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DISRUPTIVE TECHNOLOGIES IN LOGISTICS AND THEIR POSITIVE ENVIRONMENTAL CONSEQUENCES

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İSTANBUL TİCARET
ÜNİVERSİTESİ

OUTLINE

- DISRUPTIVE TECHNOLOGIES
- ADVENT OF THE INTERNET
- THE DYNAMICS OF THE POST-DIGITAL ECOSYSTEM
- INTERNET OF THINGS
- 3D PRINTERS
- AUTONOMOUS VEHICLES
- BLOCKCHAIN

DISRUPTIVE TECHNOLOGIES

- **Disruptive innovation** creates a new market and value network and eventually disrupts an existing market and value network.
- A **disruptive technology** displaces an established technology and shakes up the industry and creates a completely **new industry**.
- Disruptive technologies cause the business processes to be **redesigned**.

ADVENT OF INTERNET

- After the rise of internet, **digital economy** has started to impact all sectors including retail, transports, financial services, manufacturing, education, culture, healthcare, and media industries.
- Internet brings about fertile ecosystem for the disruptive technologies.
- These technologies **eliminate many business lines** but do not create the same amount of jobs since it requires less labor.
- The **product life cycle** is getting shorter and technological developments are getting faster.

ADVENT OF INTERNET

- The most important **production factor** in digital economy is information.
- Today, regarding access to information, there are essential **differences** among individuals who has and has not accessed to the internet.
- This differences trigger consecutive inequalities.

THE DYNAMICS OF THE POST-DIGITAL ECOSYSTEM

- The **digital divide** refers to the unequal distribution of technological infrastructure usage within society.
- On the one hand, a **computer user** who takes advantage of communication possibilities.
- On the other hand, there is a **class devoid of basic communication facilities.**

THE DYNAMICS OF THE POST-DIGITAL ECOSYSTEM

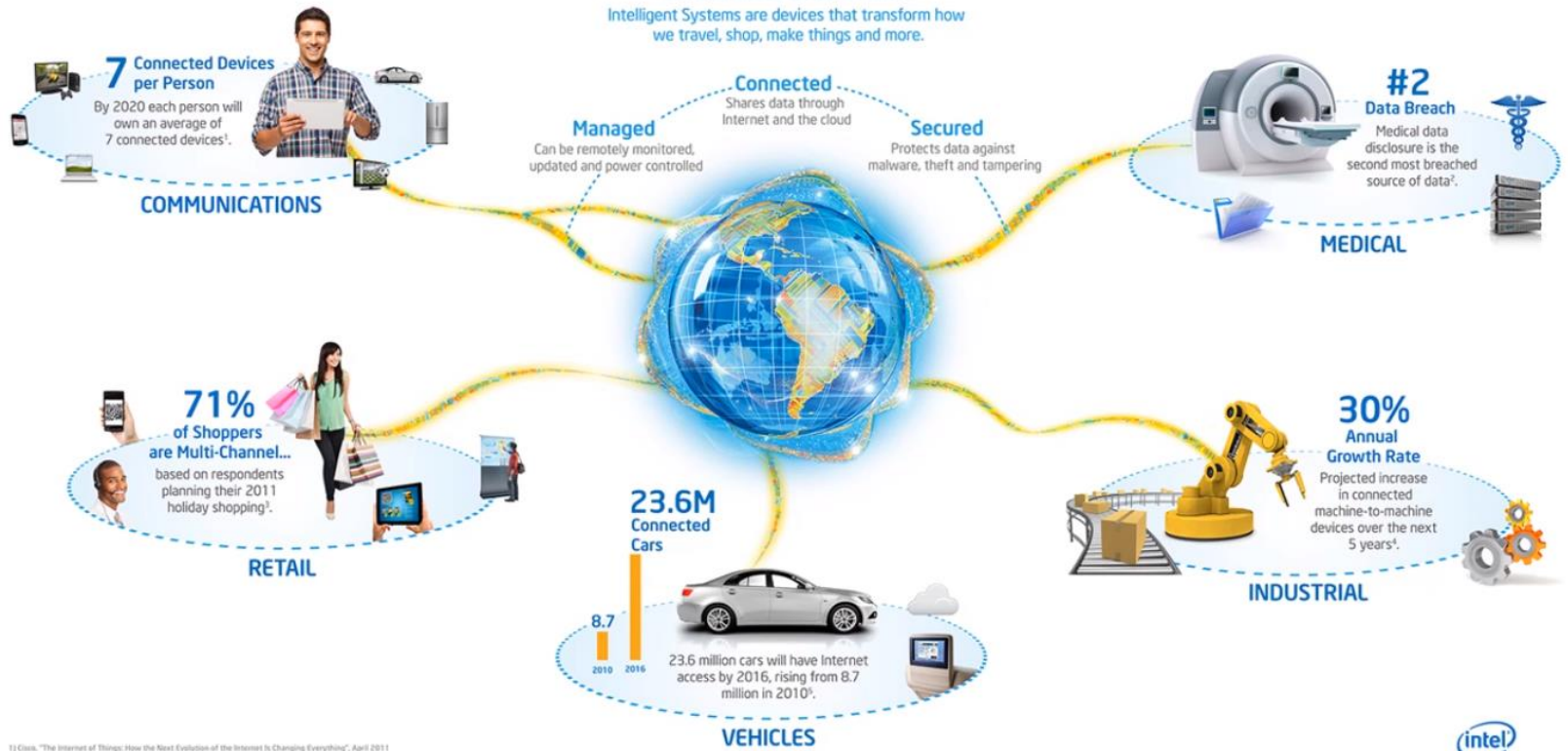
- There is a relationship between **income level** and **internet access**.
- Today, all the **routine works** are taken over by machines.
- Therefore this causes **economic inequality**.

INTERNET OF THINGS

Intelligent Systems for a More Connected World

WHAT ARE INTELLIGENT SYSTEMS?

Intelligent Systems are devices that transform how we travel, shop, make things and more.



1) Cisco, "The Internet of Things: How the Next Evolution of the Internet is Changing Everything", April 2011
 2) Solar Research, "Security challenges in the US healthcare sector" White Paper, December 2010, <http://www.mcafee.com/resources/whitepapers/hg-biosec-healthcare-security.pdf>
 3) Statista U.S., 2011 Annual Holiday Survey, http://www.statista.com/press/2011/12/06/2011-annual-holiday-survey-2011_jr_102611.pdf
 4) McKinsey Global Institute analysis, "Big data: The next frontier for innovation, competition, and productivity", June 2011
 5) Wall Street Journal, <http://online.wsj.com/article/SB10001424052702304066504576345763614933644.html>, estimate from research firm, Frost & Sullivan



INTERNET OF THINGS



Warehouse Operation



Freight Transportation



Last Mile Delivery

INTERNET OF THINGS

Warehouse Operations

- Smart inventory management
- Damage detection
- Real time visibility
- Accurate inventory control

INTERNET OF THINGS

Sensors in Freight Transport

- Fleet Management
- Predictive Asset Maintenance

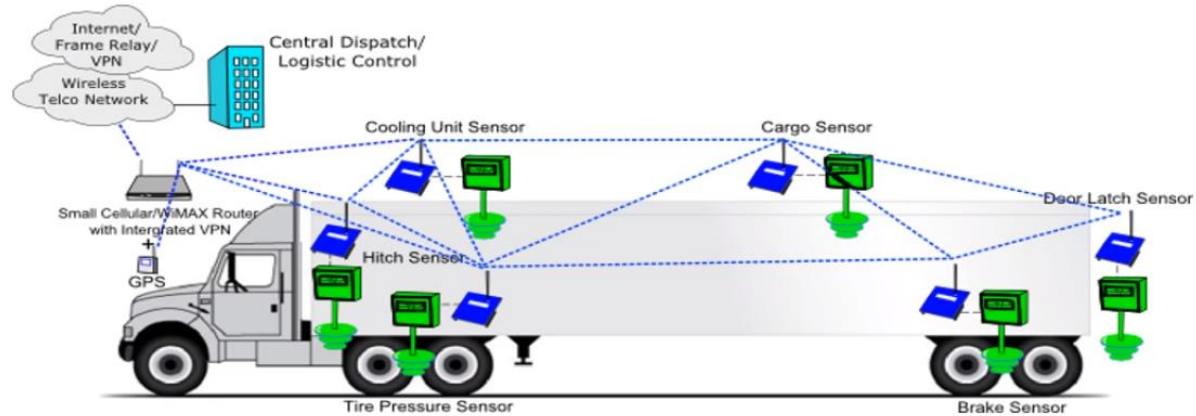
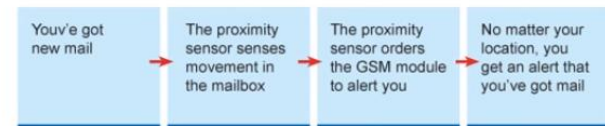
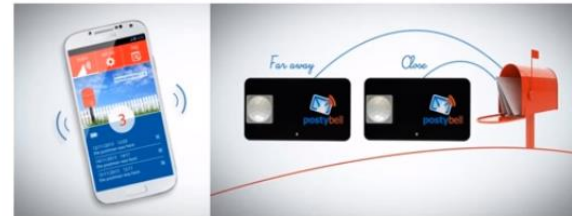


Image credit: <http://www.mouser.com>

INTERNET OF THINGS

Last Mile Delivery: IoT and Mail Delivery/Pickup

- Optimize mail pickup
- Notify customer of delivery
- Flexible delivery address
- Maximize return trip



INTERNET OF THINGS

Last Mile Delivery: IoT: Automatic replenishment and anticipatory shipping

- Smart Lockers
- Delivery on first attempt
- Tracking expiration dates
- Anticipate Orders



3D PRINTERS



3D PRINTERS

- Decentralize the production.
- Lead to **reduction in the shipping** and **air cargo volumes**.
- Reduction in warehouse requirement.
- Reduce carbon emission and reduce product carbon footprint

3D PRINTERS

Storage and warehousing are obligealiton

- Remove the need for warehouse, decrease the packaging cost
- less obsolescence of existing stock.
- It will accelerate a shift from **“push supply chains”** to **“pull supply chains.”**
- **Increase** customization.

AUTONOMOUS VEHICLES



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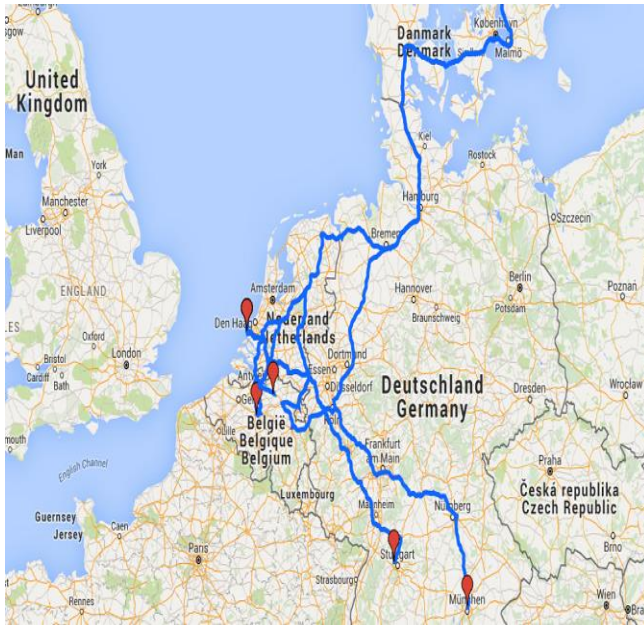


AUTONOMOUS VEHICLES



DAF
Daimler
Iveco
MAN
Scania
Volvo

AUTONOMOUS VEHICLES



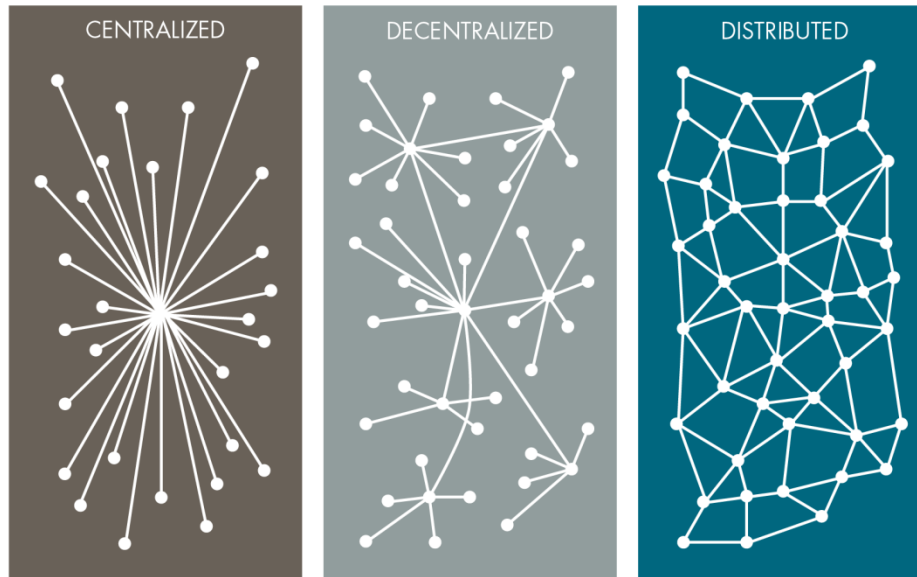
Six brands of automated trucks have been driving in columns (platooning), on public roads from several European cities to the Netherlands.

Truck platooning will ensure **cleaner** and **more efficient transport**.

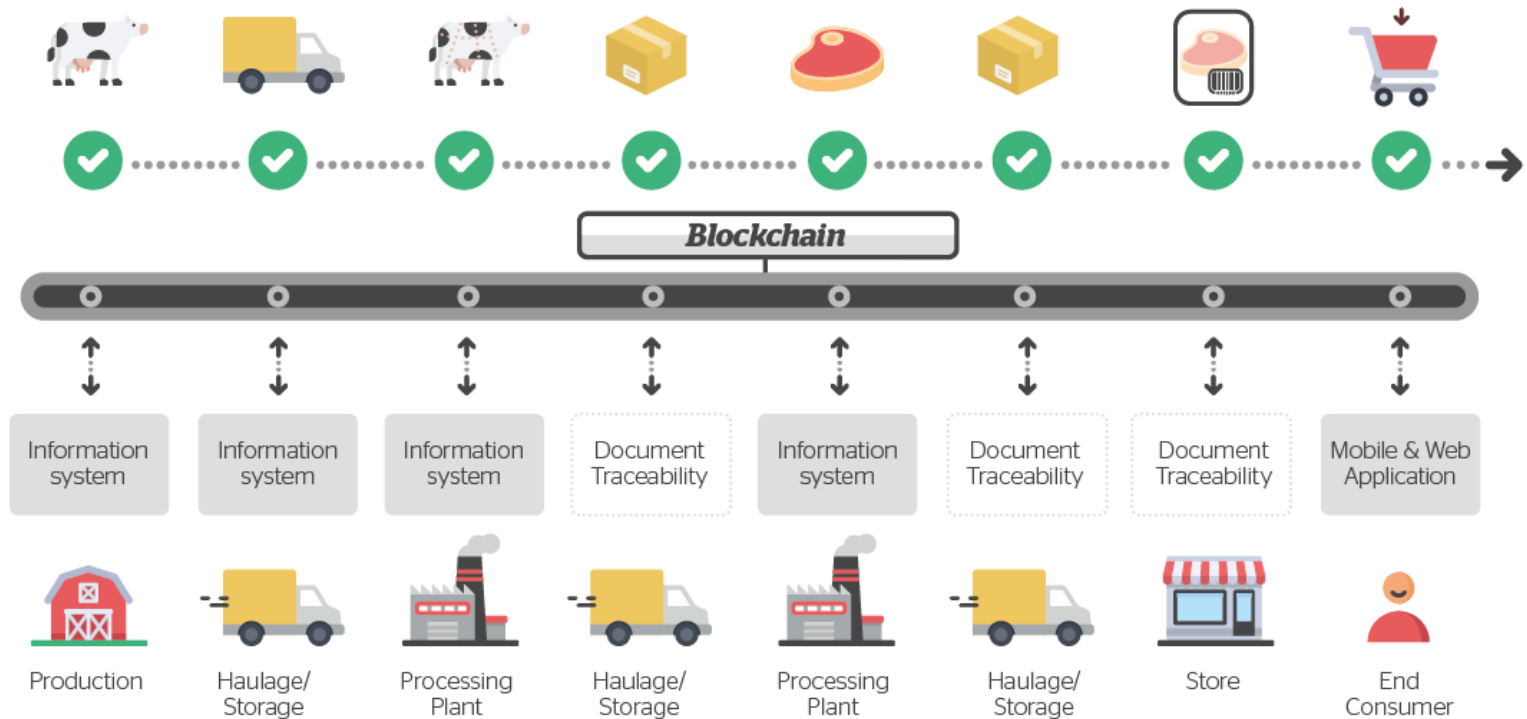
Self-driving vehicles also contribute to **road safety** because most accidents are caused by human failure

BLOCKCHAIN

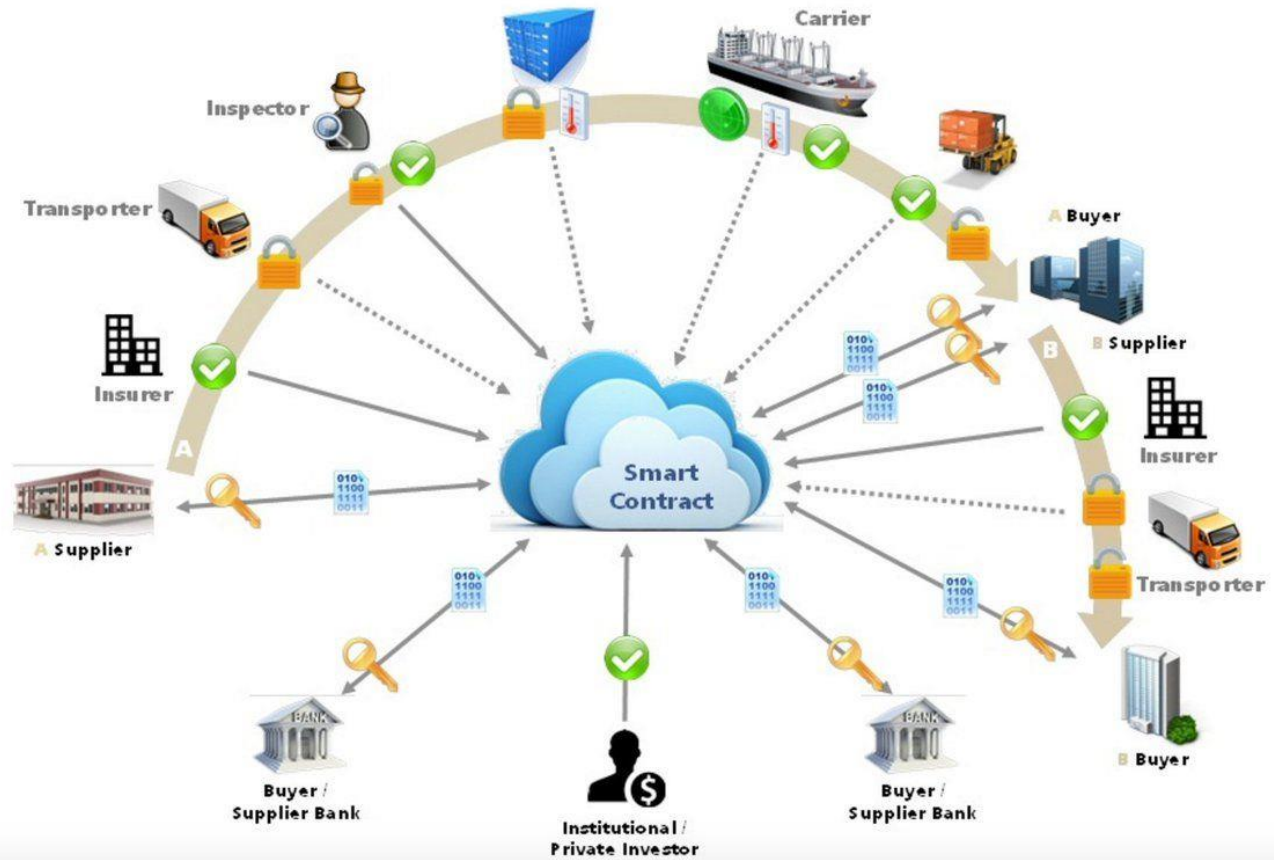
- Blockchain Based Supply Network Management System
- Autonom & Distributed Trust Model



BLOCKCHAIN



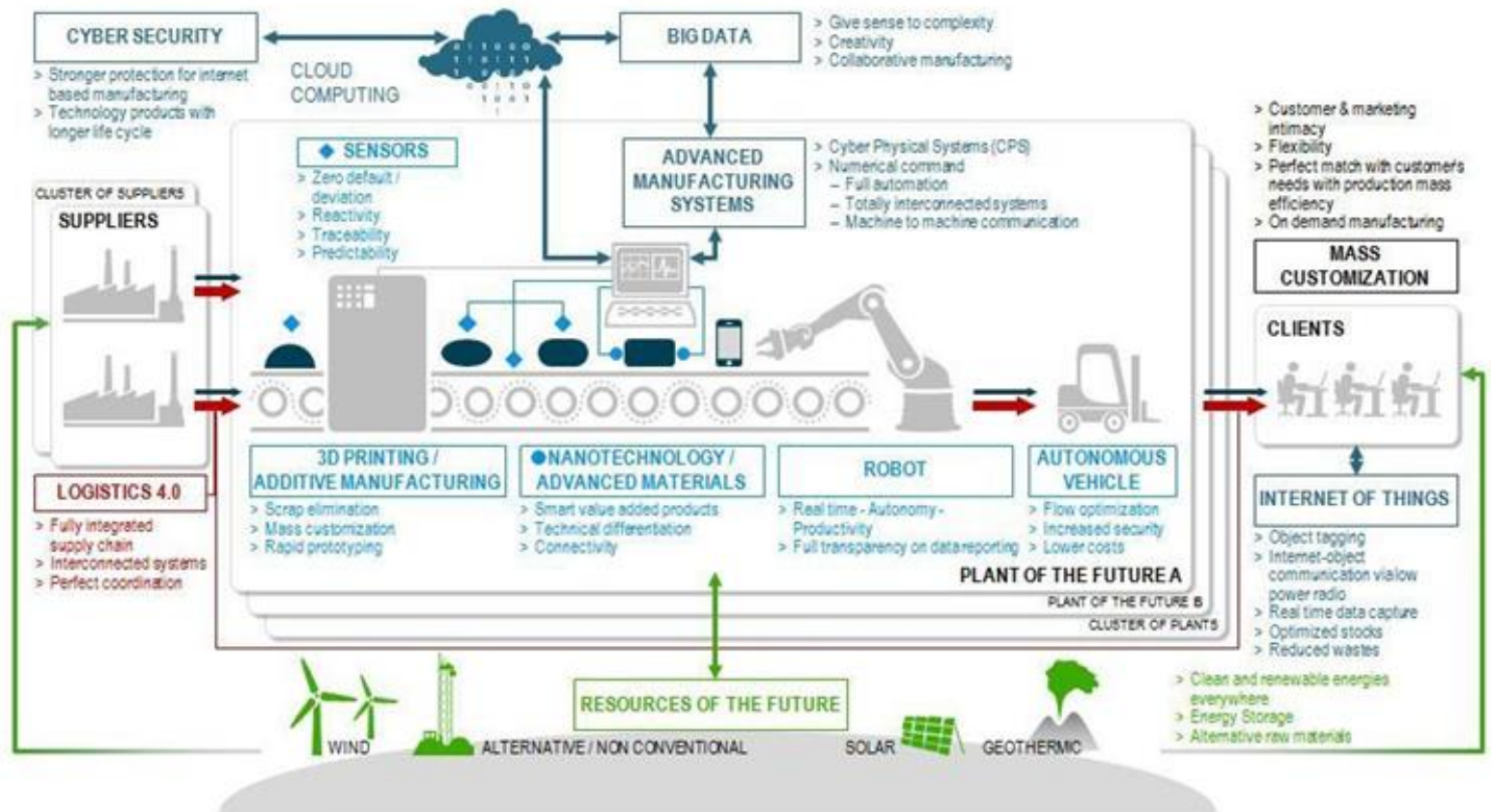
BLOCKCHAIN



BLOCKCHAIN

- **Time savings:** Transaction settlement is faster because it doesn't require verification by a central authority.
- **Cost savings:** Intermediaries are eliminated.
- **Tighter security:** Protect against tampering, fraud, and cybercrime.
- **Enhanced privacy:** Users can specify which transaction details they want other participants to be permitted to view.
- **Improved auditability:** Ability to monitor and audit transactions.
- **Increased operational efficiency:** Facilitate the transactions.
- **Building trust:** Increasing the level of trust among network participants.

Summary



The background features a series of overlapping, 3D-style rectangular blocks in teal, dark blue, and yellow, arranged in a stepped pattern that recedes into the distance. The blocks are set against a white background with vertical grey lines that suggest depth and perspective.

THANK YOU