ENOUGH

EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

The Smart Data System: digital interoperability and trust in food supply chains
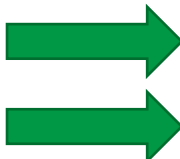
Massimiliano Pirani

Luca Spalazzi, Alessandro Carbonari, Alessandro Cucchiarelli

Marche Polytechnic University (UNIVPM)

Webinar 1st December 2022

What is a Smart Data System?
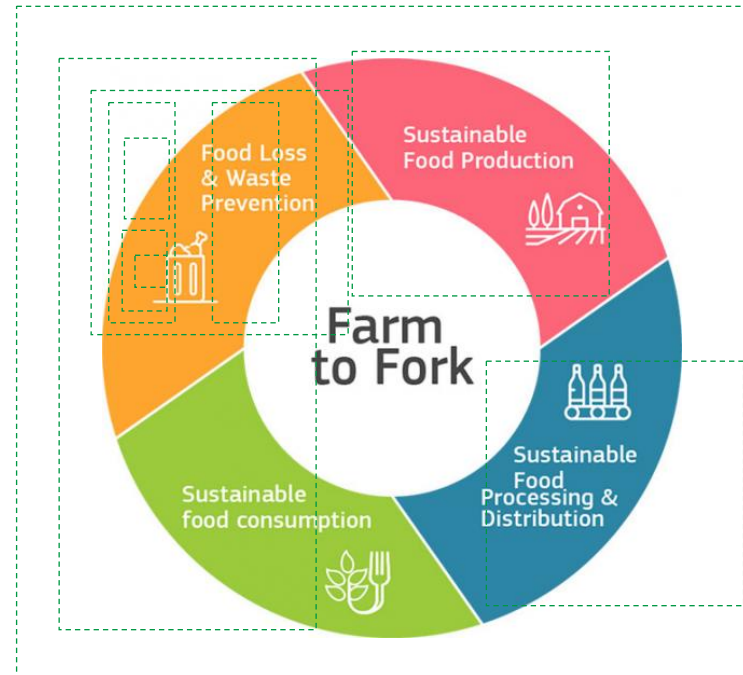
Smart → Intelligent
Simple

Data → Analysis
Control

System → Inclusion
Trust

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Overall Smart Data System's aims in ENOUGH

GHG whilst [SDG icons: 7 Affordable and Clean Energy, 8 Decent Work and Economic Growth, 9 Industry, Innovation and Infrastructure, 12 Responsible Consumption and Production, 13 Climate Action, 17 Partnerships for the Goals]

A vision for the management of complexity

Farm2Fork supply chain is seen as a **complex** system of systems & processes

For each process *do* …

- ❑ Improve continuously (Kaizen)
  - ❑ <GHG
  - ❑ Reputation
  - ❑ Dependability
  - ❑ Quality
  - ❑ Availability
  - ❑ Trustability
  - ❑ Overall sustainability (ethics)
- ❑ with all the actors and agencies (artificial or not)

> Global Quality

Chain of Trust

ENOUGH
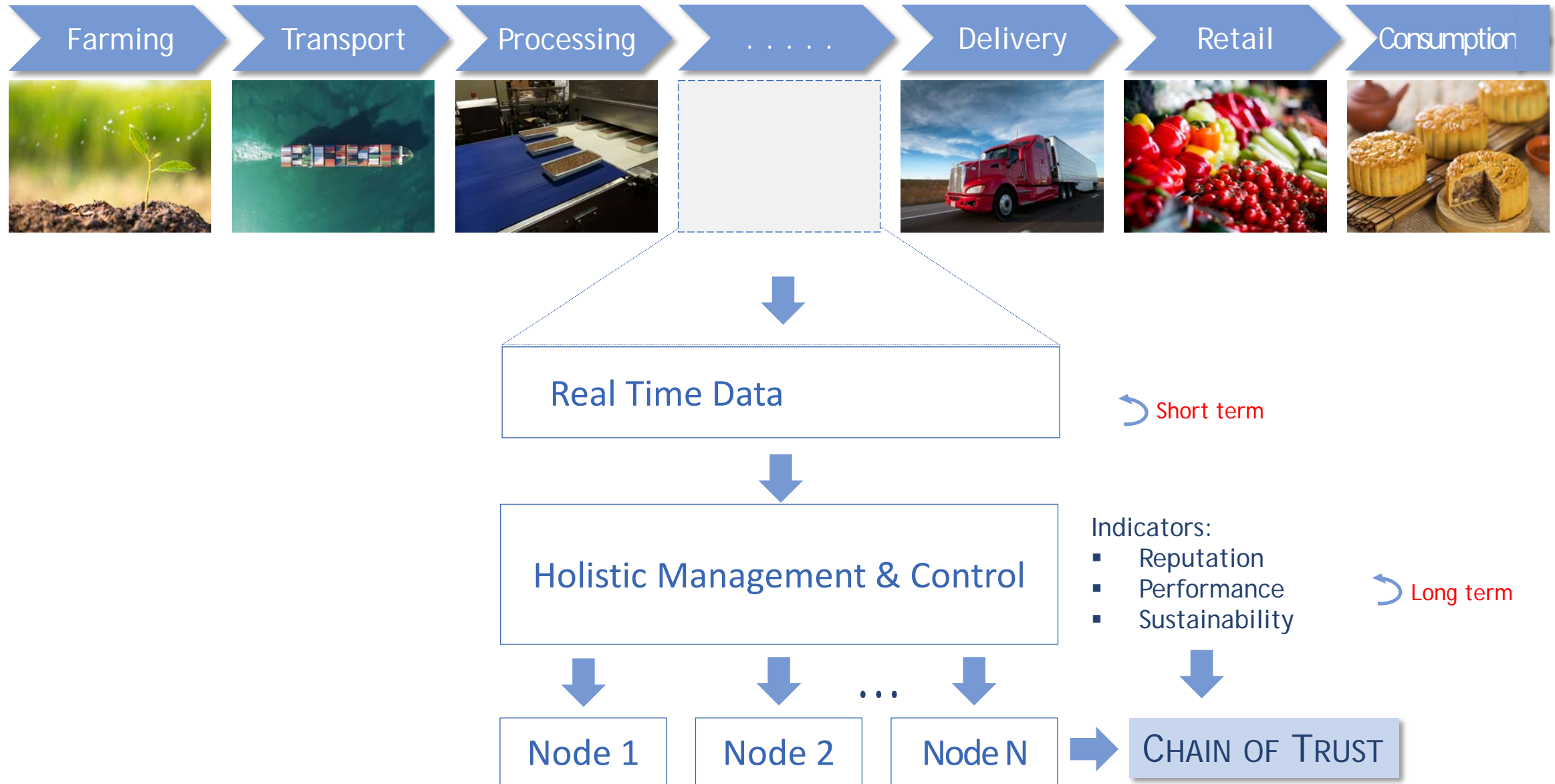EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

SDS (Smart Data System) main concepts

- the SDS concept is shaping a digital and virtual backbone of services, a holistic **ecosystem** of run-time services, in order to interoperate ENOUGH stakeholders in a unified and **co-creative** way, with sustainability inside (Enterprise 5.0).

- Starting from TRL 4-6 components and partnership to arrive to sustainable innovation in food supply chain: **with something clearly distinguished with respect to other digital platforms**

- **Impact !**
- **Uniqueness**

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

SDS (Smart Data System) keywords

- Key words (arising in the meetings with partners):
  - low carbon footprint / low GHG emission
  - real-time
  - trust
  - human-centric
  - socio-technical problems
  - circularity and sustainability

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Webinar

1st December 2022

WP5 Smart Data System

8

Supply chain becomes a chain of trust

Farming → Transport → Processing → . . . . . → Delivery → Retail → Consumption

Real Time Data ⤴ Short term

Holistic Management & Control

Indicators:
- Reputation
- Performance
- Sustainability

⤴ Long term

Node 1 … Node 2 … Node N → CHAIN OF TRUST

SDS overarching approach: Kanban

The Kanban (pull production) , «which is all about delivering in a continuous flow»

When Applicable:

- Kanban can be used in any knowledge work setting, and is particularly applicable in situations where work arrives in an unpredictable fashion and/or when you want to deploy work as soon as it is ready, rather than waiting for other work items. (see https://www.agilealliance.org/glossary/kanban/)
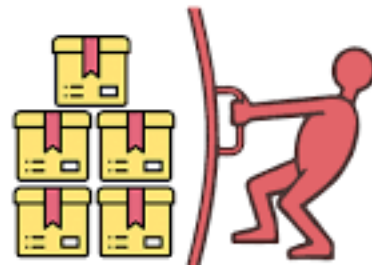
What are we going to sell?

- Not just another digital platform gadget !

- We do not reinvent the wheel

- Express our uniqueness

  - e.g. we bring about results and experience from past EU and company projects and drive them up to innovation

  - We focus on the new worldviews emerging from ENOUGH

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Webinar

1st December 2022

WP5 Smart Data System

11

Principles

- We want to comply but interpret some lessons in the "Smart Data Models" initiative (led by FIWARE)
    - Agile Standardization Manifesto (https://github.com/smart-data-models/data-models/blob/master/MANIFESTO.md)
        1. Don't just standardize, be agile and standardize (agile standardization, velocity should be measured in terms of days or weeks)
        2. Do not reinvent the wheel
        3. Normalize real cases (agile standardization should only be based on real cases)
        4. Be open
        5. Don't be overly specific
        6. Flat not Deep (be local and self-contained)
        7. Sustainability is key

- We are striving in that direction !

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Webinar

1st December 2022

WP5 Smart Data System

12

What are we going to exploit?

- The SDS framework

  - A "DevOps" rather that a specific digital platform

    - A set of practices that combines software development, management, and operational technology.

    - To shorten the systems development life cycle and provide continuous delivery with high software quality.

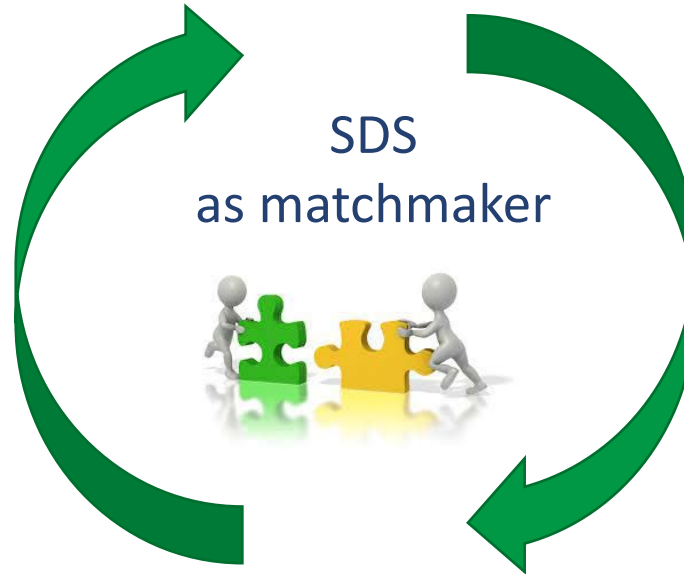 - A multipart and multisided business

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Ambitious role of the SDS (Smart Data System)

HABA
(humans are better at)

Construction
Whole
Systems thinking
Systems theory
Abduction
Hypothesys
What if
Scenario Simulations
Model refinement
Complexity
Prescriptions

SDS
as matchmaker

MABA
(machines are better at)

Reduction
Parts
Reductionism
Systems engineering
Deduction, Induction
Hypothesys testing
Observe,Plan,Do,Check
Scenario verification
Model reduction
Complicatedness
Predictions

HABA-MABA [Fitts, P. M. (Ed.). (1951). Human engineering for an effective air-navigation and traffic-control system. National Research Council, Div. of.]

ENOUGH
EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

Webinar

1st December 2022

WP5 Smart Data System

14

Convergent action of humans and machines

- Interoperable decision making

1. Observe the digitally augmented supply chain
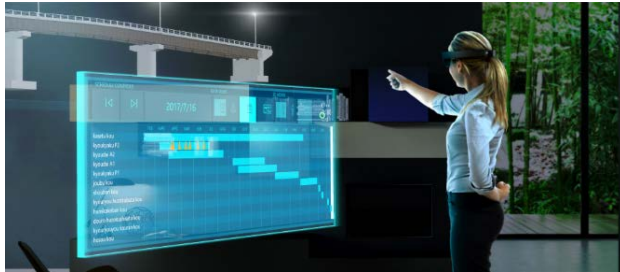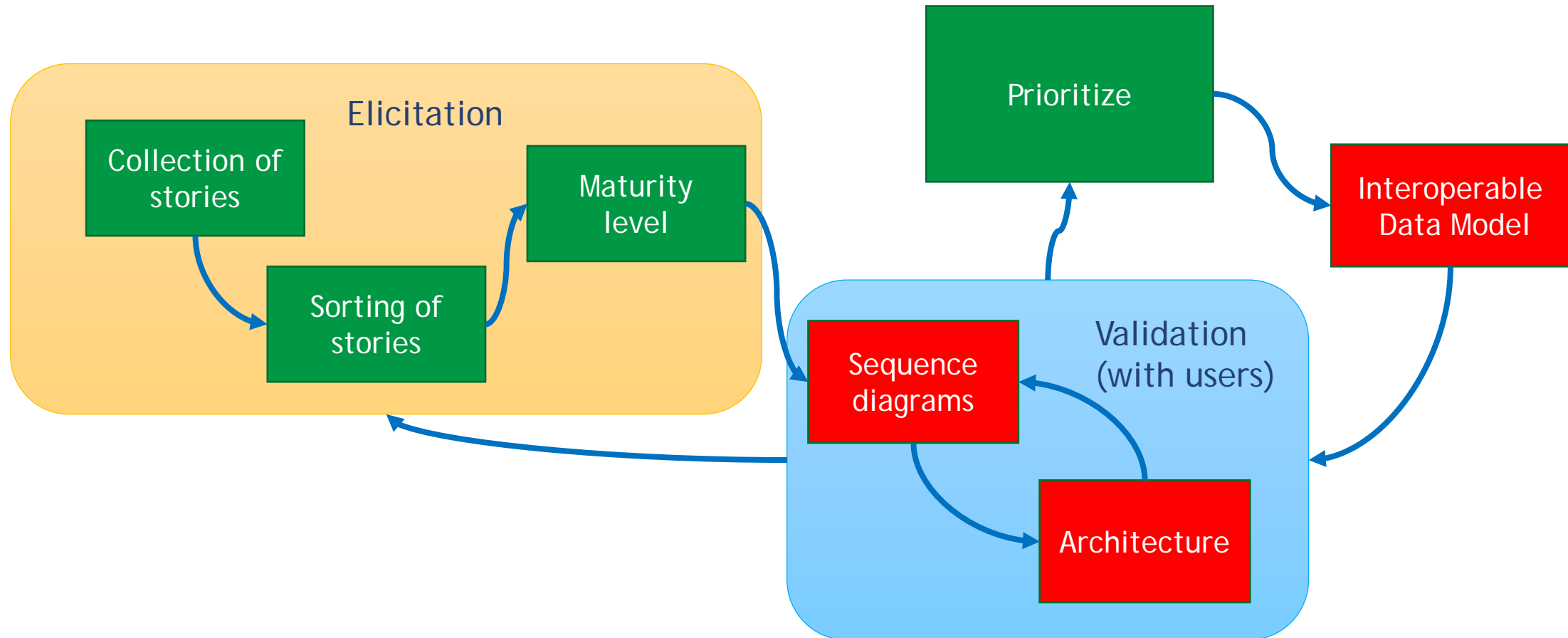

2. What-if Analysis

3. Enforcement of experts' knowledge and advice

Undergoing : SDS specifications

- From requirement **analysis** to **specifications**
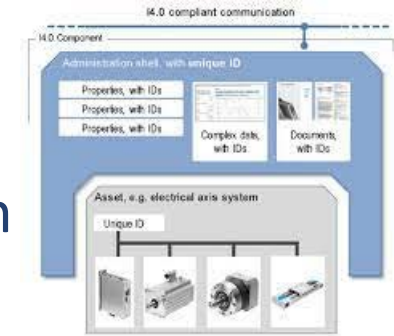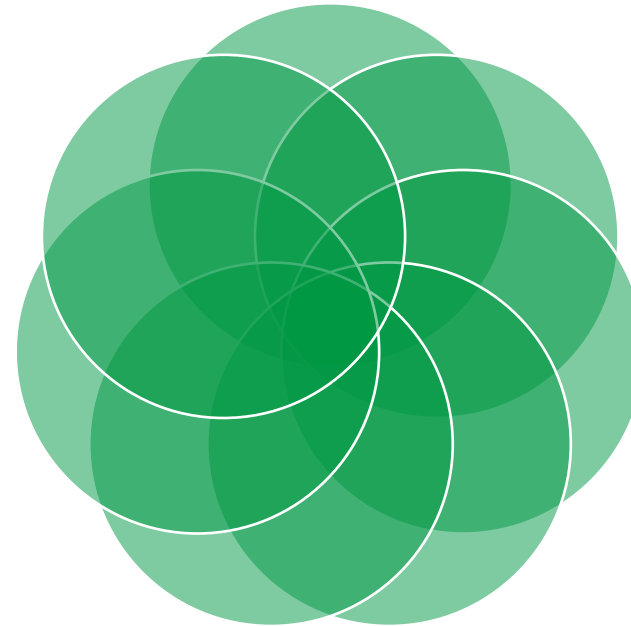
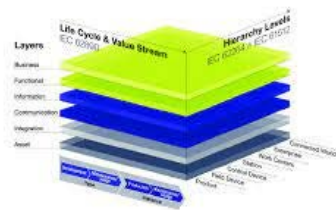# SDS specifications to comply with Industry 4.0/5.0

Blockchain

eXtended Reality

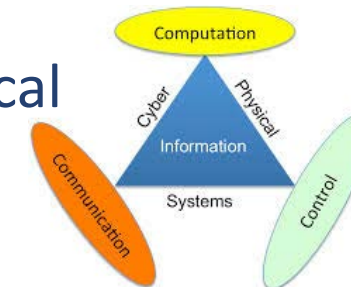AAS (Asset Administration Shell)

Digital Twins

FIWARE

RAMI 4.0

Cyber Physical Systems

ENOUGH

EUROPEAN FOOD CHAIN SUPPLY
TO REDUCE GHG EMISSIONS BY 2050

THANK YOU !

enough-emissions.eu