

DIGITAL TRANSFORMATION IN ACTION

CASES IN AGRI-FOOD DEMONSTRATING IMPACT AND CHALLENGES

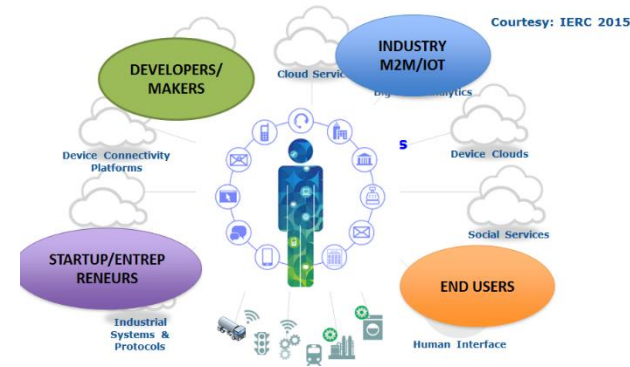
GEORGE BEERS, WAGENINGEN UNIVERSITY & RESEARCH

DIGITAL (R)EVOLUTION IN AGRI-FOOD AND FORESTRY

INESC TEC AUTUMN FORUM, PORTO, NOVEMBER 12, 2019



- Target
 - Link and align to **Strategy Digitising Europ. Industry DEI**
 - Fostering the take-up of IoT in Europe and enabling the emergence of **IoT ecosystems supported by open technologies and platforms.**
- The challenge
 - **Address business model validation & standardisation**
 - Address user validation and acceptability – **Ethics??**
 - Organisation of **open calls?**
 - Exploitation of **security & privacy** mechanisms?



European Public-Private ICT projects – Building the Ecosystem

2011-2013: **SmartAgriFood** – a FIWARE-based conceptual architecture and prototype applications (5 M€)



2013-2015: **Flspace** – B2B business collaboration platform for agri-food & logistics (+ apps) (13.5 M€)



2014-2016: **Accelerators**: SmartAgriFood2, FInish, FRACTALS (~17 M€)
- 125 apps/start-ups based on FIWARE/Flspace



Sep. 2016: **FIWARE Foundation** established with 3 verticals:
Smart Cities, Industry and **Agri-Food**



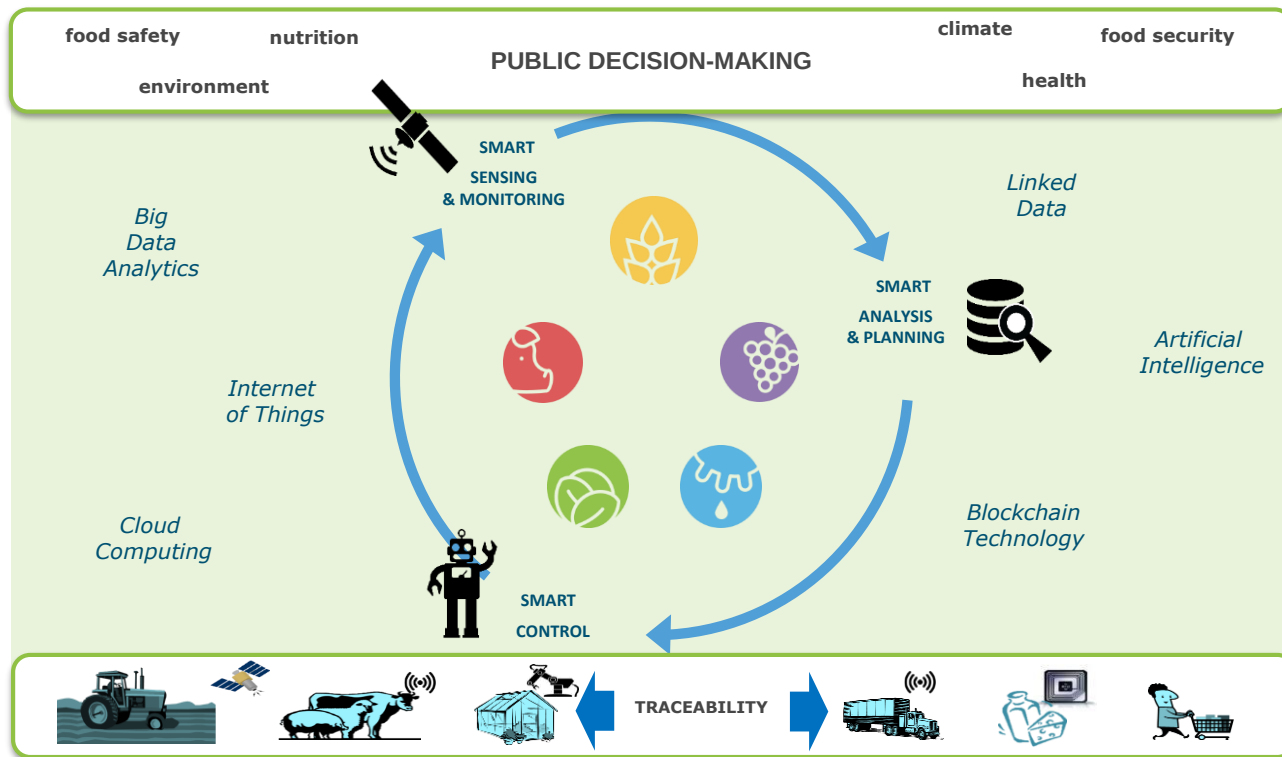
2017-2020: **IoF2020** – The Internet of Food and Farm (30 M€) - IoT large-scale pilot for smart farming and food security



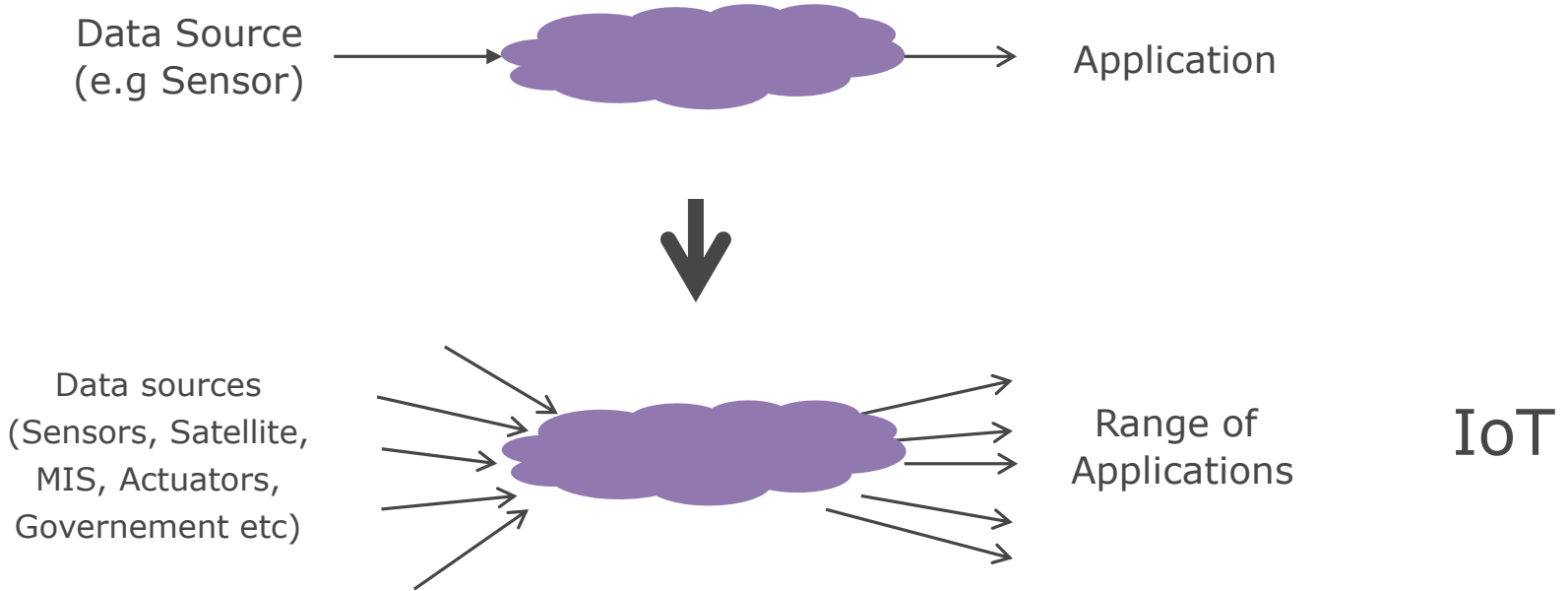
2018-2022: **SmartAgriHubs** – Connecting the dots to unleash the innovation potential for digital transformation of the European Agri-Food sector (20 M€)



DIGITAL TRANSFORMATION OF AGRI-FOOD



Cloud computing → IoT



IOF2020 IN FIGURES



**116 PARTNERS
ORGANISATIONS**



28 COUNTRIES



4 YEARS

Start = January 2017



€35 MILLION BUDGET

(€30 million co-funded under
EU H2020 programme)

OBJECTIVE

IoF2020 fosters a **large-scale uptake of IoT** in the European farming and food sector

- Demonstrate the **business case of IoT** for a large number of application areas in farming and food sector;
- **Integrate** and reuse available **IoT technologies** by exploiting open infrastructures and standards;
- Ensure **user acceptability of IoT** solutions in farming and food sector by addressing user needs, including security, privacy and trust issues;
- Ensure the **sustainability of IoT solutions** beyond the project by validating the related **business models** and setting up an **IoT ecosystem** for large scale uptake.



5 TRIALS, 33 USE CASES, 22 MS_s



ARABLE



FRUITS



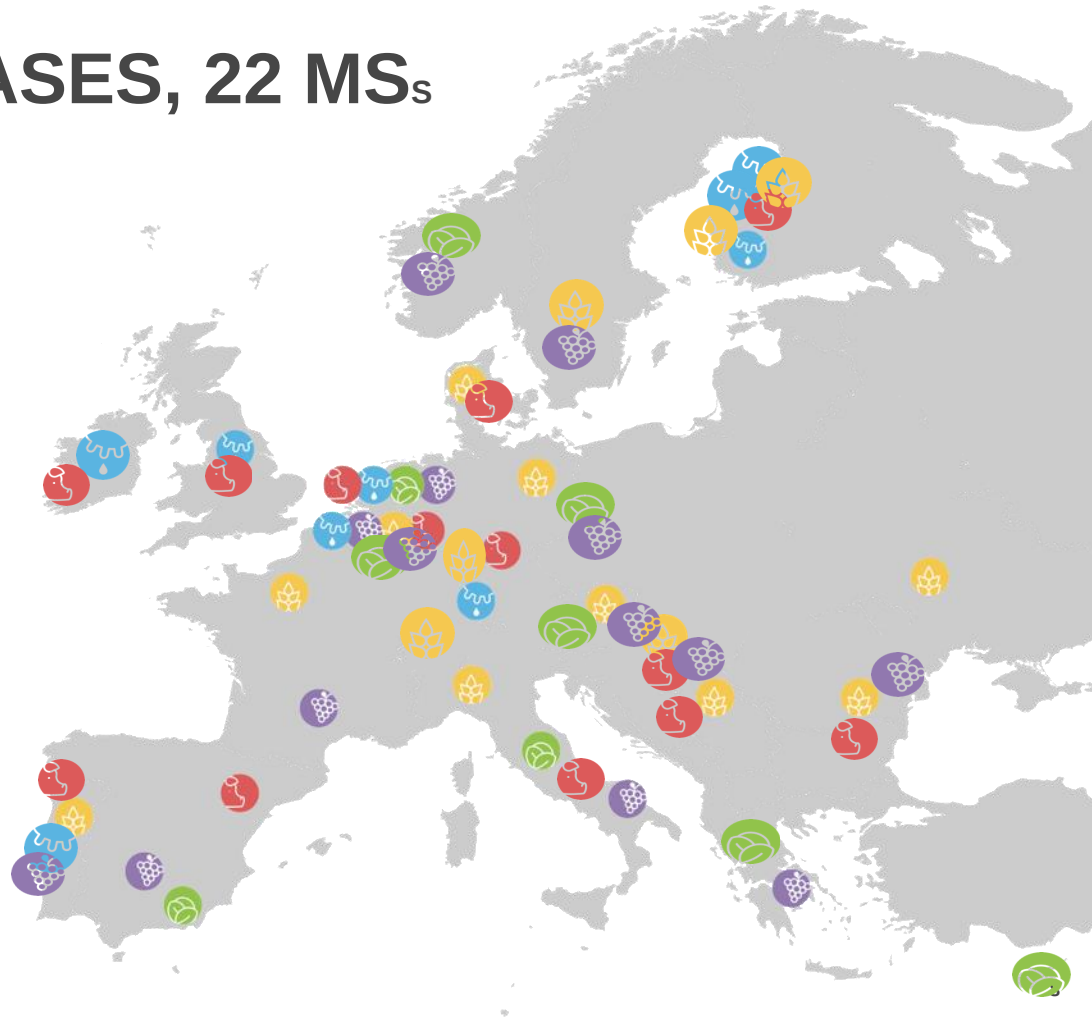
DAIRY



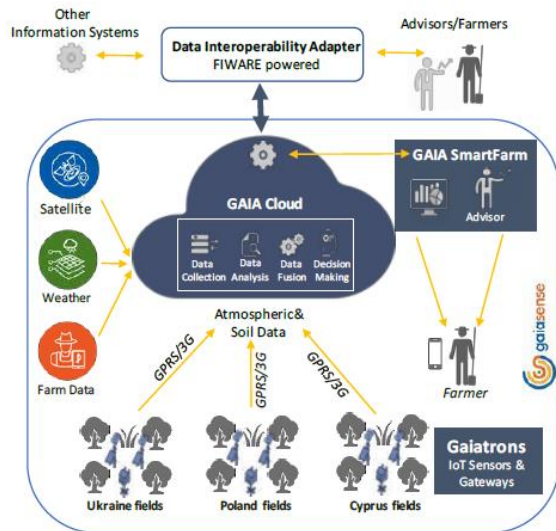
VEGETABLES



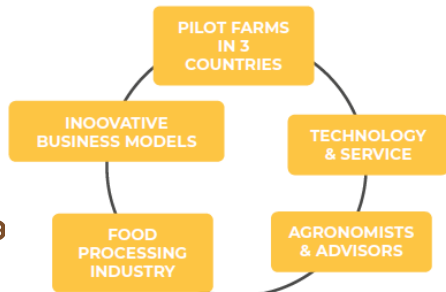
MEAT



1.6 DATA-DRIVEN POTATO PRODUCTION



COUNTRIES



- Data-driven potato prediction through the GAIA sense smart farming solution.
- Technologies: IoT, Big Data, Earth Observation, Context-based decision support, machine learning
- GAIA sense solution extended with FIWARE-powered, standards based, data exchange mechanisms in support of cross-system interoperability and openness.



6/8 CURRENT TRL & TARGET TRL

- 25% WATER CONSUMPTION

- 19% TOTAL INPUT COSTS

- 15% PESTICIDE USE

OUR OBJECTIVES

- Demonstrate how the use of IoT-driven smart farming solutions can help reduce the environmental footprint of agriculture;
- Facilitating farmers' compliance with a wide range of European environmental legislation, including water and soil protection;
- Improvement of nitrogen use efficiency (+15%);
- Reduction of pesticides use (-15%);
- Reduction of water consumption (-25%).

OTHER IMPACT

- Demonstrate how the use of IoT-driven smart farming solutions can help reduce the environmental footprint of agriculture;
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OTHER IMPACT

- Demonstrating the potential benefits derived from the use of IoT-driven solutions;
- Achieve sustainable economic growth and foster innovation;
- Reduction of inputs costs (-18,6%);
- Farmers benefited from the provided advice >500;
- Smart farming advice available up to 1500ha;
- Building on extensive business network in >50 countries.



THE INTERNET OF ARABLE FARM

- Within Field Management Zoning (potatoes)
- Precision Crop Management (wheat)
- Soya Protein Management
- Farm Machine Integration
- Solarvibes
- IoTrailer
- DaPope
- WFMZ
- IoT4Potato



THE INTERNET OF DAIRY FARM

- Grazing Cow Monitor
- Happy Cow
- Silent Herdsman
- Remote Milk Quality
- Pitstop+
- MELD



THE INTERNET OF VEGETABLES

- City Farming Leafy Vegetables
- Chain Integrated Greenhouse Production
- Added Value Weeding Data
- Enhanced Quality Certification
- TIGRE
- Cysclops



THE INTERNET OF FRUIT

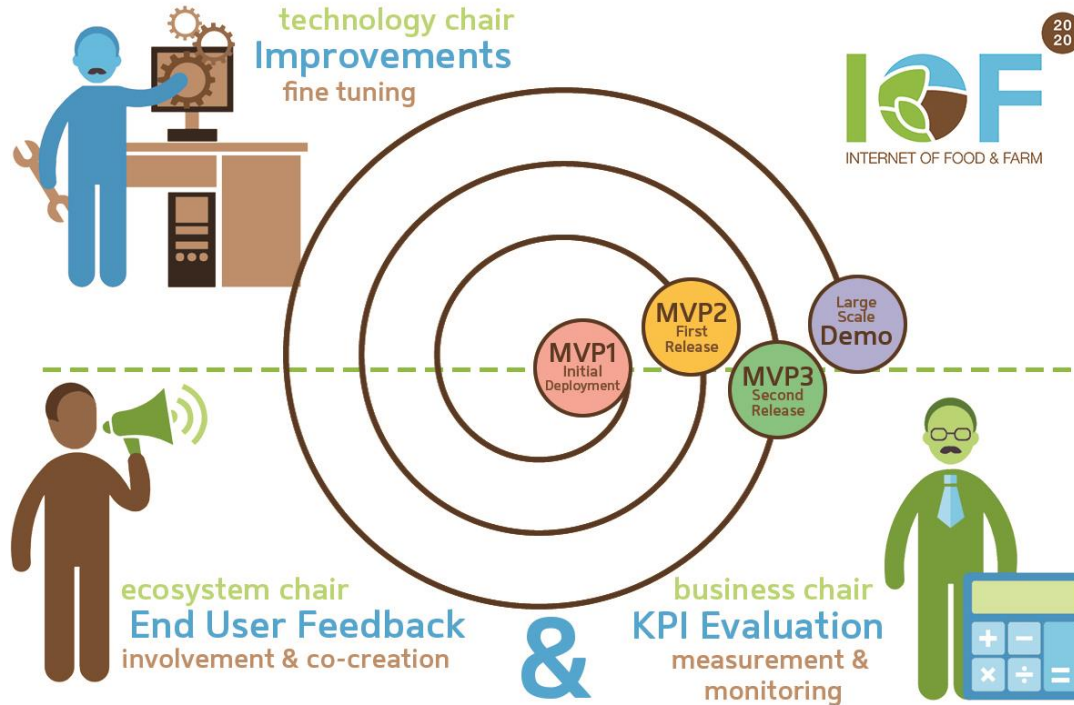
- Fresh Table Grapes Chain
- Big Wine Optimization
- Automated Olive Chain
- Intelligent Fruit Logistics
- Smartomizer
- BIT



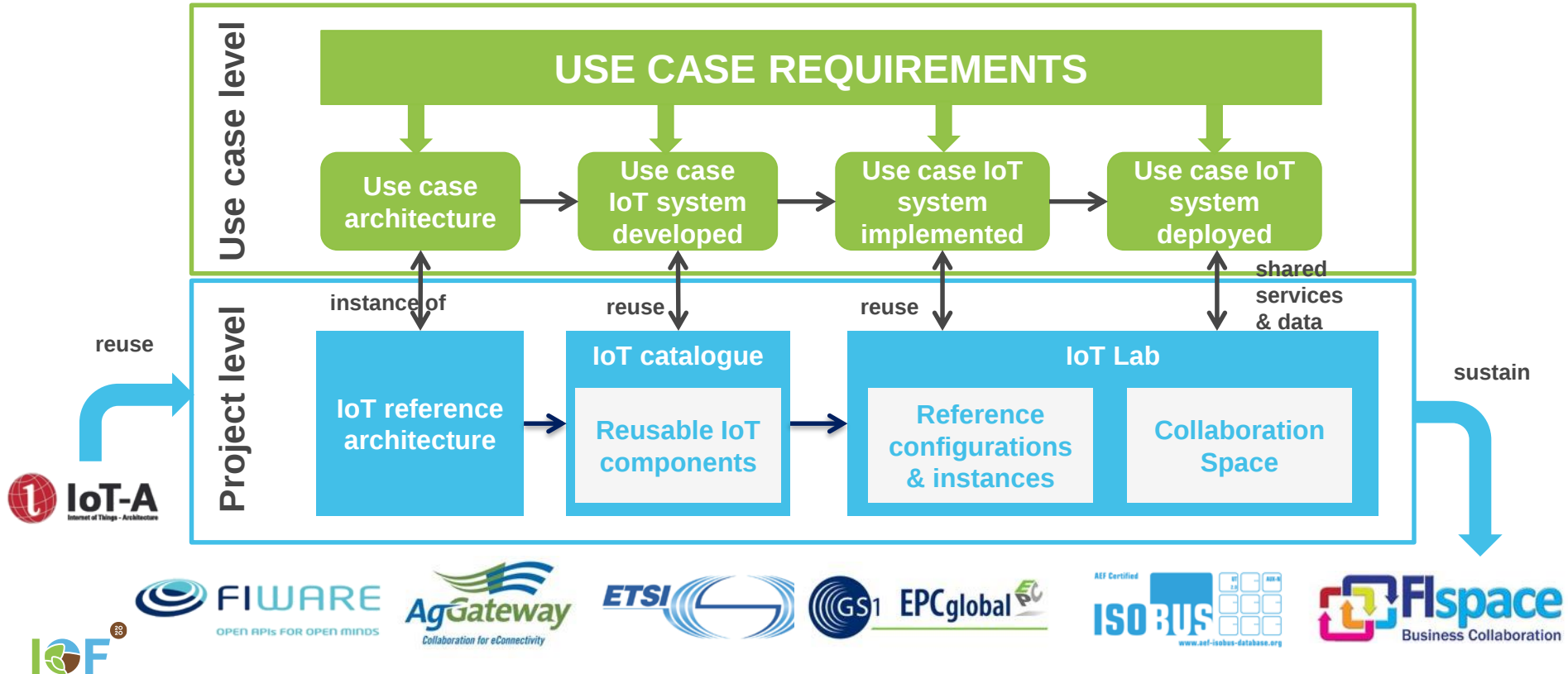
THE INTERNET OF MEAT

- Pig Farm Management
- Poultry Chain Management
- Meat Transparency and Traceability
- Sharebeef
- FitPig
- IoFeed

Overall methodology



TECHNICAL / ARCHITECTURAL APPROACH



LESSONS LEARNED – MAIN CHALLENGES

- Standardization & Interoperability
- Re-Usability
- New Business models
- Trust (Ethics, Code of Conduct)
- Test and Demonstration
- Access to Funding
- Sustaining the results
- Replicability

INNOVATION and KNOWLEDGE DEVELOPMENT – Technology Readiness Levels (TRL)

TRL9 – actual system proven in Operational environment

TRL8 – system complete and qualified

TRL7 – system prototype demonstration In operational environment

TRL6 – technology demonstrated in relevant environment

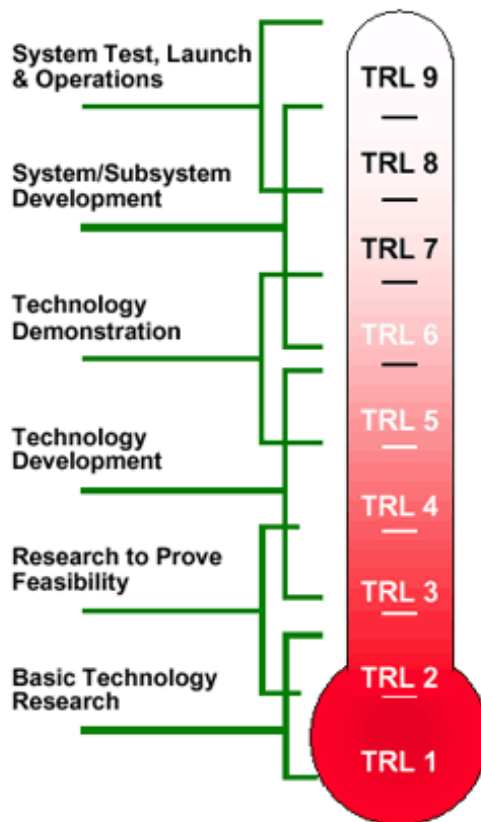
TRL5 – technology validated in relevant environment

TRL4 – technology validated in lab

TRL3 – experimental proof of concept

TRL2 – technology concept formulated

TRL1 – basic principles observed



Education
Scaling-up
Training
Acceptance
Business models
Regulations

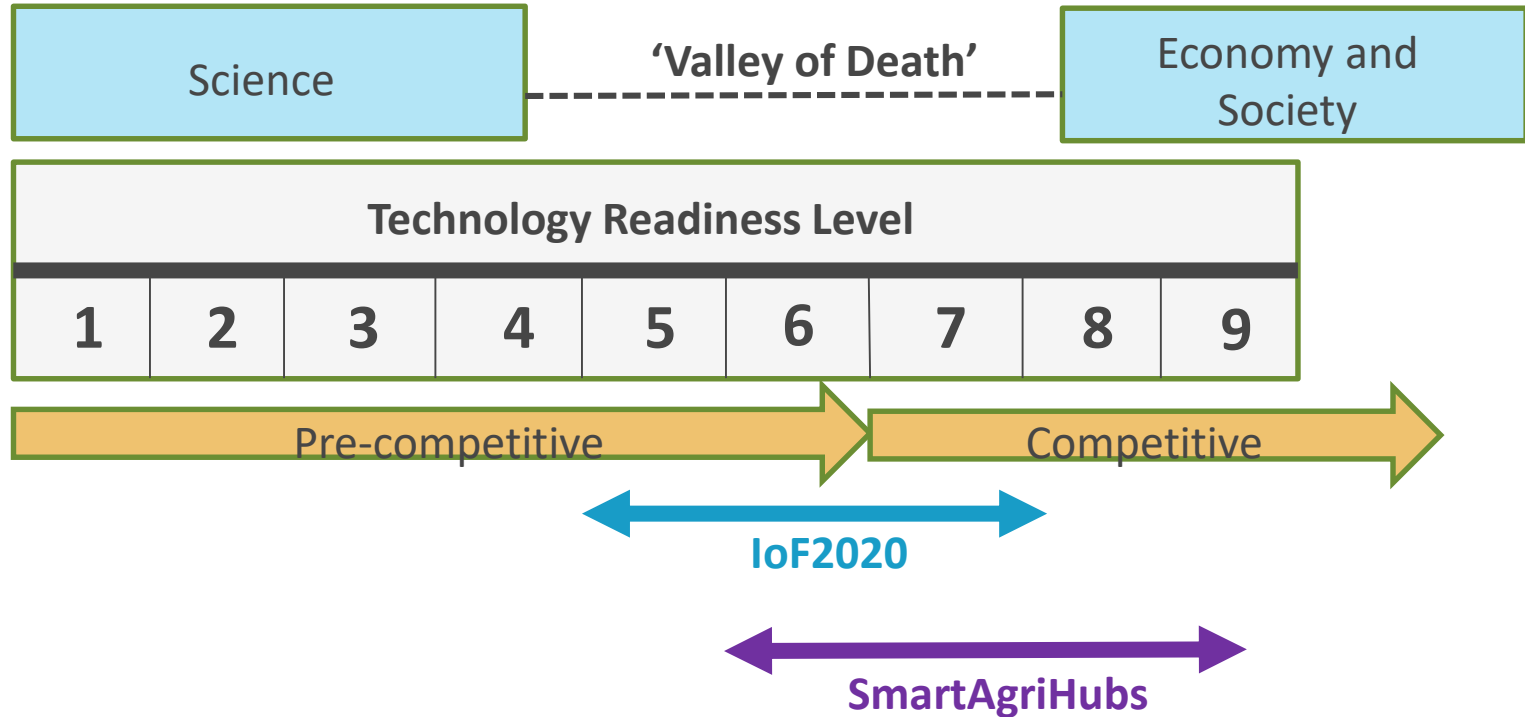
Validation

Co-Innovation

Applied Research

Examples of
Knowledge
processes

H2020 – Innovation Action



FOCUS IN TIME

- Year 1 Focus on Technology
- Year 2 Focus on Business
- Year 3 Focus on Demonstration – convincing stakeholders
- Year 4 Focus on Sustainability

Business support

KPI & IMPACT



Calculate costs
savings and effects
on revenue
development &
financing plans for
farmers

BUSINESS MODELS



Different business
models will be
tested to identify
the most successful
and sustaining ones

MARKET STUDY



Buying and selling a
product is the best
service.

PRIVACY GUIDELINES



Develop standard
procedures and
guidelines to handle
sensitive
information and to
protect IP

Additional activities:

- + network of test farms
- + building trust (ethics)
- + demonstration skills
- + access to funding

GOALS FOR SUSTAINABILITY

- Sustainable business for Use Cases
 - Business model for IoT solution
 - Business for partners
- Collection Good Practices (Use Case Navigator)
- Catalogue Re-Usable components
- Toolkit for UC support (technology, business, ecosystem, ethics)
- Stimulate Replication
- Ecosystem → SmartAgriHubs

Agricultural Digital Innovation Hubs

- Acts as one-stop-shop in proximity of the farmers
- Services to support digital innovation
- Support facility for companies (SMEs)
- Enables access to the latest knowledge, expertise, and technology
- Stimulate & promote digital transformation in Agriculture
- Provides connection with investors
- Already exist on the ground



SCALING UP AND ROLLING OUT

- Dissemination – outreach IoF results in regions
- Shared Ecosystem (for piloting-testing-demonstration-dissemination)
- Toolkit for support → DIH Services
- Re-Usable components → Innovation Experiments
- Good practices → Inspiration for DIH initiatives

→ Exposure in the Pan-European network !!

THANK YOU FOR
YOUR ATTENTION!

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