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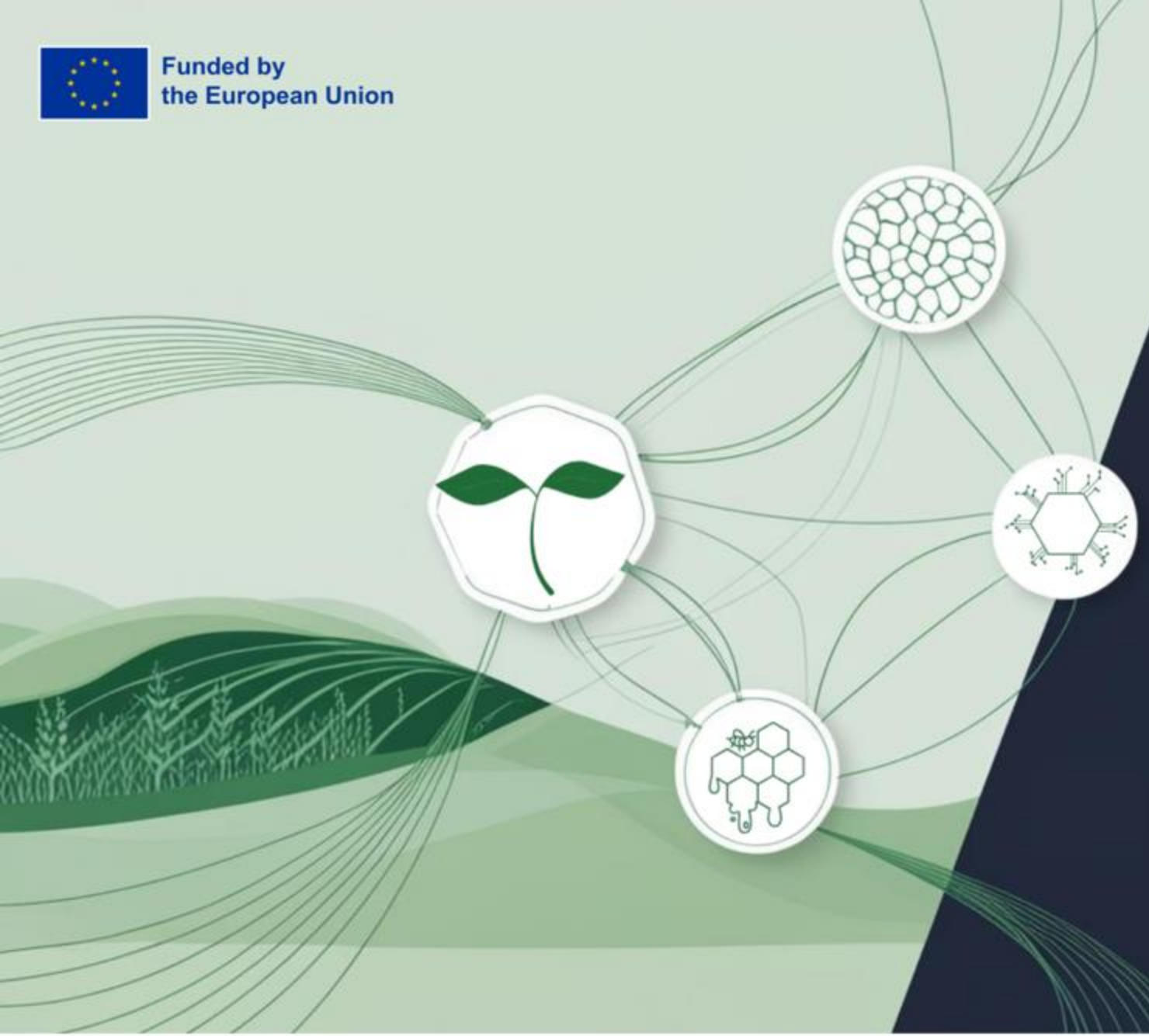
the European Union



Traceability and Verification in Food Supply Chains

The Technological Perspective

Friday 21st of February, 10.30-12.00 CET

Organised by: watson ALLIANCE THERMS CUES SEA2SEE FishEUTrust TITAN TEALHELIX

Housekeeping

- **Webinar recording:** The session is being recorded, and it will be posted on the cluster project websites shortly after the event.
- **Audio & video settings:** Please turn off your camera and mute your microphone.
- **Questions and comments:** Please use the chat function and we will address them during the question-and-answer session.
- **Captions are available:** Kindly click on more and then language and speech where you will find an option to turn on automated captions.

Agenda

- **10.30-10.35 Introduction to the Session**
- **10.35-11.35 Presentations from the Cluster Projects:**
  - Alliance
  - CUES
  - FishEUTrust
  - SEA2SEE
  - THEROS
  - TITAN
  - Watson
  - TEALHELIX
- **11.35-12.00 Questions from the Audience**

Our Speakers (I/II)

Funded by the European Union

Kostas Choumas
Postdoctoral Associate
University of Thessaly
Alliance

Kun Han
PhD Candidate
University of Wageningen
CUES

Nives Ogrinc
Jožef Stefan Institute
FishEUTrust

Sébastien Gaïde
Tilkal
SEA2SEE

Our Speakers (II/II)

Dimitra Tsiakou
Scientific Project Manager
ICCS
THEROS

Edward Sliwinski
EFFoST
TITAN

Truls Bakkejord Ræder
Senior Research Scientist
Sintef
Watson

Tim Bartram
GS1 Germany
TEALHELIX

ALLIANCE

Cluster Webinar

Traceability & Verification in Food Supply Chains

The Technological Perspective

Kostas Choumas

kohoumas@gmail.com

web.nitlab.inf.uth.gr/~kohoumas

University of Thessaly (UTH)

This project has received funding from the European Union's HE research and innovation programme under grant agreement No 101084188

ALLIANCE in a nutshell

Topic

HORIZON-CL6-2022-FARM2FORK-01-04
Fair, healthy and environmentally-friendly food systems from primary production to consumption

Consortium

- **25 partners from 12 countries**
- 5 x Research Institutes and Universities
- 7 x Industrial Organizations (LEs, SMEs)
- 5 x Associations
- 4 x Food Certification Authorities
- 2 x Retailers
- 3 Think Tanks and NGOs

Dates

- Start Date: **November 1st, 2022**
- End date: **October 31st, 2025**
- Duration: **36 months**

Funding

- IA – Innovation Action
- ALLIANCE has received **€ 3,843,571.25** from EU's Horizon Europe research and innovation programme under grant agreement No 101084188 (Total cost: € 4,408,546.25)

Aim

ALLIANCE provides a holistic framework that **safeguards data integrity and veracity**, enhances **traceability and transparency** and reinforces **interoperability** in quality labelled supply chain of organic, PDO, PGI, and GI food through innovative technology solutions and validate approaches.

How

Examining the food fraud landscape and proposing systemic solutions that move beyond current practices through novel cost-effective methods and tools that can detect adulteration on the spot and provide trusted quality labelled FSCs

- **Blockchain** for transparent and immutable transactions
- **Early Warning System** for Food Fraud Prevention
- **Advanced Spectroscopy** for Identification of Adulteration and Provenance of Food Products
- **Rapid Testing** for Authenticity Validation & Proof of Geographical Origin
- **Vulnerability Risk** Assessment

ALLIANCE Demonstration

7 quality-labelled Food Supply Chains in different countries

Pilots

- PDO/PGI Extra Virgin Olive Oil **@ Biocos, Italy**
- PDO Feta Cheese **@ Olympos, Greece**
- Organic Honey **@ WBP, France**
- PGI Faba Beans **@ ASINCAR, Spain**
- PGI Lika Potatoes **@ UPLK, Croatia**
- Organic Pasta **@ Alce Nero, Italy**
- PDO Arilje Raspberry **@ Original, Serbia**

ALLIANCE Consortium

ALLIANCE Architecture

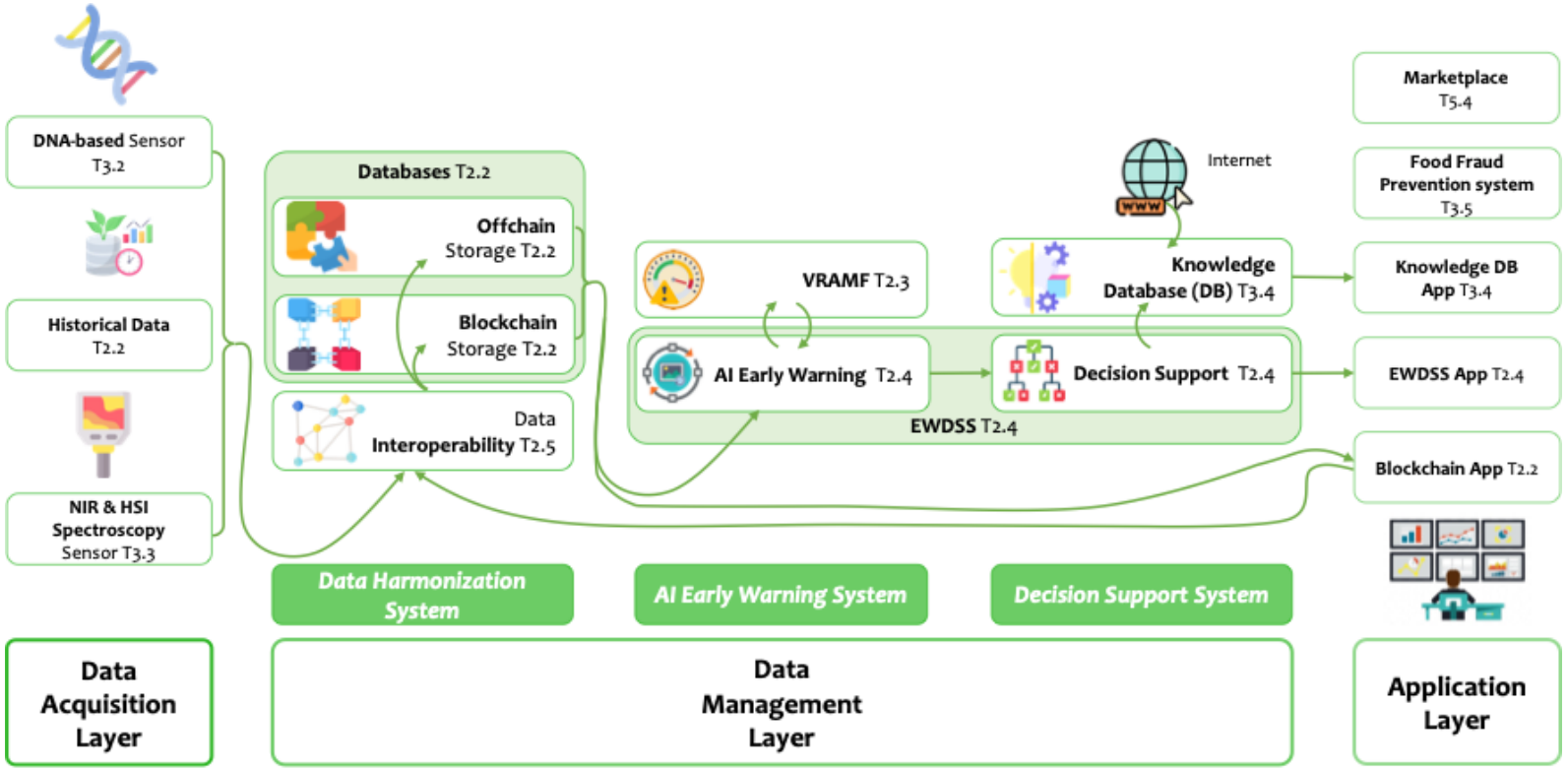
Key Offerings

Blockchain Technology

Enhancing traceability with tamper-proof records, enabling transparency and verifying authentication of claims

AI Early Warning System:

Analyzing data performance metrics from various steps in the food value chain and **detecting patterns and anomalies** indicative of food fraud in real-time, offering timely decision making to food actors



Next-Gen Portable DNA Sequencing

For verification of the geographic origin of EVOO and honey correlating specific genetic markers **confirming the authenticity of the product**

Predictive Analytics

Forecasting future risks with historical and real-time data analysis and identifying high-risk areas to proactively countermeasure vulnerabilities in the supply chain

Digital Knowledge Base

Providing and sharing comprehensive information on food products, supply chain practices, and known fraud incidences, informing involved stakeholders and actors

ALLIANCE

Thank you

UNIVERSITY OF THESSALY

www.uth.gr

CUES

CONSUMERS' UNDERSTANDING OF EATING SUSTAINABLY

Cluster Webinar

Kun Han

PhD candidate @Wageningen University

WAGENINGEN UR
For quality of life

Feb 21st, 2025

Funded by the European Union

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CUES Project

IN A NUTSHELL

CUES addresses the urgent need for a more sustainable food system that benefits the environment, society, and the economy. The project aims to foster a Triple Change in the food system concerning culture, food value chain, and policy. To this end, CUES will pilot nine food system interventions and policy dialogues, actively involving consumers, food value chain actors and policymakers. A learning community and toolkits for behavioural change and communication will be developed to motivate 3 million consumers to make sustainable food choices.

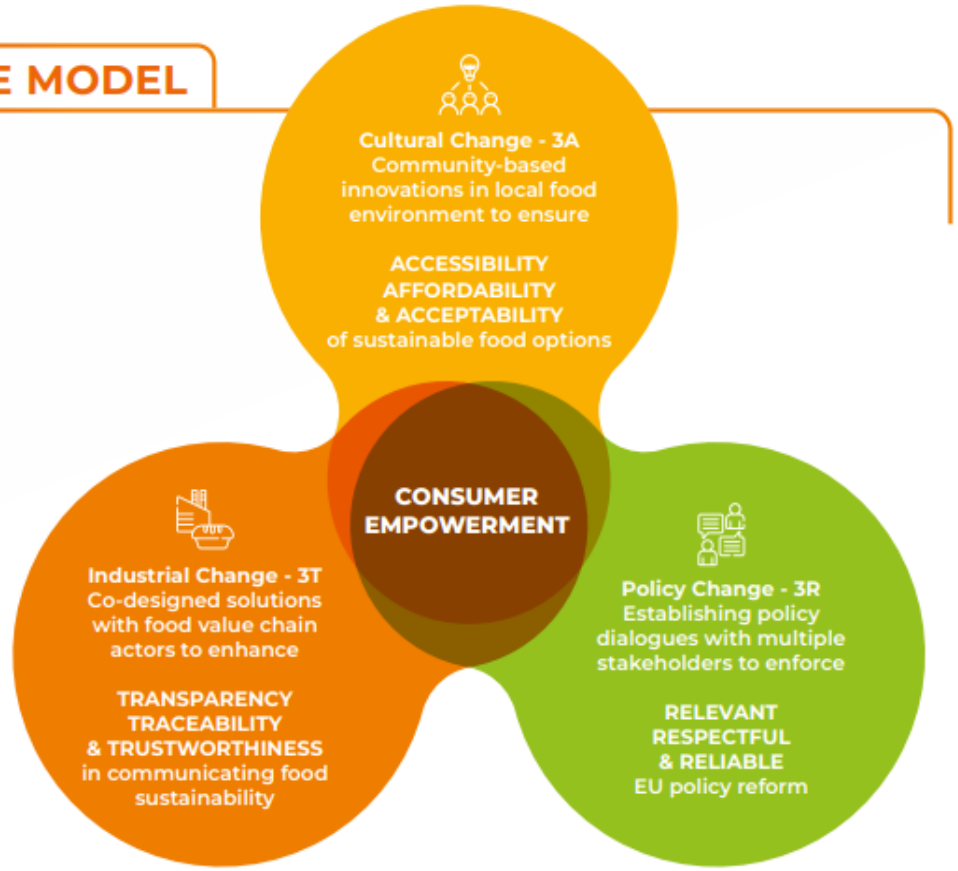
PROJECT OBJECTIVES

- Co-design methods and approaches to change consumer behaviour
- Empower food value chain actors for sustainable food options
- Increase consumers' understanding about food safety, labelling, and circular systems
- Inform food system governance

THE TRIPLE CHANGE MODEL

9 INTERVENTIONS

- Bulgaria
- Greece
- Hungary
- Iceland
- Ireland
- Italy
- Netherlands
- Portugal
- EU-wide hackathon



CUES- Participatory approach

Greece :

Consumer organization dedicated to protecting consumer rights and promoting consumer awareness

Italy :

Consortium focuses on fostering innovation and technological advancements within the food industry

Hungary:

Business association representing small and medium-sized enterprises in the food sector, aiming to support their growth and rural development

Iceland :

Alternative protein start-up promotes sustainable and eco-friendly food solutions

CUES- Participatory Action Research

PAR

- Stakeholders' tacit knowledge and researchers' analytical rigor jointly address practical challenges
- Balance between theoretical depth and practical applicability
- Stakeholders are not merely research subjects but active partners in creating knowledge
- Structured around iterative cycles of inquiry, action planning, pilot testing, and reflective evaluation

Operationalization

- A series of annual co-creation workshops conduct over four years in Hungary, Italy, Greece, and Iceland
- Process:
  - ✓ **jointly identify transparency barriers.**
  - ✓ **co-create and implement interventions designed**
  - ✓ **interventions are collectively evaluated**
  - ✓ **feedback will be used to refine and continuous improvement**
- The first workshops were conducted online, with subsequent workshops held in person.

Co-create Workshops

4

Workshops

2.5h

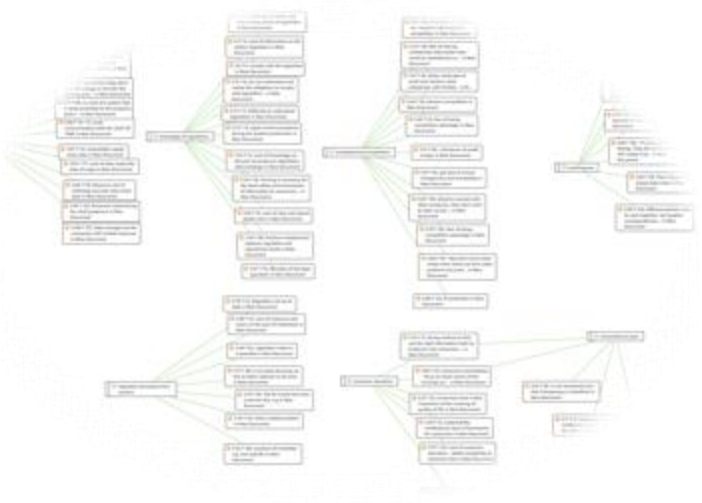
Average Duration

8

Average Participants

Growers	Food processors	Marketing agencies
Knowledge institutes	Retailers	Cooperatives
Open markets	Associations	Standards organization

Findings



Key Barriers

01 Market-related
- Competitive advantage
- Market incentives
- Consumer

02 Institutional
- Unfavorable regulations (decoupled, unsupported, penalties etc.,)

03 Organizational
- Knowledge
- Know-how
- Capacities

04 Technical
- Data
- Certification

05 Relational
- Value chain stakeholders

CUES

CONSUMERS' UNDERSTANDING OF EATING SUSTAINABLY

Thank you!

Follow us

Contact us

Partners

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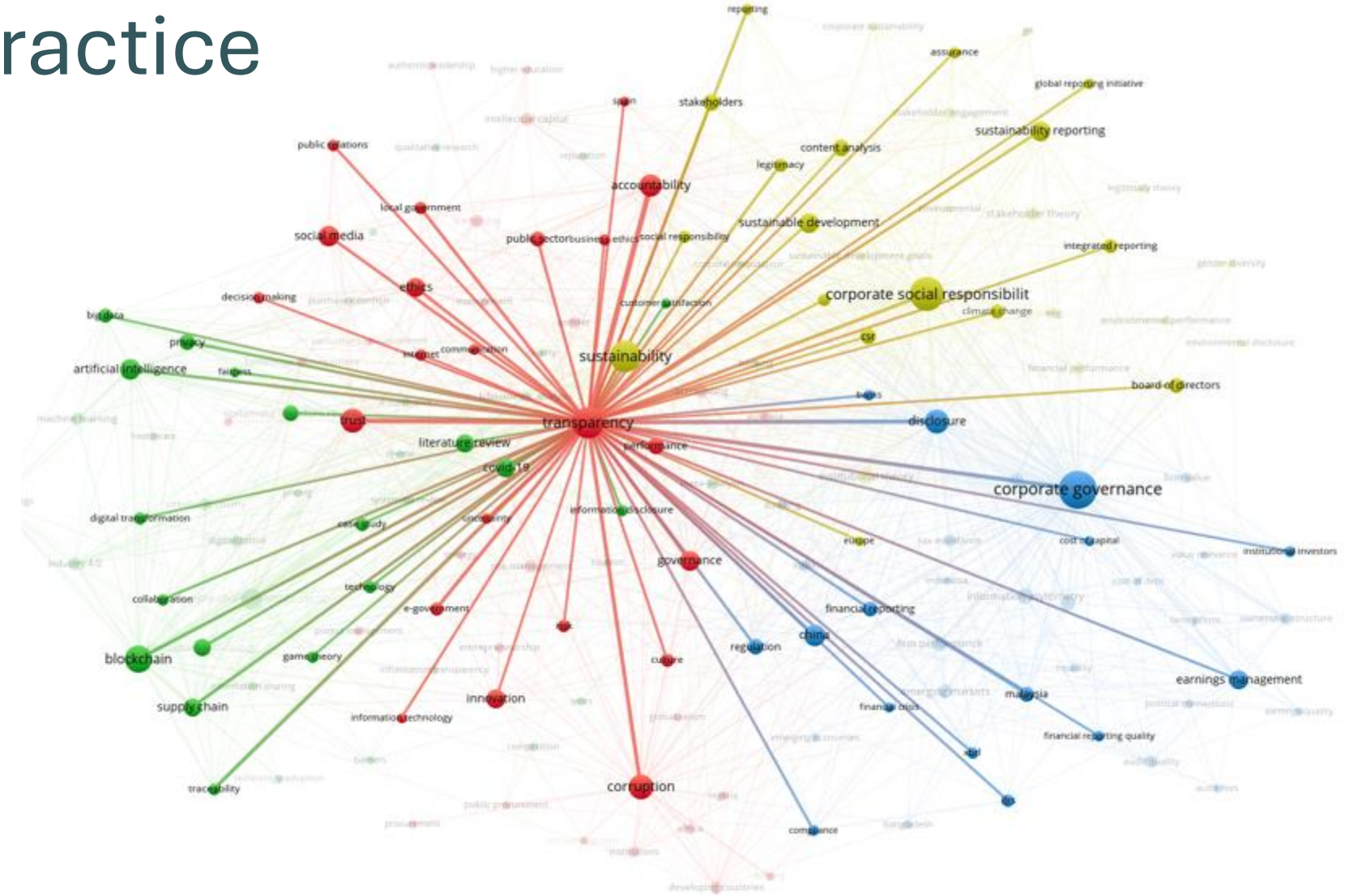
Research V.S. Practice

- Previous studies:
  - Intangible value
  - Big companies
  - Intentionally
- Practice:
  - Tangible value
  - SMEs
  - Unintentionally

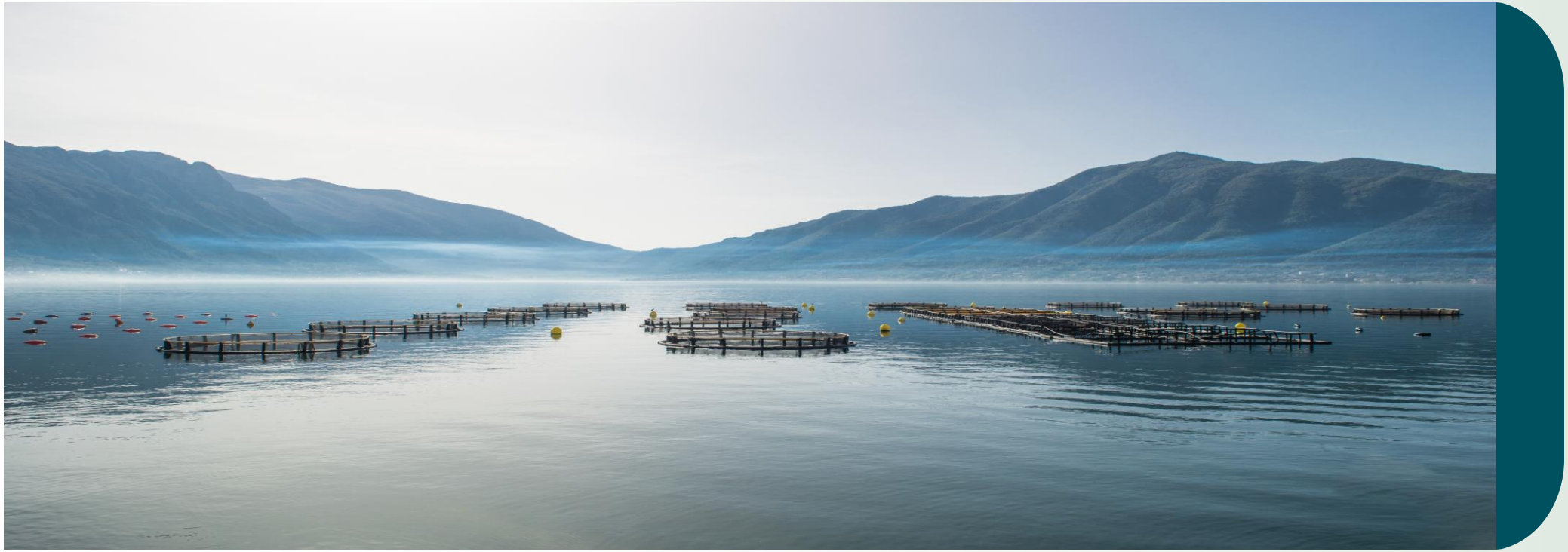


Traceability systems developed in FishEUTrust

Synergy Webinar: Food Traceability and Verification Cluster

Jožef Stefan Institute

Nives Ogrinc



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Traceability technologies in FishEUTrust

Physical testing of food

Animal species, origin, nutritional claims, …

Food sensing technologies

Fast methods for analysis and characterization of food, link to IoT

https://www.wur.nl/

Internet of Things (IoT)

Hardware devices linked to the internet to assist in data gathering

Image by Freepik

Software

Blockchain and non-blockchain solutions, and Software as a Service

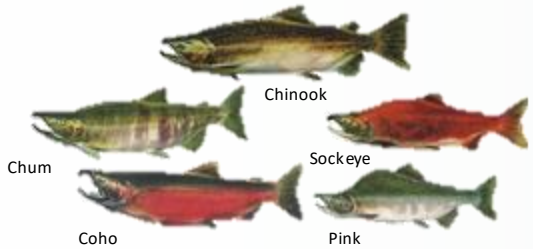
Physical testing

Verify the authenticity and safety of food products

Microbiological and DNA testing

Stable isotope approach

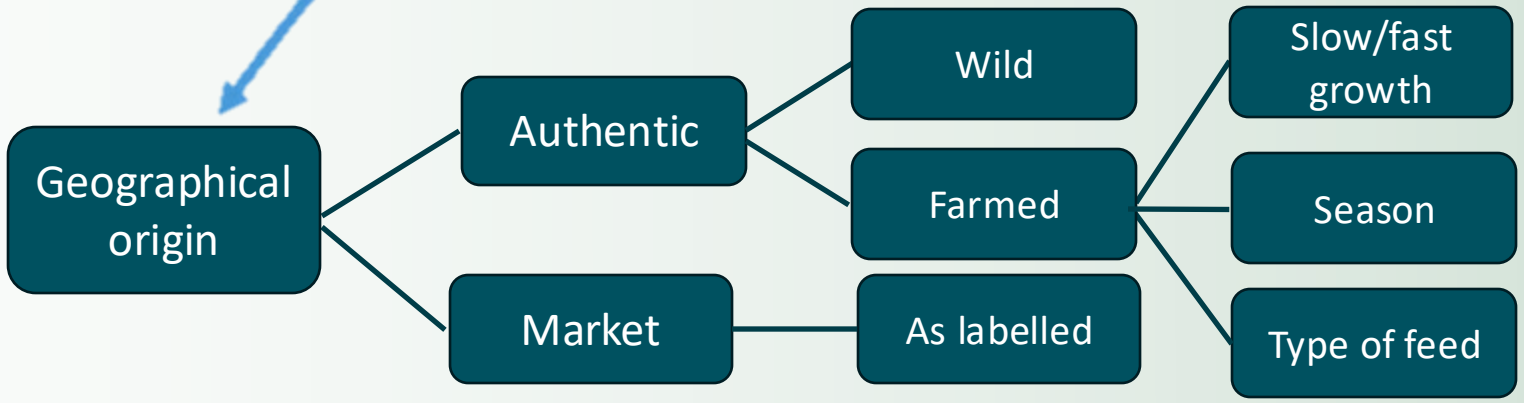
Species origin



Pacific salmon species

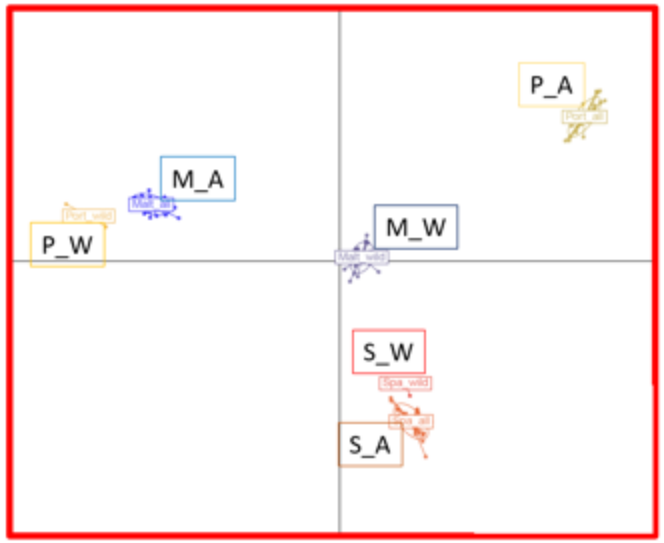
DNA analysis

Norway, Scotland, Ireland, Faroes, Iceland, Chile, Canada, …



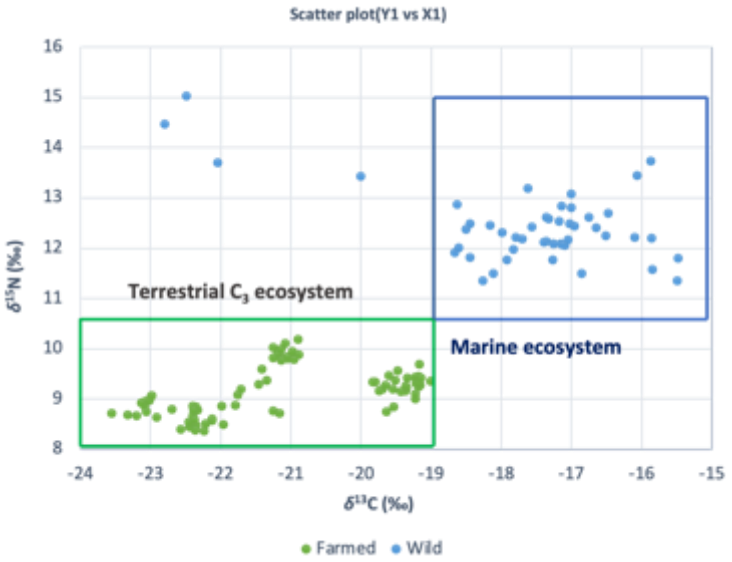
Stable isotope analysis

Sample collection



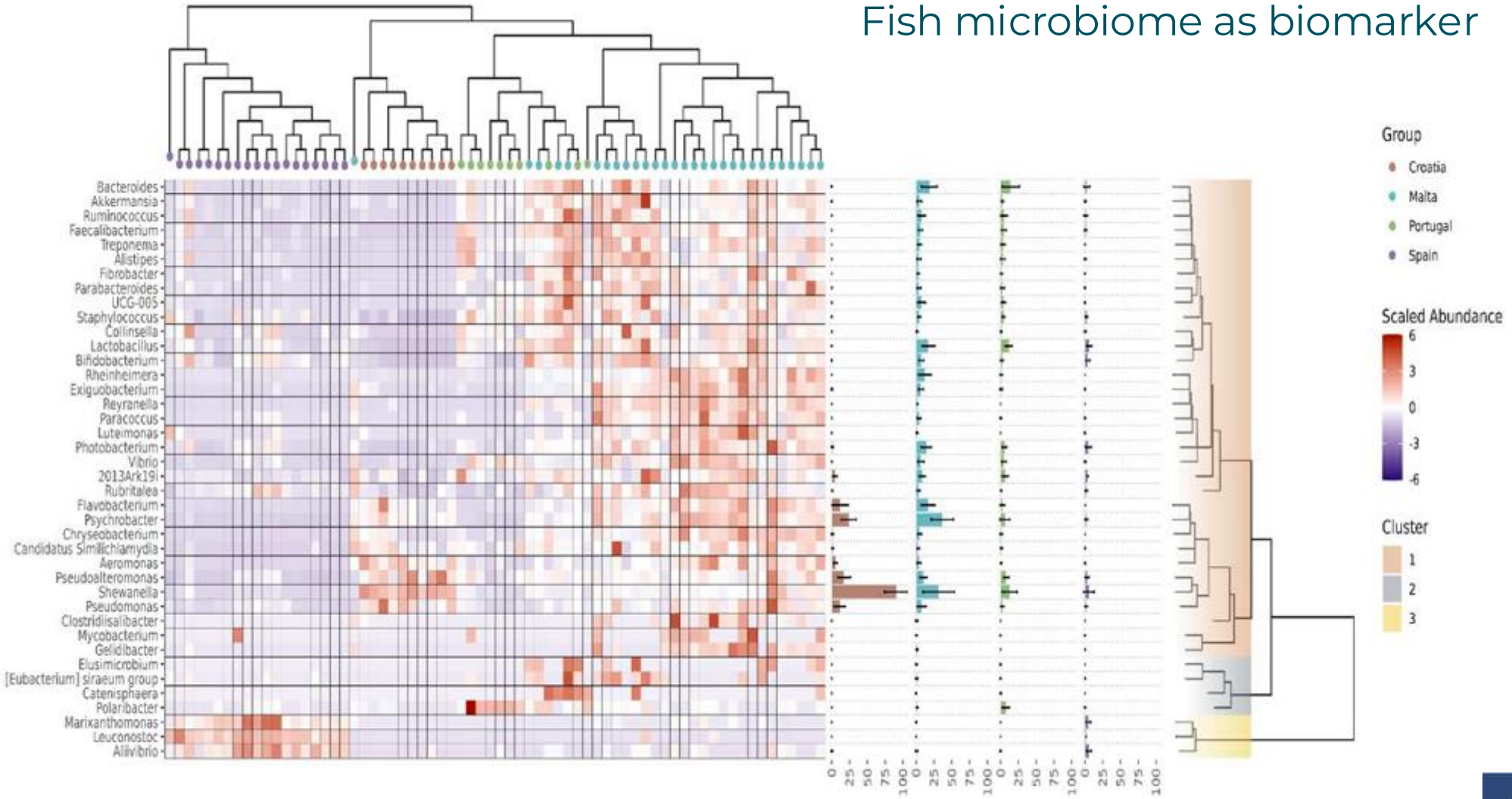
DNA barcoding

DPCA on 161 sea bream sample based on 27,913 common SNPs

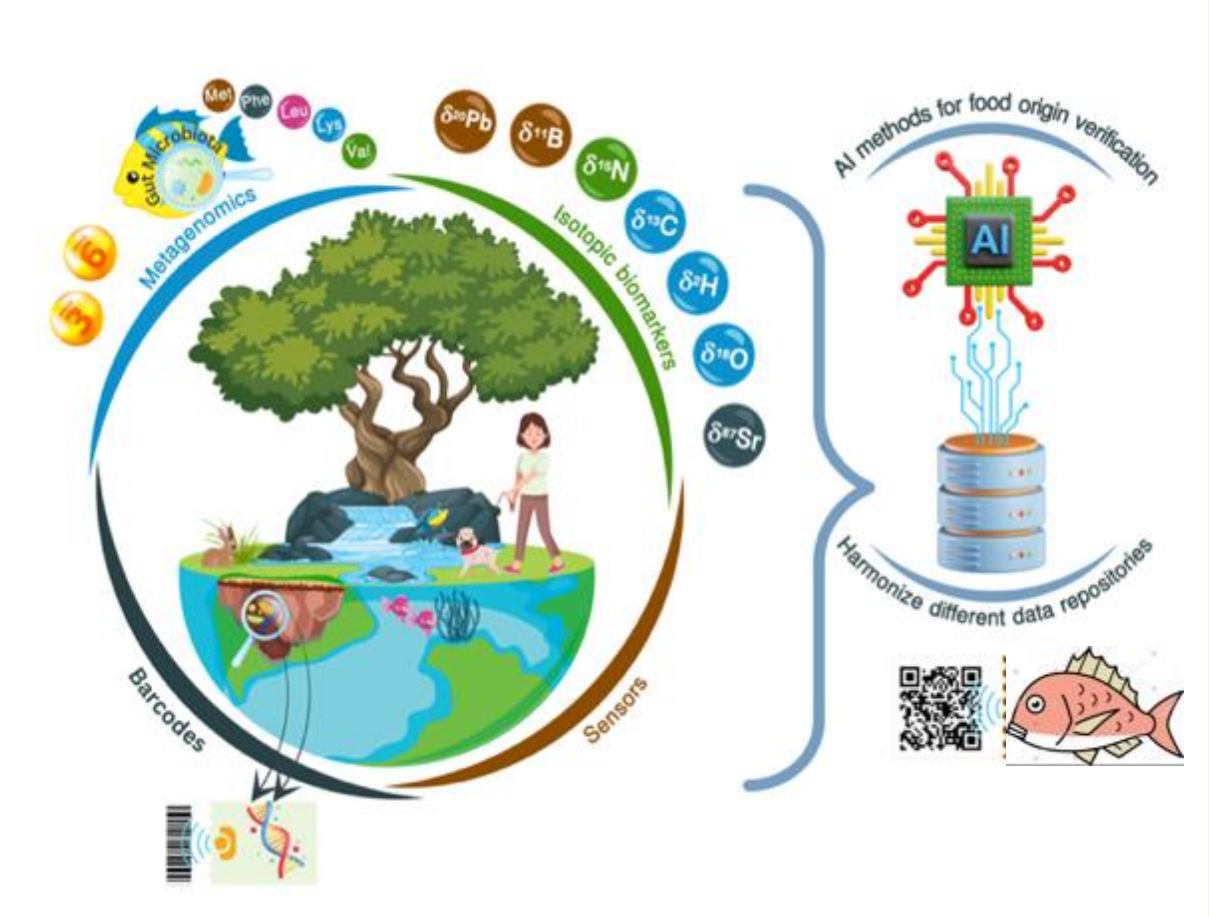


Stable isotope approach

Fish microbiome as biomarker



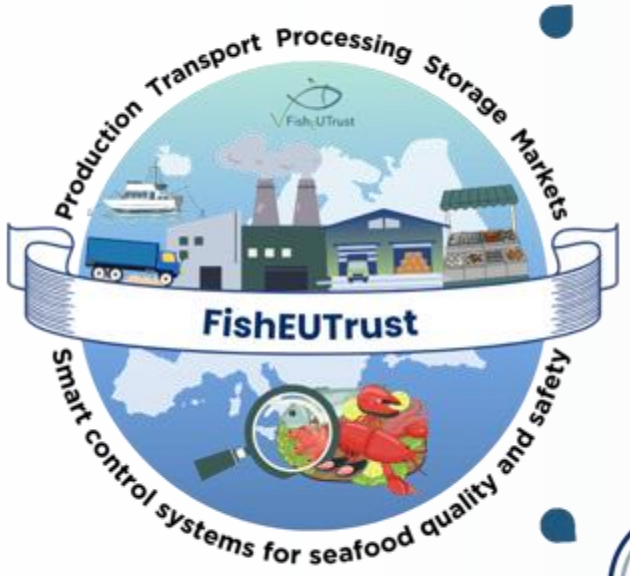
Physical testing



Food authenticity and traceability concept

Database:
IsoFoodTrack

Smart control system for quality and safety



Freshness

Electrochemical chemotransistor with electrical control of receptor affinity, paired with an Arduino platform.

Biological safety

Electrochemical sensors targeting bacterial biofilm and dangerous bacteria, such as *Salmonella enterica*.

Chemical safety

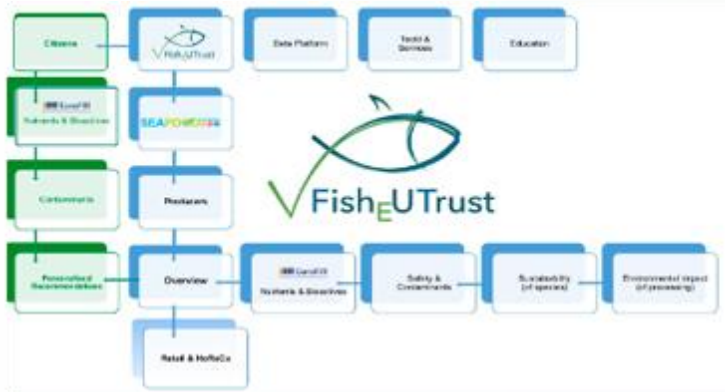
Electrochemical sensors targeting specific antibiotics, such as vancomycin, tetracyclines and cephalosporins.

Toxins

Aptasensors for okadaic acid and saxitoxin detection

DEMO session

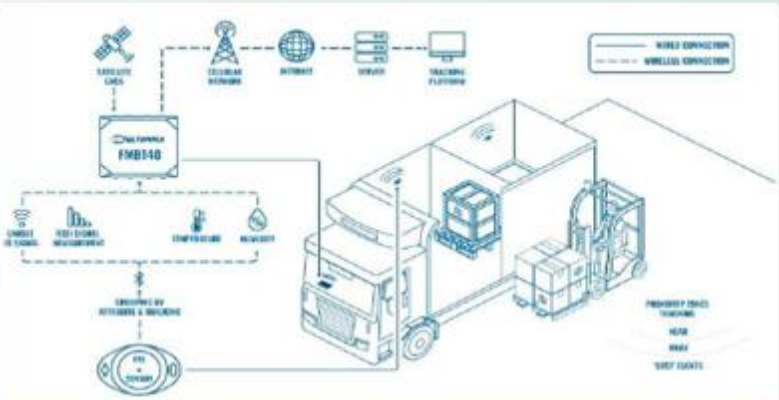
Digital solutions: integration



SEAFOOD TOMORROW

benchmark tool

EuroFIR
European Food Information Resource

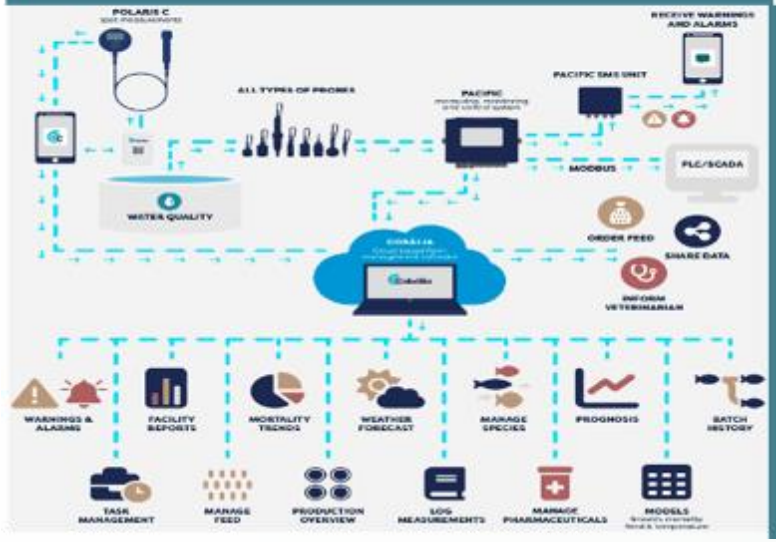


IsoFoodTrack
Database for food authenticity and traceability

Jožef Stefan Institute

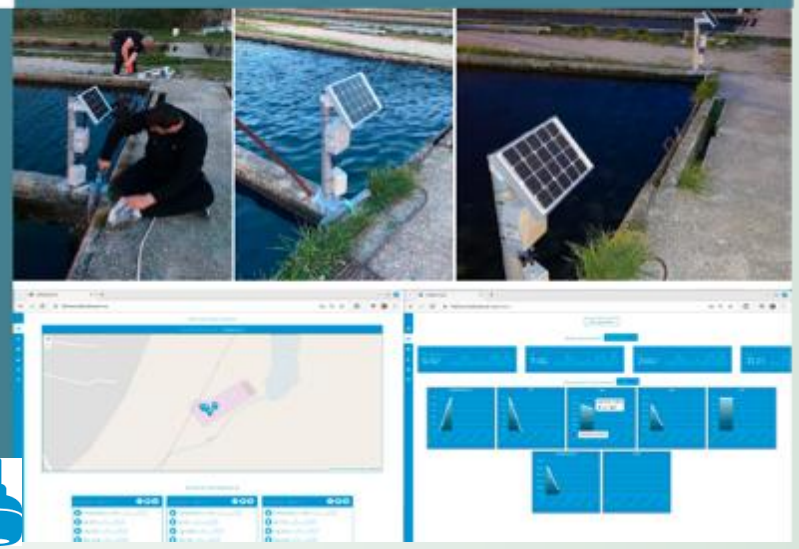
Prototyping IoT system for fish farms

DigitalSmart

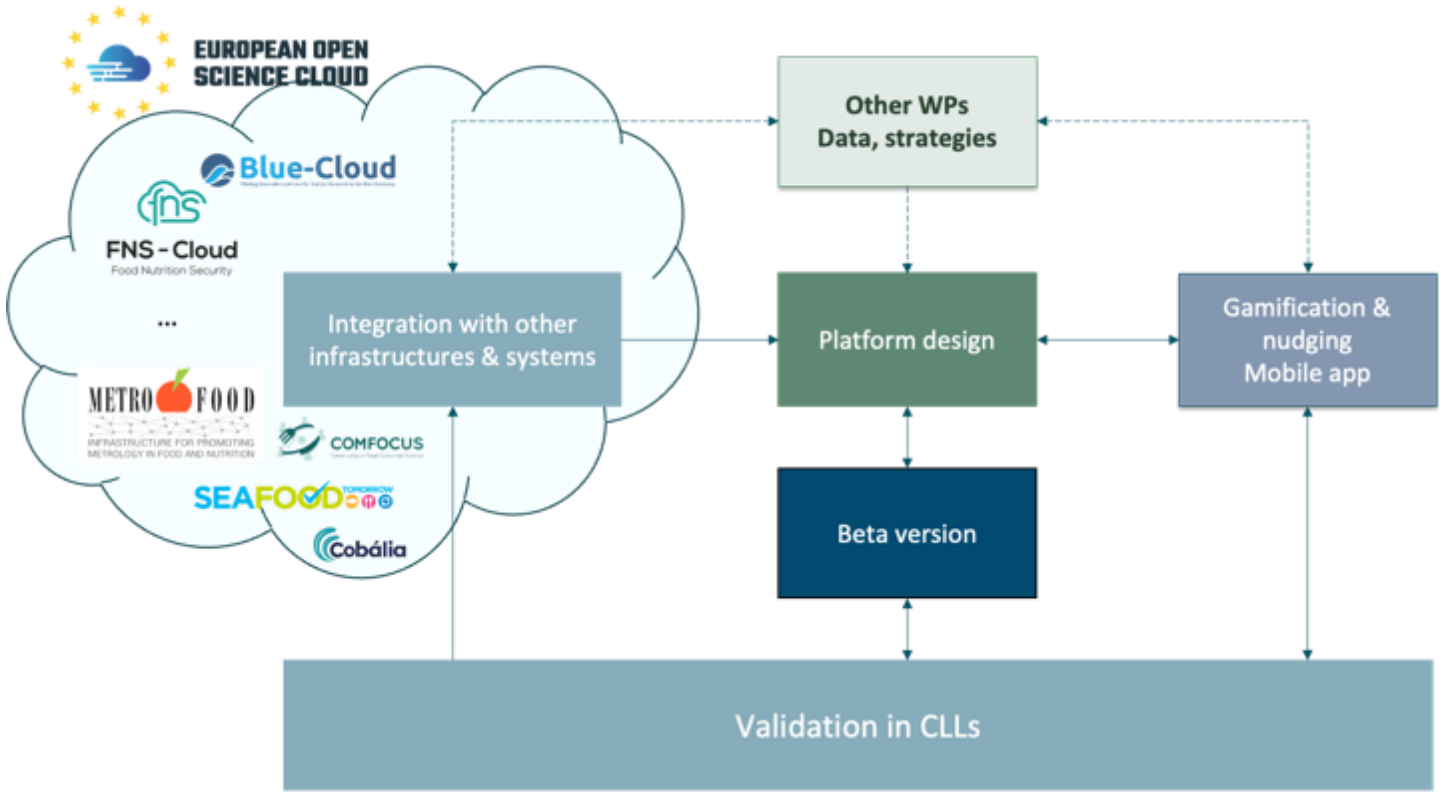


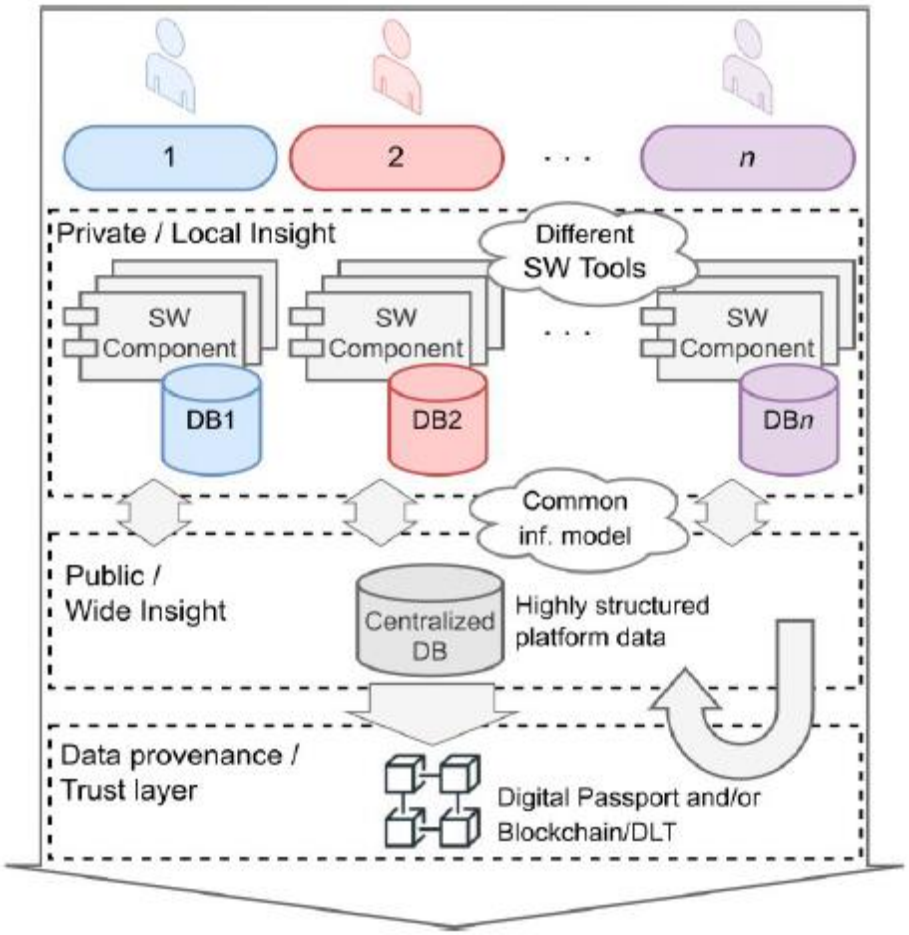
Cobália's Integration with OxyGuard hardware for a complete facility overview (image: Cobália)

OxyGuard®



The FishEUTrust innovation platform

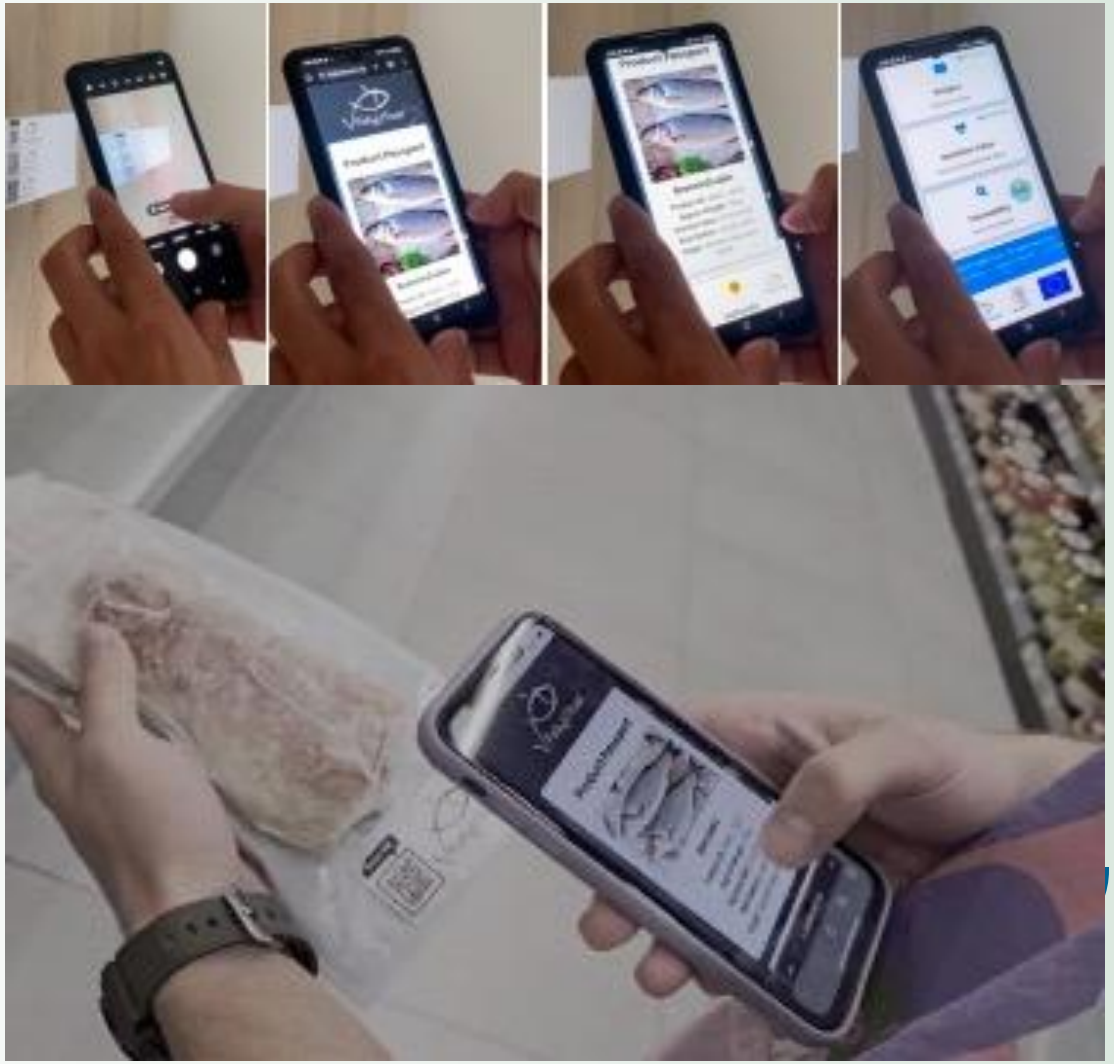




Design a platform to support integration of technologies, digital solutions for supporting consumer empowerment and data and information sharing

Product Passport and QR code based smart tag

A blockchain will be used for the batch's digital passport, containing essential data – still under discussion



Thank you for your attention!

www.fisheutrust.eu

You can find me at:

nives.ogrinc@ijs.si

Don’t’ forget to follow us:

Innovative blockchain traceability technology and Stakeholders' Engagement strAtegy for boosting Sustainable sEafood visibility, social acceptance and consumption in Europe

Overall project presentation

Sea2See Consortium Partners

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (REA). Neither the European Union nor the granting authority can be held responsible for them.

SEA2SEE

a snapshot

THE PROJECT

SEA2SEE emerges to fill in existing seafood traceability gaps to help you answer the question "where my seafood comes from?"

WHY

To significantly increase trust, transparency and traceability of the European Seafood sector throughout the value chain

To give actors with sustainable seafood practices a competitive advantage by making them more visible

To foster multi-stakeholder dialogue and set the basis for social innovation, while raising awareness about the benefits of seafood

HOW

Through the development of innovative technological:

- End-to-end blockchain based platform
- Professional and consumer friendly consumer applications
- A cloud-based, AI powered solution, tailored to the European seafood industry

Flexible enough to adapt to changes along the chain, while bringing transparency to the users at its end

A valuable source of data, collected across the whole seafood value chain and verified by diverse groups of stakeholders.

5 CASE STUDIES

- Demonstrate the real-world impact of the innovative technology
- Real life data used for each of the involved value chains
- Focus on scalability and market uptake

- FISHERY — Octopus (Octopus vulgaris)
- AQUACULTURE — Rainbow trout (Oncorhynchus mykiss)
- AQUACULTURE — Sea bream (Sparus aurata)
- AQUACULTURE — Meagre (Argyrosomus regius)
- THIRD COUNTRY IMPORT — Tuna from capture fisheries from Ecuador and Peru

HOW

Through stakeholders' engagement strategies for boosting sustainable seafood visibility, social acceptance and consumption in Europe

- Enhanced seafood literacy for informed purchasing decisions and responsible consumption
- Empower citizens by implementing societal and sectora strategies for the traceability tool co-creation
- Engage consumers in providing trustworthy traceability information through participatory demonstrations of the use of web-based and digital tools.

SEA2SEE - **Reshaping** the seafood landscape with **technological solutions** answering the need for

- Valuable source of collected data
- Verified inputs from diverse groups of stakeholders

Responsible seafood practices **leading the way** to

- Healthier oceans
- Empowered consumers
- Resilient global food system

Co-funded by the European Union

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Why SEA2SEE?

- Answering: "Where does my seafood come from?"
- Enhancing trust, transparency, and traceability in the European seafood sector
- Boosting visibility for sustainable seafood actors
- Encouraging multi-stakeholder dialogue and social innovation

Key Benefits:

- Healthier oceans
- Empowered consumers
- Resilient global food system

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How It Works:

- Data collection across the value chain
- Verified inputs from stakeholders
- Blockchain-based platform for transparency
- User-friendly applications for professionals and consumers
- AI-powered cloud solutions for the seafood industry

Case Studies:

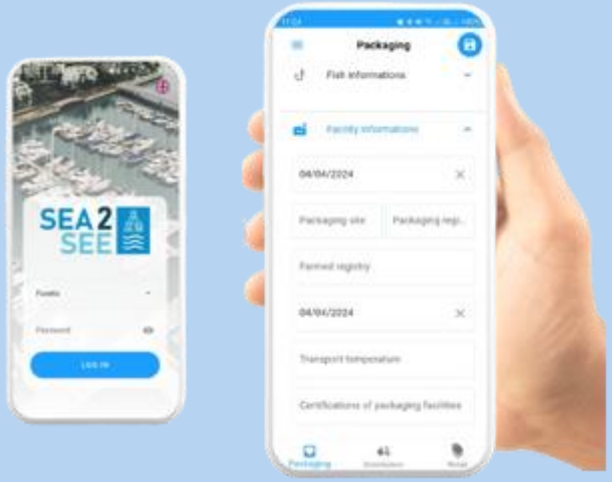
- Octopus
- Sea bream, Sea bass, Rainbow trout, Meagre
- Third-country imports: Tuna from Ecuador & Peru

Impact:

- Transforming seafood traceability through technology
- Fostering responsible consumption and industry innovation

1 Data Collection

- Data collection tools
- Data aggregation
- Data notarization and securisation based on blockchain



- Blockchain based
  - Simple actor onboarding
  - Easy audit
  - Immutable data
- GS1/EPCIS Supply chain standard
  - Leverage standard to describe supply chain events
- SmartWater Medusa
  - Probe with 7 water quality parameters
- SmartWater Cloud SaaS
  - Aquaculture production management
- PAGE UP mobile applications and SDK
  - Trace everywhere

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2 Analytics

- Risk assessment
- Alerts
- Supply visibility

- Sea2See platform powered By Tilkal
- Visualize collected data, aggregated to understand your supply chain
  - Insights
  - Traceability trees
  - Consumer interactions reports
- Risk assessment
  - Certification
  - Alerts

Co-funded by the European Union

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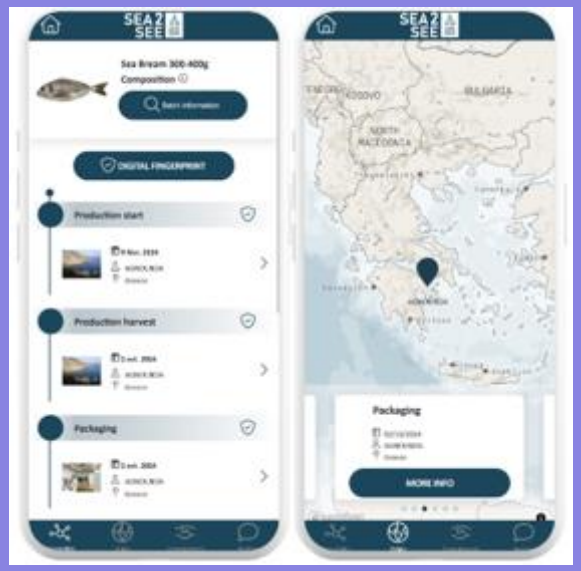
3 Restitution

- Impact assessment
- Transparency and product visibility with the Spotlight App



- Sea2See Spotligh application (Digital Product Passport), powered by Tilkal
  - Help the consumer better informed about the product
- Product visibility configured by the brand
  - Impact assessment
  - Images, videos and marketing material
- Single page web application, no installation needed
  - Direct communication with consumers
  - Survey to get feedback (stars, yes/no or open questions)

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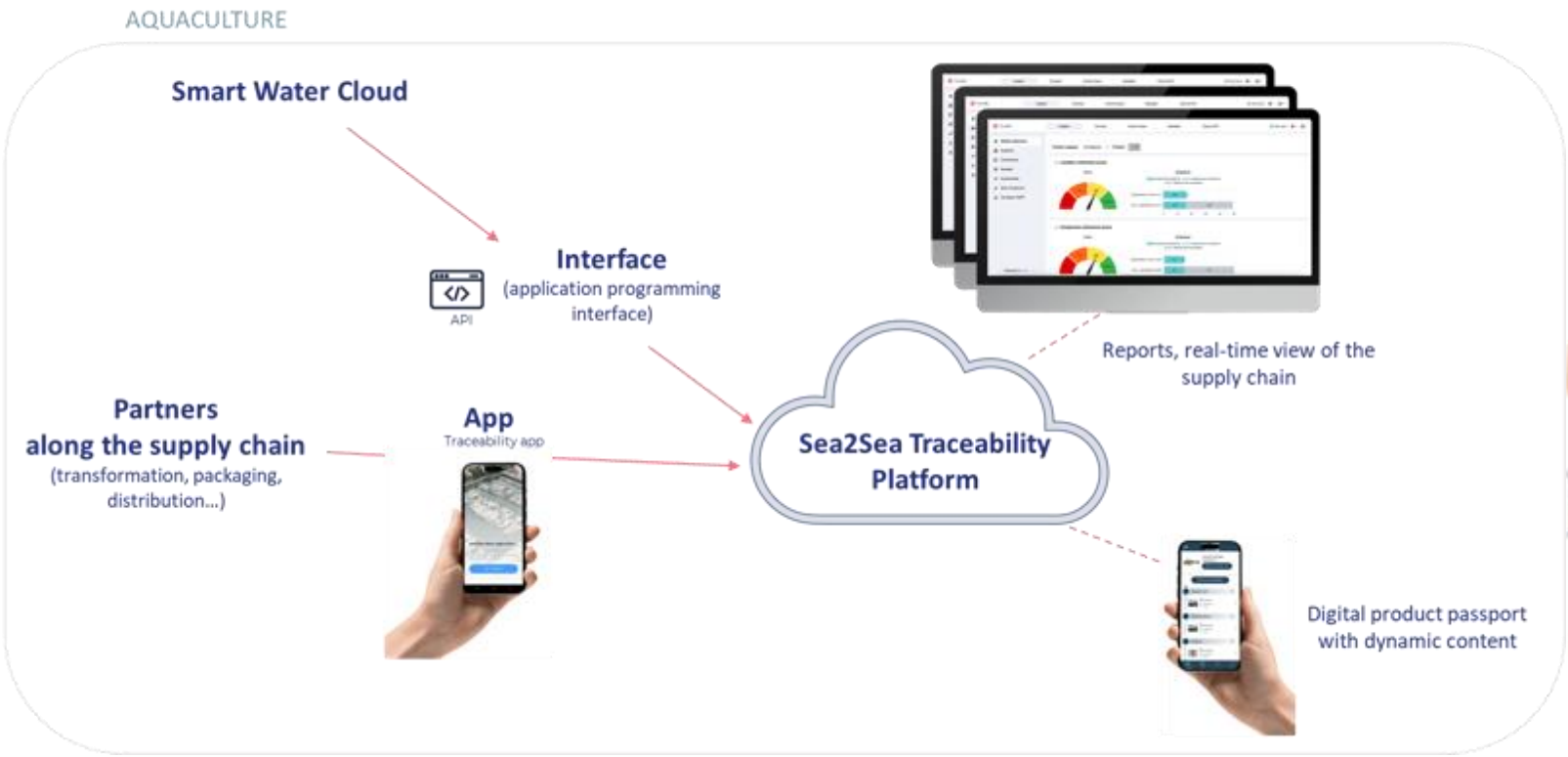
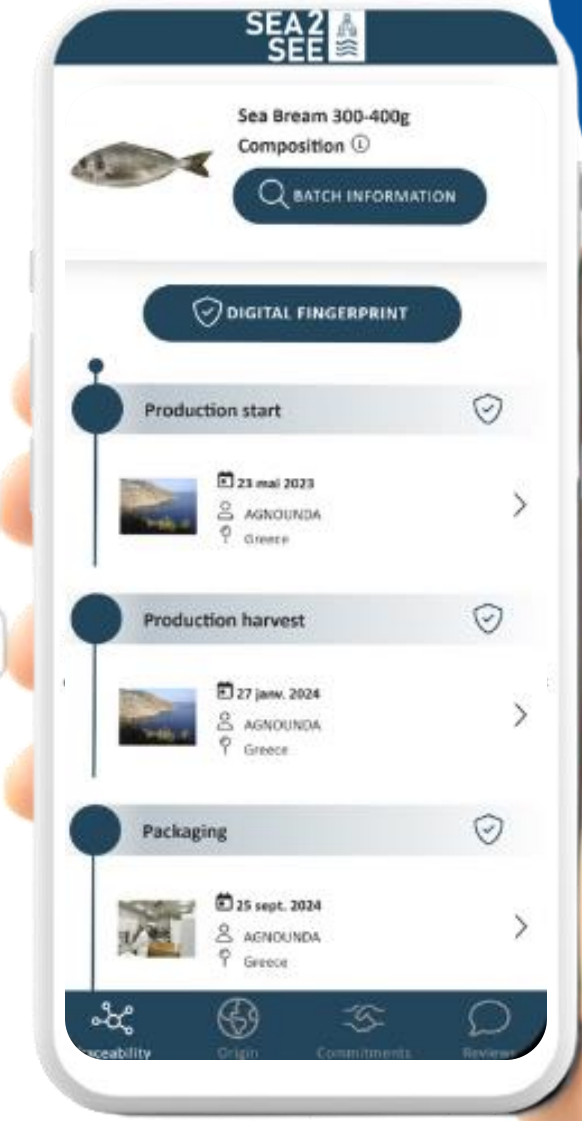
4 Summary

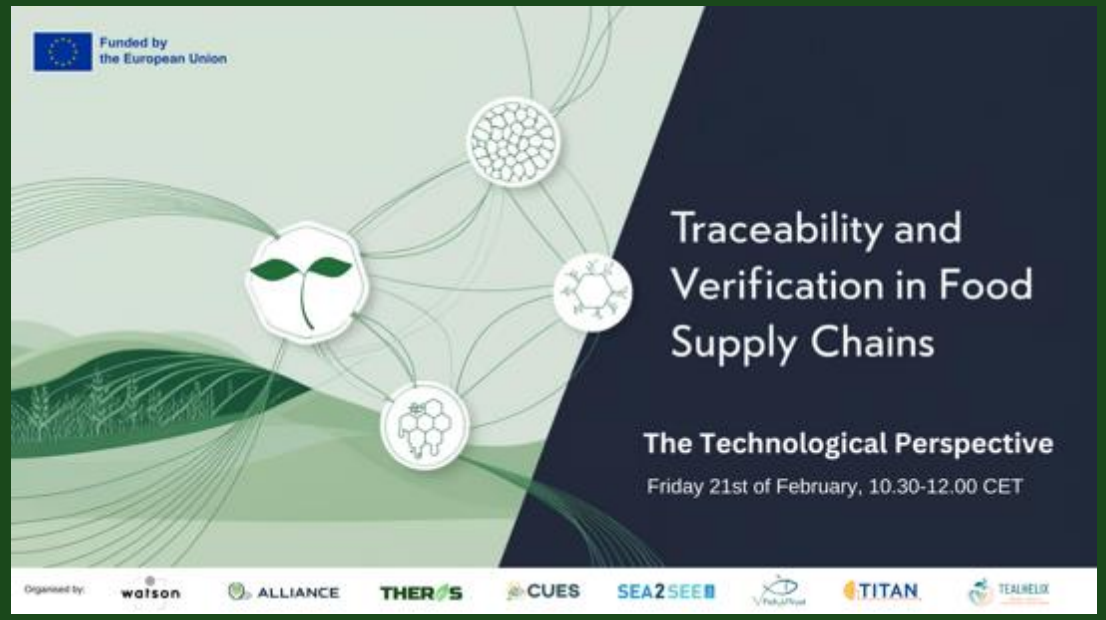

AQUACULTURE
Smart Water Cloud
Interface
(application programming interface)
API
Partners
along the supply chain
(transformation, packaging, distribution...)
App
Traceability app
Sea2Sea Traceability Platform
Reports, real-time view of the supply chain
Digital product passport with dynamic content


SEA2SEE
Sea Bream 300-400g
Composition
BATCH INFORMATION
DIGITAL FINGERPRINT
Production start
23 mai 2023
AGNOUNDA
Greece
Production harvest
27 janv. 2024
AGNOUNDA
Greece
Packaging
25 sept. 2024
AGNOUNDA
Greece

Thank you !

Traceability and Verification in Food Supply Chains- The Technological Perspective

THEROS: An integrated toolbox for improved verification and prevention of adulterations and non-compliances in organic and geographical indications food supply chain



Dr. Angelos Amditis, Valantis Tsiakos, Dimitra Tsiakou, Georgios Tsimiklis
I-SENSE Group, Institute of Communication & Computer Systems (ICCS)

THEROS

THEROS at a glance

- **Topic:** "Innovative solutions to prevent adulteration of food bearing quality labels: focus on organic food and geographical indications"
- **Duration:** 01.01.2023 - 31.12.2025 (36 months)
- **Funding scheme:** IA – Innovation Action
- **EU contribution:** EUR 3,999,961.00
- **Coordinated by:** Institute of Communication and Computer Systems (ICCS), Greece

6 Participating Countries

17 Partners

Funded by the European Union

THEROS Vision & Concept

Low-cost, digital and scalable solutions.

Blockchain enhanced traceability system.

Platforms and algorithms allowing management and harmonization.

Interfaces to facilitate monitoring and inspections.

Pilot 1: Serbia

Pilot 2: Greece

Pilot 3: Czech Republic

Pilot 4: Spain

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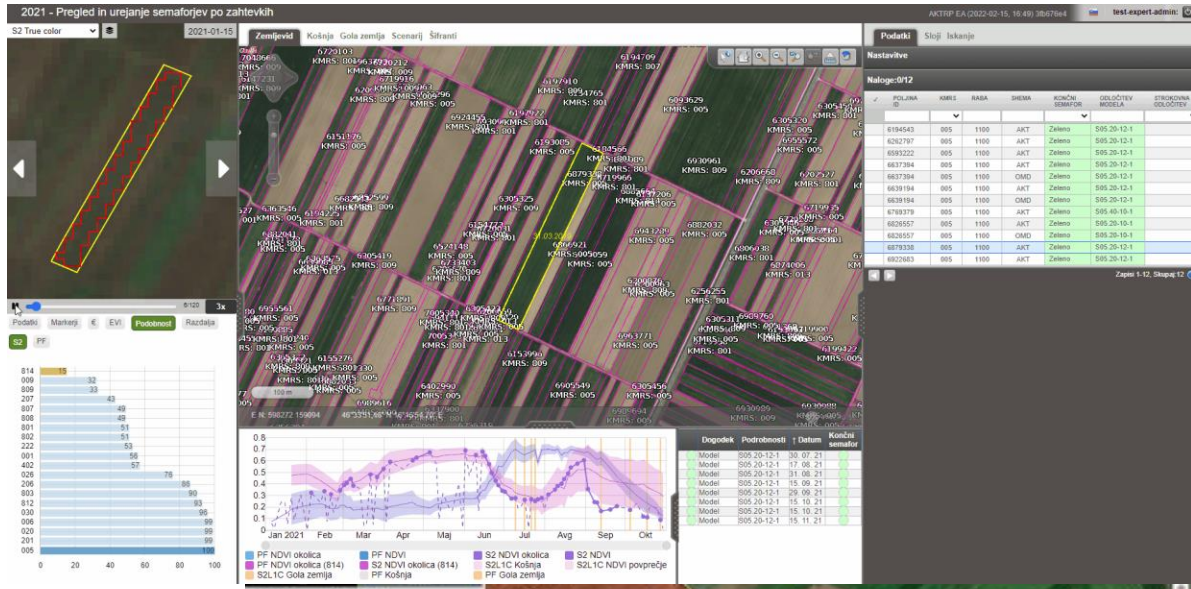
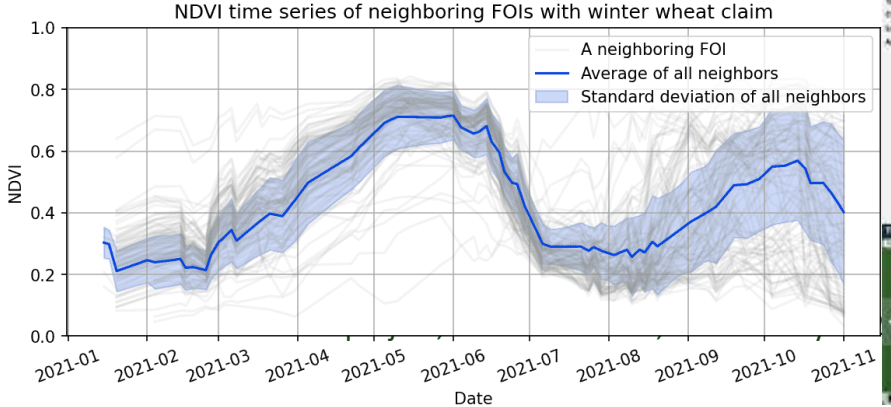
Earth Observation (EO) Services

01. Establish sustainable supply chains for innovative Earth observation value added products and services, focusing on monitoring the compliance with organic standard using satellite imagery from Sentinel-2, including a model to distinguish between organic and conventional parcels.

- Use satellite imagery for monitoring parcels remotely.
- Compute "**markers**" (machine learning) on satellite imagery to monitor agricultural activity.
- Novel machine learning techniques to address challenges related to the complexity of carbon footprint and sequestration study and its impact.
- Combing these markers to help agencies with risk assessment and monitoring large areas of organic farming regulations compliance.





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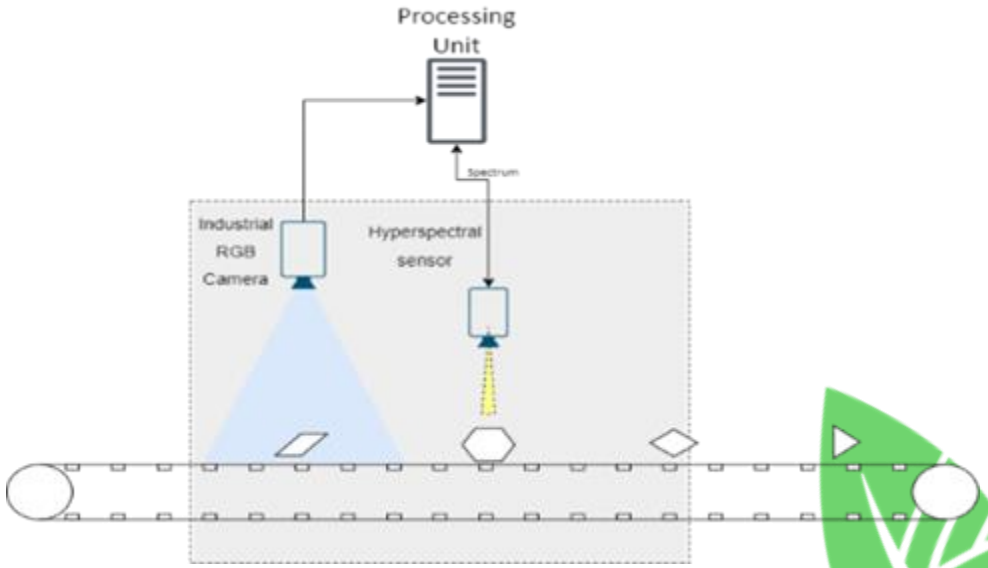
MEMS-Based Photonics System

02. The MEMS system in THEROS advances food adulteration detection by providing quick, non-destructive analysis of organic products with high accuracy using low-cost, portable spectrometers.

- Deployed low-cost MEMS sensors for **non-destructive analysis** of organic products, like wheat flour and apple juice.
- Achieved high accuracy (R^2=0.93 for wheat flour).
- Developed **AI models** to differentiate between organic and non-organic oranges and *analyze soil properties*.
- Created a comprehensive spectral library supporting fraud detection and environmental impact assessments.
- Mobile application for MEMS designed to facilitate data acquisition from spectrometers, with seamless integration via Bluetooth connectivity.



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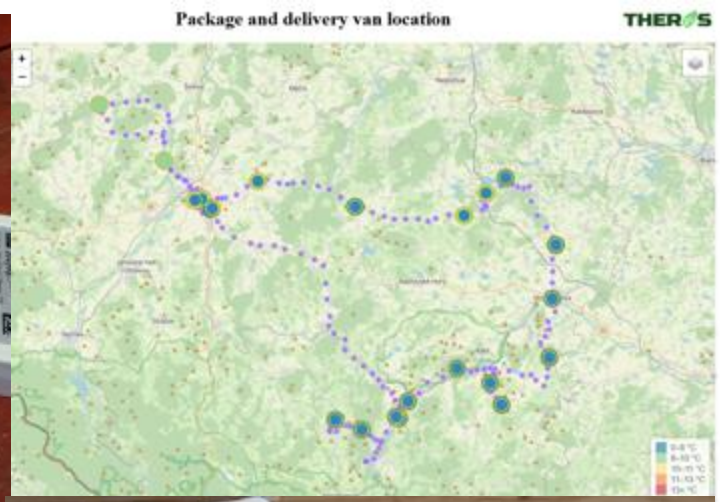
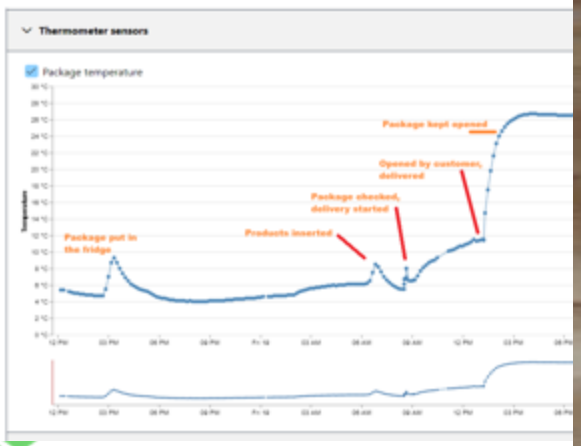
IoT Sensors Network

03. IoT sensors enable the monitoring of quality/climate parameters related to the transport of organic/GI foods, including the effective recording of all key tracking events and thus preventing potential misuse of the trademark.



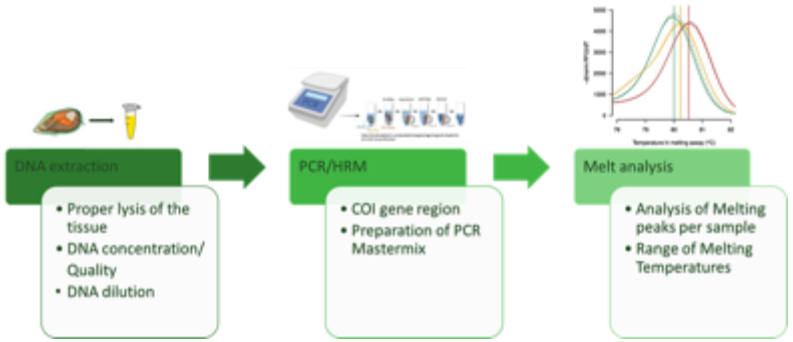


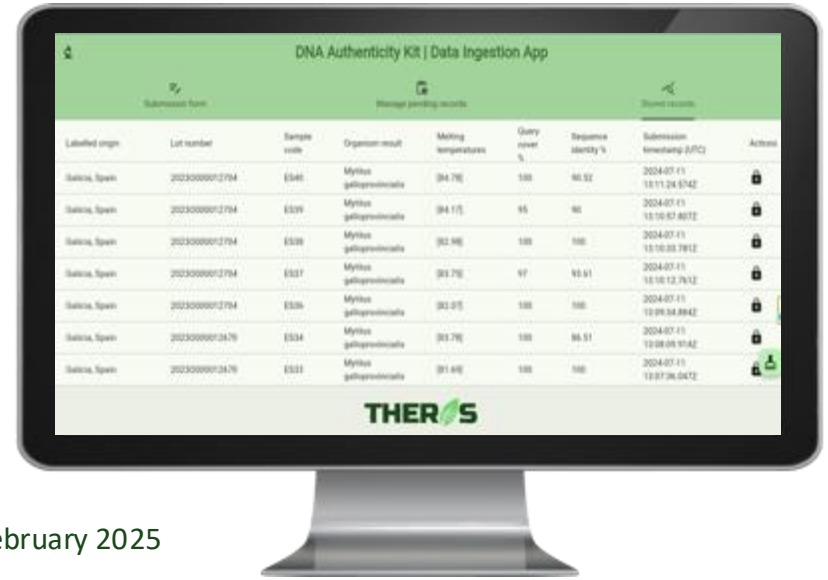
- Designed and deployed an IoT network to **monitor quality and climate parameters** during the *transport* of organic/GI foods, addressing both intentional and unintentional adulterations.
- Monitored air temperature, humidity, and package integrity, with real-time data transmission to the THEROS platform.
- The integrity status of the package represents the opening or closing of the package by connection or disconnection of a magnetic button in the cover of the box.
- Conducted successful initial tests in the Czech Republic, demonstrating the system's effectiveness in ensuring product integrity.

DNA-Based Authenticity Kit

04. THEROS developed portable DNA analysis kit to verify the species origin and authenticity of food products, particularly focusing on organic and GI-labelled products, with high-resolution melting profiles and DNA sequences providing accurate identification of species and product origin.

- In the Spanish pilot the kit was used to analyze mussels, using **DNA barcoding regions** such as COI and 16S to ensure the authenticity of the products.
- **Machine learning models** were created to *predict the origin* of mussels based on DNA sequences and melting temperatures, significantly enhancing the detection of mislabeling and adulteration.
- The kit significantly enhances the detection of mislabeling and adulteration, providing a robust tool for stakeholders in the food sector, including certification authorities.





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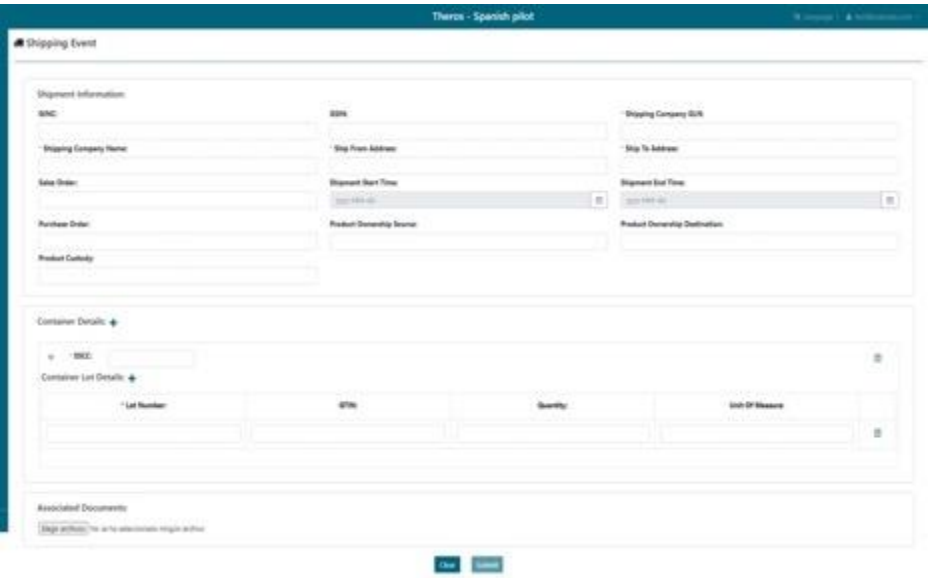
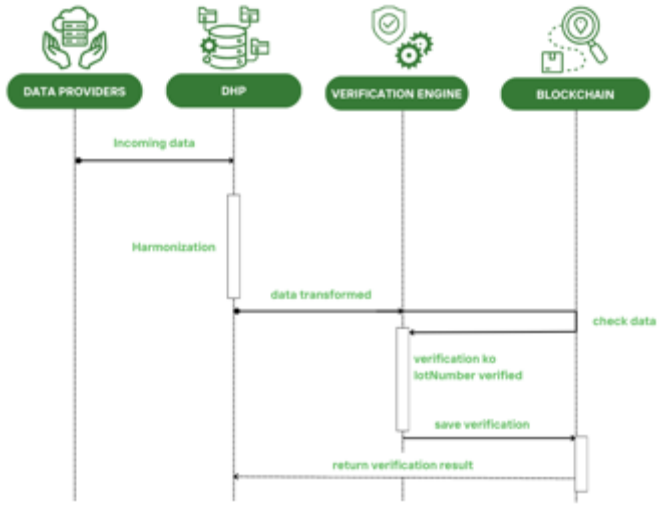
Blockchain-Based Traceability System, Verification Engine, and Dynamic Digital Product Passport

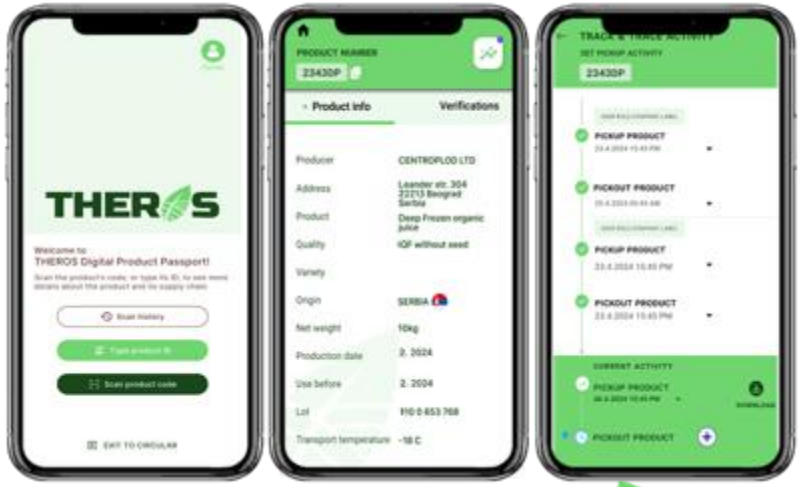
05. THEROS developed a blockchain platform to ensure secure and transparent tracking of food products across the supply chain.

0.6 Also, a critical component of the THEROS toolbox, the verification engine was developed to automate the process of validating the integrity and authenticity of organic and GI food products.

07. The Dynamic Digital Product Passport (dDPP) offers real-time traceability and verification of organic and GI food products, integrating with other THEROS tools for a unified interface.







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Thank you for your attention!

Dimitra Tsiakou,
dimitra.tsiakou@iccs.gr

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Traceability and Verification in Food Supply Chains – The technological perspective

Webinar, 21 February, 10.30h CET

Edward Sliwinski, PhD, European Federation for food Science and technology (EFFoST)

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Main facts

Call: HORIZON - CL6 - 2021 - FARM2FORK - 01 – 17

Increasing the **transparency** of EU food systems to boost health, sustainability and safety of products, processes and diets

Budget: 11.8 mln EUR

4 years project: 01/09/2022 – 31/08/2026

Type of action: Innovation Action

27 partners representing the food system of which SMEs (12), Universities /Research centres (12), and NGOs (3)

15 call pilots

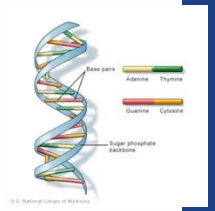
8 Open call pilots

14 countries (Norway, Finland, Poland, United Kingdom, Netherlands, Germany, Belgium, France, Switzerland, Italy, Spain, Portugal, Serbia, Greece)

TITAN Key Expertise Areas (KEAs)

1. Enabling consumers to make informed food choices
   - Ensuring Food safety and authenticity
   - Informing and educating the consumer
2. Facilitating supply chain sustainability
   - Environmental & Social,
   - Economic support for SMEs,
3. Implementation of new innovative technologies
   - Faster and/or more accurate detection methods,
   - Disruptive digital technologies,
4. Taking the food system approach
   - Towards a sustainable food system
   - Successful innovation

Innovative detection methods



Several pilots are developing and / or testing new (DNA-based) detection methods. Focus is on portable rapid detection methods or technologies that can give accurate results fastly.

Pilot-01: Demonstration of traceability and authenticity in the olive supply chain

Partners: FOCOS, INL, USC, OFC,

Pilot-02: Development of a traceability system and food safety testing for the presence of undeclared food allergens

Partners: FOCOS, INL, USC, AI Talentum

Pilot-03: Microbiology of fermented food products, safety demonstration of food cultures

Partners: MicroBion and UCSC

Pilot-04: Omics and molecular approaches for microbial and chemical quality of long shelf-life food products

Partners: UCSC and MicroBion

Pilot-05: digital microscopy and Artificial Intelligence and for an affordable, rapid, on-site screening solution to guarantee honey quality and fight against honey

Partner: Microfy AI

Sensor techno-logies

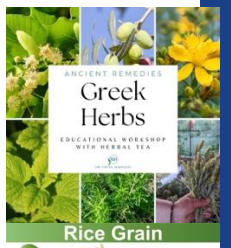
Several pilots are developing and / or testing new sensors that can give information about the freshness and thus the remaining shelf life of the food products tested.

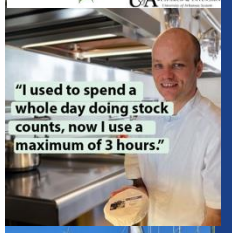
Pilot-11: TellFish: Determination of fish freshness to give an indication of the remaining shelf life using a spectroscopic sensor
Partners: TellSpec

Pilot-12: Food waste reduction through the use of a dynamic expiration date by intelligent packaging containing a revolutionary color technology in combination with AI
Partners: ColorSensing

In a number of pilots the key challenge is to connect data coming from different sensors / tools into one IT network / system that allows the user to take fact-based decicions.

IoT and Intercon-nectivity





Pilot-21: Real-time & intelligent data sharing for verification of honey and herbs suppliers

Partners: Agroknow and Symbeosis

Pilot-22: Developing a new traceability tool to help farmers to grow tomato and rice more sustainably

Partners: Agricolus and INRAe

Pilot-23: Development of a fully automated inventory system for the hospitality sector

Partners: TotalCtrl and AveryDenison

Pilot-24: Integrated solution for enhanced tuna fishing

Partners: Zunibal

Pilot-25: Advanced Decision Support System (DSS) for vineyard management with the goal to contribute to a more sustainable agriculture

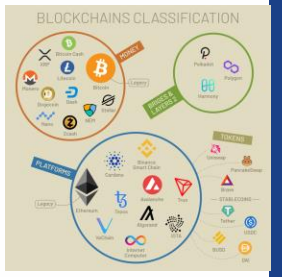
Partners: PrimoPrincipio

Digita-lization

Two pilots have the goal to digitize and improve trading processes by setting up and optimalizing online trade platforms with the ultimate goal to constribute to the reduction of food waste.

Pilot-31: Development of a common language for growers and purchasers of fresh fruits and vegetables
Partners: Consentio and AZTI
Pilot-32: Development of a unique data-centric platform to synchronize supply with demand, minimize waste, reduce production risks and efficiently distribute fresh agricultural products
Partners: AgriCom

Open or affordable Blockchain



In several pilots blockchain, and preferably open or affordable blockchain is part of the solution that is being developed to make the food supply chains more sustainable (people, planet, profit).

Pilot-41: Setting up the supply chain for carbon certificates in almond production
Partners: Agri-MarketPlace,
Pilot-42: Improving the transparency in the Vietnamese shrimp supply chain by implementing digital traceability
Partners: Sakana and Open Food Chain
Pilot-43: Pilot on simple affordable blockchain traceability systems for Agri-food SMEs
Partners: QualityChain
Pilot-44: Blockchain-Facilitated Recipe & Event Supply-chain
Partners: ChiefChain

TITAN's KPIs

What TITAN wants to achieve:

- Increase of access to relevant data,
- Reduction of food safety issues,
- Higher income for vulnerable workers,
- Improved nutritional intake by vulnerable children,
- Reduction of valuable resources like water in food production,
- More economic value for carbon storage,
- Reduction of food losses and waste,
- Reduction of food fraud cases,
- More trust between food producers and buyers,

TITAN

Transparency solutions for transforming the food system

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Traceability in Food Supply Chains - WATSON

Truls Bakkejord Ræder

Senior Research Scientist

SINTEF Nord AS

truls.rader@sintef.no

SINTEF

watson

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Watson – PROJECT OVERVIEW

A holistic frameWork with Anticounterfeit and intelligence based technologieS that will assist food chain stakehOlders in rapidly identifying and preventing the spread of fraudulent practices.

watson

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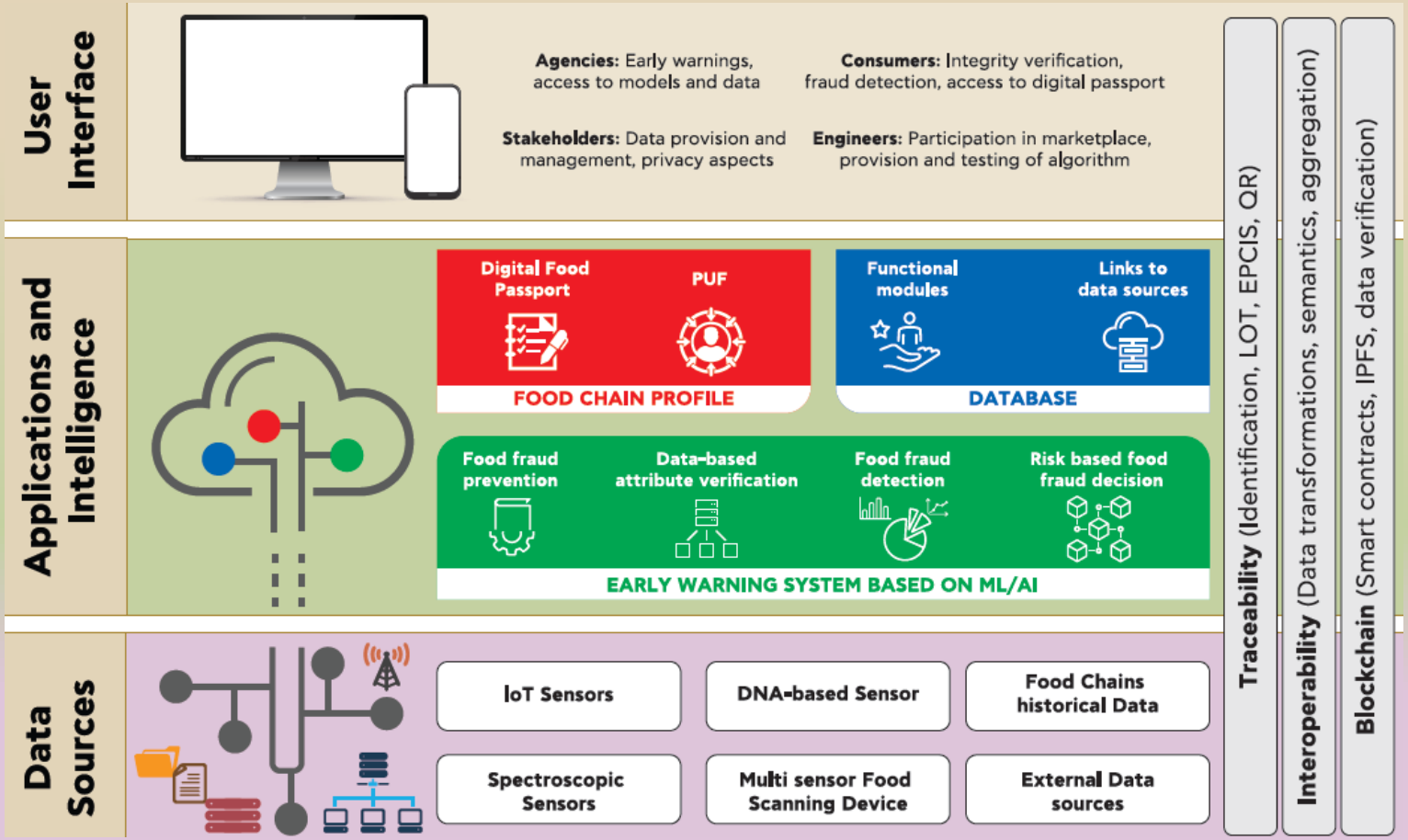
CONCEPT & APPROACH

Digital Technology Architecture

- **Watson** high level architecture follows a layered and modular approach organized into three tiers:
  - trustworthy data sources
  - intelligence & application layer
  - user interface
- **Intelligence-based risk calculation**
- **Digital passport for food products**



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Key results – Systematic Literature Review

- **Challenges of Blockchain networks**: seamless interoperability across technologies and existing supply chain management systems; vast amounts of datasets; technical complexity; scalability; maintenance costs; energy consumption; clear roles and responsibilities; regulatory landscapes
- **Key takeaways**:
  - Blockchain is *not always* be necessary
  - Lack of *mature* applications: lack of evidence of applications passing prototyping stage;
  - *Mixed* supply chains, possibly intersecting several Blockchains;
  - Blockchain adds value for immutability for *stateful applications* with multiple writers and no trusted third party available online
  - Need to decide:
    - **Purpose**: Is Blockchain the best tool for *what purpose*?
    - **Data organization**: What should be on- and off- chain? How should the off-chain data be organised?
    - **Access**: *How* and *by whom* should data be accessed and use

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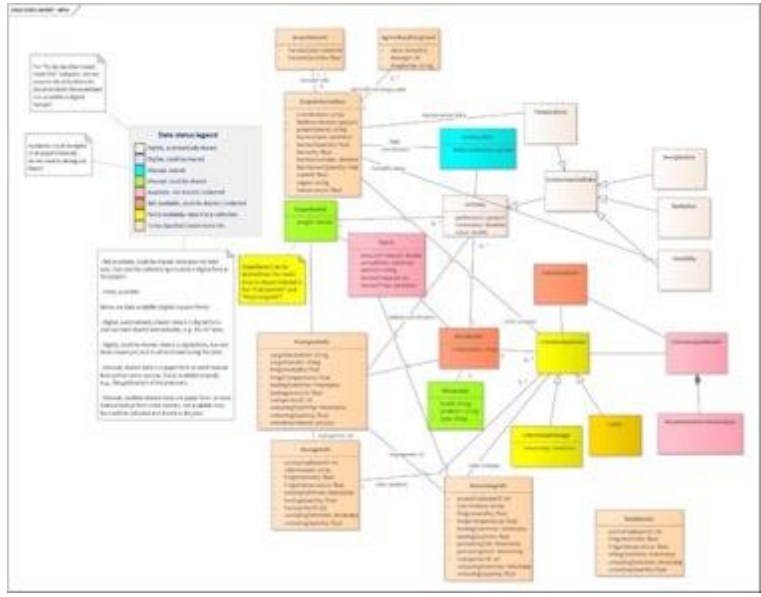
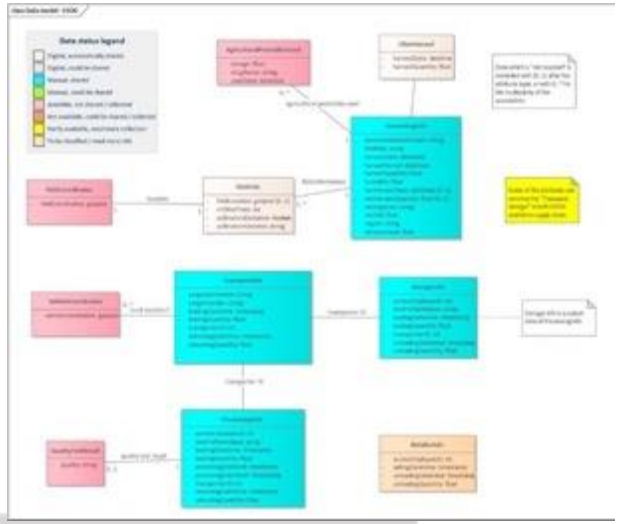
Key results – Modelling

- Description of all project supply chains in different contexts:
  - High level supply chain interactions
  - Business process models
  - Information models
  - Data availability mapping
- Alignments with relevant standards, such as GS1 Transport Instructions, EPCIS,





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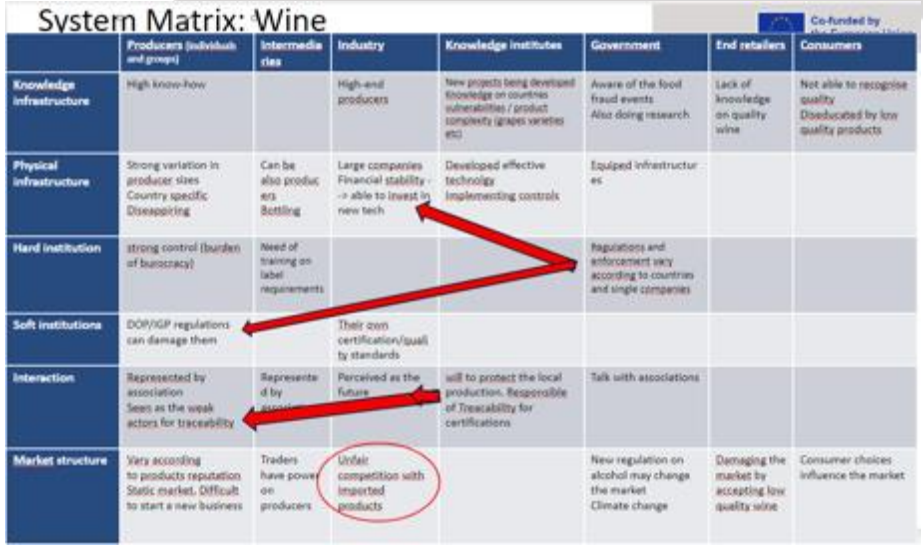
Key results – Expert interviews

- **Wine (Porto/Douro)**: Strong protections, but some external producers market misleading, non-authentic products.
- **Olive Oil**: Frequent origin and quality mislabelling, especially in Extra Virgin; climate change may worsen issues.
- **Dairy:** Fewer issues overall, though premium products and animal welfare claims remain vulnerable.
- **Fish**: High fraud risk due to traceability problems, international chains, and species swaps—needs stronger regulation.
- **Meat:** Fraud detection is challenging with existing legislative gaps and deceptive marketing practices.
- **Honey:** Widespread origin mislabelling and added sugars; many products fail to meet EU standards.



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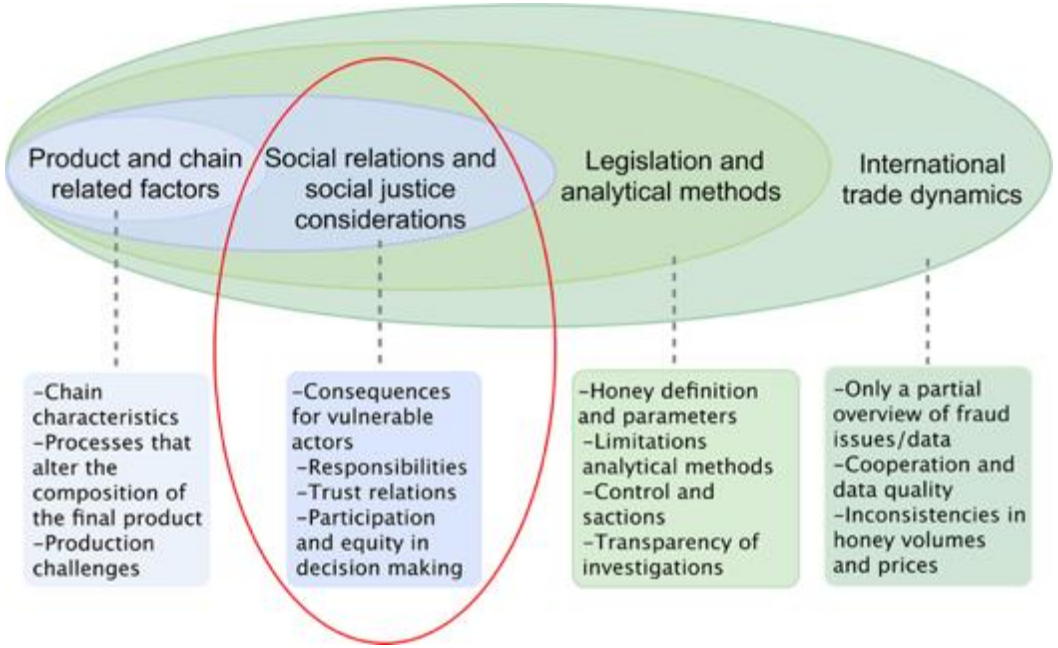
Key results - vulnerability assessment & behavioural analysis

- Various levels of vulnerability, including **product- and chain-related factors**, **social dynamics and social justice considerations** incl. **trust relations**, factors at the **level of legislation and analytical methodologies**, and vulnerabilities related to **international trade dynamics**.



Watson has received funding from the European Union's Horizon Europe research and innovation programme under grant agreement no. 101084265

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Thank you for your attention!

CONTACT
Name: Truls Bakkejord Ræder
Organisation: SINTEF Nord AS (SIN)
Email: truls.rader@sintef.no

TEALHELIX

SMART LABELS
INCLUSIVE SOLUTIONS

Building Resilience Through Inclusive and Personalized Food Labeling

Event Driven Traceability with GS1 EPCIS

Cluster Webinar Food Traceability and Verification

Tim Bartram
GS1 Germany GmbH

PARTNERS

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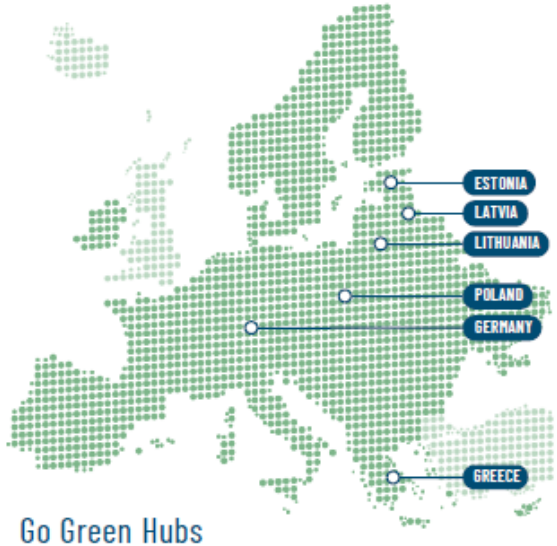
TEALHELIX

OUR APPROACH

Understanding the current state

We begin by mapping the impact of **external environments, consumer needs, and current labelling approaches** to inform our interventions. This includes **analysing the influence of media, marketing, and sociocultural factors** on consumer understanding of sustainability, and identifying **information expectations** across environmental, social, and economic dimensions.

To achieve this, we develop **effective measures** to match preferred sustainability dimensions, create **innovative behavioural interventions** to motivate the use of sustainability information, and engage citizens through **co-creation** and **citizen science**. Using methods such as desk research, expert interviews, data scraping, and large-scale surveys, we also explore **AI-based apps**, **pilot test labelling approaches**, and validate findings through experimental testing.



Go Green Hubs

Go-Green Hubs are collaborative spaces where citizens, stakeholders and experts collaborate to test and refine sustainable solutions in real-world settings. These hubs will drive transparency, combat green-washing, and use inclusive strategies to engage all consumer types, from supportive to vulnerable. Join us in co-creating a more sustainable food labelling system!

Pilot testing

Testing and validating behavioural interventions and most efficient labelling approaches in real-life settings across Germany, Lithuania, Latvia, Poland, Estonia, and Greece.

PHASE 1

Development and Pre-market testing

We will refine labeling approaches through expert collaboration, research, and controlled testing using experimental design methods like randomised control trials and boundary condition measurements. Go Green Hubs will be established to engage communities in co-creating labelling solutions and providing feedback.

PHASE 2

Testing in real-life settings

Interventions will be tested in real retail environments. Effectiveness will be evaluated using control vs. experimental group comparisons and experience sampling.

WHAT WE OFFER

Claims Buster app

Scan and verify sustainability claims on food products in real-time. Challenge your knowledge with games, earn badges, and make informed choices with confidence.

BetterMe app

Uses gamification to help users adopt sustainable food habits with personalised recommendations.

Sustainable Food Compass

A psychometric tool to assess consumers' food sustainability preferences, integrated into BetterMe.

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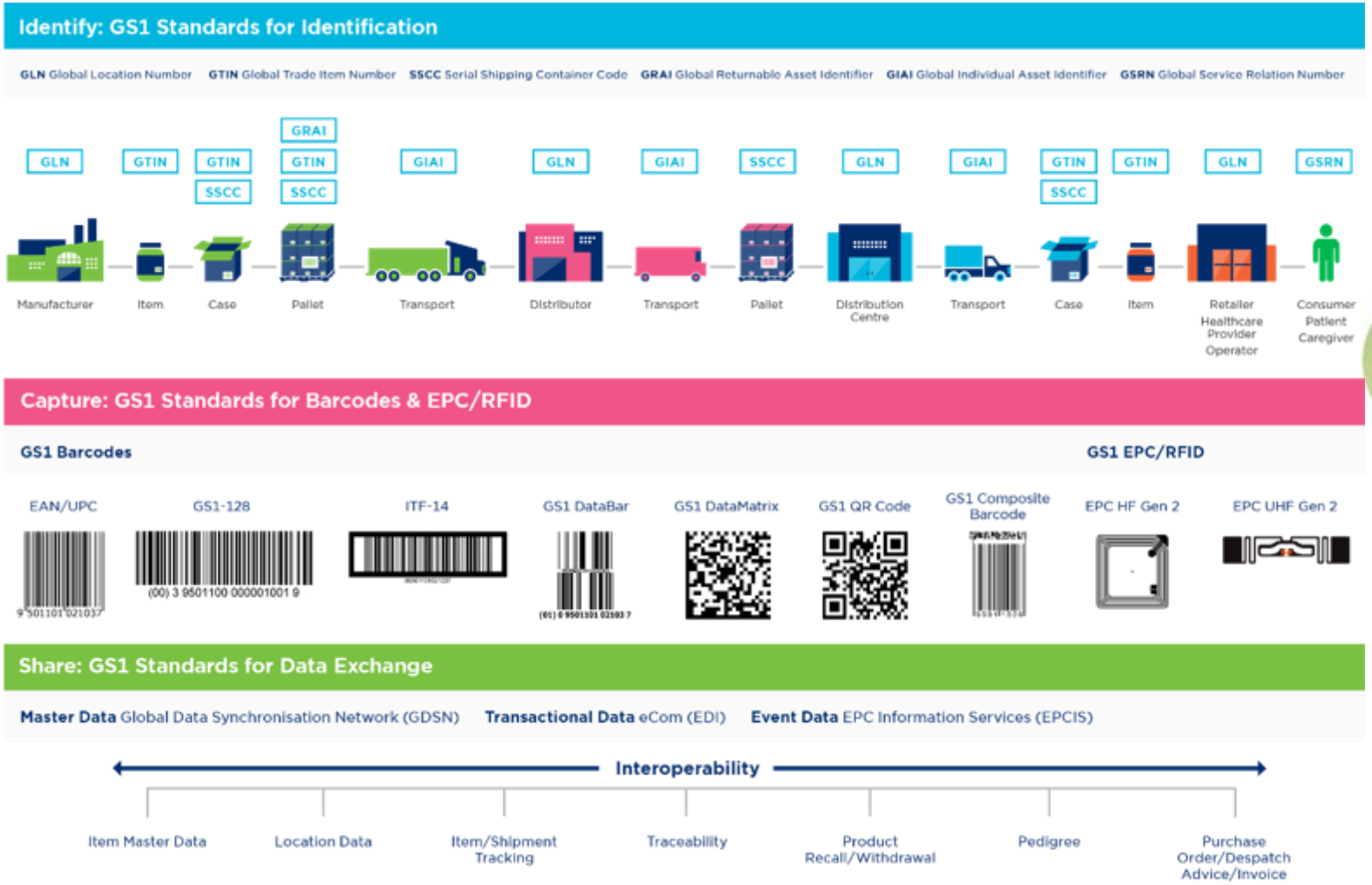
GS1 Standards – global, integrated, interoperable

GS1 Germany

Uniquelly **Identify** products, assets, locations …

Automatically **Capture** real-time data

Efficiently **Share** information



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Event Driven Traceability with GS1 EPCIS

Standardised Interface for Data Capture and Query

- **What** product
- **When** date/ time
- **Where** location
- **Why** business step
- **How** conditions, e.g., weather, sensor data

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GS1 Global Traceability Standard

- **Design of interoperable traceability systems for supply chains**
  - *Identification*
    - **Objects**
    - **Parties**
    - **Locations**
  - *Data*
    - **Master data**
    - **Transaction data**
    - **Event data**
  - *Key enablers*
    - **Identification**
    - **Data capture**
    - **Data sharing**

- **Identification of Critical Traceability Events (CTEs)**

- **Verified by GS1 – search, look up and verify information** (www.gs1.org/services/verified-by-gs1)

Progress ahead …

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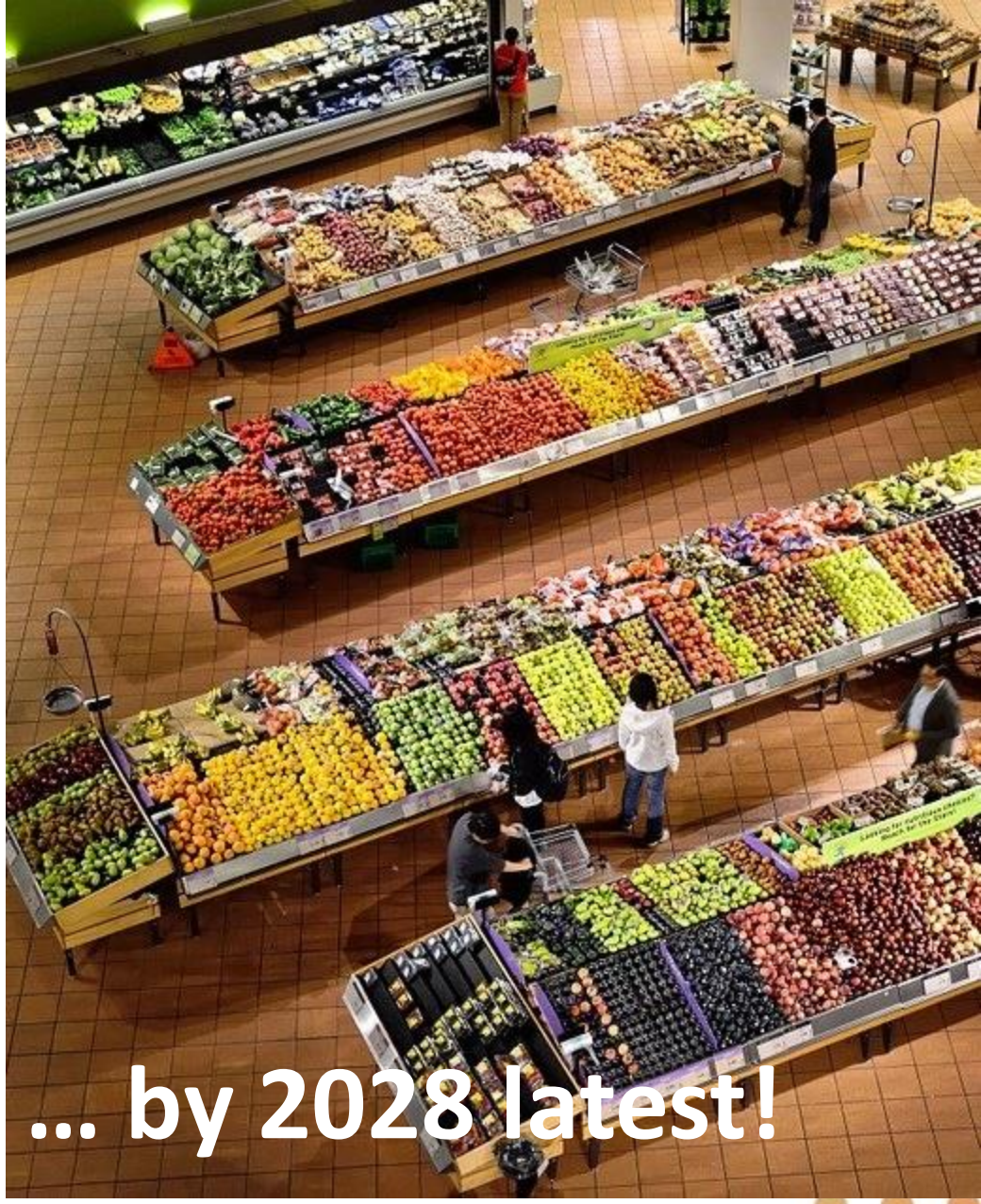
https://id.gs1.de/01/04012345999938

Greater Capacity + Smaller Code
= Endless Opportunities

- Inventory Management
- Traceability
- Safety
- Sustainability
- Consumer Engagement
- Improved Packaging



TEALHELIX

SMART LABELS
INCLUSIVE SOLUTIONS

Tim Bartram

Senior Manager Research

GS1 Germany GmbH

50933 Köln, Stolberger Str. 108 a

GERMANY

+49 163 6878 459

tim.bartram@gs1.de

www.gs1.de

VISIT:

www.tealhelix.eu

CONTACT US:

info@tealhelix.eu

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Now its Your Turn!

Do you have any questions for our speakers?

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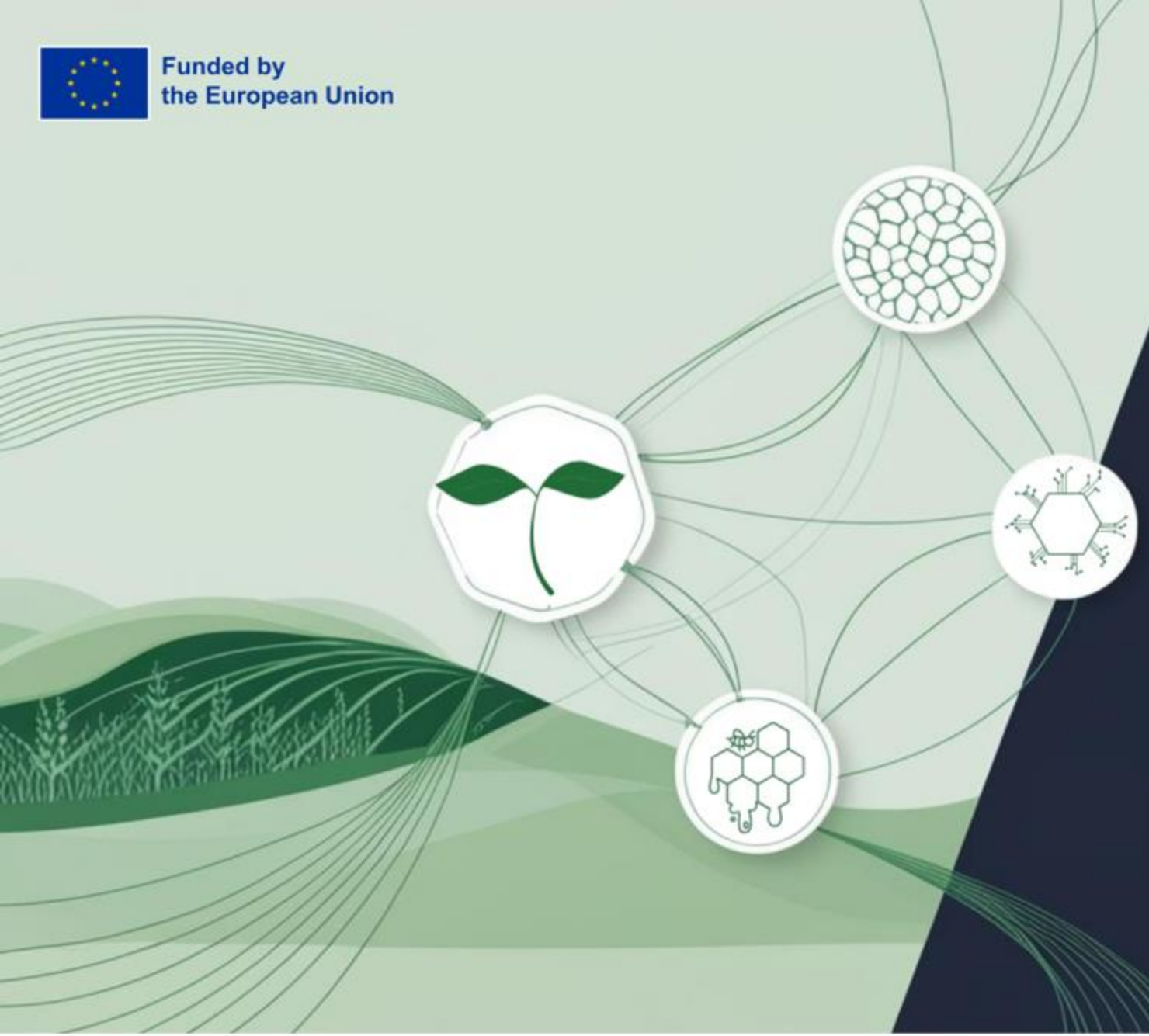

Traceability and Verification in Food Supply Chains

The Technological Perspective

Friday 21st of February, 10.30-12.00 CET

Organised by: watson ALLIANCE THERMS CUES SEA2SEE FishEUTrust TITAN TEALHELIX