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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

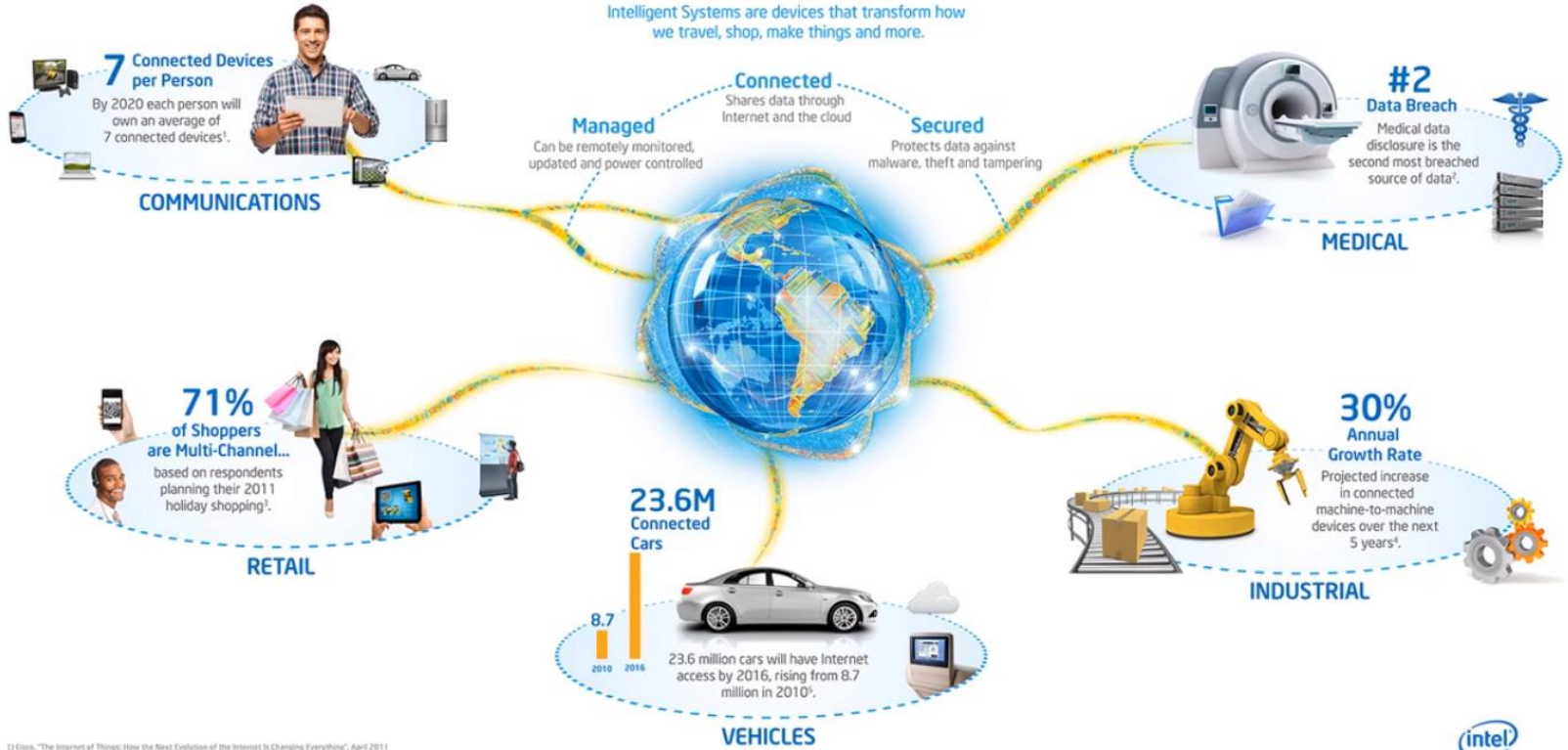
- There is a relationship between **income level** and **internet access**.
- Today, all the **routine works** are taken over by machines.
- Therefore this causes **economic inequality**.

# 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/ug-bloos-healthcare-security.pdf>  
 3) Statista U.S., 2011 Annual Holiday Survey, [http://www.statista.com/press/press-releases/2011/01/2011-us-holiday-survey\\_2011\\_jan\\_102611.pdf](http://www.statista.com/press/press-releases/2011/01/2011-us-holiday-survey_2011_jan_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/SB10001424052702304066504576349763614933644.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

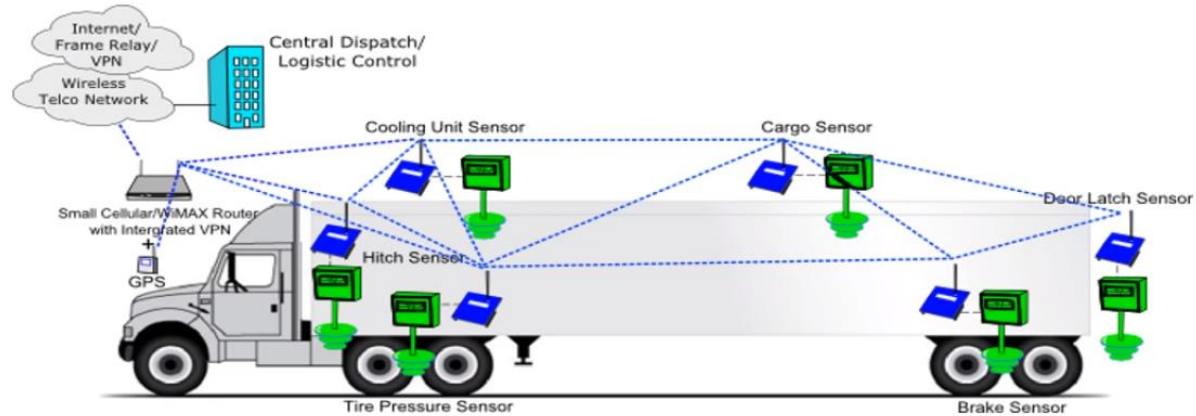
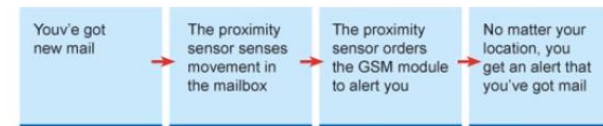
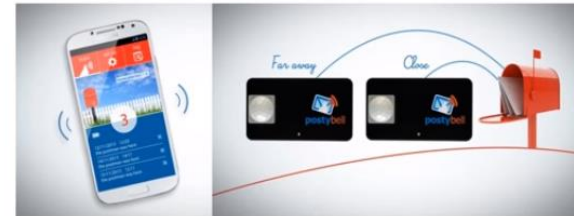


Image credit: <http://www.mouser.com>

# 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 obligaliton

- 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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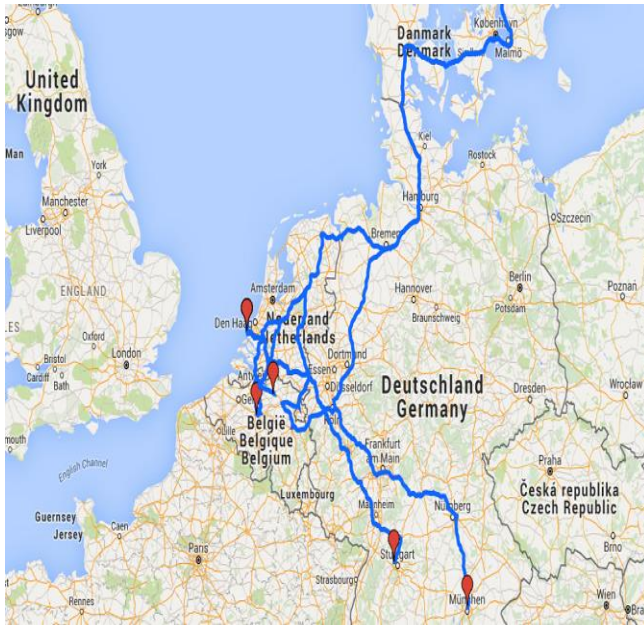


# AUTONOMOUS VEHICLES



DAF  
Daimler  
Iveco  
MAN  
Scania  
Volvo

# AUTONOMOUS VEHICLES



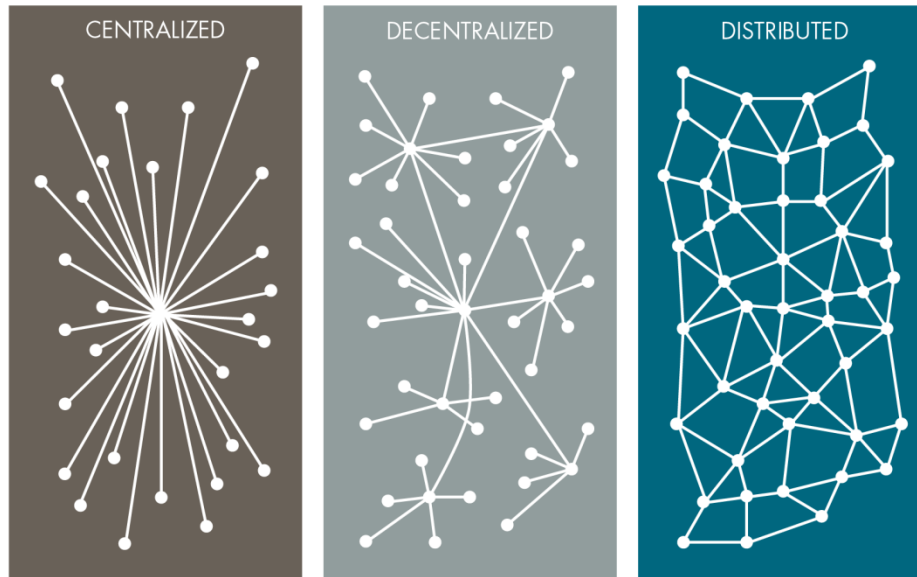
Six brands of automated trucks have been driving in columns (platooning), on public roads from several European cities to the Netherlands.

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

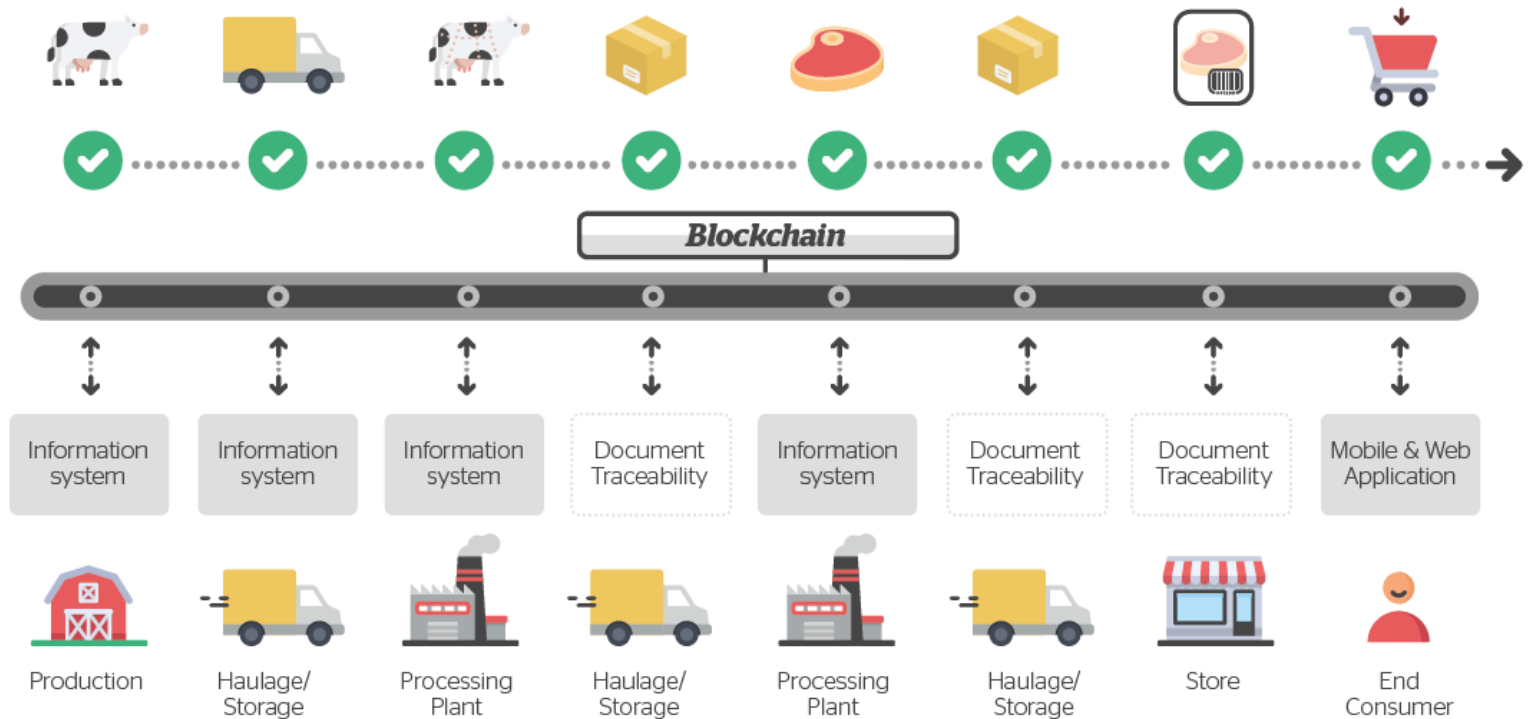
Self-driving vehicles also contribute to **road safety** because most accidents are caused by human failure

# BLOCKCHAIN

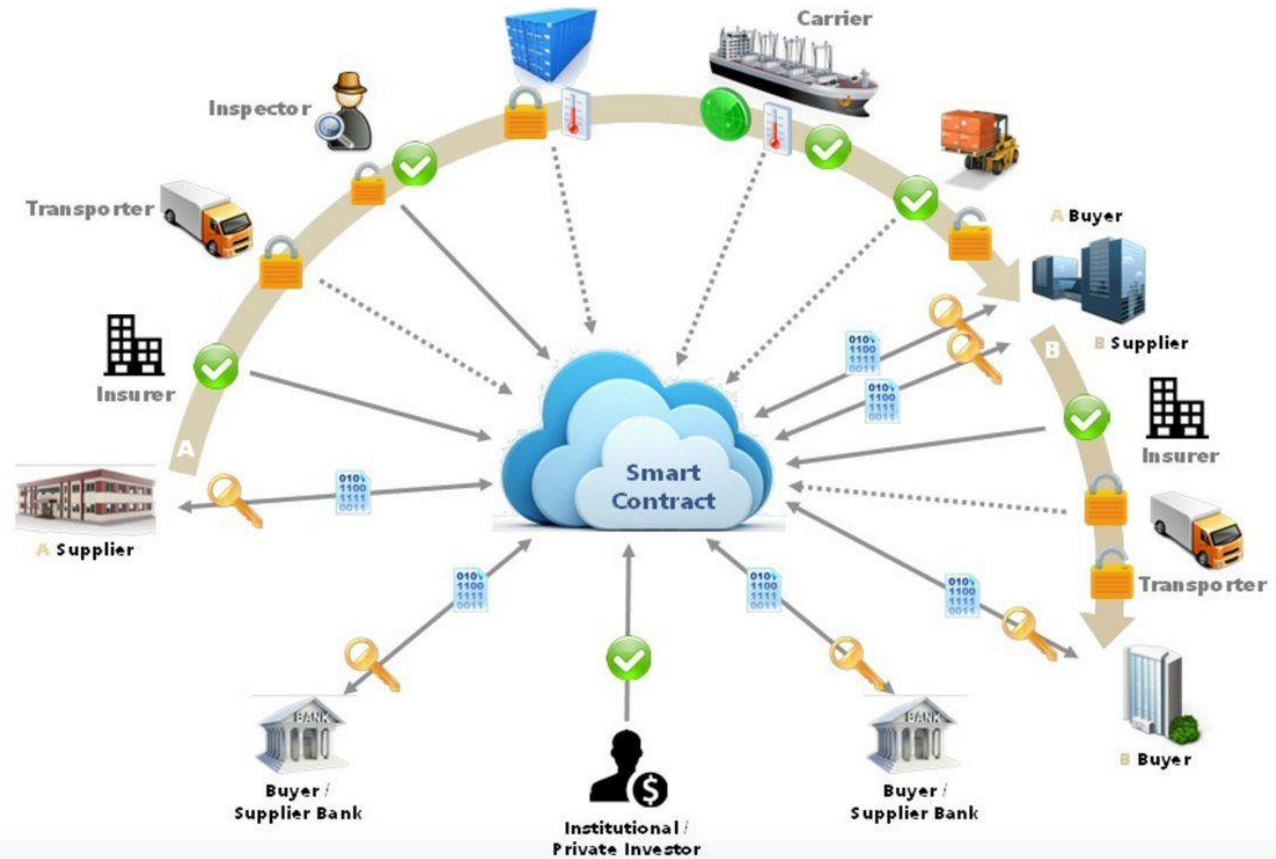
- Blockchain Based Supply Network Management System
- Autonom & Distributed Trust Model



# BLOCKCHAIN



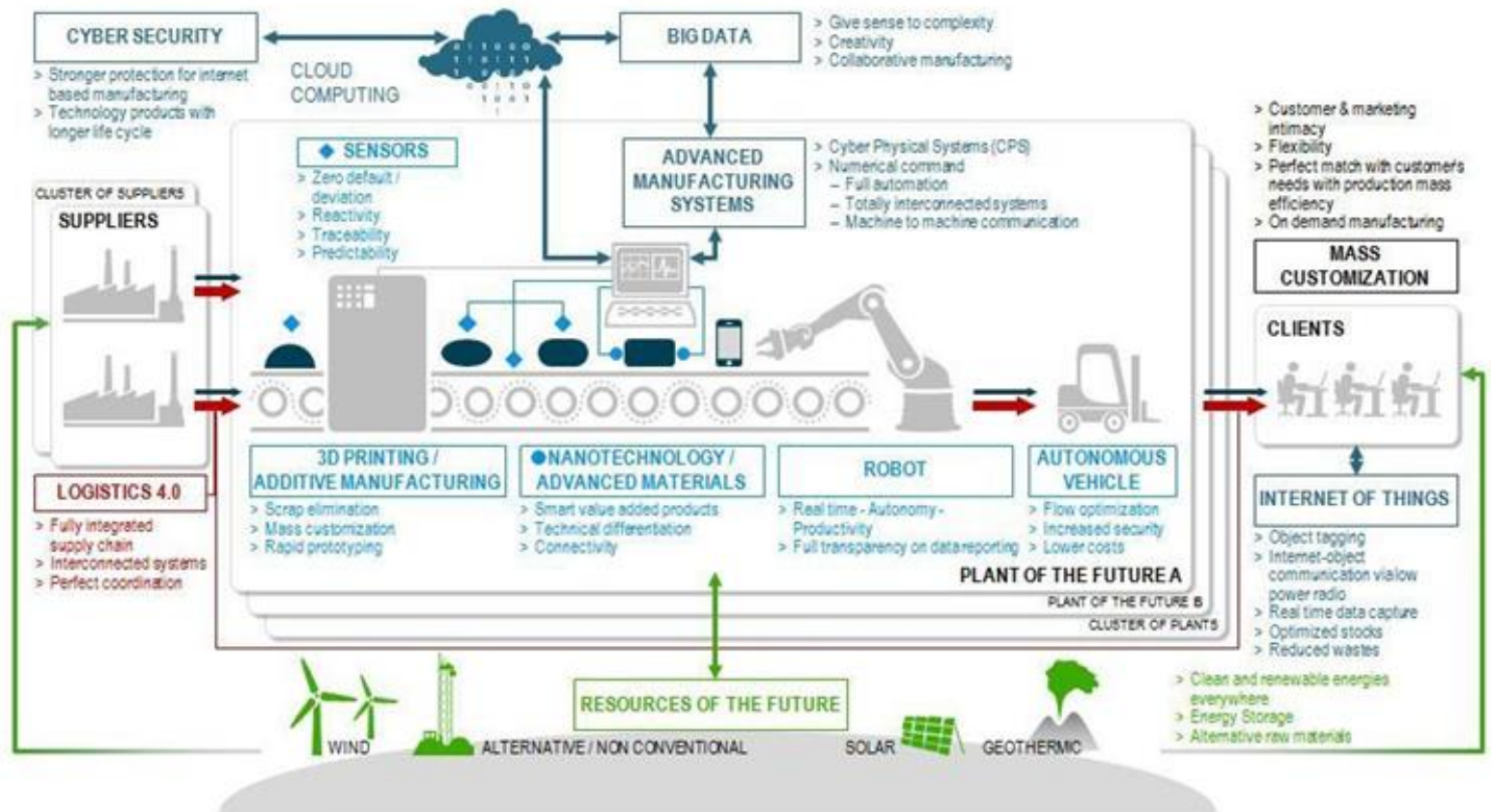
# BLOCKCHAIN



# 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, creating a sense of depth and movement. The blocks are arranged in a grid-like pattern that recedes into the distance on the right side of the image. The colors are vibrant and solid, with sharp edges and no gradients.

THANK YOU