

# Disruptie SMAACT het best

Dr. Barry Derksen MMC CISA CGEIT



# About the speaker

Onder- nemer  
Onder- wijzer  
Onder- zoeker  
Onder- manager



Business  
& IT  
Trends  
Institute



**NTI**



# Smart home & sustainable energy(en €):

- elect. car (home & transport 0 at meter)
- 44 solar panels (connection!)
- removing gas



# Assets in average home within 5 years?



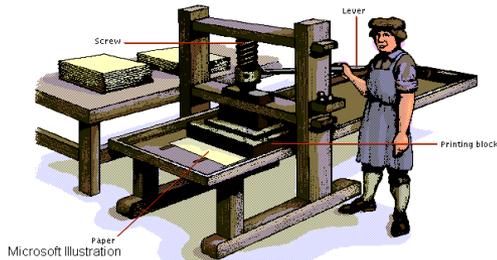


**When it all was so simple then?**

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# Wat kunnen we leren uit het verleden: Technologie-ontwikkelingen kennen een “S-curve” van ~ 50 jaar

Boekdruk: 1500->1550



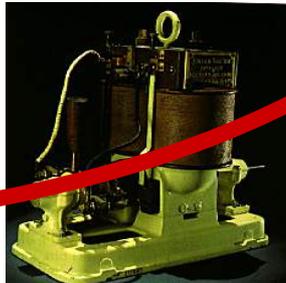
Katoen: 1750->1800



Spoor: 1800-1850



Elektromotor: 1820-1870



Computer: 1950-2000



Bronnen: Drucker, Carr (HBR)

“als je de toekomst wilt voorspellen, moet je het verleden bestuderen”

## Vraag

Was Cxxxx  
toen veel  
eenvoudiger?  
en waarom?

Ja...

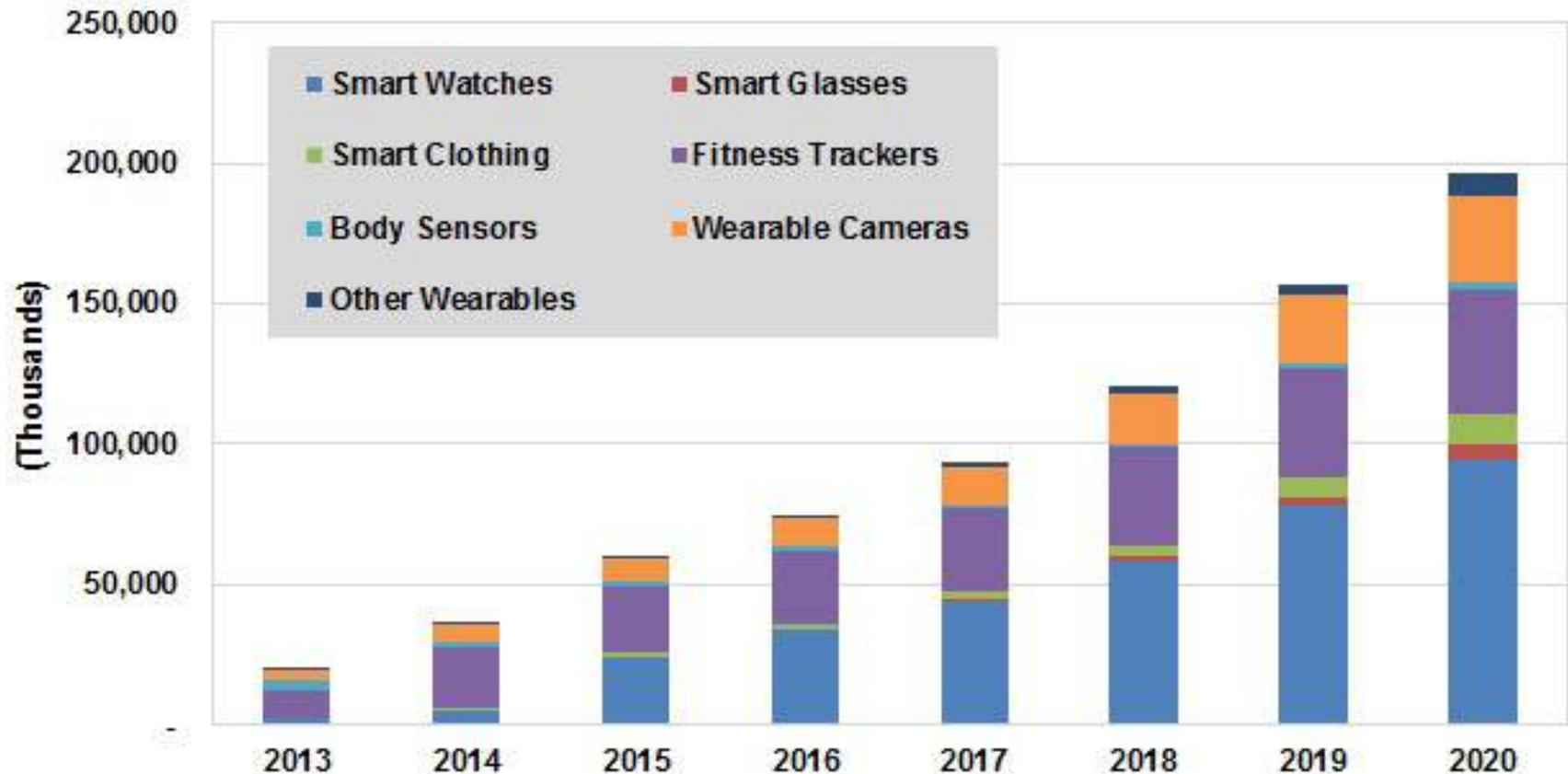
Nee...



# Trend 1: Architecture of Smart you & me



Wearable Device Shipments by Device Type, World Markets: 2013-2020



Source: Tractica



## Vraag

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Komen er nieuwe assurance producten (ISAE 34xxx)?

Ja

Nee

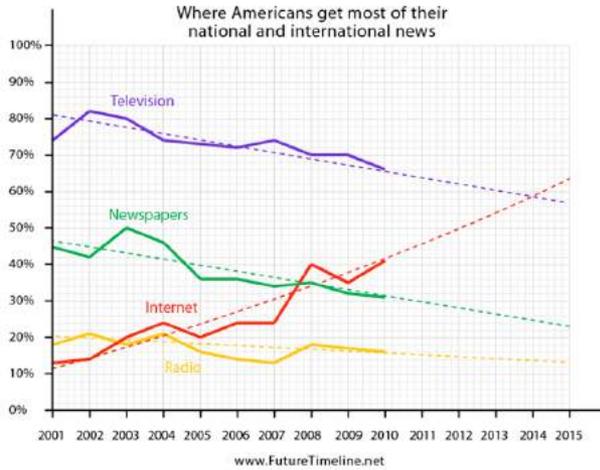
Bedenk:

Welke assurance producten zie je al ontstaan?

Welke zou je nog kunnen bedenken?

# Trend 1: What's went on in 2014-2017

Where Americans get most of their national and international news



- Internet larger reach than TV
- Google glas publically launched & followed by Hololens
- First solar Airplane around the world (64 meter wing, 12.000 solar cells..)
- Personal DNA sequence < \$100
- Memristor technology available (nano technology not based on on/off switch)
- Smart watch is the new gadget (apple)
- Laser guns at U.S.Navy
- India to Mars (camera/ infrared/heatting, ..)
- Elon to Mars....2 times...1 rocket

source: timeline.net



SOURCE: futuretimeline.net / Gartner /

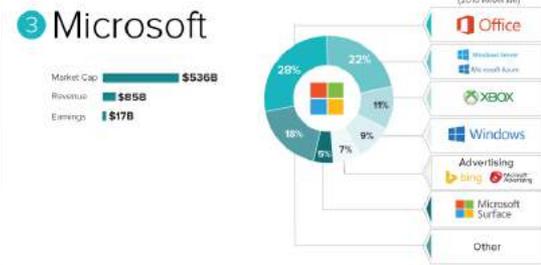
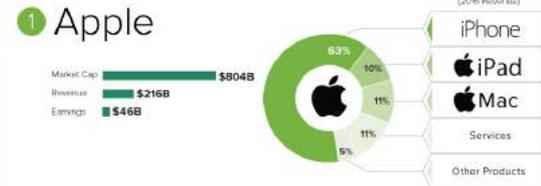
## HOW 5 TECH GIANTS MAKE THEIR BILLIONS

Comparing the revenue streams of the five largest tech companies

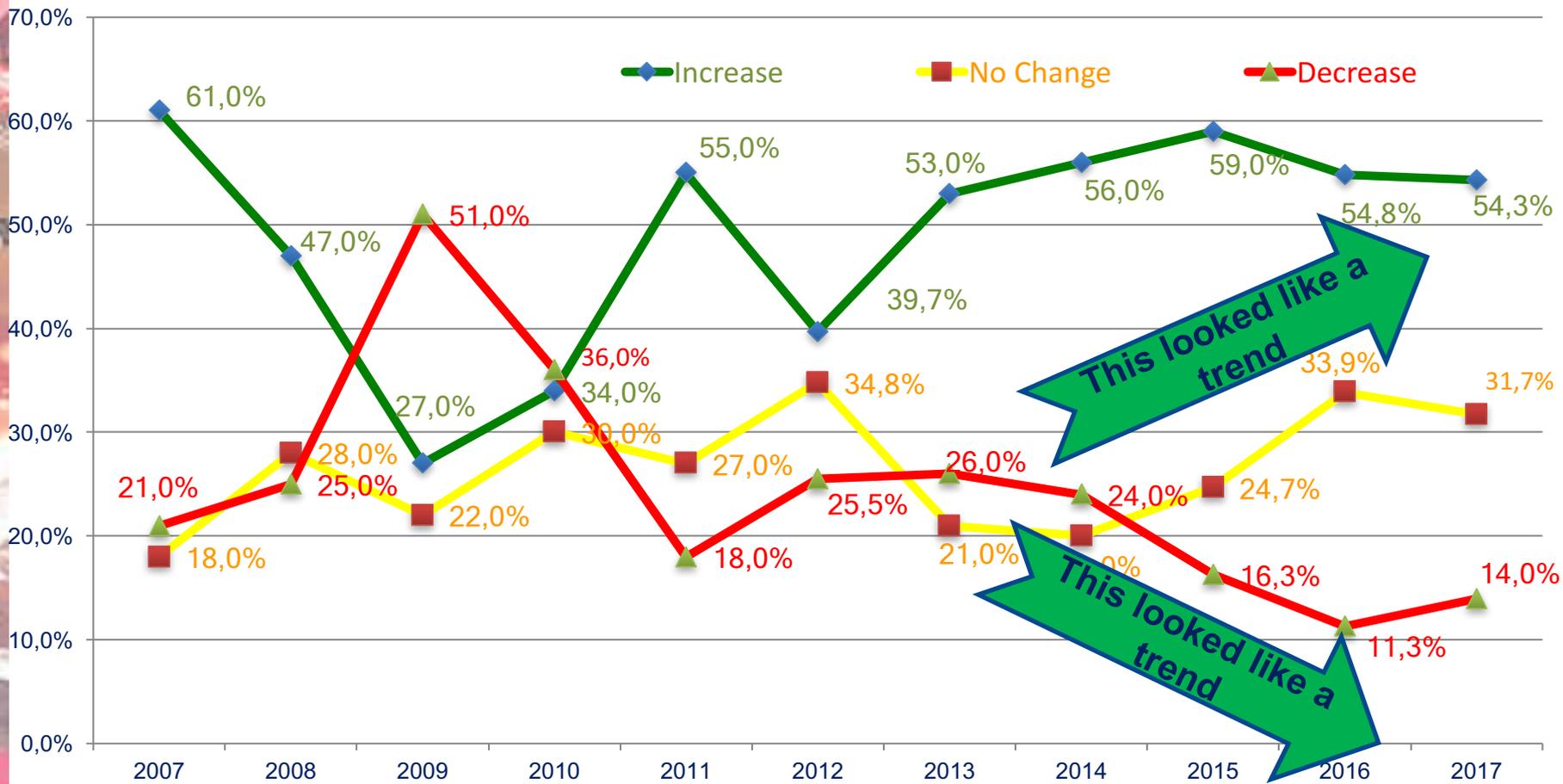
**Technology has taken over.**  
 These five tech companies are the most valuable stocks in the U.S. market, worth a collective \$2.9 trillion in market capitalization.  
 In 2016, these companies combined for \$555 billion in revenue, and a \$94 billion bottom line.



Here's how they compare:





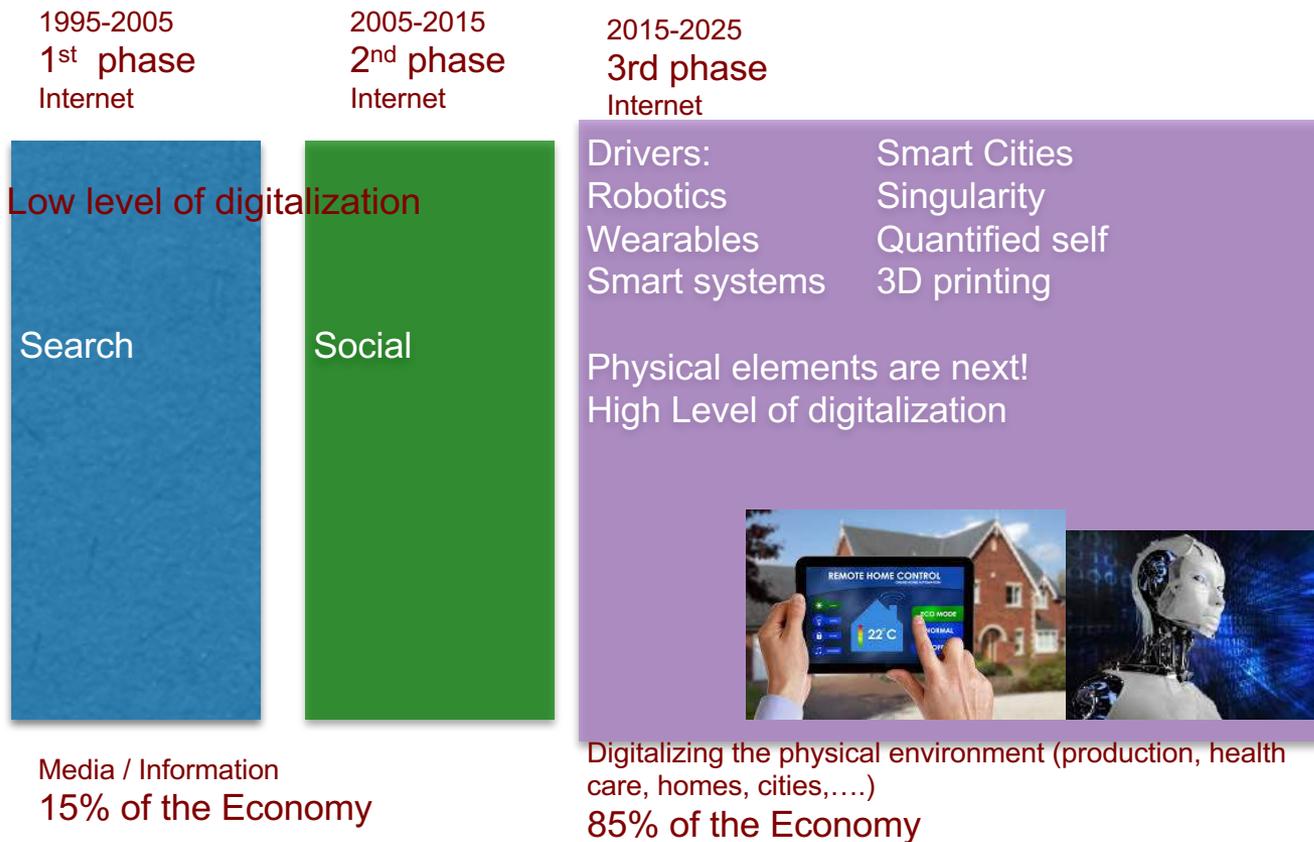


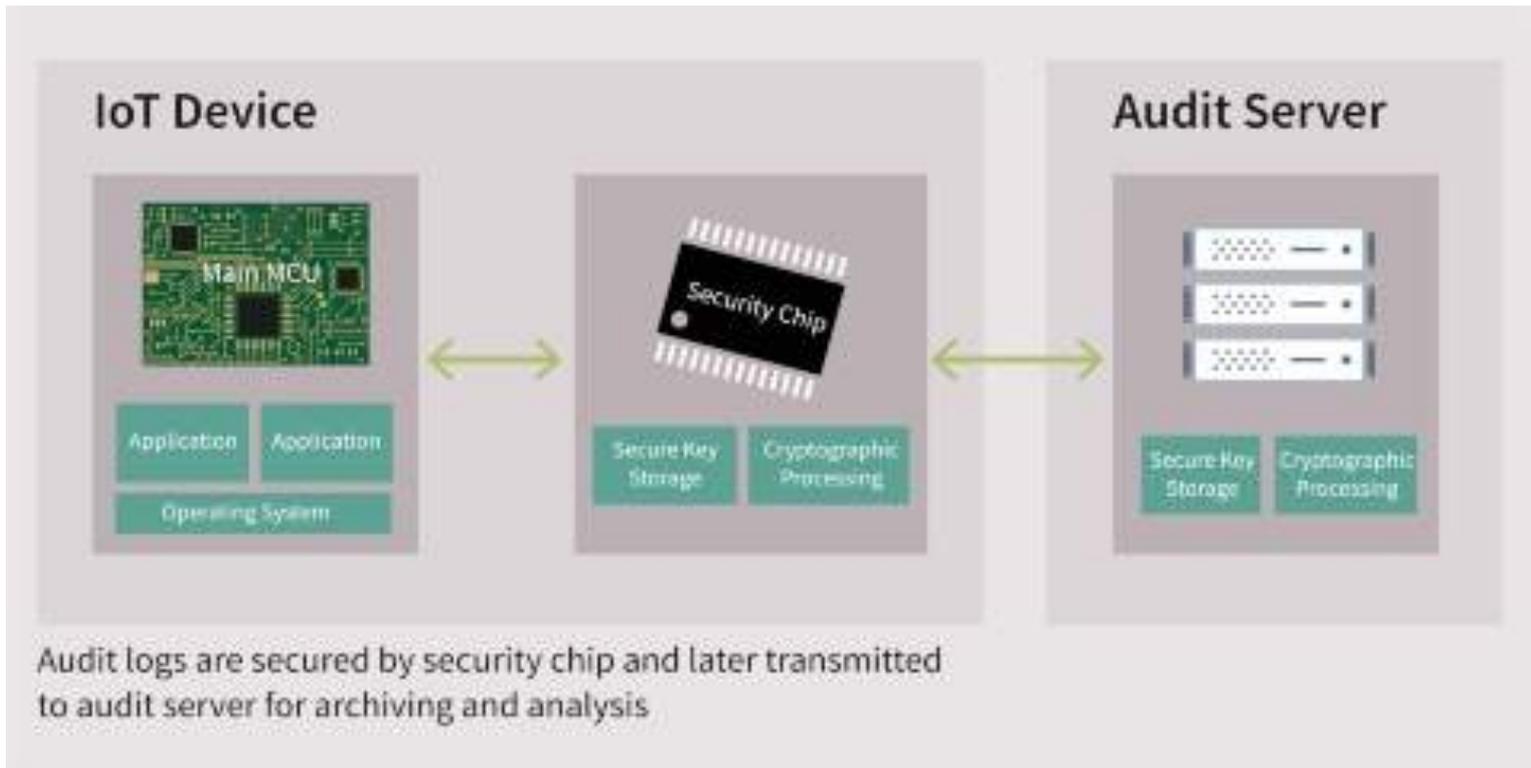
## Trend 3: IT assurance not in bits but in Atoms

- Phase 1: Media & Information publically available  
Last 20 years: Internet changed publicity...participation was in 'bits'
- Phase 2: Social Media is hot
- Phase 3: From bits to Atoms  
(digitalizing the physical environment)



# Trend 4: IT quality & assurance will have enough to do, from 14% to 18%?





**Vraag:**

**Waar zit de focus van C..... bij IOT?**

**A) IoT Device, b) secure key storage, c) audit server**

# Trend 5: Disruption is started & I(o)T still does matter!

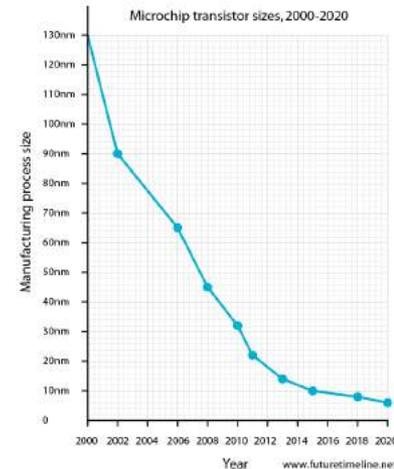


# 2017-2019

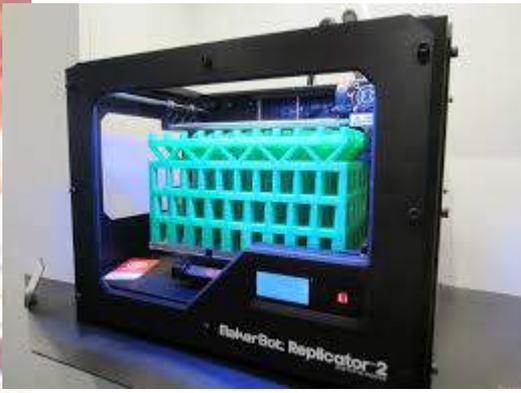


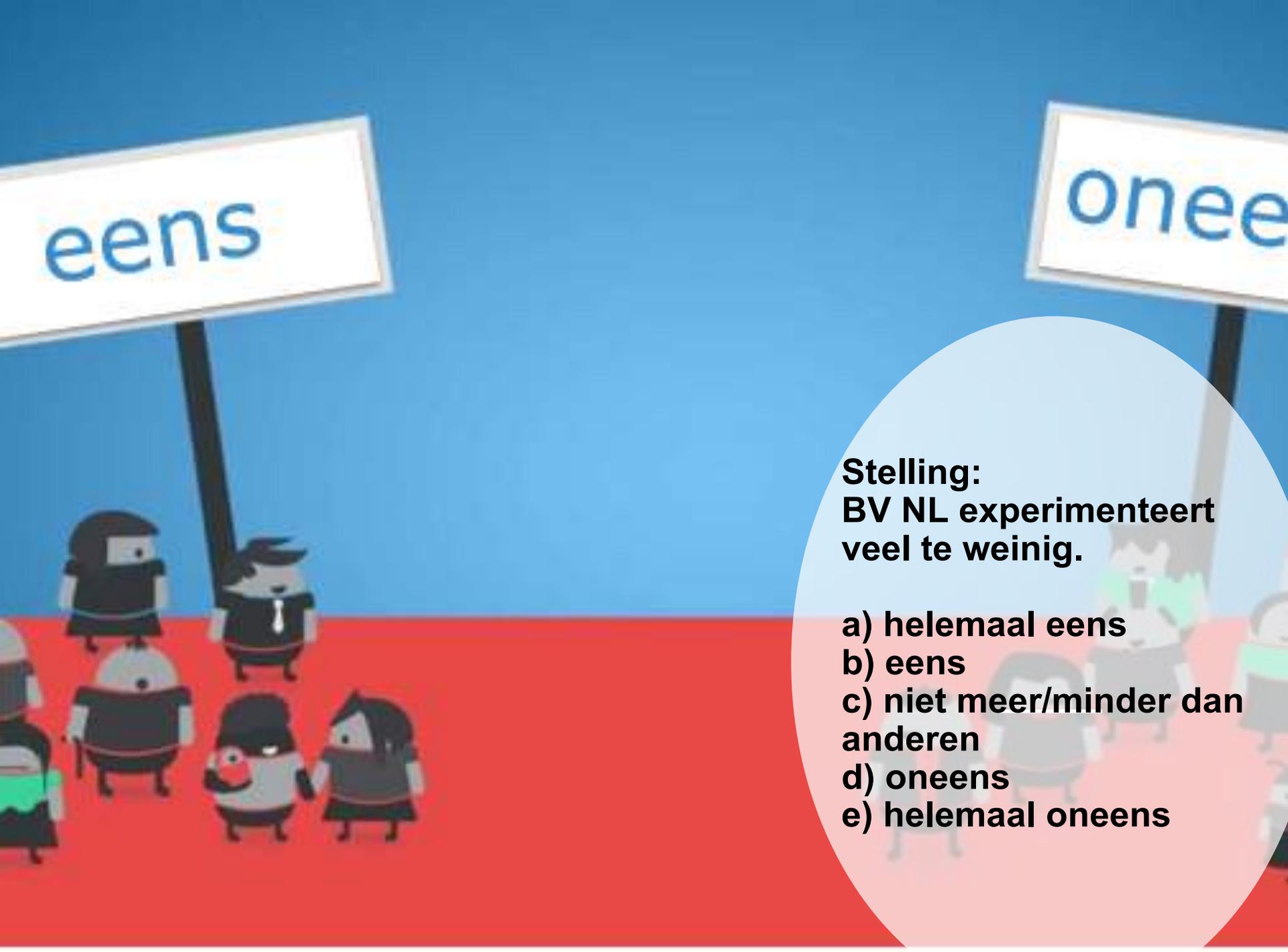
- Comeback Virtual Reality
- 1st phase Masdar city (Abu Dhabi) ready: first complete green technology city, zero waste/carbon
- First moon tourist (Dennis Tito was in 2001 **first space tourist**)
- Batteries 10x longer & faster charged & in smart devices (based upon lithium -ion)
- 3d printing consumer product.
- 10 nanometre chips in mass production (Moore's law ends)

sources: FutureTimeline, Gartner, BITTI.nl



# Are you experimenting with?





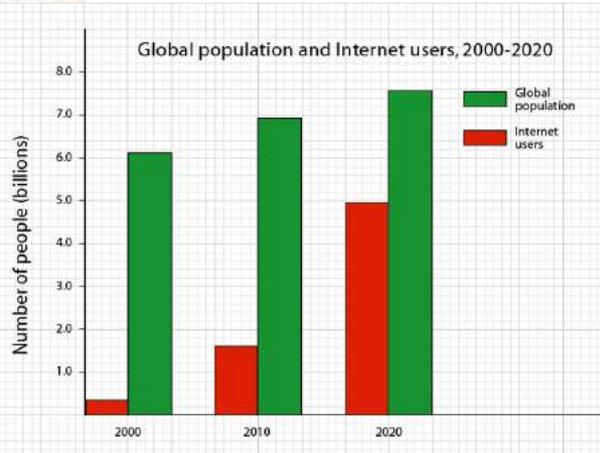
eens

onee

**Stelling:**  
BV NL experimenteert  
veel te weinig.

- a) helemaal eens
- b) eens
- c) niet meer/minder dan  
anderen
- d) oneens
- e) helemaal oneens

# 2020-2030



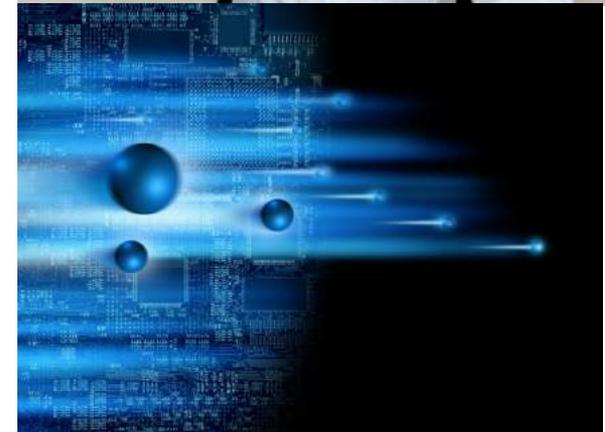
**5G**  
2020



- Internet has 5 biljoen users.
- 5G available
- Texting by thinking
- Energy net is completely intelligent
- > 10,000.... drones worldwide
- Games real-life (e.g. 3d).. & bigger / more intelligent than Google.
- Human A.I. becomes reality
- Groceries without seeing someone

sources: FutureTimeline, Gartner, BITTI.nl

# 2030-2040



- Smart Grids realised in all western countries
  - Most cars will be plug in electric
  - AI is normal usage within organisations
  - Super fast ‘crime-scene investigation’
  - New roles: avatar manager, body part maker, waste data handler
  - Quantum computers anywhere
  - Old computers will receive the
- 03:14:07 UTC on Tuesday,  
19th January 2038 Bug

bronnen: Futuretimeline, Gartner, Wikipedia, BITTI.nl

...EN DOE ER OOK NOG MAAR EEN  
DIEFSTAL VERZEKERINGETJE BIJ!



Stelling:  
Assurance is niet meer nodig in 2030?  
JA, Nee

# Libelium Smart World

## Air Pollution

Control of CO<sub>2</sub> emissions of factories, pollution emitted by cars and toxic gases generated in farms.

## Forest Fire Detection

Monitoring of combustion gases and preemptive fire conditions to define alert zones.

## Wine Quality Enhancing

Monitoring soil moisture and trunk diameter in vineyards to control the amount of sugar in grapes and grapevine health.

## Offspring Care

Control of growing conditions of the offspring in animal farms to ensure its survival and health.

## Sportsmen Care

Vital signs monitoring in high performance centers and fields.

## Structural Health

Monitoring of vibrations and material conditions in buildings, bridges and historical monuments.

## Quality of Shipment Conditions

Monitoring of vibrations, strokes, container openings or cold chain maintenance for insurance purposes.

## Smartphones Detection

Detect iPhone and Android devices and in general any device which works with Wifi or Bluetooth interfaces.

## Perimeter Access Control

Access control to restricted areas and detection of people in non-authorized areas.

## Radiation Levels

Distributed measurement of radiation levels in nuclear power stations surroundings to generate leakage alerts.

## Electromagnetic Levels

Measurement of the energy radiated by cell stations and WiFi routers.

## Traffic Congestion

Monitoring of vehicles and pedestrian affluence to optimize driving and walking routes.

## Smart Roads

Warning messages and diversions according to climate conditions and unexpected events like accidents or traffic jams.

## Smart Lighting

Intelligent and weather adaptive lighting in street lights.

## Intelligent Shopping

Getting advices in the point of sale according to customer habits, preferences, presence of allergic components for them or expiring dates.

## Noise Urban Maps

Sound monitoring in bar areas and centric zones in real time.

## Water Leakages

Detection of liquid presence outside tanks and pressure variations along pipes.

## Vehicle Auto-diagnosis

Information collection from CanBus to send real time alarms to emergencies or provide advice to drivers.

## Item Location

Search of individual items in big surfaces like warehouses or harbours.

## Waste Management

Detection of rubbish levels in containers to optimize the trash collection routes.

## Smart Parking

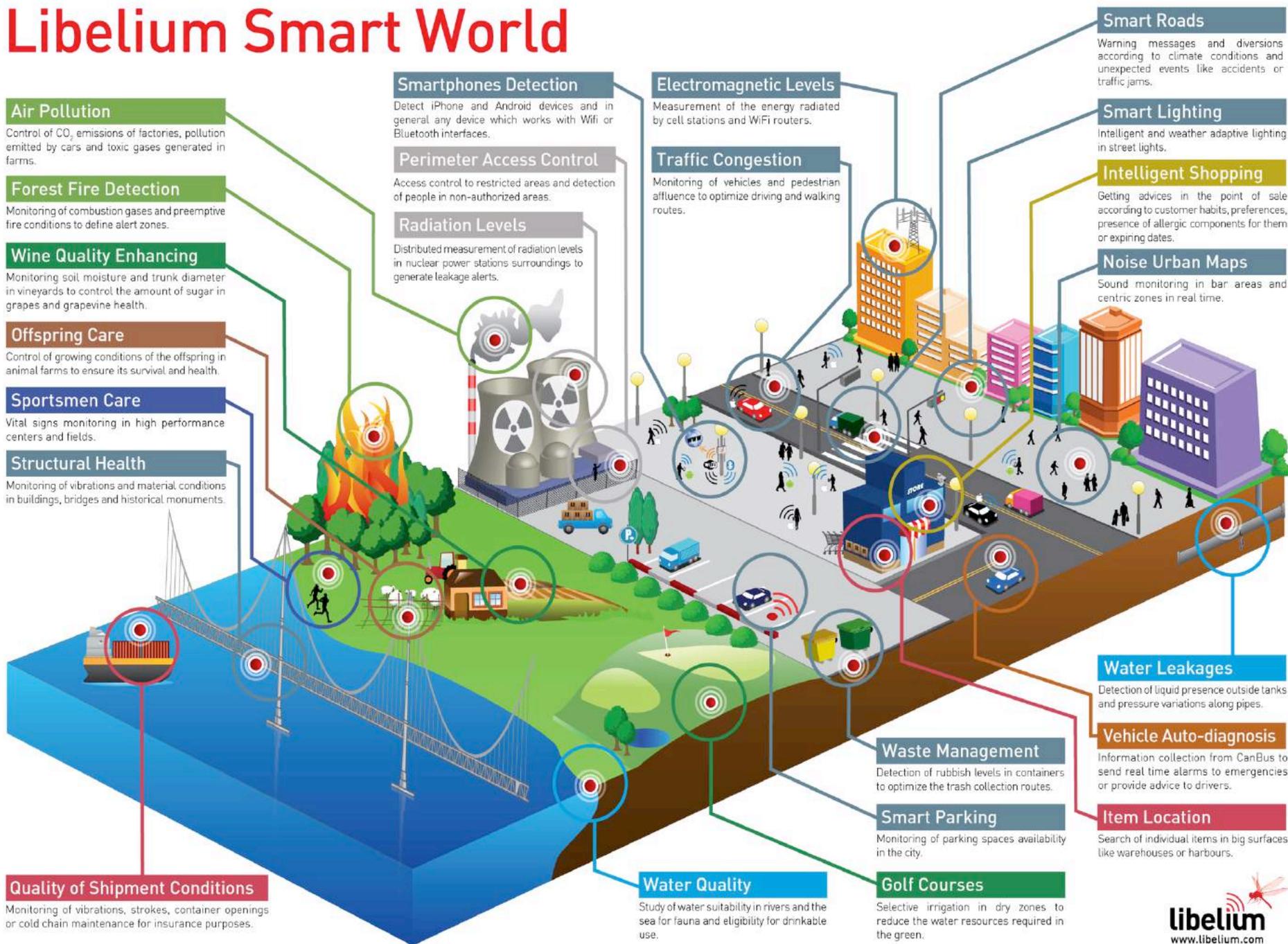
Monitoring of parking spaces availability in the city.

## Golf Courses

Selective irrigation in dry zones to reduce the water resources required in the green.

## Water Quality

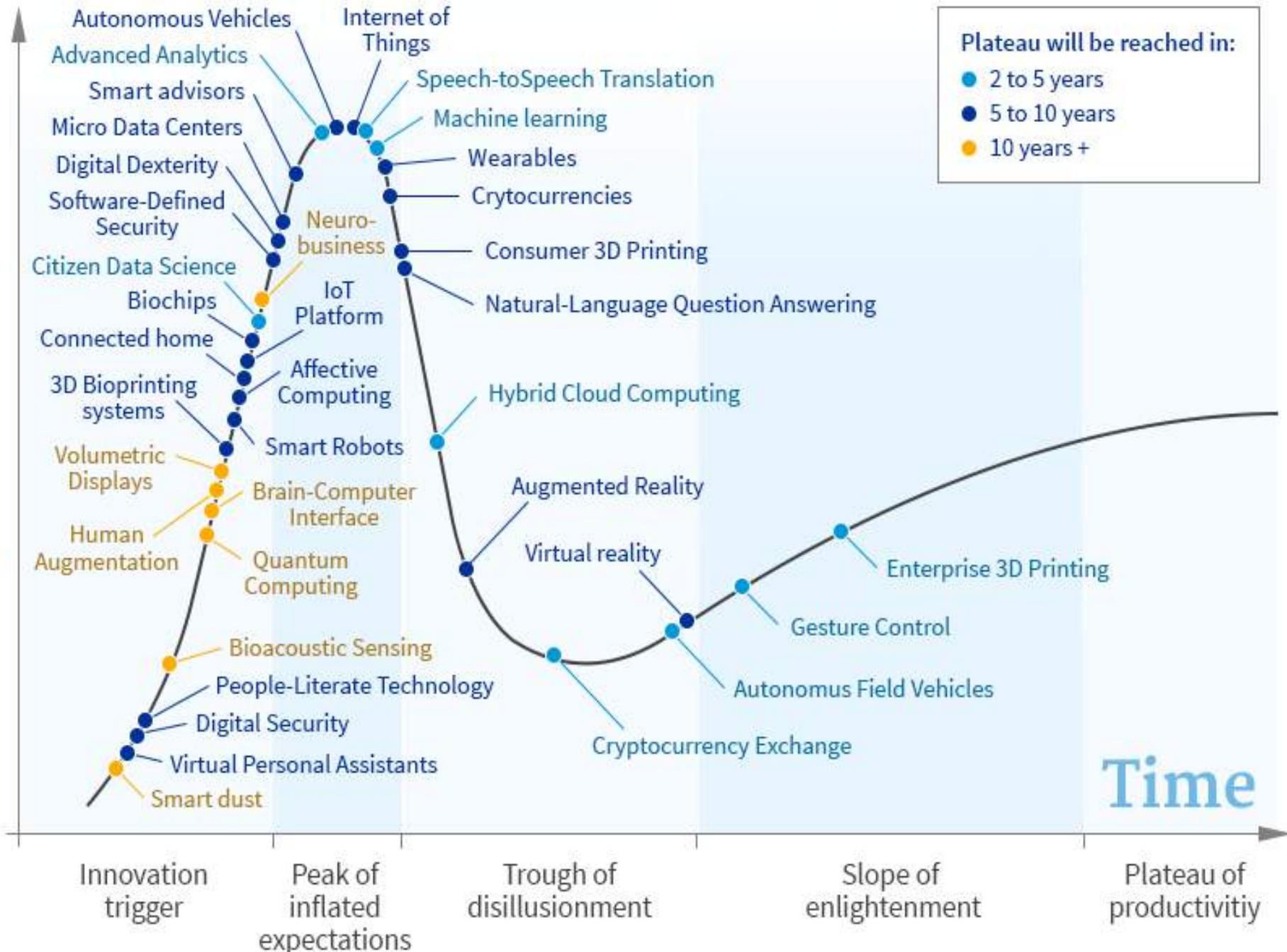
Study of water suitability in rivers and the sea for fauna and eligibility for drinkable use.



Expectations

Plateau will be reached in:

- 2 to 5 years
- 5 to 10 years
- 10 years +



## CURRENT STATE

### BI/DW CHALLENGES

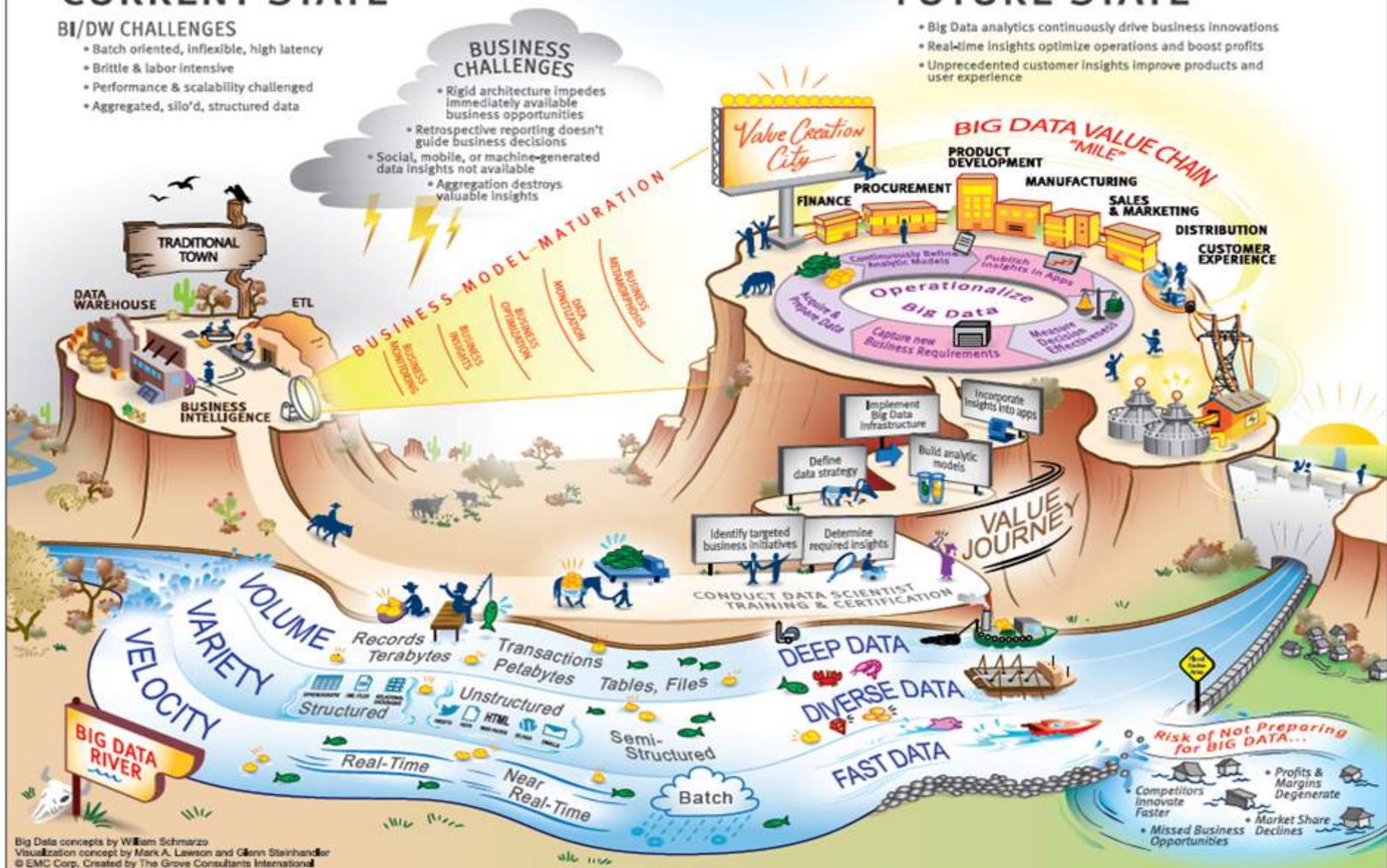
- Batch oriented, inflexible, high latency
- Brittle & labor intensive
- Performance & scalability challenged
- Aggregated, silo'd, structured data

### BUSINESS CHALLENGES

- Rigid architecture impedes immediately available business opportunities
- Retrospective reporting doesn't guide business decisions
- Social, mobile, or machine-generated data insights not available
- Aggregation destroys valuable insights

## FUTURE STATE

- Big Data analytics continuously drive business innovations
- Real-time insights optimize operations and boost profits
- Unprecedented customer insights improve products and user experience



# MODERN DATA SCIENTIST

Data Scientist, the sexiest job of 21st century requires a mixture of multidisciplinary skills ranging from an intersection of mathematics, statistics, computer science, communication and business. Finding a data scientist is hard. Finding people who understand who a data scientist is, is equally hard. So here is a little cheat sheet on who the modern data scientist really is.

Big data  
scientists rollen

Big Data  
Check rollen (e.g.  
Facebook)

---

## MATH & STATISTICS

- ☆ Machine learning
- ☆ Statistical modeling
- ☆ Experiment design
- ☆ Bayesian inference
- ☆ Supervised learning: decision trees, random forests, logistic regression
- ☆ Unsupervised learning: clustering, dimensionality reduction
- ☆ Optimization: gradient descent and variants

## DOMAIN KNOWLEDGE & SOFT SKILLS

- ☆ Passionate about the business
- ☆ Curious about data
- ☆ Influence without authority
- ☆ Hacker mindset
- ☆ Problem solver
- ☆ Strategic, proactive, creative, innovative and collaborative

## PROGRAMMING & DATABASE

- ☆ Computer science fundamentals
- ☆ Scripting language e.g. Python
- ☆ Statistical computing package e.g. R
- ☆ Databases SQL and NoSQL
- ☆ Relational algebra
- ☆ Parallel databases and parallel query processing
- ☆ MapReduce concepts
- ☆ Hadoop and Hive/Pig
- ☆ Custom reducers
- ☆ Experience with xaaS like AWS

## COMMUNICATION & VISUALIZATION

- ☆ Able to engage with senior management
- ☆ Story telling skills
- ☆ Translate data-driven insights into decisions and actions
- ☆ Visual art design
- ☆ R packages like ggplot or lattice
- ☆ Knowledge of any of visualization tools e.g. Flare, D3.js, Tableau



# 4 V's in Big Data

**40 ZETTABYTES**  
[ 43 TRILLION GIGABYTES ]  
of data will be created by 2020, an increase of 300 times from 2005



## Volume SCALE OF DATA

It's estimated that **2.5 QUINTILLION BYTES** [ 2.3 TRILLION GIGABYTES ] of data are created each day



Most companies in the U.S. have at least **100 TERABYTES** [ 100,000 GIGABYTES ] of data stored



## The FOUR V's of Big Data

From traffic patterns and music downloads to web history and medical records, data is recorded, stored, and analyzed to enable the technology and services that the world relies on every day. But what exactly is big data, and how can these massive amounts of data be used?

As a leader in the sector, IBM data scientists break big data into four dimensions: **Volume, Velocity, Variety and Veracity**

Depending on the industry and organization, big data encompasses information from multiple internal and external sources such as transactions, social media, enterprise content, sensors and mobile devices. Companies can leverage data to adapt their products and services to better meet customer needs, optimize operations and infrastructure, and find new sources of revenue.

By 2015 **4.4 MILLION IT JOBS** will be created globally to support big data, with 1.9 million in the United States



As of 2011, the global size of data in healthcare was estimated to be

**150 EXABYTES**  
[ 151 BILLION GIGABYTES ]



**30 BILLION PIECES OF CONTENT** are shared on Facebook every month



By 2014, it's anticipated there will be **420 MILLION WEARABLE, WIRELESS HEALTH MONITORS**

**4 BILLION+ HOURS OF VIDEO** are watched on YouTube each month



**400 MILLION TWEETS** are sent per day by about 200 million monthly active users



## Variety DIFFERENT FORMS OF DATA

The New York Stock Exchange captures **1 TB OF TRADE INFORMATION** during each trading session



## Velocity ANALYSIS OF STREAMING DATA

Modern cars have close to **100 SENSORS** that monitor items such as fuel level and tire pressure



By 2016, it is projected there will be **18.9 BILLION NETWORK CONNECTIONS**

— almost 2.5 connections per person on earth



**1 IN 3 BUSINESS LEADERS**

don't trust the information they use to make decisions



**27% OF RESPONDENTS**

in one survey were unsure of how much of their data was inaccurate

## Veracity UNCERTAINTY OF DATA

Poor data quality costs the US economy around

**\$3.1 TRILLION A YEAR**



# What Happens in an Internet Minute?



**Vraag:  
Welke kansen  
biedt big data  
voor de Cxxx?**

## And Future Growth is Staggering



# Who's Generating Big (IoT) Data



**Social media and networks**



**Scientific instruments**



**Mobile devices**



**Sensor technology and networks**

- The progress and innovation is no longer hindered by the ability to collect data
- But, by the ability to manage, analyze, summarize, visualize, and discover knowledge from the collected data in a timely manner and in a scalable fashion

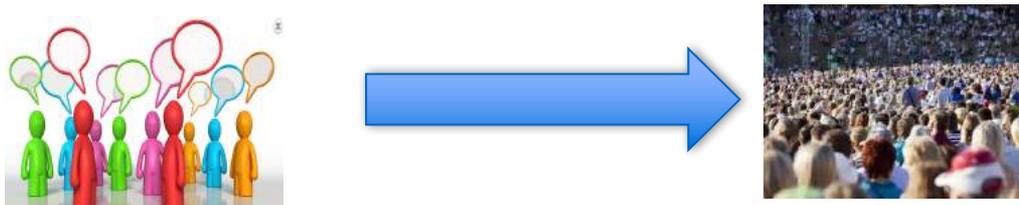
# The Model Has Changed...

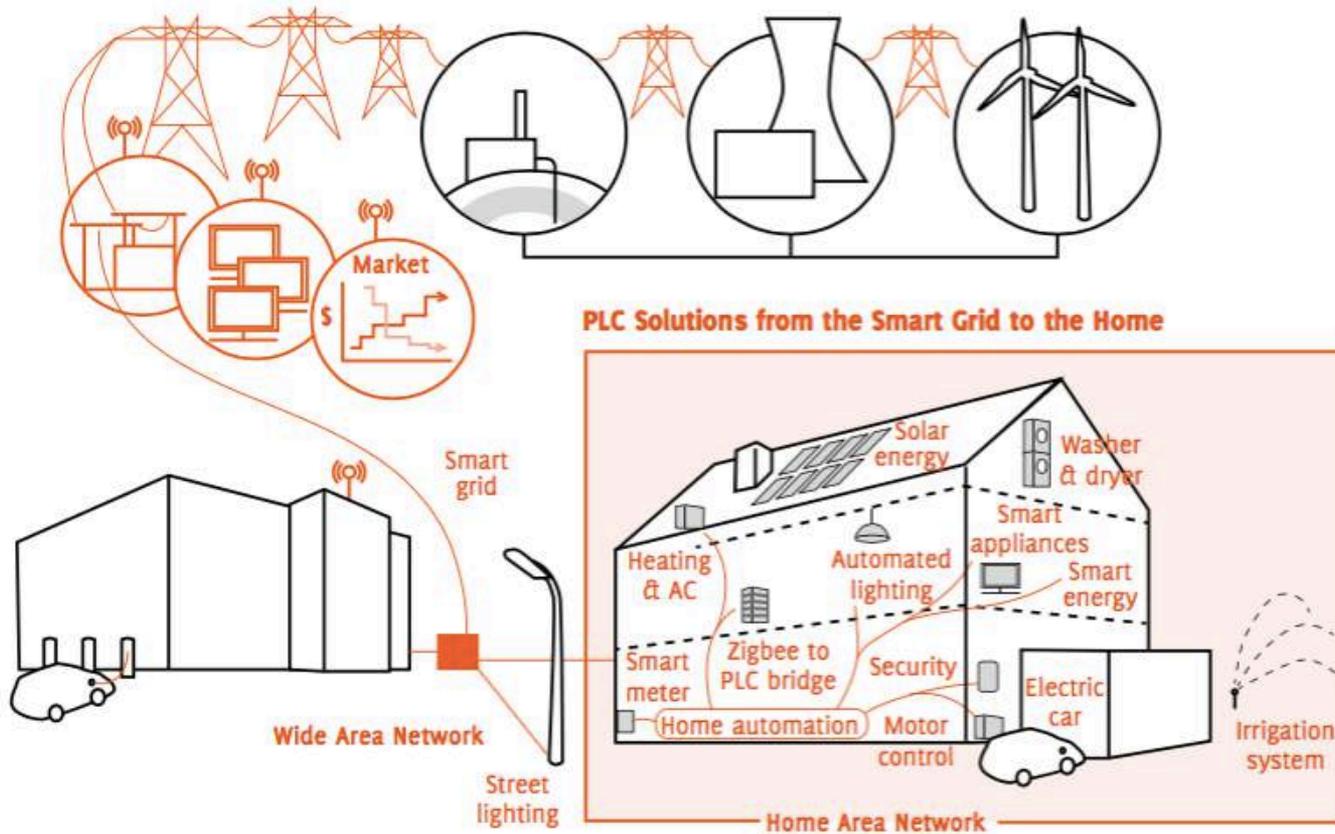
- **The Model of Generating/Consuming Data has Changed**

Old Model:

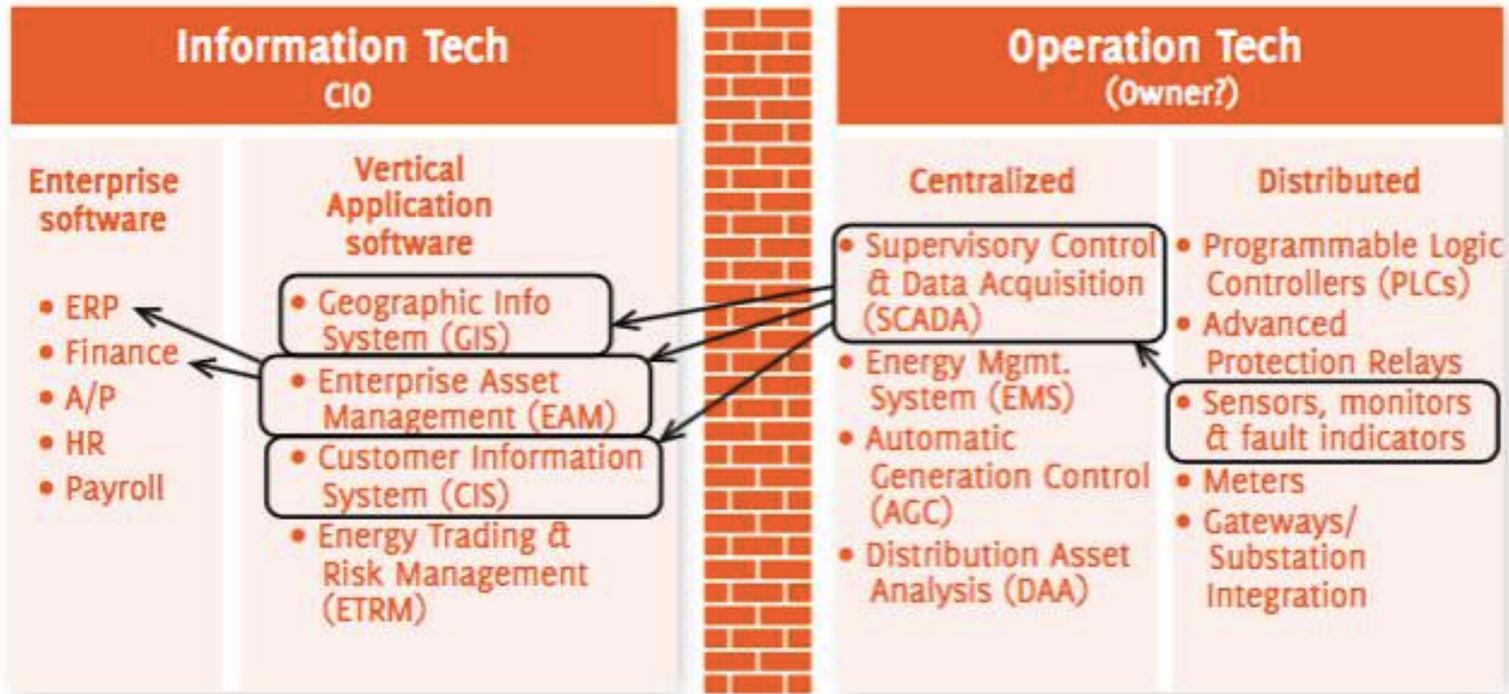


New Model:



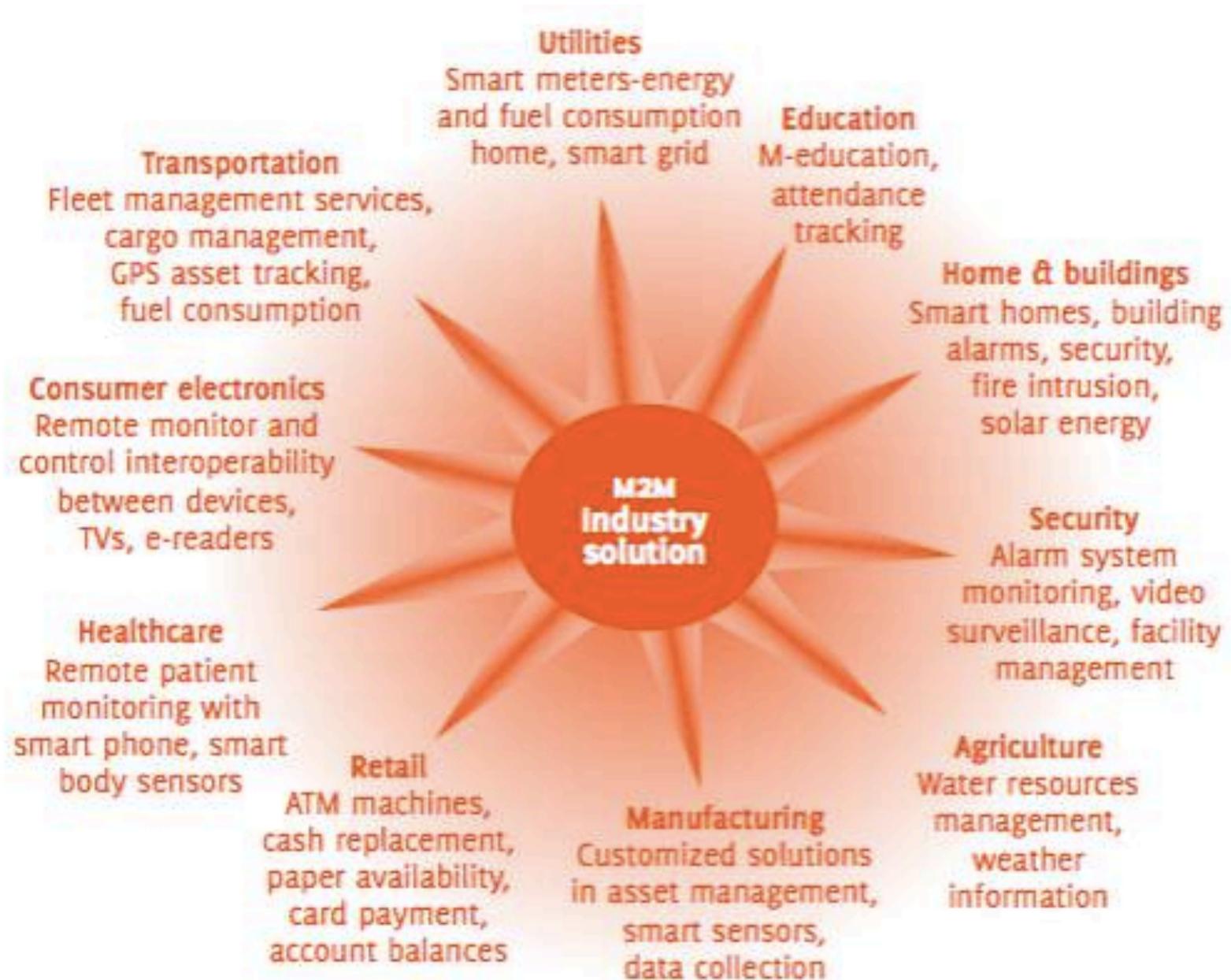


**De wereld wordt steeds leuker?  
Ja / Nee**



Testen, Kwaliteit en assurance worden steeds moeilijker → Cloud Risk?  
Ja, Nee, anders

# Werkgebieden van de toekomst?



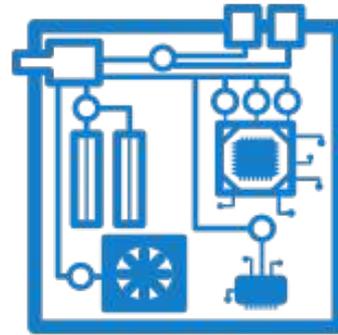
Triggers



Data Visualization



Asset Tracking



Your Hardware

Remote Monitoring



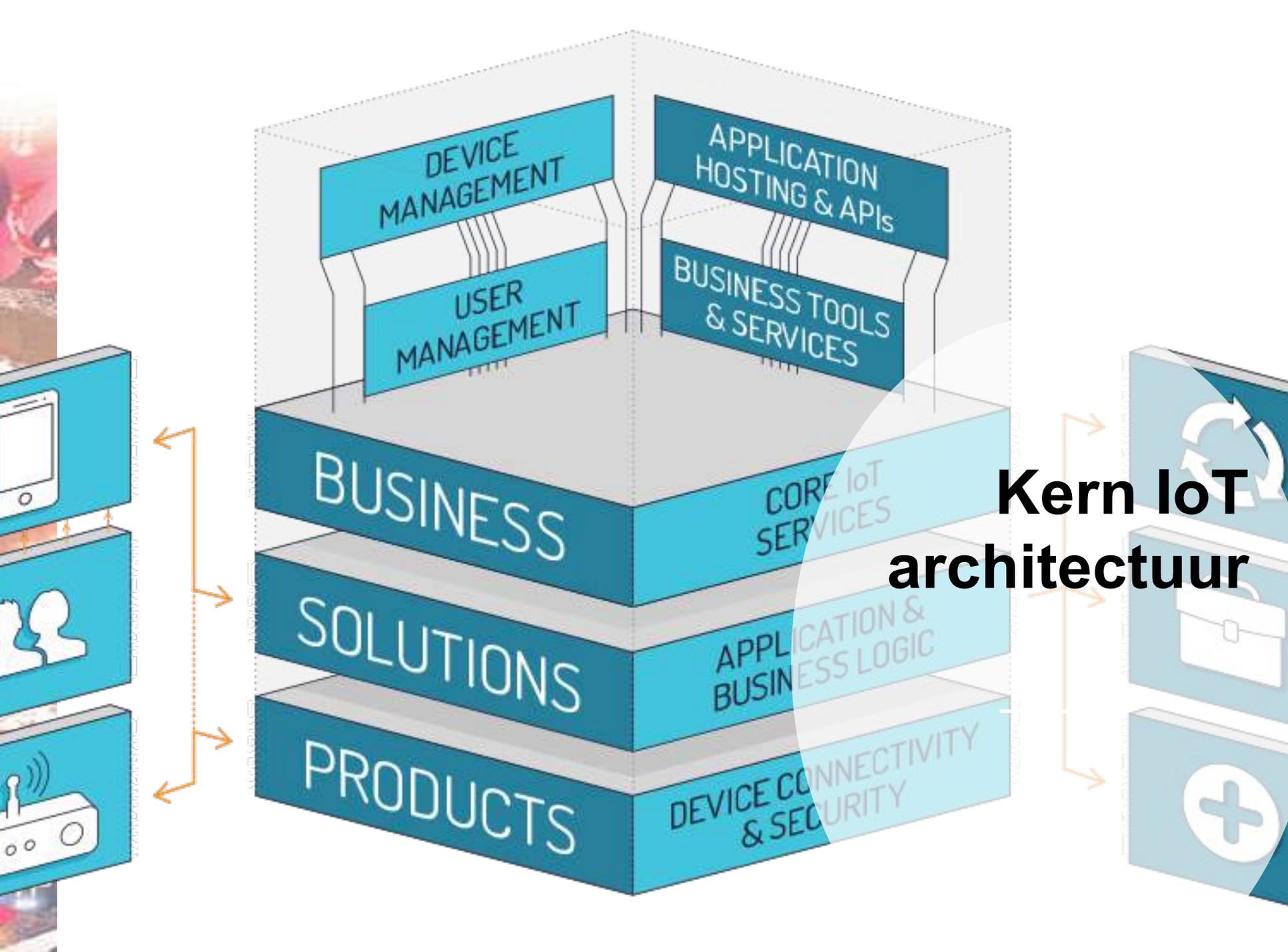
**IoT  
functionalitei  
ten**

IoT Cloud

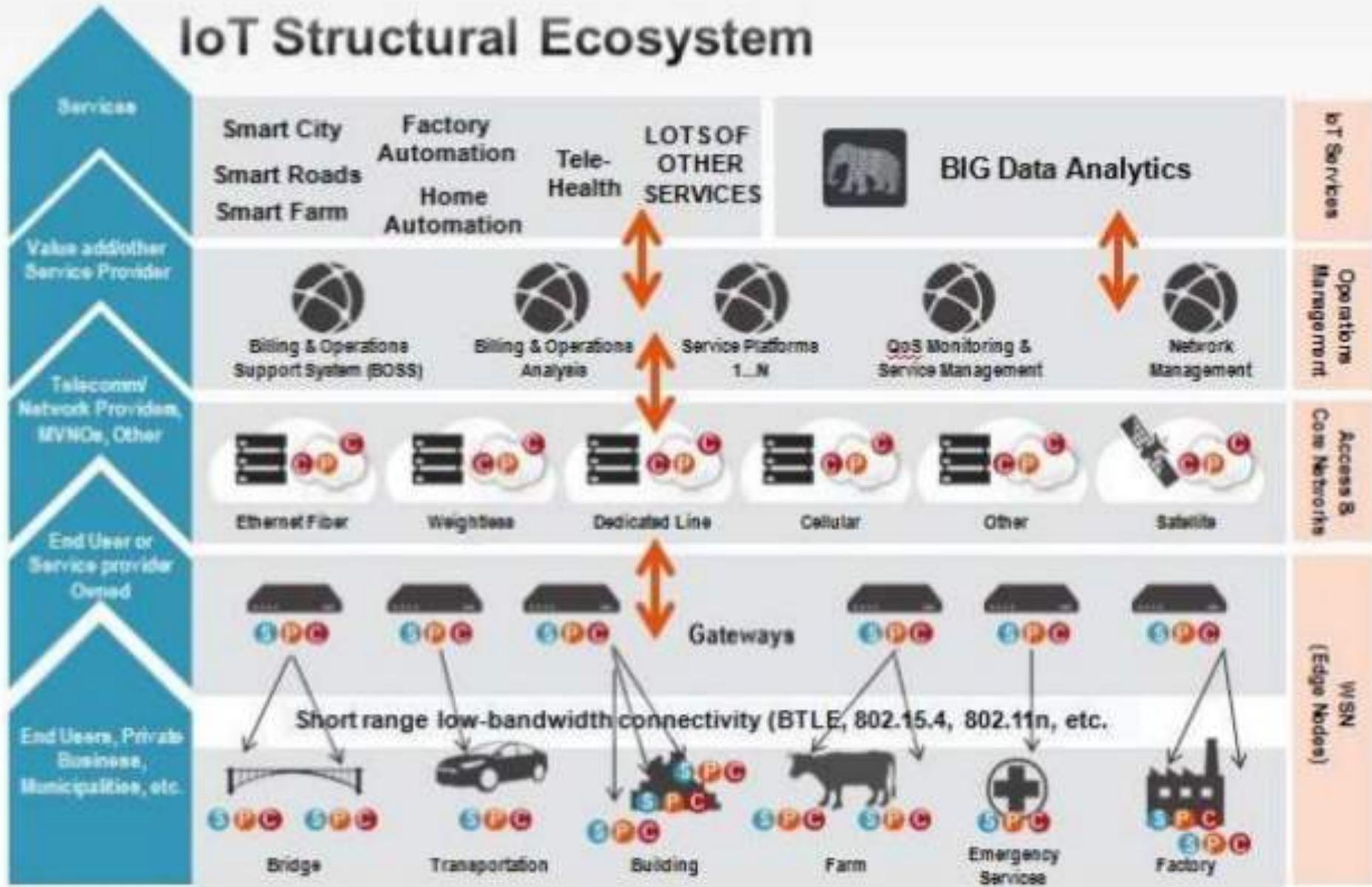


SMS & Email Alerts



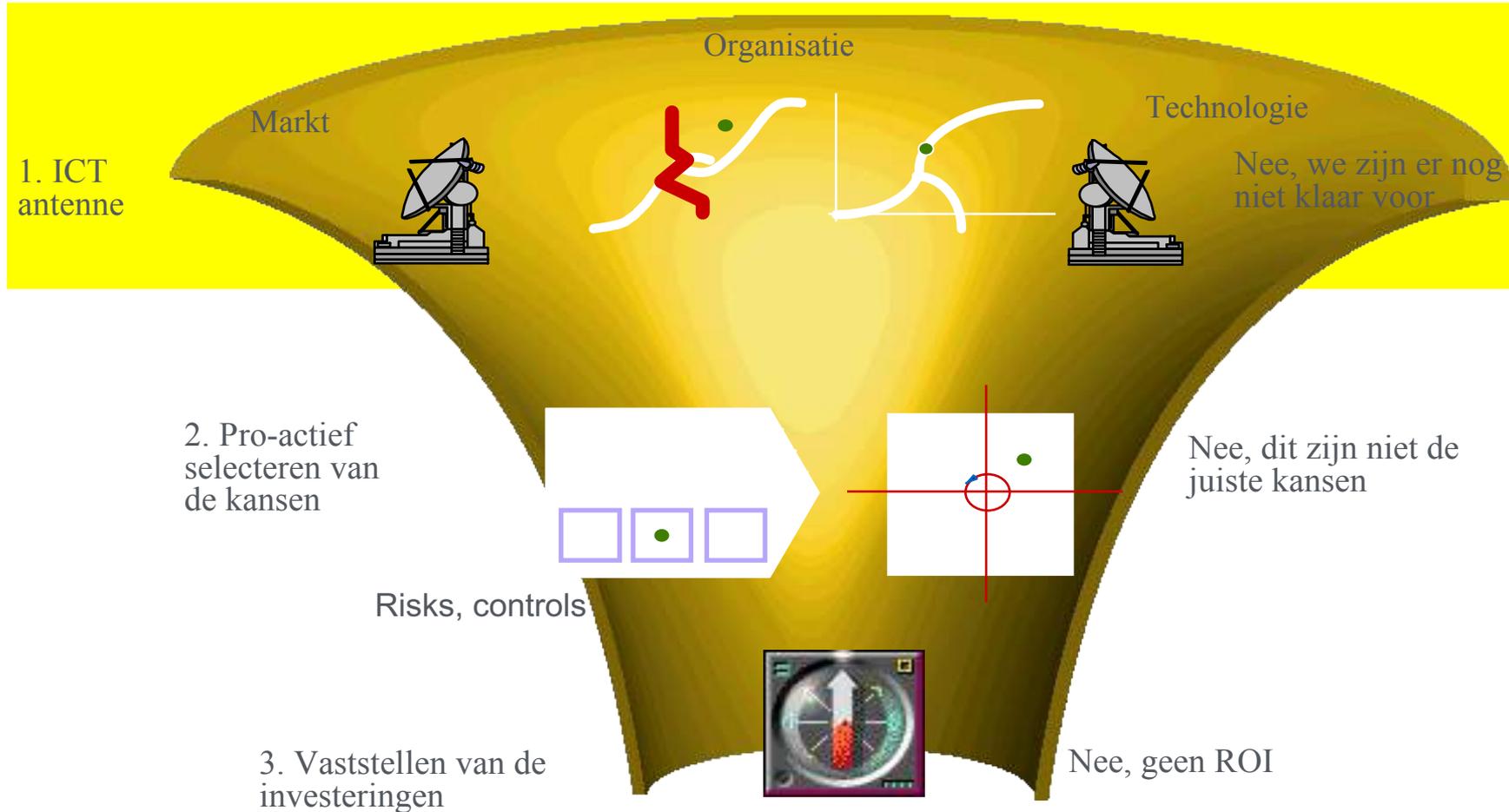


# IoT Structural Ecosystem

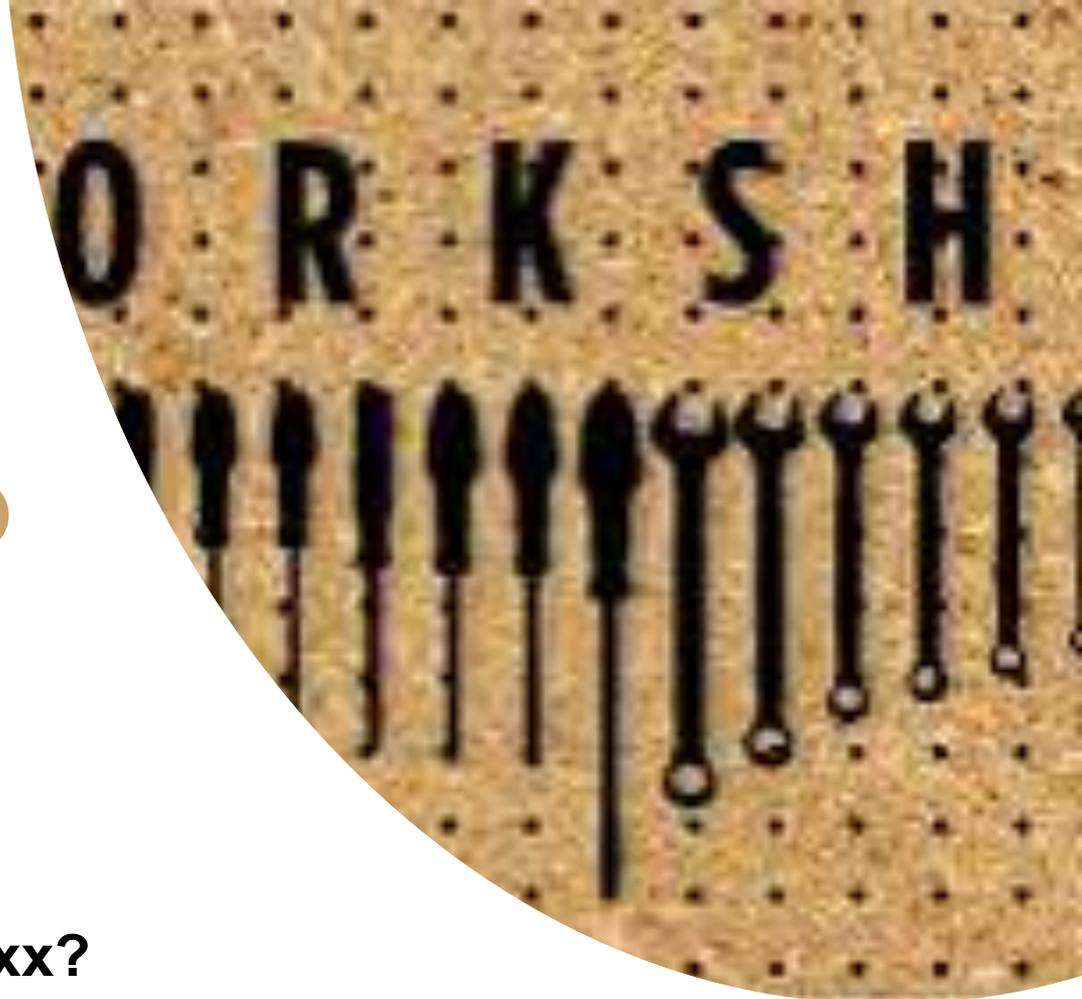




# Op tijd investeren in de juiste technologie is een kwestie van gefundeerde keuzes ...



*Waar staan we en wat gaan we doen?*



WORKSH

**Discussie,  
Wat betekent dit voor Cxxx?  
(denk aan verhalen Big Data,  
Blockchain en IoT)**

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