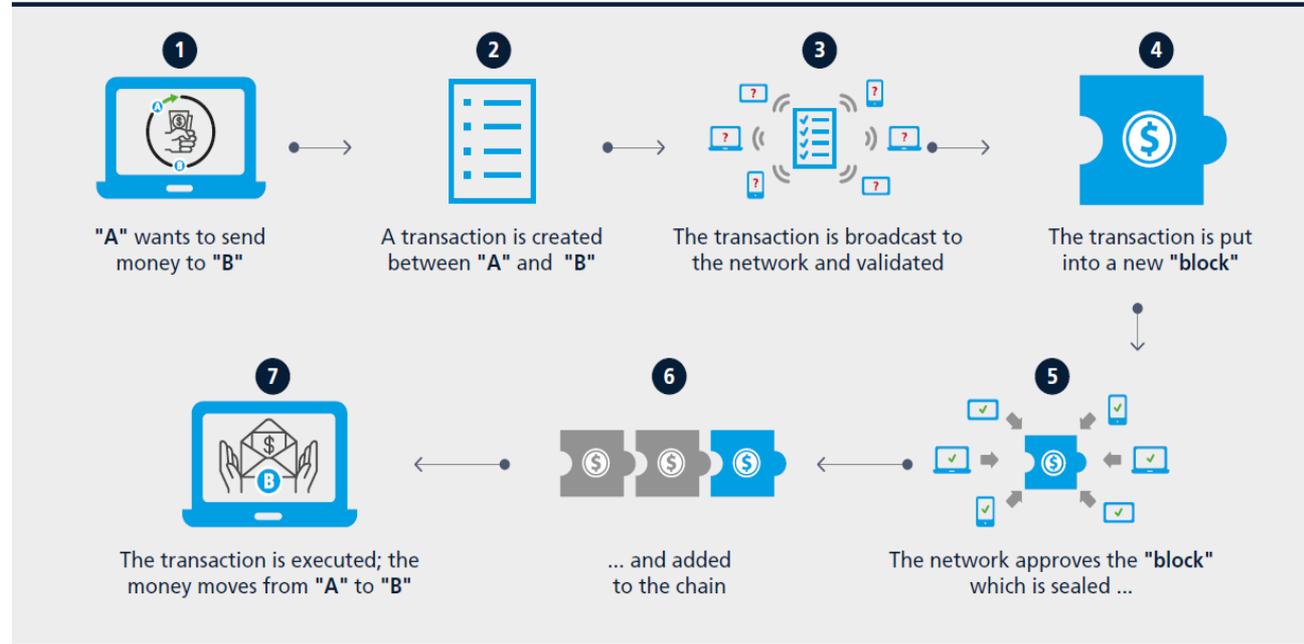# Factors influencing the Future of Logistics (freight)

- Technology

- Decarbonisation (Sustainability)

- Delivery Models- mass customisation- customer fulfilment

- Outsourcing- Commoditisation- Differentiation

- Traceability- Transparency- Security

- Asset sharing- Pricing- Uberisation

- Procurement models

- Driver availability

Blockchains are ledgers (like Excel spreadsheets), but they accept inputs from lots of different parties. The ledger can only be changed when there is a consensus among the group. That makes them more secure, and it means there's no need for a central authority to approve transactions. (Crowe, P, Business Insider UK, Mar 5, 2016)

Blockchain verification-nodes-mining- hashing

Public vs Private Blockchain Networks

METHOD OF OPERATION – BLOCKCHAIN

1 "A" wants to send money to "B"

2 A transaction is created between "A" and "B"

3 The transaction is broadcast to the network and validated

4 The transaction is put into a new "block"

7 The transaction is executed; the money moves from "A" to "B"

6 ... and added to the chain

5 The network approves the "block" which is sealed ...
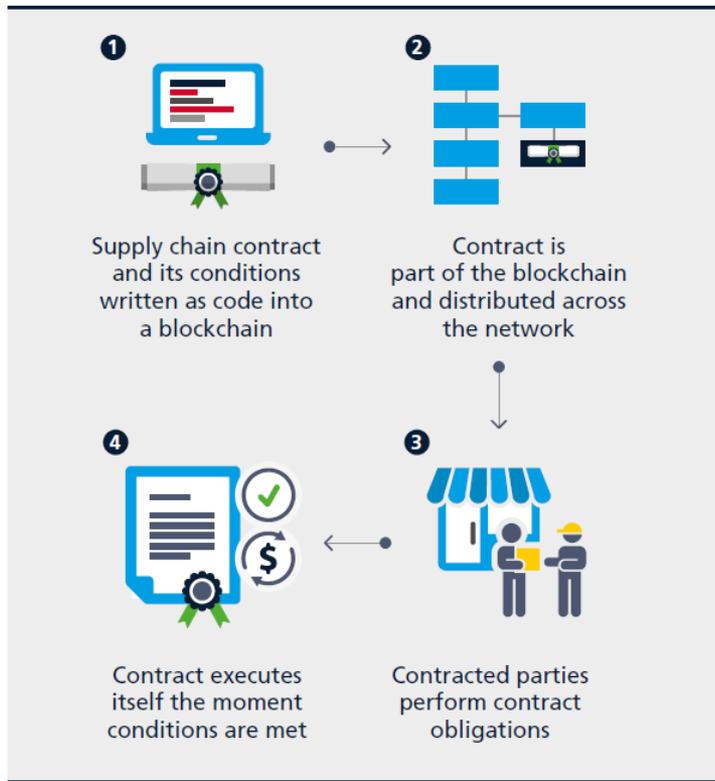
Ref: Blockchain in logistics, DHL Trend Research

Collective self-interest ensures the blockchain's safety and reliability. (Tapscott and Tapscott, MIT Sloan Management Review, Winter 2017)

SERIALIZED

AGGREGATION/DISAGGREGATION

AUTHENTICITY CHECK

GENUINE   FAKE

| 1 MANUFACTURER | 2 WAREHOUSE "RECEIPT" | 3 WAREHOUSE "PICK & PACK" | 4 WAREHOUSE "SHIP" | 5 DESTINATION |

- Confirmation goods (units) dispatched to DHL

- Confirmation goods have arrived at DHL
- Confirmation of authenticity
- Update new aggregated information (from serialization)

- Update which unit has been picked from which carton
- Update the box that the unit has been packed into
- Update new aggregated information (from serialization)

- Confirmation that the box has dispatched

- Confirmation of delivery
- Confirmation of authenticity

Figure 19: Simplified example of how a blockchain-based track-and-trace system can be used to monitor pharmaceutical goods from manufacturer to end user; **Source:** Accenture/DHL

Ref: Blockchain in logistics, DHL Trend Research

SMART CONTRACTS

① Supply chain contract and its conditions written as code into a blockchain

② Contract is part of the blockchain and distributed across the network

③ Contracted parties perform contract obligations

④ Contract executes itself the moment conditions are met

Blockchain in Transport Alliance (BiTA)- US centric

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Internet of Things

- RFID
- Sensors
- Digital barcodes
- GS1
- Devices
- Distributed databases
- Business models
- OmniChannel

Ref: Internet of Things in Logistics, DHL Trend Research and Cisco Consulting

The future of Logistics

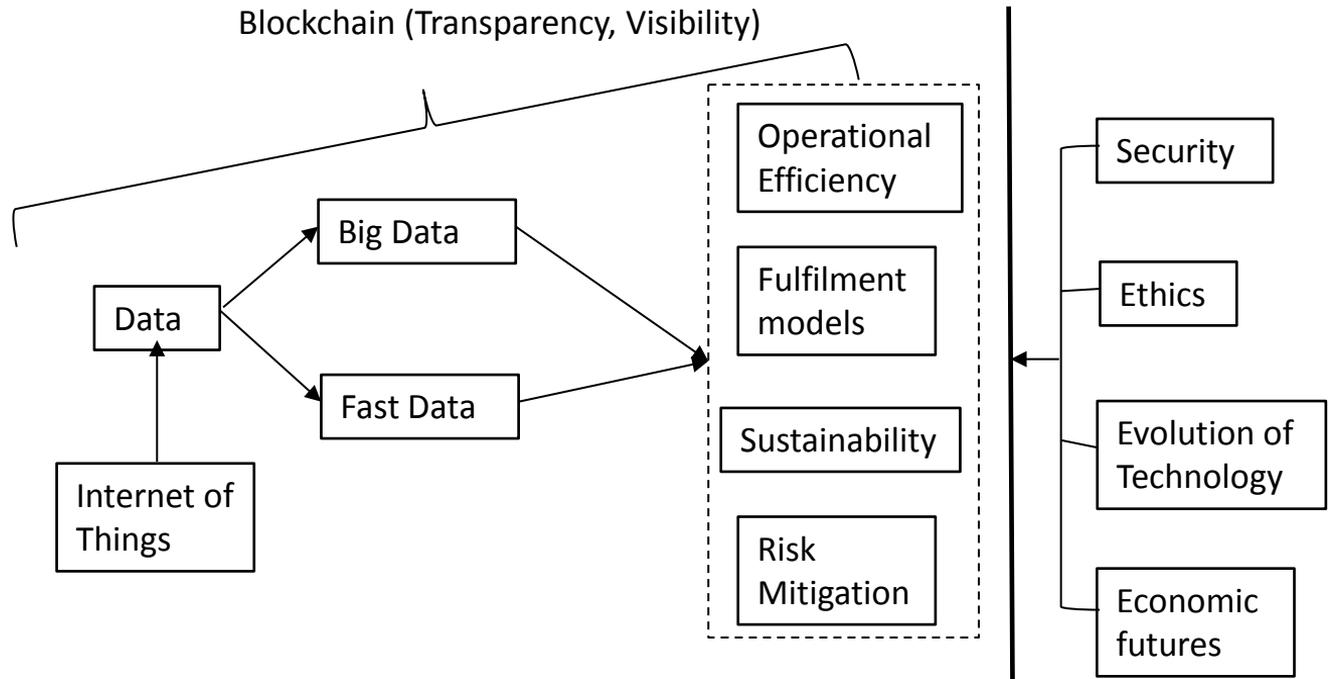Ref: Logistics Trend Radar, DHL Trend Research

The future of Logistics

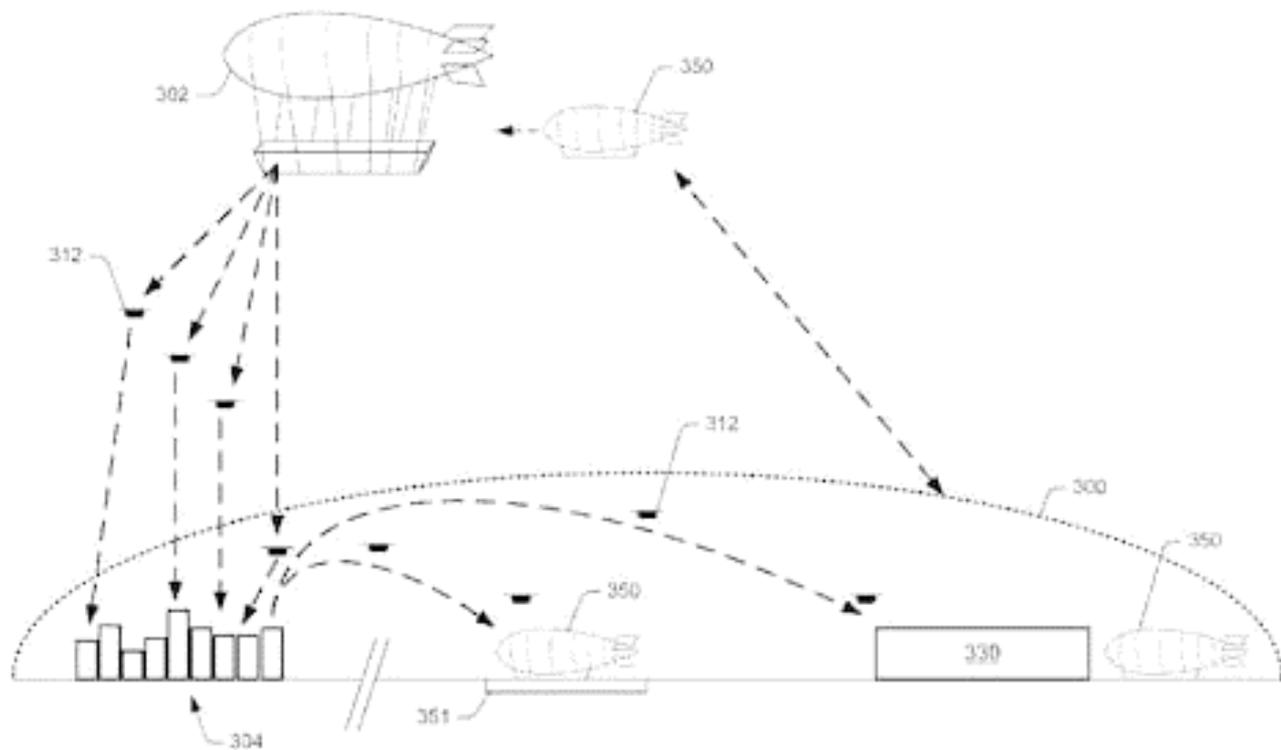Ref: Internet of Things in Logistics, DHL Trend Research

Points to consider

- Big Data and Fast Data
- The availability of data- ethical norms, data sharing and data storage
- Autonomous vehicles and AI- evolutionary timeline, currently pilot studies however fast evolving, platooning
- Security of data- IoT, cybercrime and cyber risks
- Transparency, Visibility and Trust
- Blockchain not only for financial transactions but also for product and service integrity and visibility
- Logistics and customer fulfilment models
- Decarbonisation- city freight- middle mile- last mile

Logistics Futures

Blockchain (Transparency, Visibility)

Data → Big Data
Data → Fast Data
Internet of Things → Data

Big Data → (box)
Fast Data → (box)

- Operational Efficiency
- Fulfilment models
- Sustainability
- Risk Mitigation

- Security
- Ethics
- Evolution of Technology
- Economic futures

Amazon's patented design for a floating warehouse and drone delivery system

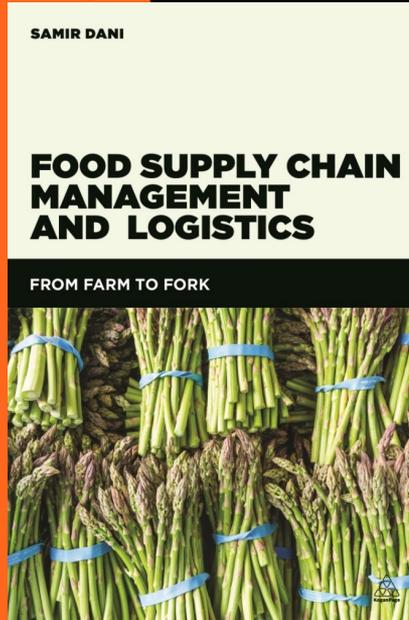The Telegraph, Technology Intelligence, James Titcomb, 29 December 2016

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Thank You
Questions?

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SAMIR DANI

FOOD SUPPLY CHAIN MANAGEMENT AND LOGISTICS

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