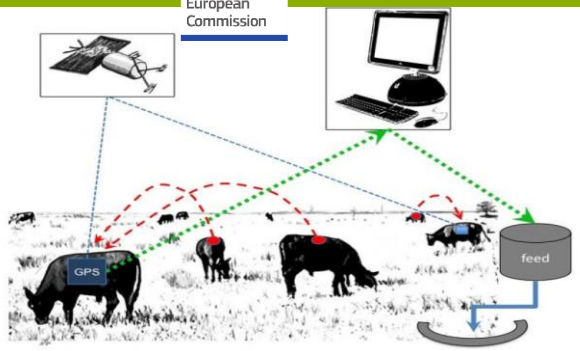
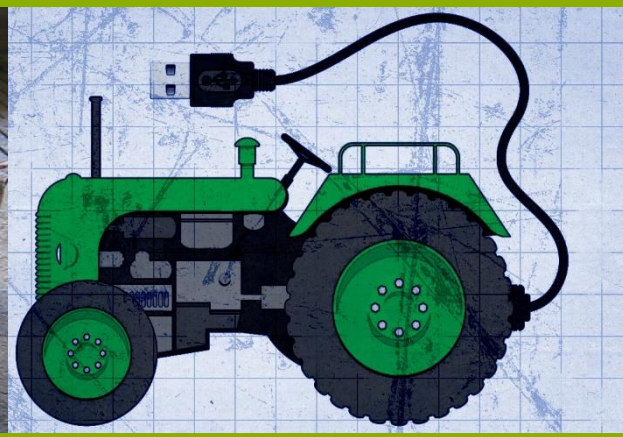
KU LEUVEN

European Commission

AGROLINK FLANDERS



Unlocking the potential of digitisation in Farming



UNIVERSITEIT GENT

4D4F
Data Driven Dairy Decisions for Farmers

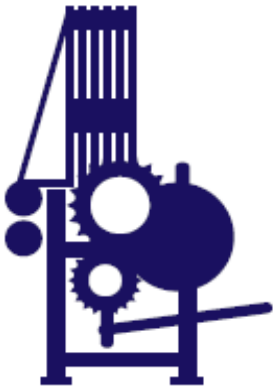
ILVO
Instituut voor Landbouw- en Visserijonderzoek

Yes, there is a huge challenge!

Source: World Resources Institute

Precision Farming can do this

4th revolution



First mechanical loom
1784

First production line,
Cincinnati slaughterhouses
1870

First programmable logic controller
(PLC), Modicon 084
1969

4. industrial revolution
based on Cyber-Physical
Systemss

3. industrial revolution
uses electronics and IT to
achieve further automation
of manufacturing

2. industrial revolution
follows introduction of
electrically-powered mass
production based on the
division of labour

1. industrial revolution
follows introduction of
water- and steam-powered
mechanical manufacturing
facilities

complexity

time

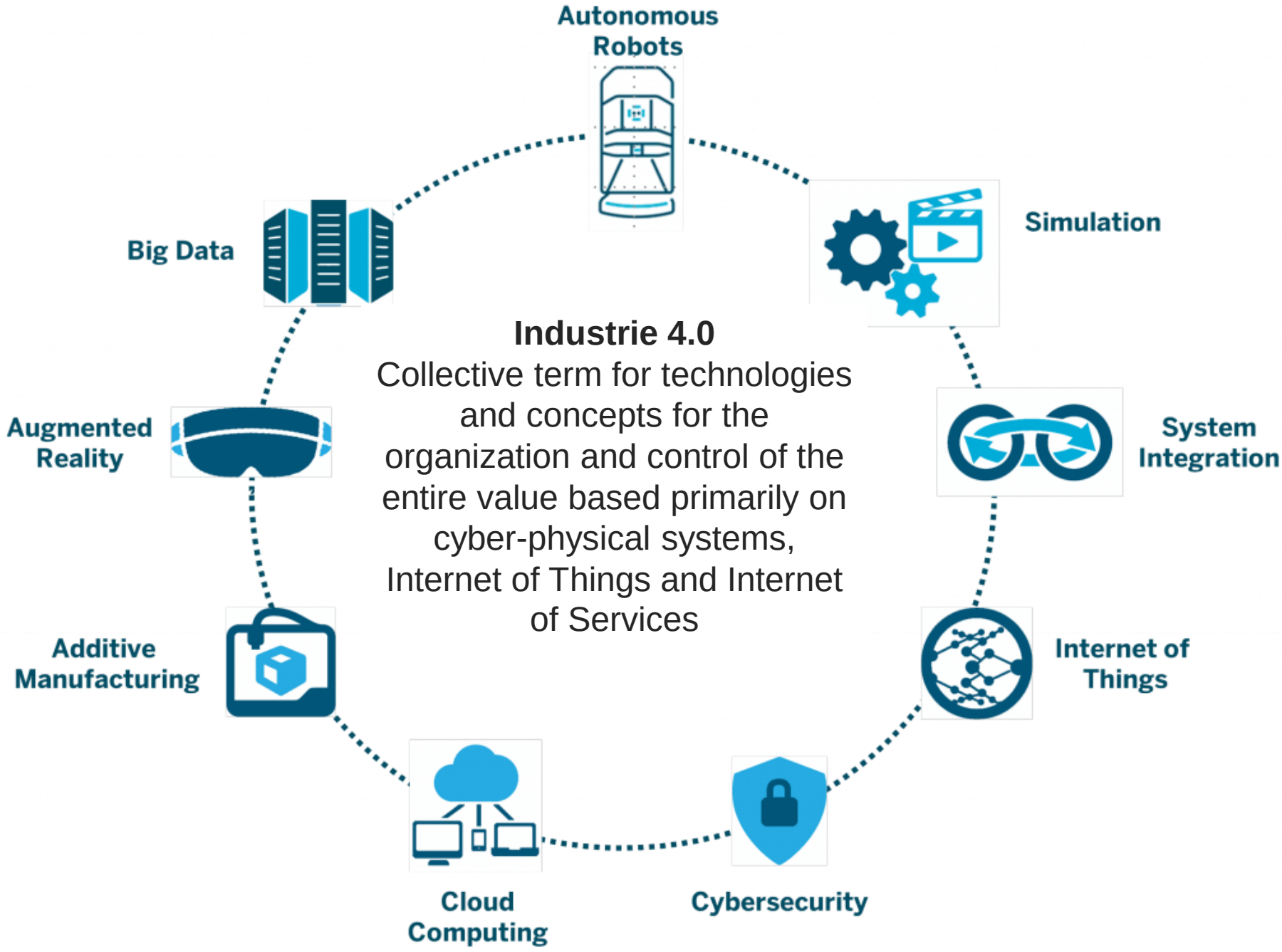
End of
18th century

Start of
20th century

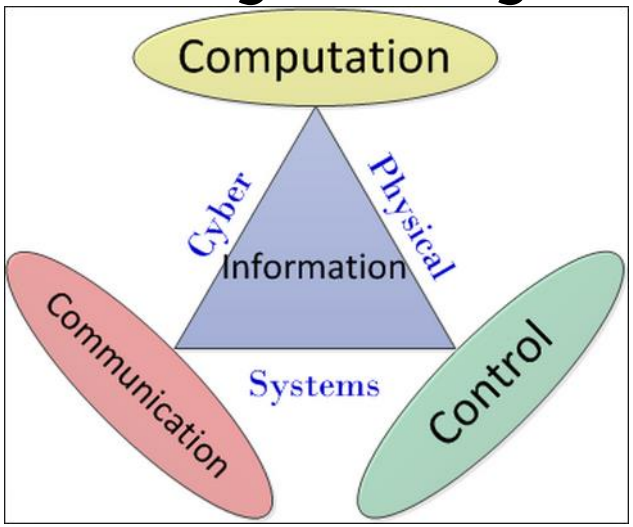
Start of 1970s

today

Source: DFKI 2011

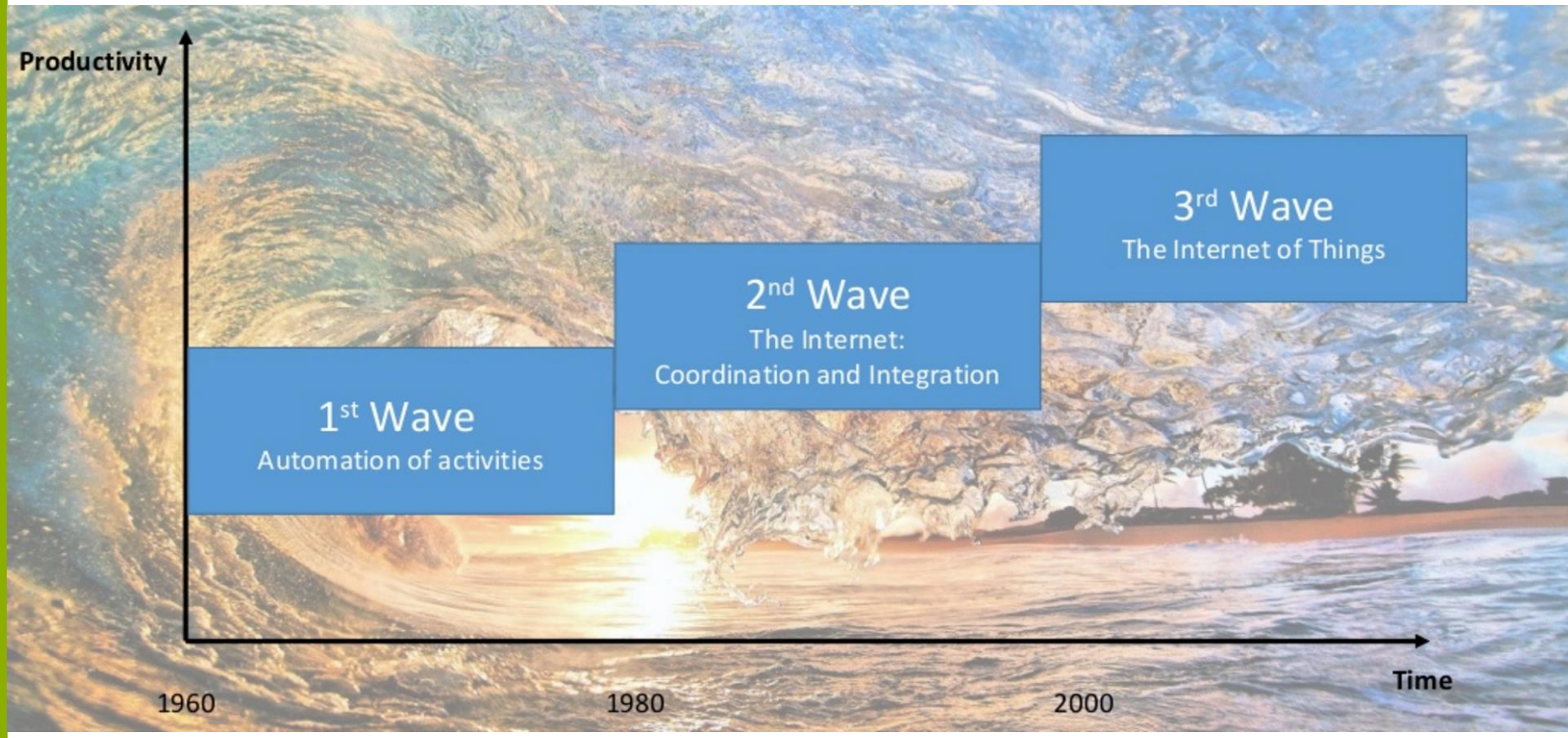

Autonomous Robots
Simulation
System Integration
Internet of Things
Cybersecurity
Cloud Computing
Additive Manufacturing
Augmented Reality
Big Data
Industrie 4.0
Collective term for technologies and concepts for the organization and control of the entire value based primarily on cyber-physical systems, Internet of Things and Internet of Services

Cyber-fysic system?



- Integration of the virtual and physical worlds
- Intelligence, control and communication elements built into physical systems work together to monitor, control and integrate these systems.
- Complex combination of large numbers of sensors and actuators are intelligent machines, with high autonomy, intelligence and connectivity through the integration of low-cost technology such as sensors, ICT applications, open source controller platforms

What is IOT?

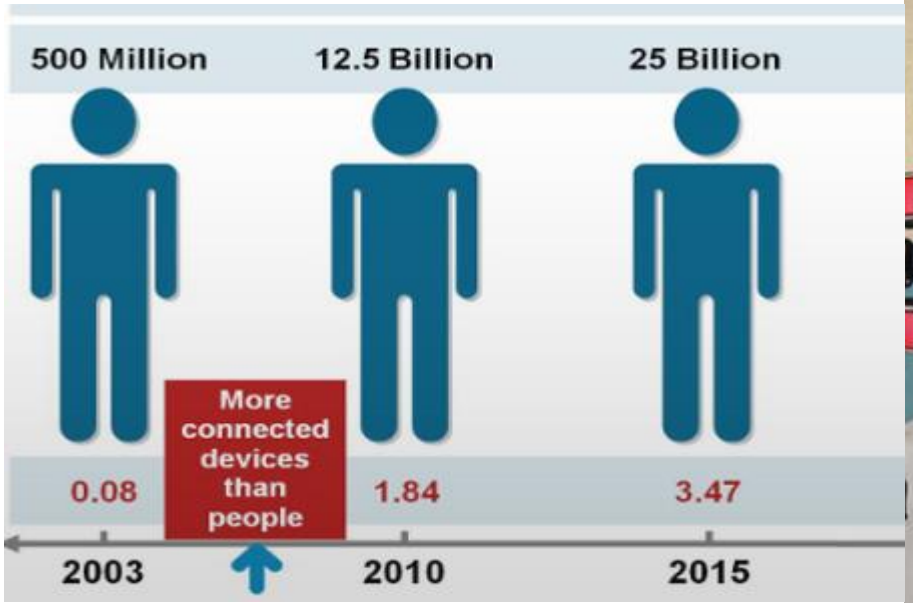


Now IT is embedded in products themselves creating smart connected objects

Porter and Heppelmann, Harvard Business Review, 2014

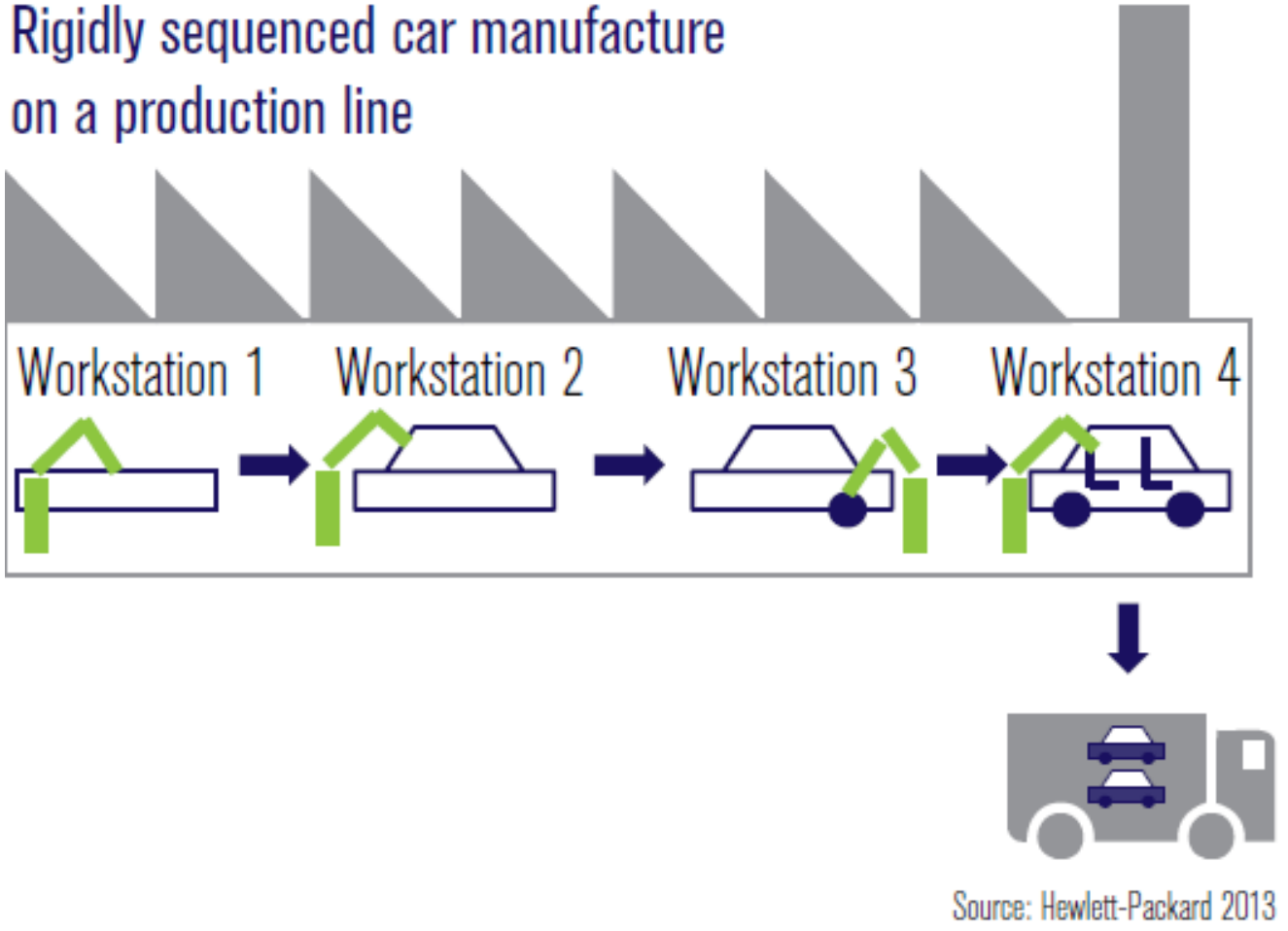
What is IOT?

- combination of **sensors** and tiny **devices embedded** in physical objects and linked through **wired and wireless networks** that generate huge data volumes analysed in dedicated applications.

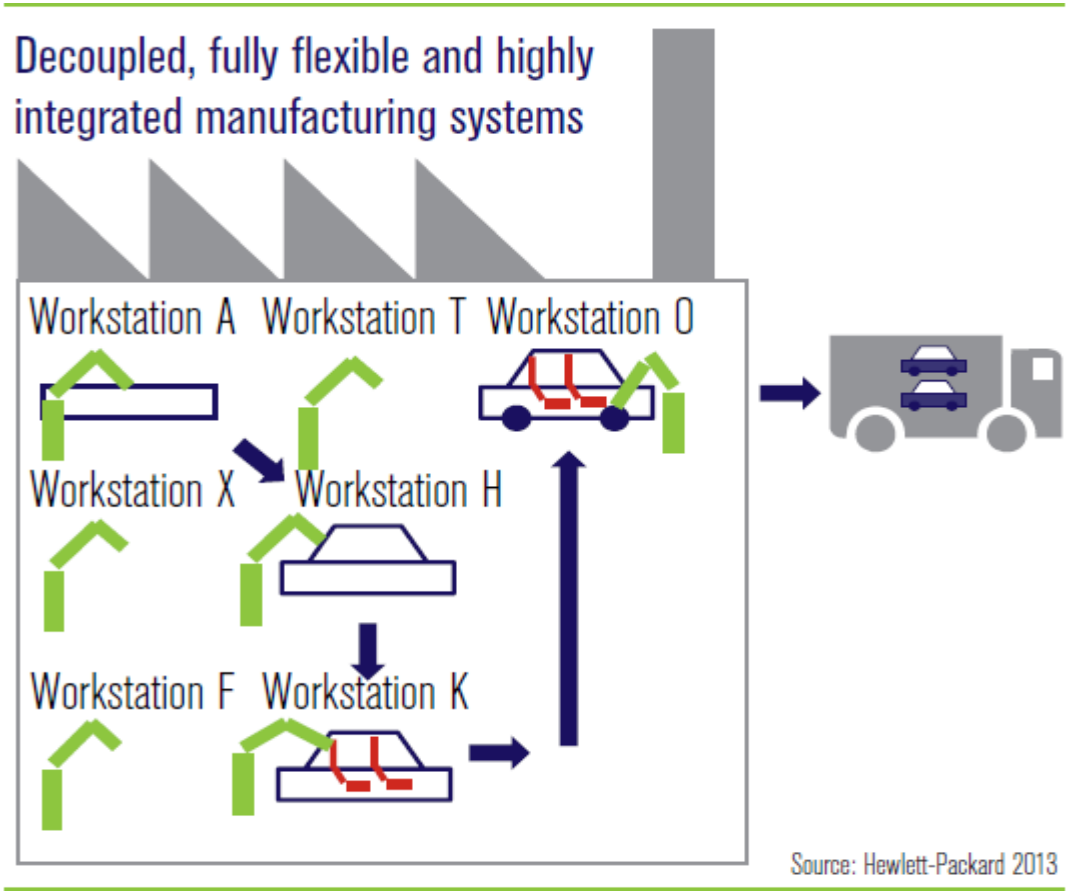


M. Chui, M. Löffler, and R. Roberts. 'The Internet of Things'. McKinsey Quarterly, 2010.

Example?



- Static production
- Difficult to reconfigure



- Dynamic production
- Autonomic movement between workstations
- Individual variations

Precision farming + Digitalisation

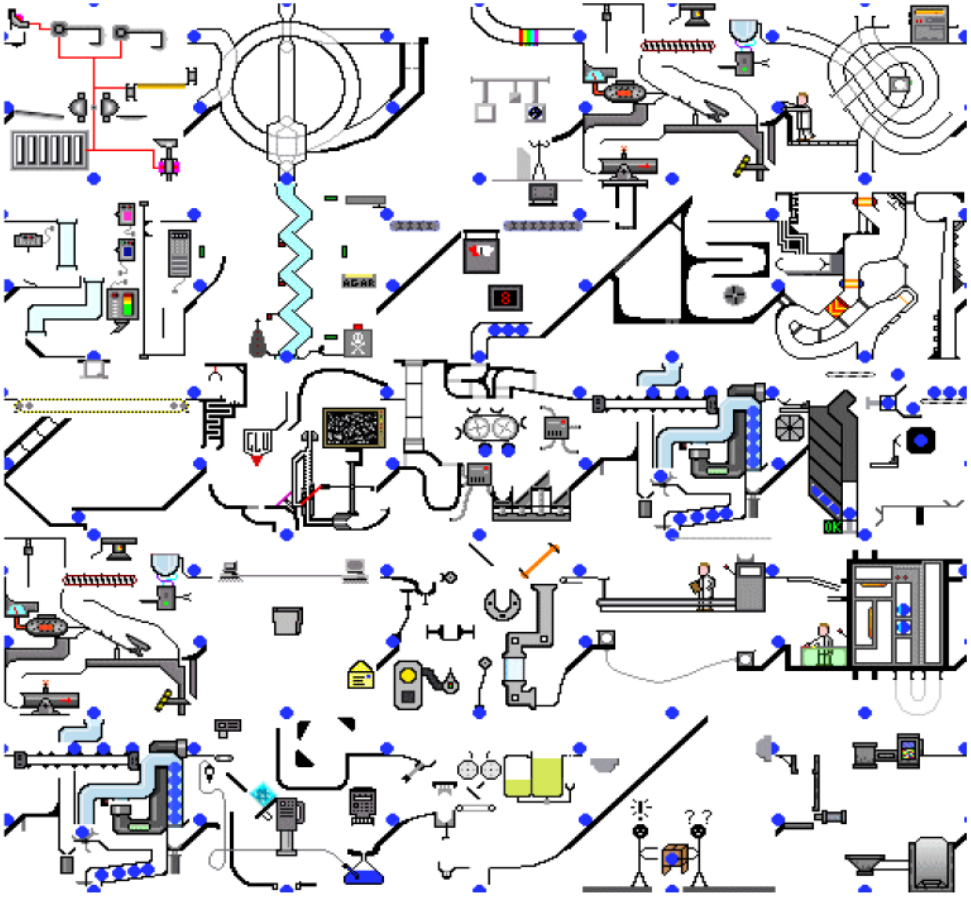
FARMING 4.0 = Smart Digital Farming

Combined with

- Apps stores & cloud services (ICT-trends):
  - The internet is everywhere

- Social media: direct and immediate contact between stakeholders

In future



- Data stream>
- Money & Materials

Need for a new internet: Internet of Things

Smart Digital Farming

- = ranked as the technological opportunity with the highest expected positive impact on society Global Opportunity Report (2016)

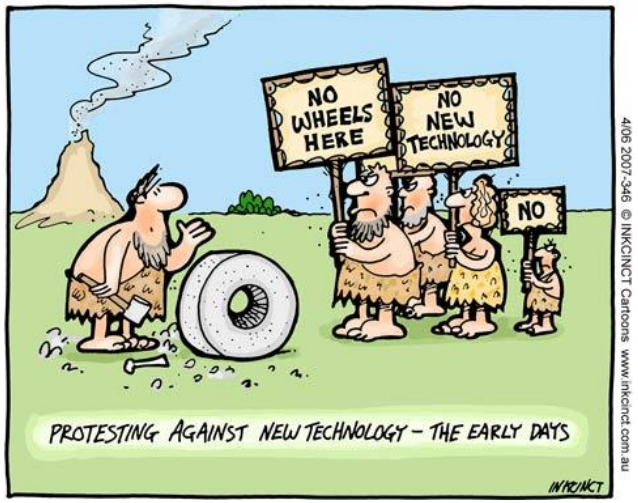
Does the future look bright?

- Digital progress
- Adoption
- Penetration
- Digital capacity

=>lower than expected

e.g. 35% smart spreaders

Try to identify the main reasons behind the current lack of adoption, and identifying the key barriers to the implementation of Precision Farming on European farms.

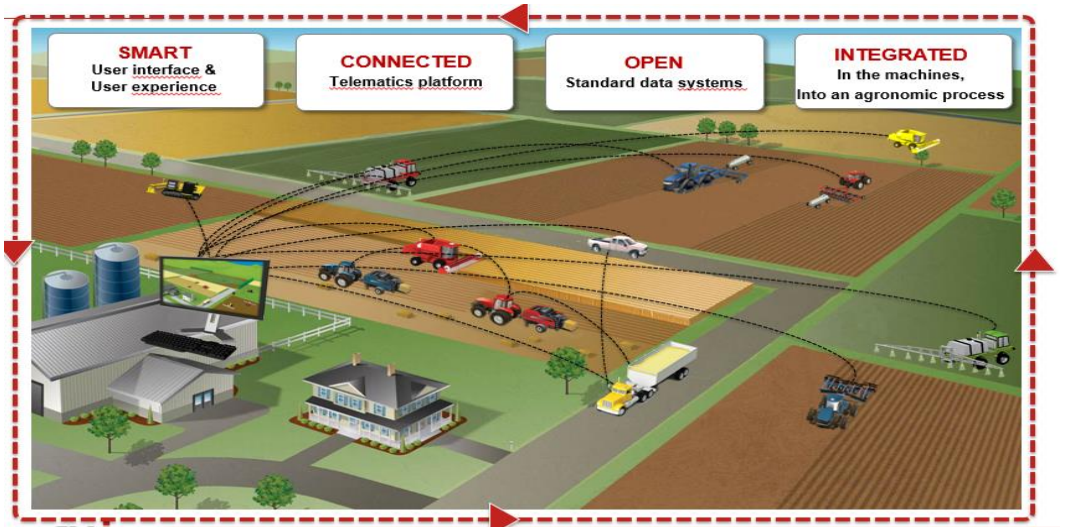


Need for smart digital ecosystems

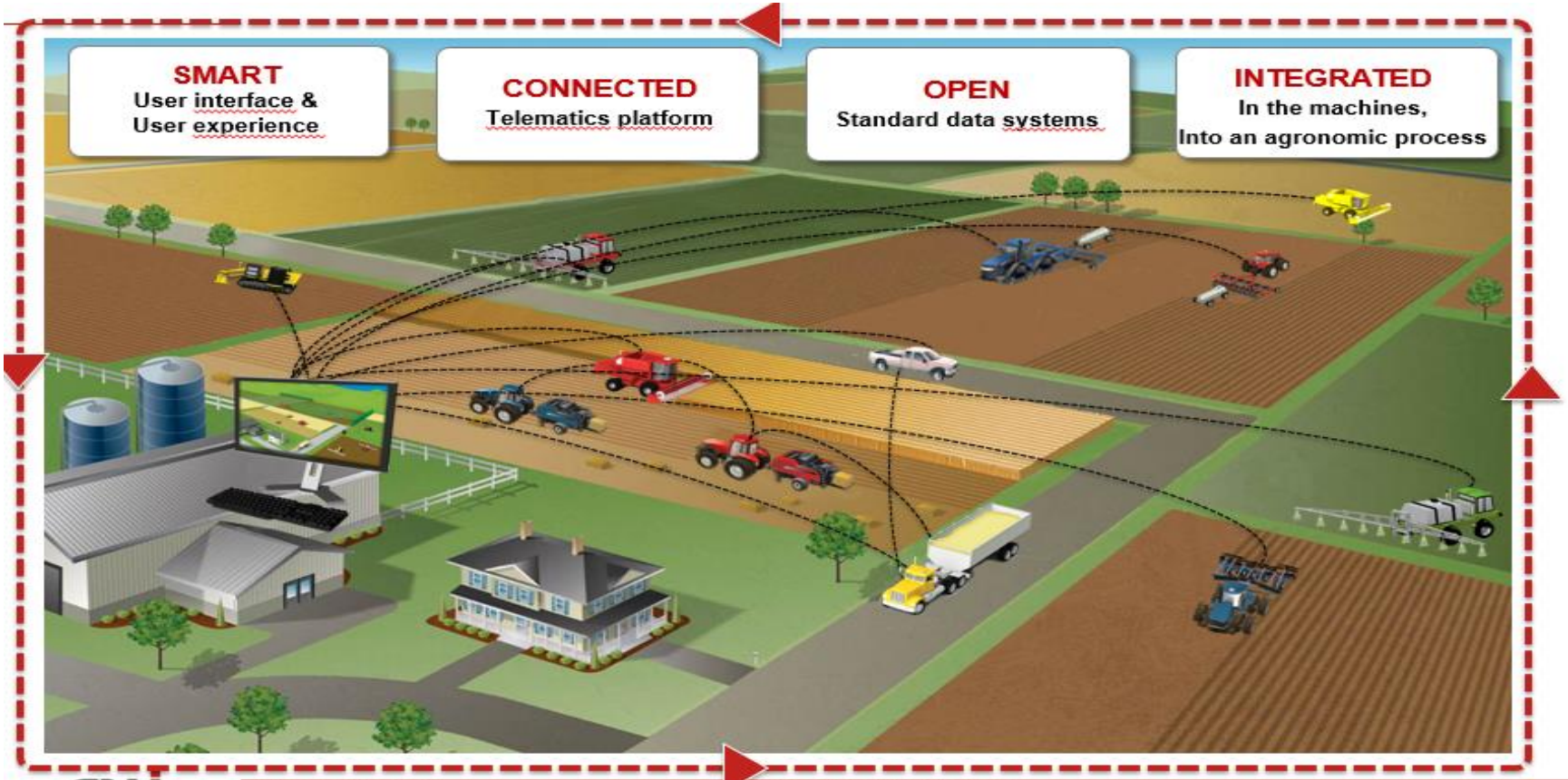
- Large potential in agriculture
- Ecosystem of suppliers and stakeholders is very complex:
  - Large machine constructors
  - Suppliers van M2M technology and “decision support systems”
  - Advisory services, experts, service providers …
  - …
- Large companies are digitalized via ERP (Enterprise Resource Planning) software but between smaller organizations there is a need for data exchange

Need smart digital ecosystem

- Via Cloud: the “connected farm” becomes reality
  - Real-time processen monitoring
  - Integrating
    - Weather data, climate, economy …
    - Product information and machine-settings
  - No installations or back-ups
  - Syncing mobile devices
  - Integration of business partners in the supply chain
  - Monitoring of several sites/locations



Agricultural Production Ecosystem



IBN
Smart Digital Farming

Digital Farming

- Robotica, automatisation and GNSS-technology
- Connectivity (Internet of Things = IoT)
- Big data analytics

⇒Explosion of data

⇒Data revolution in the Agri food sector

- Strategy?

Unlocking economic potential for Flanders of the data revolution in the Agro-food sector

Smart Digital Farming

The specific objectives:

-Increasing knowledge and expertise
-Stimulating open and data-driven innovation
-Establish concrete validation processes
-Implementing new business models
-Encouraging market-and product differentiation
-Increasing the international visibility

Netwerk Manager:

Peter.rakers@ilvo.vlaanderen.be
peterrakers@smartdigitalfarming.be

Timing

3 years: 2017 -> 2019

IBN - Smart Digital Farming

(1) Geo-ICT-companies:

(2) **Developers of sensors, drones and embedded controllers**

(3) Data-analytics

(4) IOT –companies

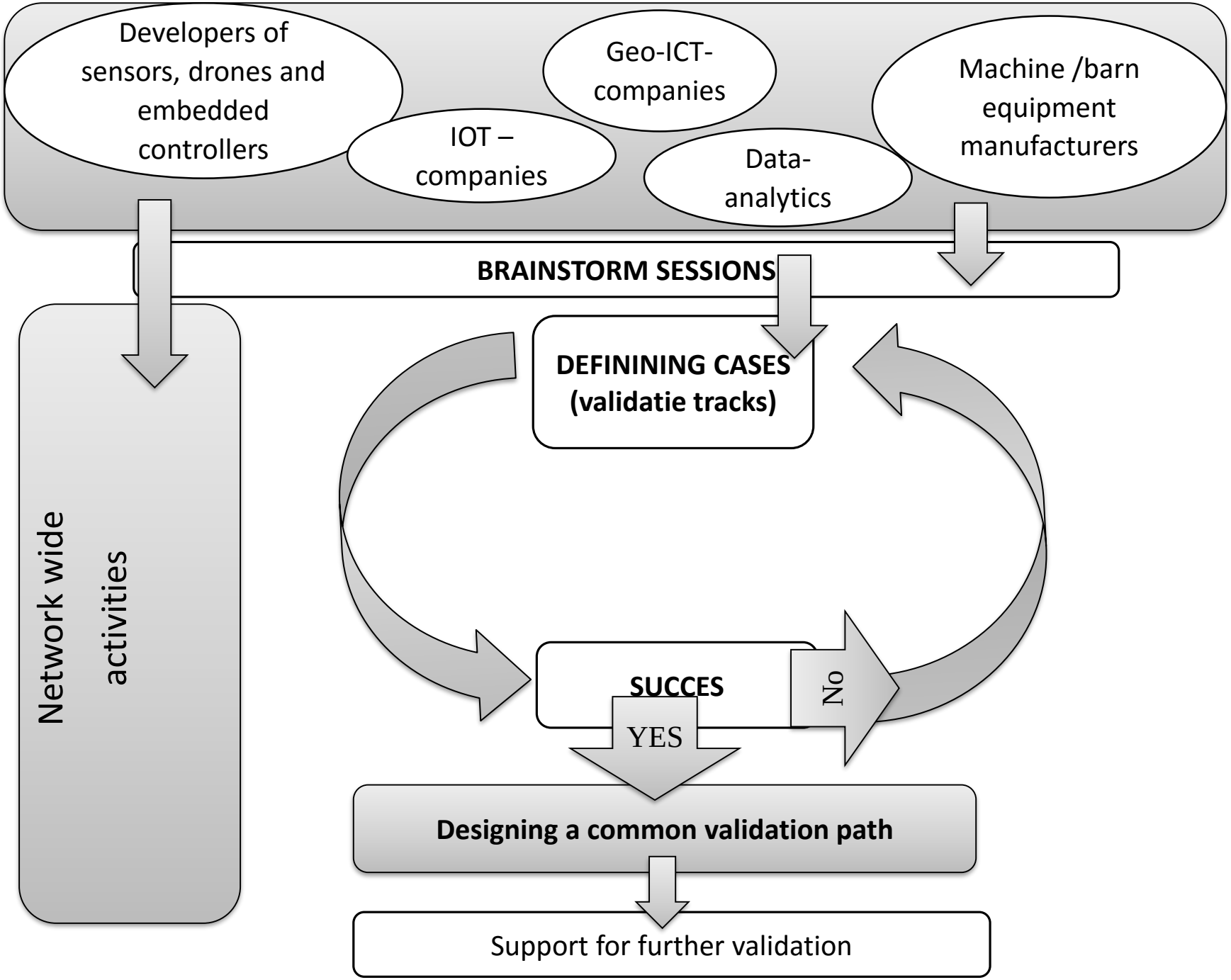
(5) Machine and barn equipment manufacturer

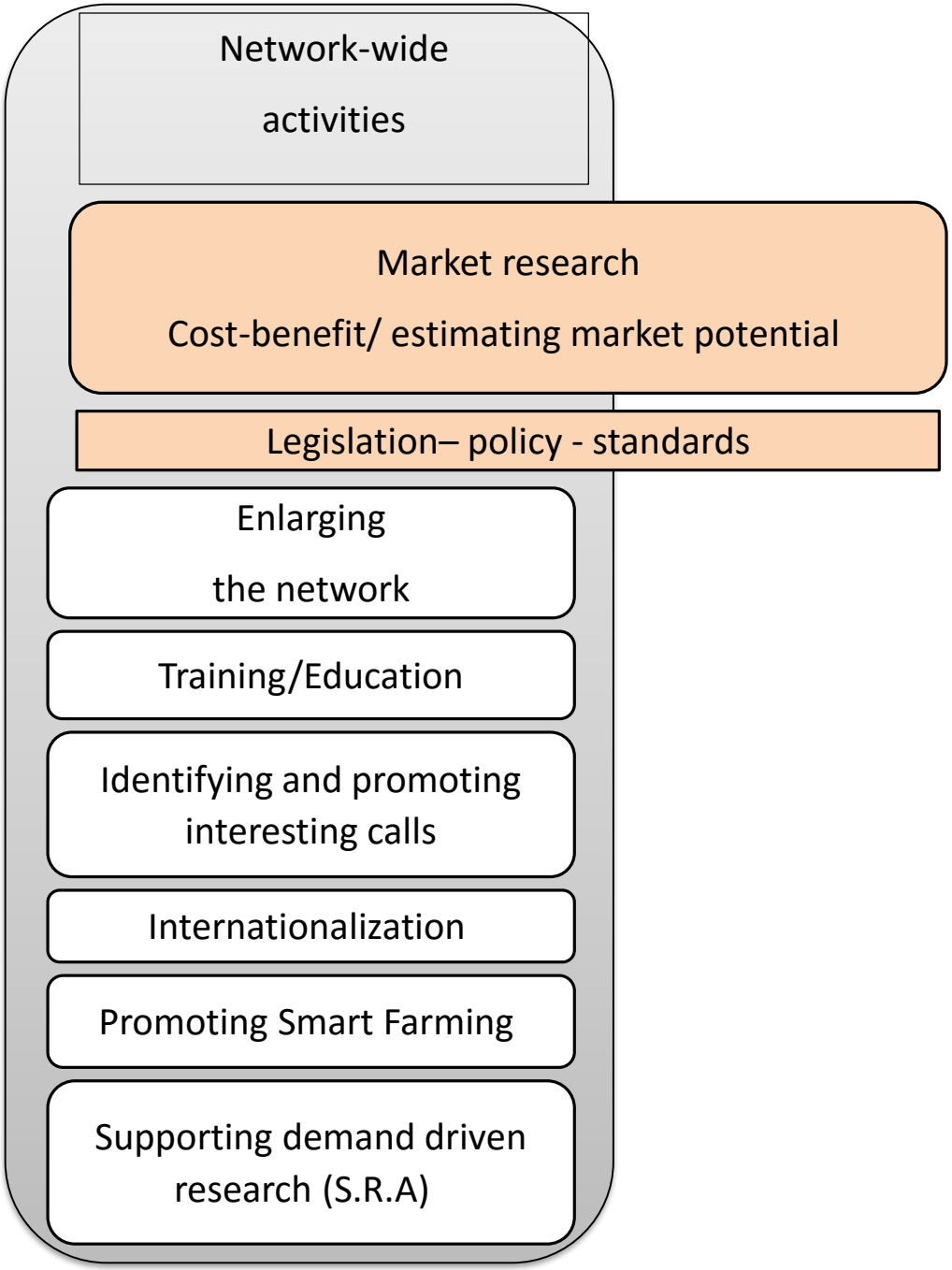
⇒26 companies over the whole supply chain + observers

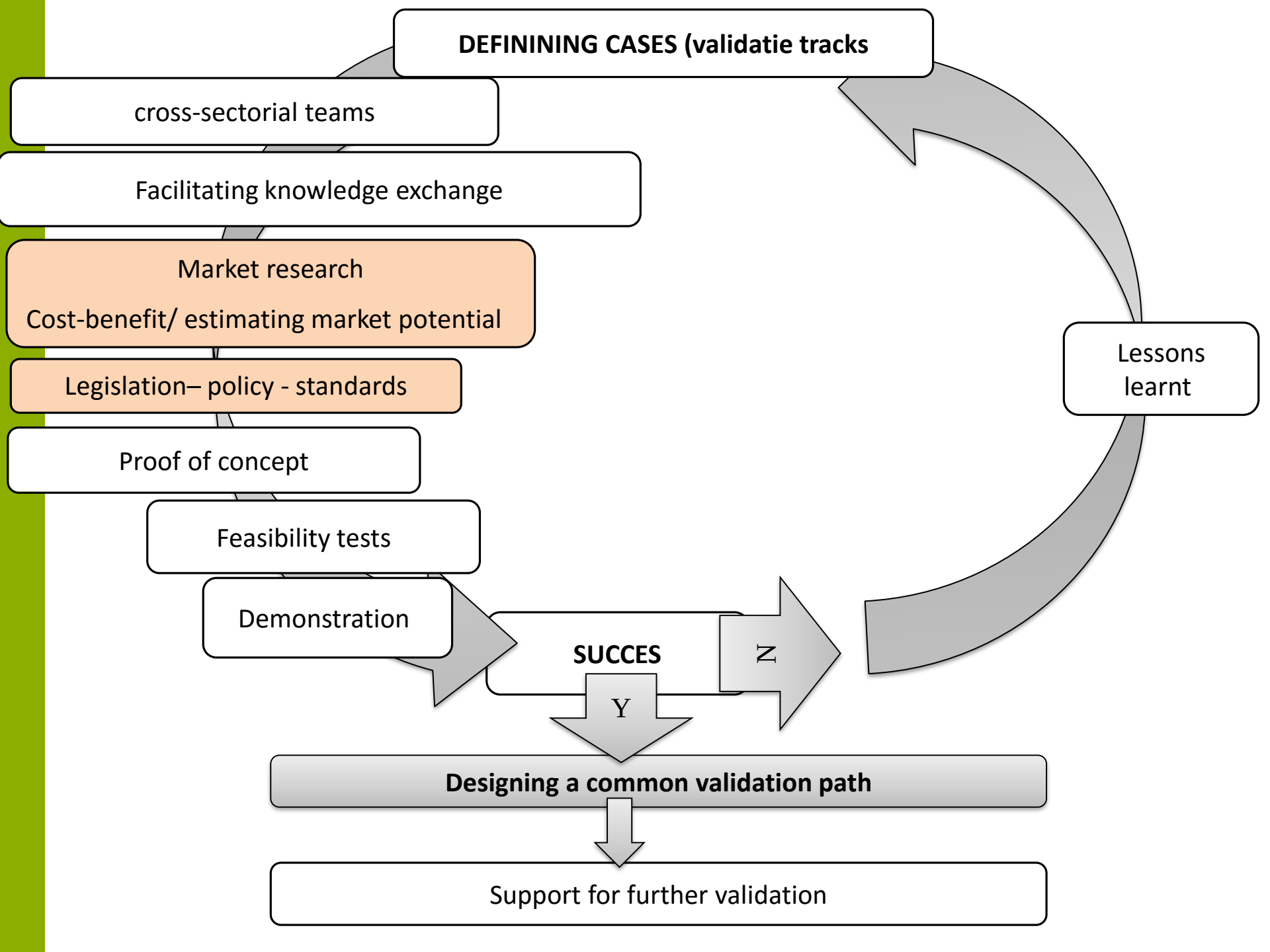
⇒ **SMART DIGITAL ecosystem (SDEs) in Agriculture**

= new **interdisciplinary ecosystem** to generate '**data driven business models'**

More Concrete …


Developers of sensors, drones and embedded controllers
Geo-ICT-companies
IOT – companies
Data-analytics
Machine /barn equipment manufacturers
BRAINSTORM SESSIONS
Network wide activities
DEFININING CASES (validatie tracks)
SUCCES
No
YES
Designing a common validation path
Support for further validation


Network-wide
activities
Market research
Cost-benefit/ estimating market potential
Legislation– policy - standards
Enlarging
the network
Training/Education
Identifying and promoting
interesting calls
Internationalization
Promoting Smart Farming
Supporting demand driven
research (S.R.A)


DEFININING CASES (validatie tracks
cross-sectorial teams
Facilitating knowledge exchange
Market research
Cost-benefit/ estimating market potential
Legislation– policy - standards
Proof of concept
Feasibility tests
Demonstration
SUCCES
Z
Y
Lessons learnt
Designing a common validation path
Support for further validation


Digital is the main reason just over half of the companies on the Fortune 500 have disappeared since the year 2000
Pierre Nanterme
CEO of Accenture


It's just the beginning

Thank you-Questions?