

European challenges for the agri-food system: implications for research

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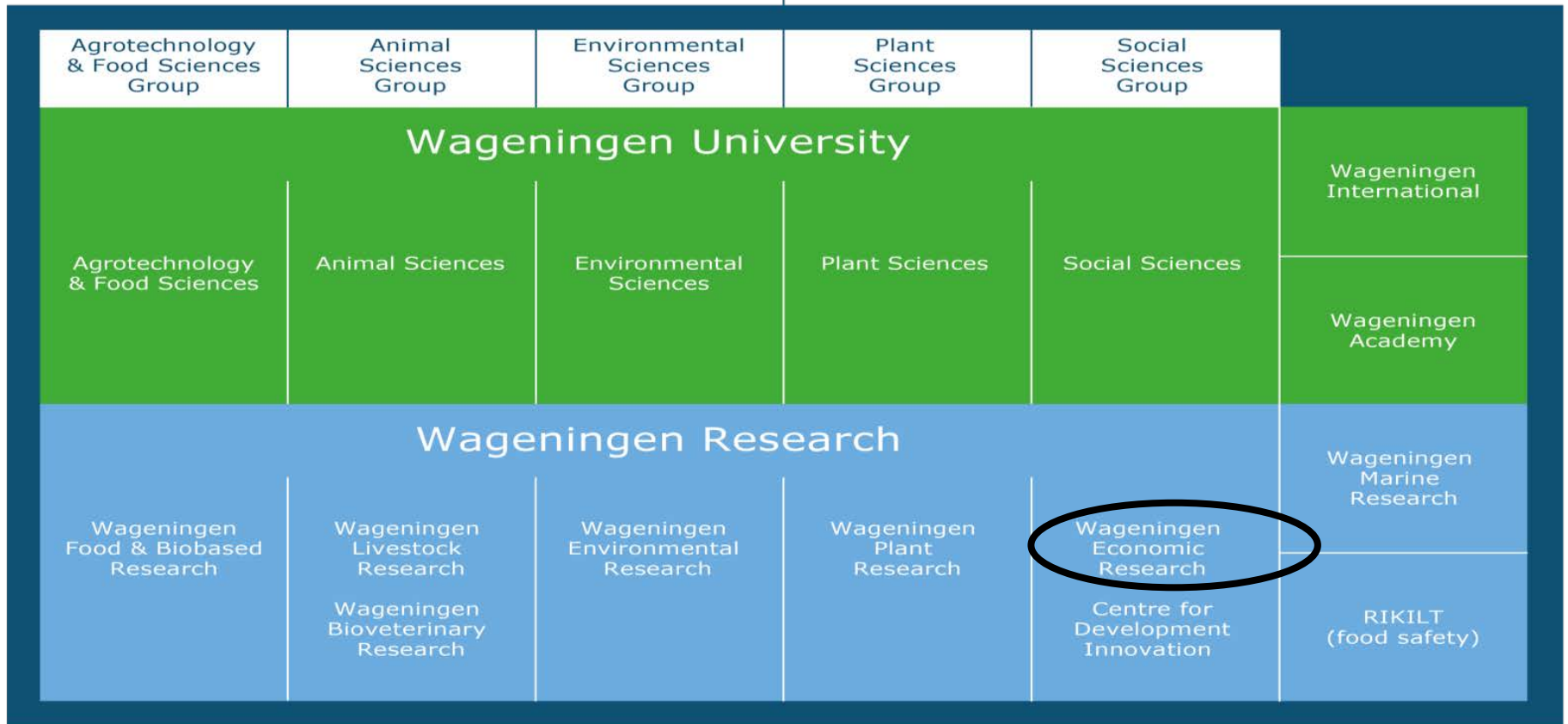
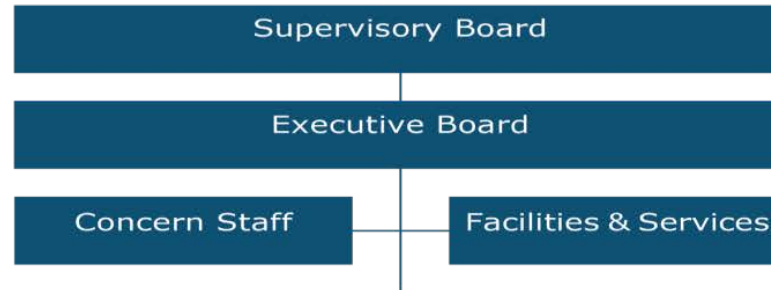


Wageningen University & Research

- Academic research & education, and applied research
- 5,800 employees (5,100 fte)
- >10,000 students (>125 countries)
- Several locations
- Turnover about € 650 million
- Number 1 Agricultural University for the 4th year in a row (National Taiwan Ranking)



To explore the potential of nature to improve the quality of life



WAGENINGEN UR

For quality of life

Krijn J. Poppe



- Business economist, EUR 1981
- Chief Policy Analyst Wageningen Economic Research
- Rli – Council for the Environment & Infrastructure:
member of the council (1 day / wk)
- Fellow and former Secretary-General of the EAAE
 - Involved in its journal management (ERA-E, EuroChoices)
- Member South Holland Council for Environmental Advise
- Member of the Governing Board of SKAL
- EU Projects; SCAR-AKIS 1-3 and Chair Experts Food2030

Content

- Societal challenges and innovation areas
- Need for a food system approach
- The role of ICT – and why now
- Changes in our AKIS
- Key innovation challenges
- Implications for public policy: CAP and FP9



Five major challenges

- Food and nutrition security and safety
- Climate change and water & energy use
- Reducing ecological impacts (biodiversity)
- Healthy diet for a lifelong healthy lifestyle
- Inequality



Five major innovation areas

- Genetics
- Digitalisation and big data
- Energy and bio-based transitions
- Redesigning the food chain
- Social innovations

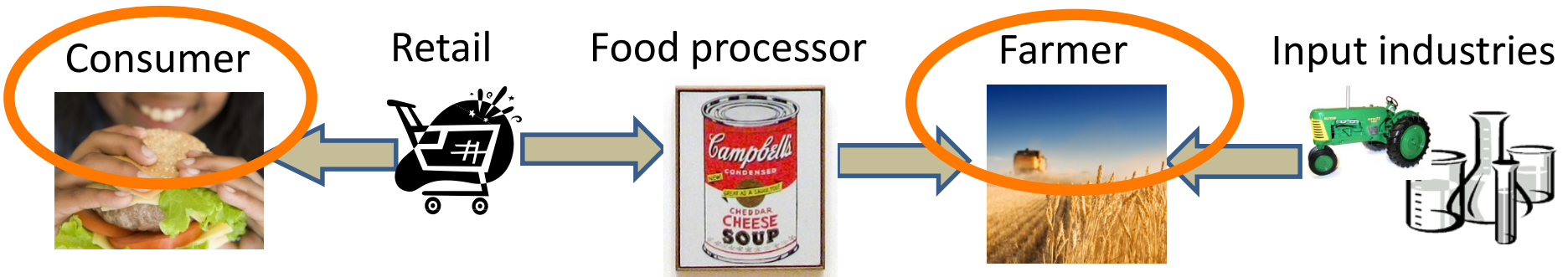


Five misunderstandings

- 'There is a crisis in agriculture'
- 'It is wrong for the organisation of the food chain to be so industrialised'
- 'Agriculture is the main solution for rural areas'
- 'International trade is harmful'
- 'The CAP is expensive and leads to overproduction'



Food chain: 2 weak spots – opportunity?



- Public health issues – obesity, Diabetes-2 etc.
- Climate change asks for changes in diet
- Strong structural change
- Environmental costs need to be internalised
- Climate change (GHG) strengthens this

Is it coincidence that these 2 are the weakest groups?
Are these issues business opportunities / market failure?
Or system failure and lack of transformative capacity?

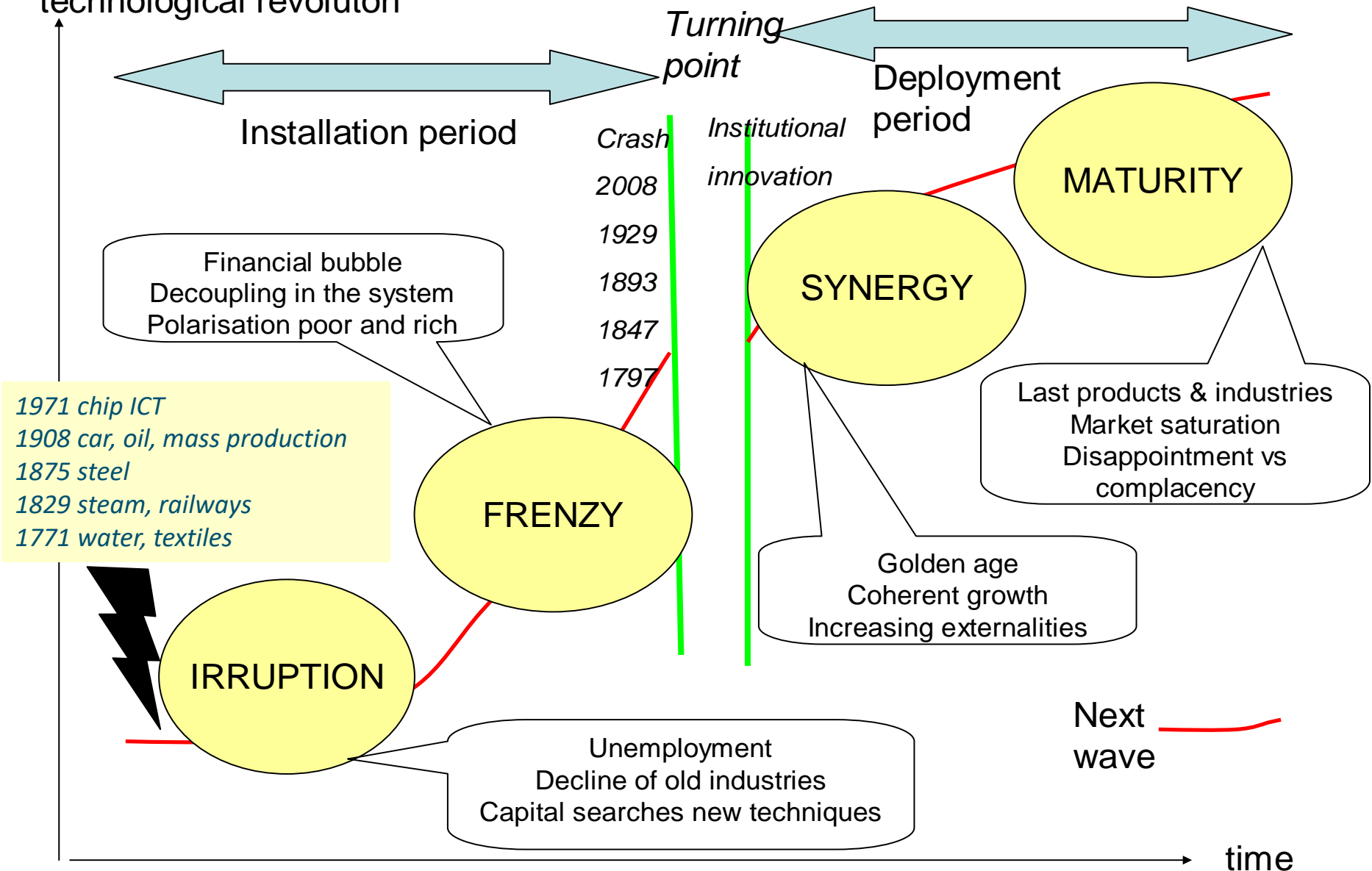
The role of ICT – and why now?

Based on work with WUR team (Sjaak Wolfert, Cor Verdouw, Lan Ge, Marc Jeroen Bogaardt, Jan Willem Kruize and others)



The opportunity for green growth

Degree of diffusion of the technological revolution



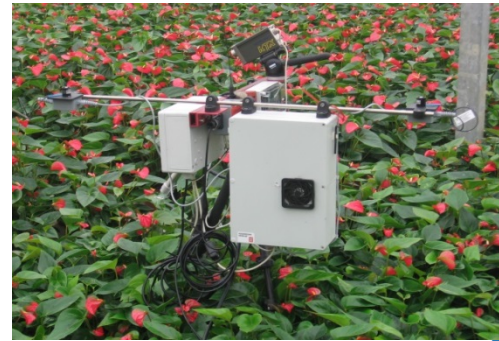
Based on Perez, 2002

Disruptive ICT Trends:

- **Mobile/Cloud Computing** – smart phones, wearables, incl. sensors everywhere
- **Internet of Things** – everything gets connected in the internet (virtualisation, M2M, autonomous devices) anything
- **Location-based monitoring** - satellite and remote sensing technology, geo information, drones, etc. anywhere
- **Social media** - Facebook, Twitter, Wiki, etc.
- **Block Chain** – Tracing & Tracking, Contracts everybody
- **Big Data** - Web of Data, Linked Open Data, Big data algorithms

High Potential for unprecedented innovations!

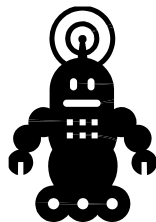
IoT in Smart Farming



smart sensing
& monitoring



cloud-based event
and data
management



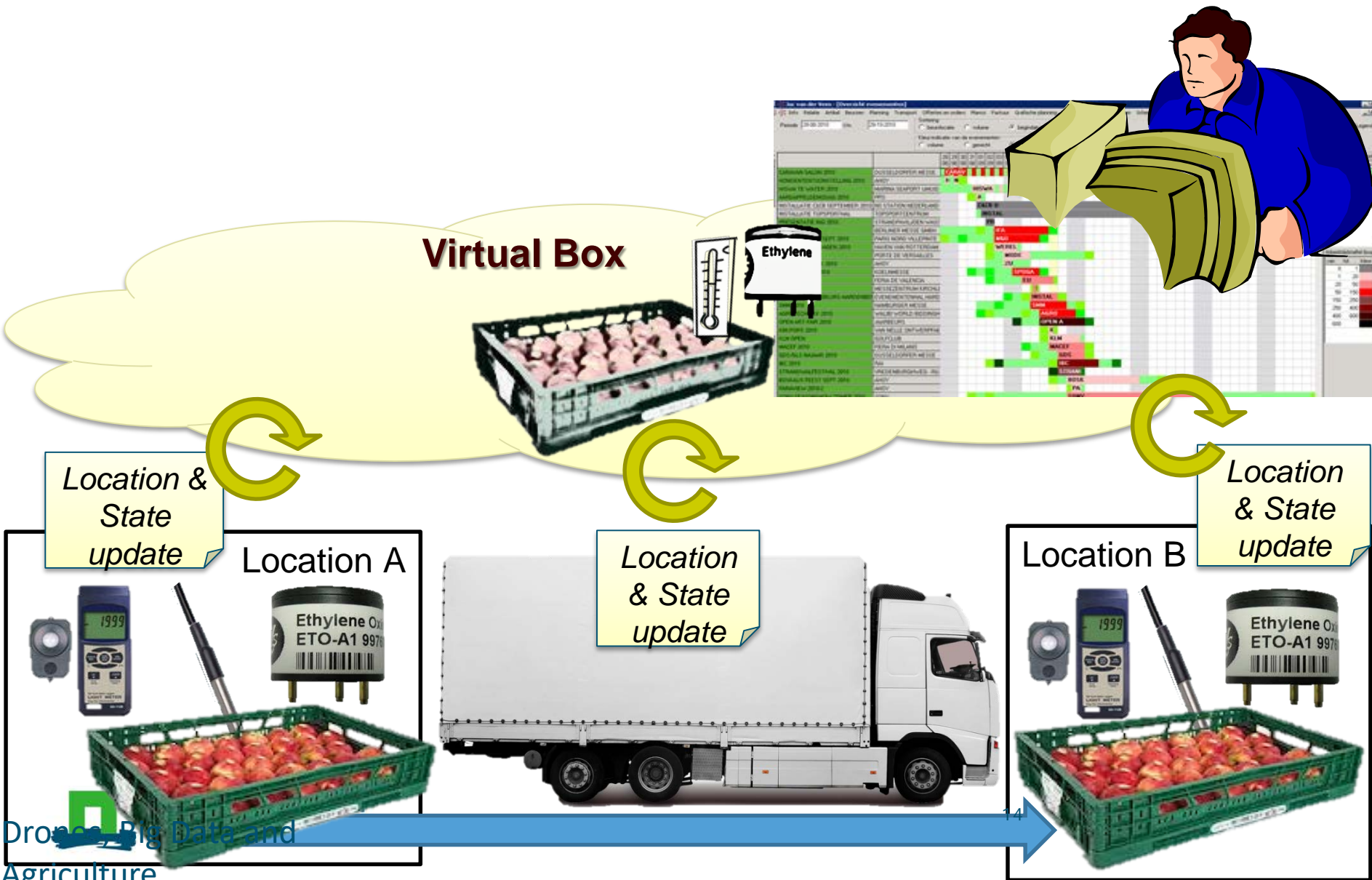
smart control



smart analysis
& planning



IoT in Agri-Food Supply Chains



IoT and the consumer

Smart Farming

tracking/ & tracing

Smart Logistics



Domotics

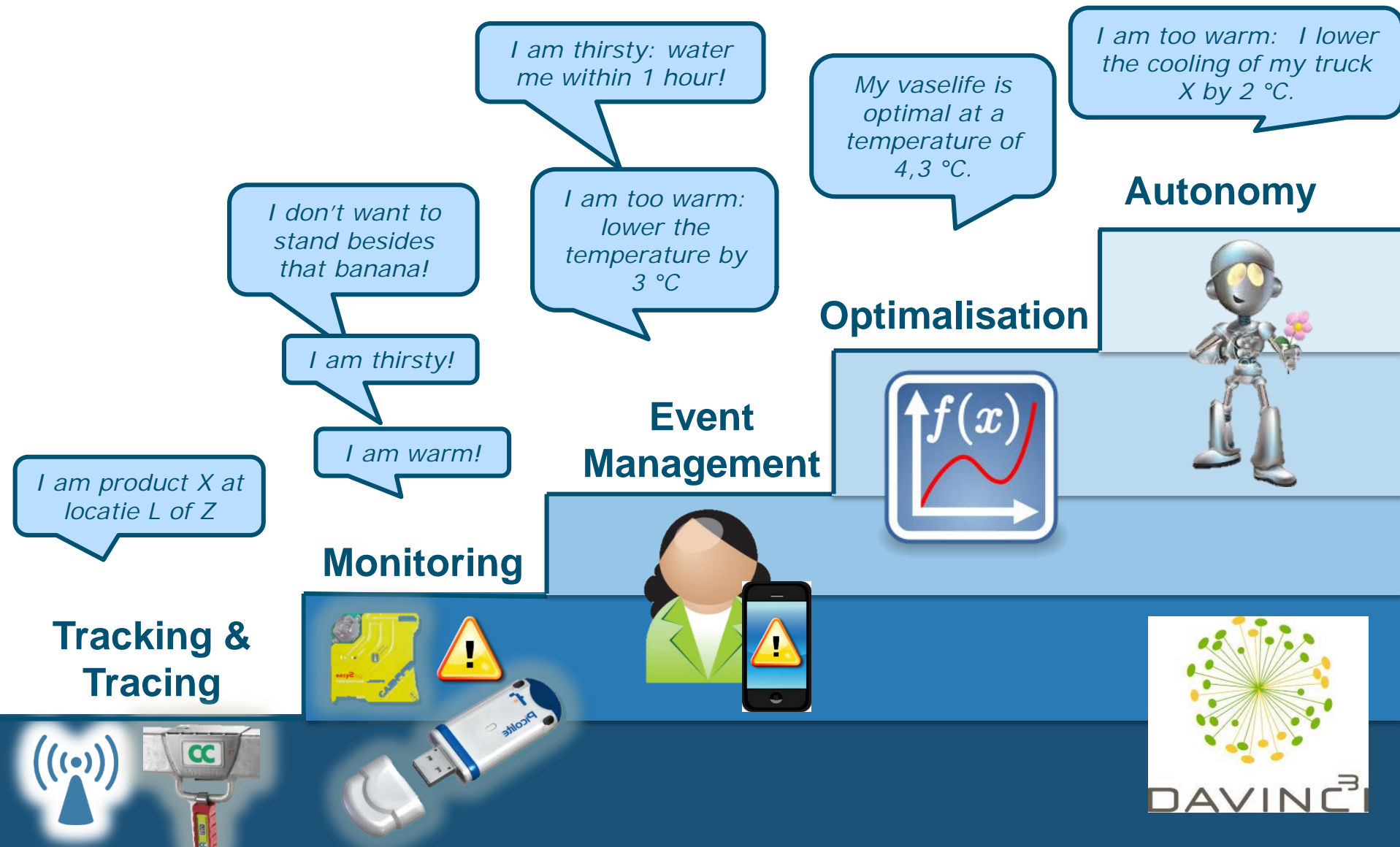
Health

Fitness/Well-being



Drones, Big Data and Agriculture

Towards smart autonomous objects



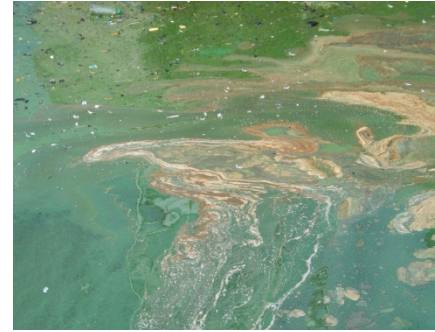
Grand challenges: tomorrow's business



Food & nutrition security



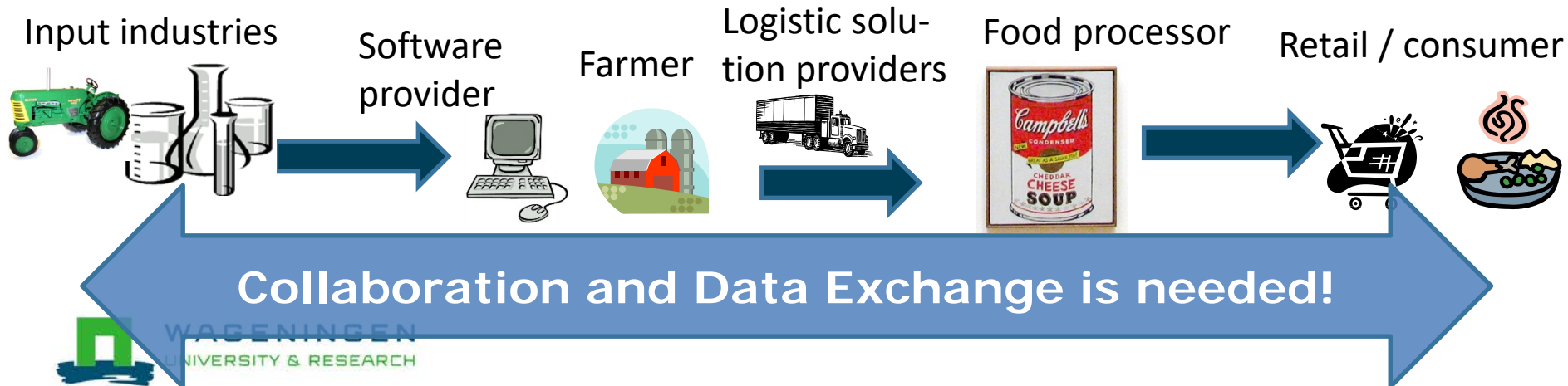
Climate change



Environmental issues

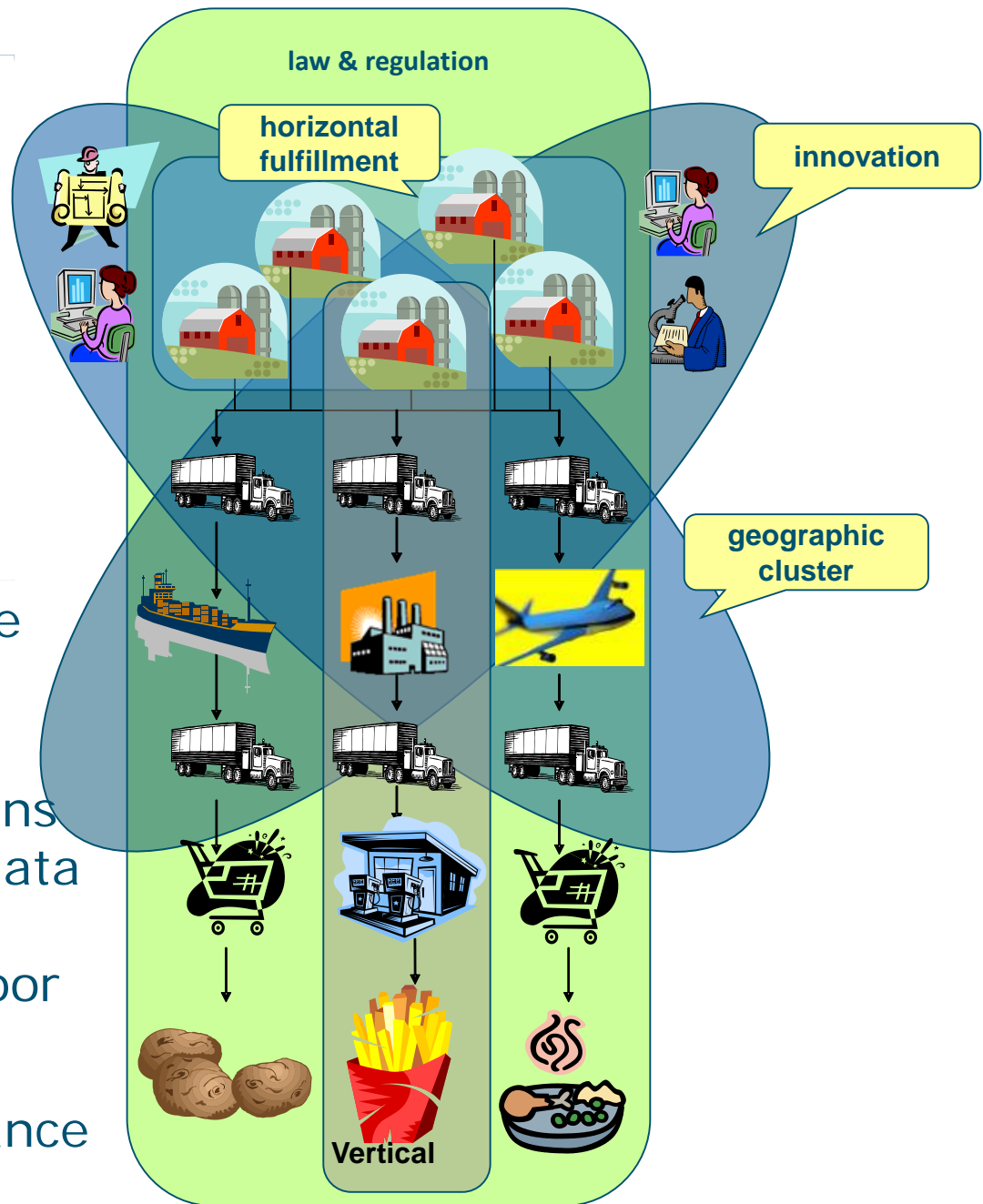


Healthy diet for a healthy life

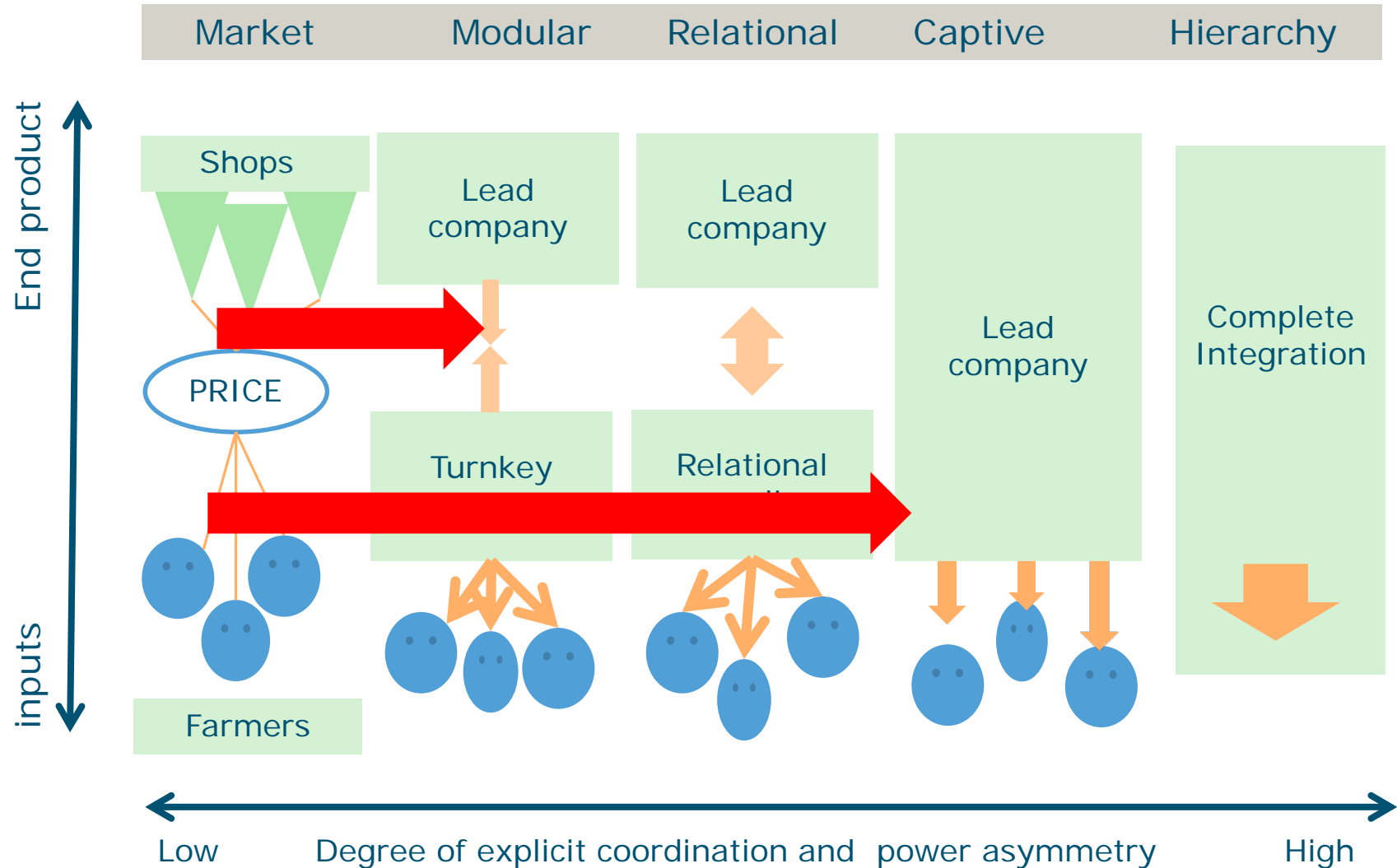


There is a need for ABCDEFs: Agri-Business Collaboration & Data Exchange Facilities

- Large organisations have gone digital, with ERP systems
- But between organisations (especially with SMEs) data exchange and interoperability is still poor
- ABCDEF platforms help
- Our focus: data governance



Chain organisation changes (©Gereffi et al., 2005)



Europe towards 2030

3 scenarios to explore the future of EU agriculture + implications for Agricultural Knowledge and Innovation Systems



- **HighTech:** strong influence new technology owned by multinationals. Driverless tractors, contract farming and a rural exodus. US of Europe. Rich society with inequality. Sustainability issues solved. Bio-boom scenario.
- **Self-organisation:** Europe of regions where new ICT technologies with disruptive business models lead to self-organisation, bottom-up democracy, short-supply chains, multi-functional agriculture. European institutions are weak, regions and cities rule. Inequalities between regions, depending on endowments.
- **Collapse:** Big climate change effects, mass-migration and political turbulence leads to a collapse of institutions and European integration. Regional and local communities look for self-sufficiency. Bio-scarcity and labour intensive agriculture. Technology development becomes dependent on science in China, India, Brazil.

Scenario 1: High Tech multinationals, clean technology, strong EU



Scenario 2: Self organisation

new business models, regions and cities rule, diversify



Scenario 3: Collapse climate change, migration, breaking up of the EU



Effects on AKIS

(Ag. Knowledge & Innovation System)

- **HighTech:** International players in agribusiness, direct access to best universities for own labs and extension programs. EU-Public Private Partnerships. Product and technology oriented. Upskilling of specialised AKIS staff. Small role regional government.
- **Self-organisation:** Regional orientation, food and non-food. New (local) actors like NGO and cities. EU: connect the dots. Multi-skills of AKIS staff.
- **Collapse:** Local orientation, food oriented. Problems of soil and water are main focus. Fragmentation of AKIS, strong emphasis on extension. Donors play a big role, fundamental research is done in China or India. Emphasis on basic skills of AKIS staff.

Key

Innovation

Challenges



Misunderstandings in social debate: one



as a solution of everything, -where??

- *Put fewer forks on the table* – Thomas Maltus (1798, *An essay on the principles of population*)
- *Bake a bigger pie* - Marquis de Condorcet
- *Teach everyone better table manners* – William Godwin

© Warren Belasco: Meals to come – a history of the future of food

Productivism paradigm

- Focus on more supply
- Calories for the world
- Eco-efficiency per kg

Sufficiency paradigm

- Food is more than calories
- Changes in menu needed for sustainability
- Local effects, emissions per ha count too.

Healthy diet
for a
healthy life



Climate
change

Help Empty
Rural Regions



**Green,
Healthy
Cities**

Peri-urban
multifunctional
farms with short
supply chains

**Help
Consumers
Change:**
* personalised
nutrition

**Less animal
based:**

- Reduce GHG cattle
- Improve sustainb. pigs and poultry
- New (lab) meat and feed (insects, algae etc.)

More plant based:

- Improve soil management
- Cope with climate change (water)
- Less chemicals, more biodiversity
- Improve factory farming

CIRCULAR PRINCIPLES

- Less waste
- More resource efficiency
- Close P-cycle

Health
sector
+ Cities

**CONSU-
MERS**

**RETAIL
& OUT
of
HOME,
Food
Procesng**

INPUT
INDUSTRY

FARMERS

ICT

FOOD
PROCESSING

Transforming the CAP into a Common Agricultural and Food Policy

Five examples of a Common Agricultural and Food Policy

- Make our diets more healthy and sustainable with a price that factors in true costs
- Incorporate climate change agreements in farm decisions
- Align incentives in the food chain
- Install smart instruments for environmental management
- Support disruptive innovation in the urban food system and bio-economy

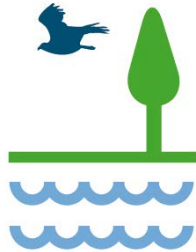


Transforming the CAP into a CAFP



Pillar A

INCOME
SUPPORT



Pillar B

ECOSYSTEM
SERVICES



Pillar C

RURAL
DEVELOPMENT



Pillar D

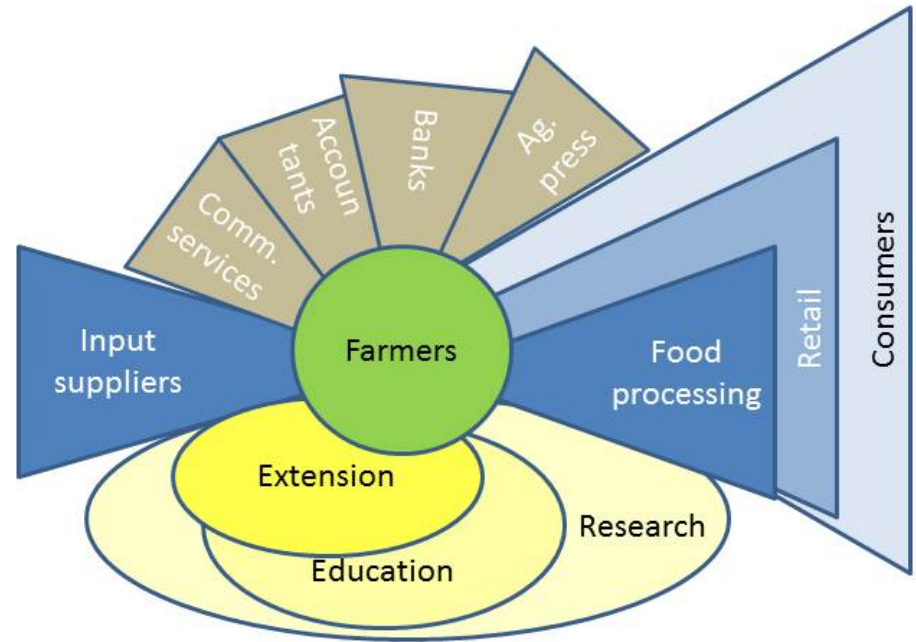
FOOD
& HEALTH



Pillar E

MONITORING
& RESEARCH

Pillar C: rural development



Innovate for
competitiveness

Pillar E: monitoring reflection and research



By the deployment of reflective citizen science
in support of adaptive governance

Food2030: 4 themes ?



Thanks for your attention

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