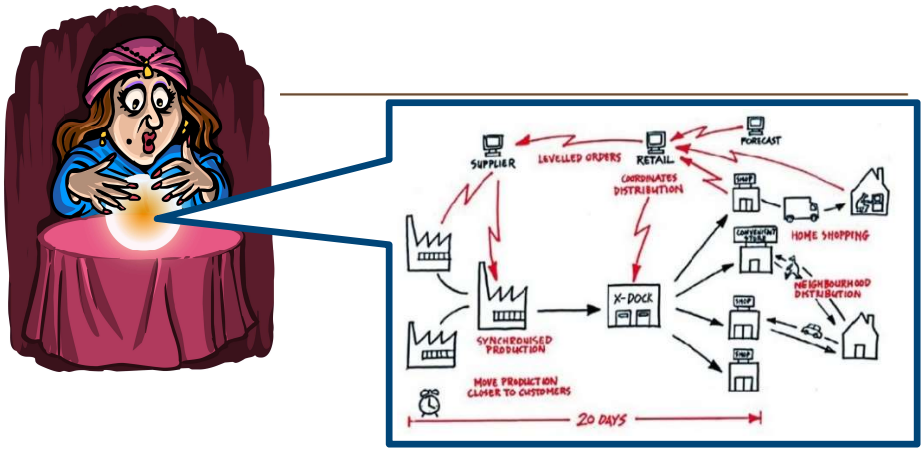

LOOKING TO THE FUTURE OF SUPPLY CHAINS

WHAT'S TO WORRY?

Themes – Friction in the Supply Chain

- Global unrest

Themes – Friction in the Supply Chain

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- Anti-globalization

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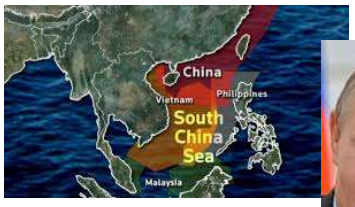
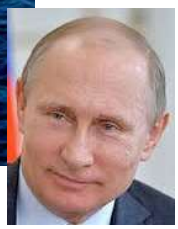





The Netherlands Wilder


France Le Pen

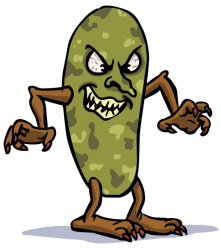

Mexico Obrador


Hungary Orban


Turkey Erdugan

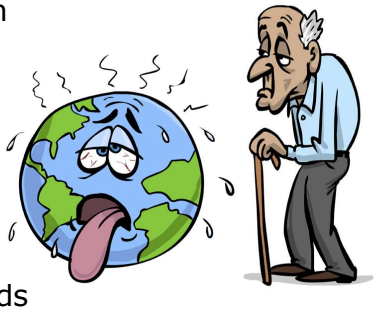
Themes – Friction in the Supply Chain

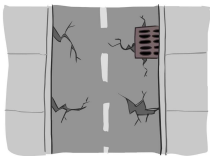
- Global unrest
- Anti-globalization
- Nationalism
- Dangers



Themes – Friction in the Supply Chain

- Global unrest
- Anti-globalization
- Nationalism
- Dangers
- Challenging trends

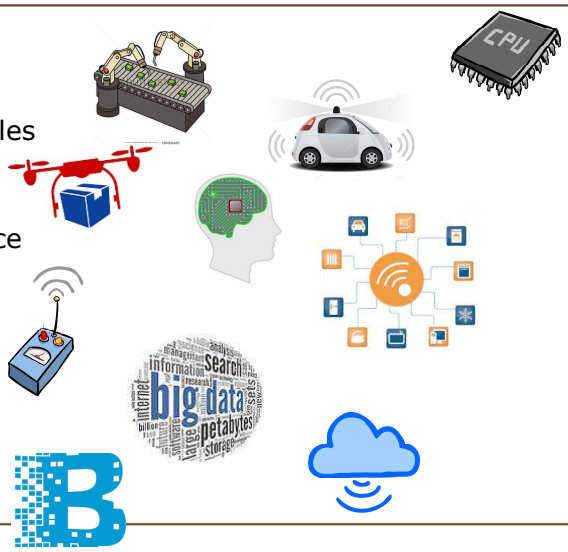




NEW TECHNOLOGIES

Themes – ICT Advances

- Digital control
- Robotics/3D
- Autonomous vehicles
- Drones
- Artificial intelligence
- IoT
- Sensing
- Big data
- Cloud Computing
- Blockchain



Technologies – 3D Printing

Implications:

+ End of mass production? Hyper-customization?
+ Complexity is free
+ Speed up design/engineering

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  + Reduce number of suppliers
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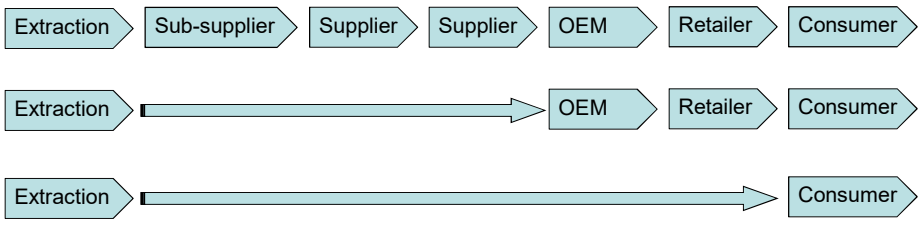

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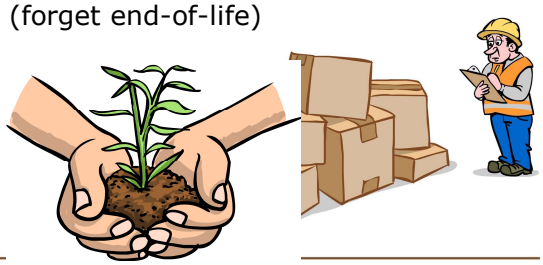
+ (Almost) zero waste



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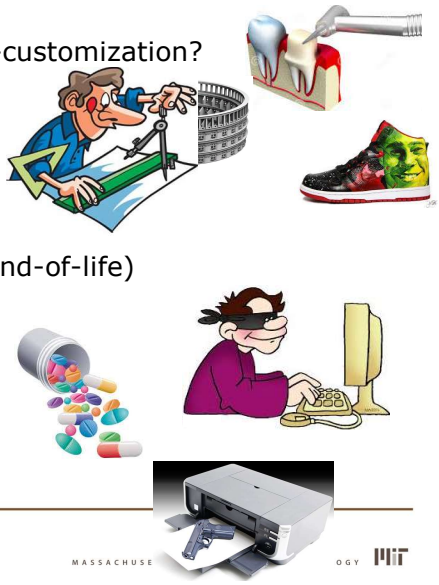
+ Lower inventory levels (forget end-of-life)
+ (Almost) zero waste
- Impact on IP
- Cyber security
- Manufacture of illicit products
  - Drugs
  - Guns



Technologies – Cloud Computing

- What's the big deal?
  - Is this just another name for SaaS, which has been around for decades?
  - Cloud -> you can customize and manage your applications on a server hosted by a 3rd party. Access to the data via the internet. No need to maintain the servers.
  - SaaS -> You pay a subscription fee to access an already-developed application. The software vendor maintains the applications on its own or a cloud service.

Technologies - IoT

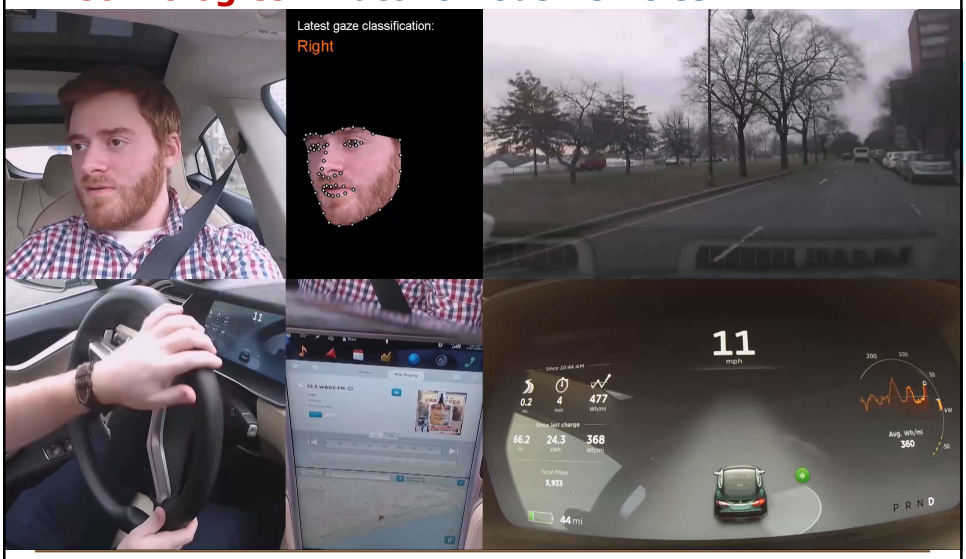
- What is the big deal?
  - Is it just another name for RFID? SenseAware?
  - The vision:
  - More sensors and readers everywhere
  - Getting to the consumer/home level? Automated ordering; Alexa
  - Increased in-transit visibility? (cloud-based GPS + RFID)
    - Pedigree (pharma), fake products, CSR
  - Insight into consumer use of product
  - Collect huge data
    - Use big data analytics to find hot spots (asset loss, component failure, delays, temperature in cold chain,…)
    - Optimize inventory in real time

Technologies - Autonomous vehicle

(Coupled with ride sharing)

+ Better flows
+ Lower costs
+ Safety – reduction in highway death and injuries
- Cyber terror opportunity
- Future of automotive companies – who will buy cars? (Power shift in the chain?)

Technologies - Autonomous vehicles



Technology – Autonomous Trucks

What is it?

- Trucks and other vehicles that can operate with minimal (or no) human interaction.
- Established Levels of Automation
  - No Automation (Level 0)
  - Function-Specific Automation (Level 1)
  - Combined-Function Automation (Level 2)
  - Limited Self-Driving Automation (Level 3)
  - Full Self-Driving Automation (Level 4)

What is status today?

- Autonomous Delivery Already Happened
  - First paid autonomous delivery occurred in Colorado in October 2016.
  - Otto delivered full TL of beer
- Major investments in technology
  - Uber acquired Otto in 2016 for $680M
  - Intel acquired Mobileye in 2017 for $15B

Current Systems in Place:

- Collision Mitigation Systems
- Integrated Safety Systems
- Lane Departure Warning
- Blind Spot Detection

Technology – Autonomous Trucks

- Direct Impact:
  - Single day range of trucks could double (~1000 miles)
  - Lower fuel costs owing to lower speeds
  - Lower fuel costs owing to platooning
  - Ubiquity of truckload is combined with low cost of intermodal (truck-rail)
- Potential Longer Term Indirect Impacts
  - Reduction in number of distribution centers and thus lower overall inventory levels
  - Concentrated corridor traffic with terminals for local driving for last mile (E2E operation)
  - Dissolution of TL carriers to independent driving entities
  - Large job loss in long-haul trucking
    - But: more city drivers, mechanics, service

Technology – Autonomous Trucks

- Short term:
  - Operator still behind the wheel
  - Fuel efficiency - platooning
  - Longer operating hours (14 instead of 11)

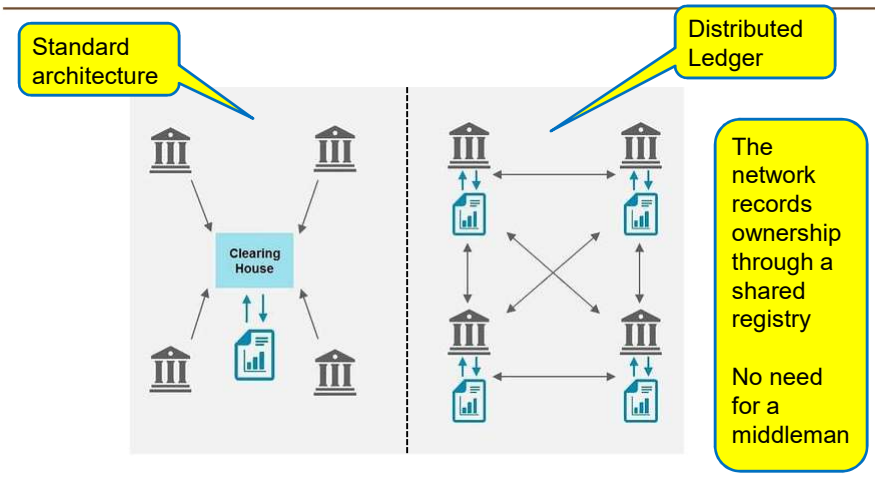
- Long term:
  - Fully autonomous
  - E2E autonomous operation
  - City delivery (electric tractor?)
  - Many new "truck stops"

Technologies – Block Chain

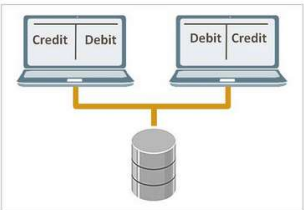
What?

- A data structure that makes it possible to create a digital ledger of transactions and share it among a distributed network of computers. It uses cryptography to allow each participant on the network to manipulate the ledger in a secure way without the need for a central authority
- Once a block of data is recorded on the ledger, it is difficult to change or remove. If a participants in the network wants to add to it, the majority of nodes have to agree by running algorithms to evaluate and verify the change (e.g., it has to match the history). When approved, a new block is added
- Bitcoin is "permission-less" – anybody can join. With supply chain, likely "permissioned" block chains – allowing only known participants

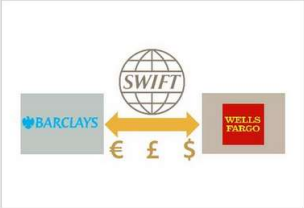
Blockchain – Shared Registry



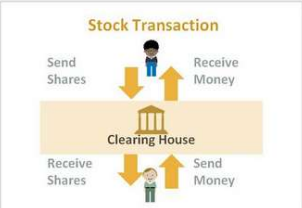
Existing IT Architectures vs. Block Chain



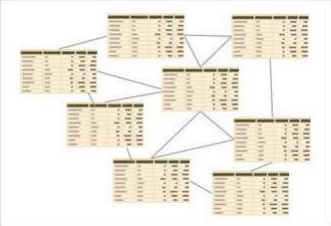
Internal transactions – Central, internal database



Secure inter-party massaging middleware



Third party agent-in-possession



Distributed ledger with cryptographic integrity

Blockchain Technology - Supply Chain Implications

- Traditional supply chain: multiple bilateral contractual links joined together to form a chain
- Blockchain supply chain: formation of an open ecosystem for collaboration
- Issues addressed:
  - Lack of open and trustworthy information technology across the supply chain
- Reasons
  - Trust between partners
  - Technology gaps
  - Legacy practices

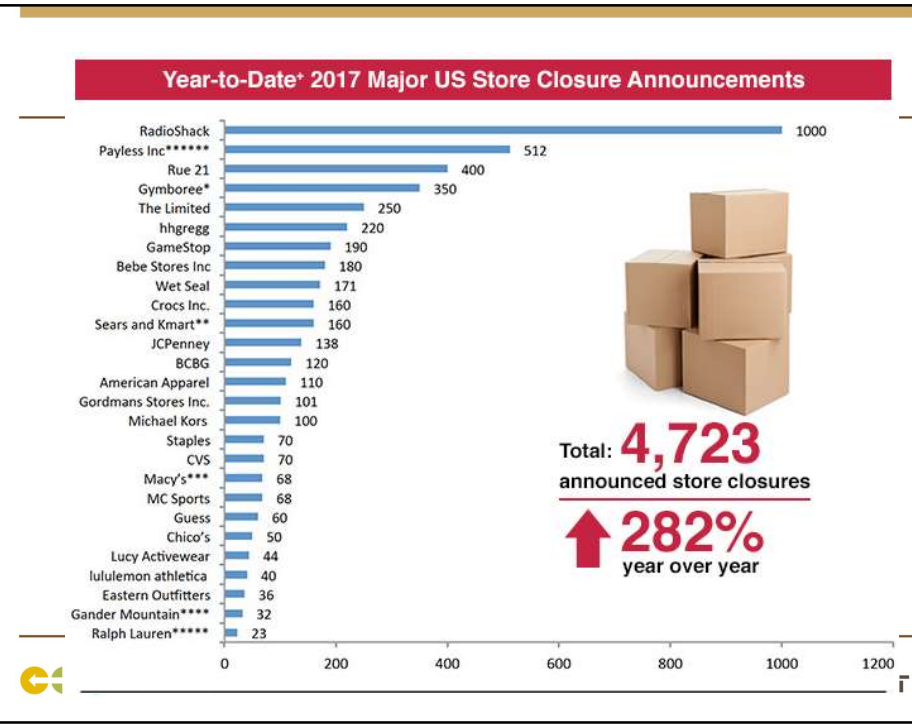
Result:
- An eco-system where information flows openly and securely between permissioned participants
- Reduced the assumed risk => lower costs
- Increased agility and adaptiveness

NEW SERVICES

Themes – Future of Retailing

- Electronic commerce
  - Fraction of e-commerce?
  - End of high street?
- Consumer expectations
  - No settling!
  - In stock
  - Faster
  - Anywhere
  - Customized


GOING OUT OF BUSINESS
ENTIRE STORE ON SALE!
GOING OUT OF BUSINESS
STORE CLOSING
ENTIRE STORE ON SALE!
VITZ FURNITURE
EVERYTHING 25% TO 50% OFF ORIGINAL PRICE
duane
131-135
STORE CLOSING
EVERYTHING MUST GO!
LEVITZ FURNITURE GOING OUT OF BUSINESS EVERYTHING ON SALE!


Year-to-Date* 2017 Major US Store Closure Announcements
RadioShack 1000
Payless Inc****** 512
Rue 21 400
Gymboree* 350
The Limited 250
hhgregg 220
GameStop 190
Bebe Stores Inc 180
Wet Seal 171
Crocs Inc. 160
Sears and Kmart** 160
JCPenney 138
BCBG 120
American Apparel 110
Gordmans Stores Inc. 101
Michael Kors 100
Staples 70
CVS 70
Macy's*** 68
MC Sports 68
Guess 60
Chico's 50
Lucy Activewear 44
lululemon athletica 40
Eastern Outfitters 36
Gander Mountain**** 32
Ralph Lauren***** 23
0 200 400 600 800 1000 1200
Total: 4,723
announced store closures
282%
year over year

Retailing

Traditional retailing

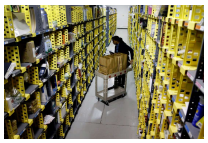
- Electronic commerce
  - Basic
  - Repetitive
  - Little differentiation
- Store experience
  - Premium
  - Personal
  - Immersive
  - Educational
  - Fun
  - Treasure hunt

On/Off Line

- Store pick up
- Workers on the way hom

Retail Delivery

- Amazon Prime now:
  - Household items within 2 hours (free); $7.99 within 1 hour
  - Restaurant delivery within 1 hour (free)
  - Regular delivery (everywhere)
    - 2 days free delivery for prime customers
  - Same day delivery
    - Prime customers: >$35 – free; <$35 - $5.99
    - Non-prime customers: $8.99 + $0.99/item
- New DC system
- Warehouse Robotics
- Amazon fleet



Retail Delivery

The new competitive landscape:

- Inexpensive
  - Free delivery
- Fast
  - Within hours
- Customized
  - GSK – tailored medicines
  - 3D-printed
- Anywhere
  - Japan – delivery to transit stations
  - Nike – during the Boston Marathon

MIT Center for Transportation & Logistics

41

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Retail Experience

- The US has five time the SQ. ft. or retail space per person compared to other developed countries
  - Doom and gloom may be simply retrenchment and getting out of a non-viable situation
- Not all brands/stores are declining
  - The differentiator: customer experience
- Deep product expertise in the store
  - fashion advice
  - DIY help
  - fun experience
  - Walmart movie nights

The Required Customer Experience (?)

- A single destination that houses all product information so every point of distribution has the same information.
- One view of inventory – "so you can make commitments to consumers that if they make the effort to pick up a product, it will be there for them."
- Detailed transaction information.
- A single consumer profile that houses their transaction history: "It drives me batty when I get a pop-up ad on a website for something I just bought."
- An integrated cross-channel strategy for contacting customers.
- Walkthroughs: Marketers used to do store walkthroughs prior to seasonal launches. She said the practice should be revived to make sure that campaigns are cohesive across all channels.

Levi's retail executive

Retail of the Future

- Automatic replenishment
- Picture – identify – compare – buy
- No down time for retailers
- Retail competition is for the consumer's wallet
  - Consumers are spending more on experiences and less on "stuff"
    - Only 60% of today's 18-year-olds have a driver's license, compared with 80% in the 1980s
    - "Must have" item car => smart phone
  - 2016 - U.S. apparel industry last year grew 3%, while the U.S. domestic travel industry grew 5%
  - For the first time, American consumers spent in 2016 more at bars and restaurants than on groceries

Product Servicization

- Product centric - extraction of more utility from a product
  - Inventory management
  - Maintenance and repair
  - Spare parts support
  - Training and certification
  - Testing and audit

Whole product services

- Customer centric – providing expertise, resources, alliance
  - Customization
  - Consulting
  - Business development
  - Integration & turnkey projects
  - Outsourcing and managed services

Value creation services

Why Servicizing?

- Growth:
  - Stimulating product sales by selling additional services
  - Competitive advantage through differentiation
  - Higher barriers to entry
  - Protection against product reverse-engineering/imitation
- Margins
  - High capacity utilization
  - Service markets have superior margins
  - Avoid price competition
  - Protection against demand shocks
- Relationship
  - Increased "stickiness"
  - Understanding customer needs better and learning about it fast
  - Fast penetration of innovation/new technology to the market

Servicization -

NETAFIM™ GROW MORE WITH LESS

Drippers company

Managed Services for specific verticals:
- Green houses
- mining

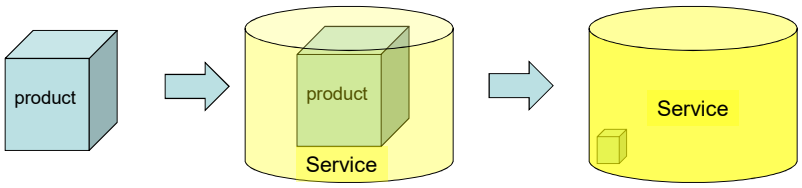
Professional Services:
- Consulting
- Integration
- Project management

Expertise:

Feasibility Study → Detailed Design → Procurement → Implementation → Training & Support

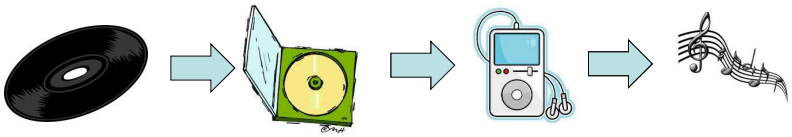
Value:

From Product to Service



Example: On Star

Music example:



Vinyl CD Download Streaming

The Future…

sheffi@mit.edu