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

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Webinar series 1: Securing our food supply chains: EU's innovative initiatives to combat food fraud, improve food traceability and sustainability, and increase consumers' trust – September 11, 2024

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AIM

Traceability and authenticity in the food system

- **Watson** provides a methodological framework combined with a set of tools and systems that can detect and prevent fraudulent activities throughout the whole food chain

- **Watson** aims to improve sustainability of food chains by increasing food safety and reducing food fraud through systemic innovations that

  (i) increase transparency in food supply chains through improved track-and-trace mechanisms containing accurate, time-relevant and untampered information for the food product throughout its whole journey;

  (ii) equip authorities and policy makers with data, knowledge and insights in order to have the complete situational awareness of the food chain and

  (iii) raise the consumer awareness on food safety and value, leading to the adoption of healthier lifestyles and the development of sustainable (and greener) food ecosystems.

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OBJECTIVES

Preventing food fraud through digital and intelligence-based technologies

- **DESIGN and DEVELOP** a holistic traceability framework that will integrate data-driven services, intelligence-based toolsets and risk-estimation approaches
- **VALIDATE** and demonstrate the effectiveness of the proposed framework and toolset in 6 agri-food use cases
- **ADVANCE** the inspection and control capabilities of food safety authorities through robust, reliable and rapid methods based on emerging technologies
- **ENSURE** wide communication and dissemination of the results, raising awareness and promoting multi-stakeholder cooperation and information-sharing in order to tackle fraudulent activities in the food chain
- **MAINSTREAM** project results towards relevant policy making organisations and standardisation bodies

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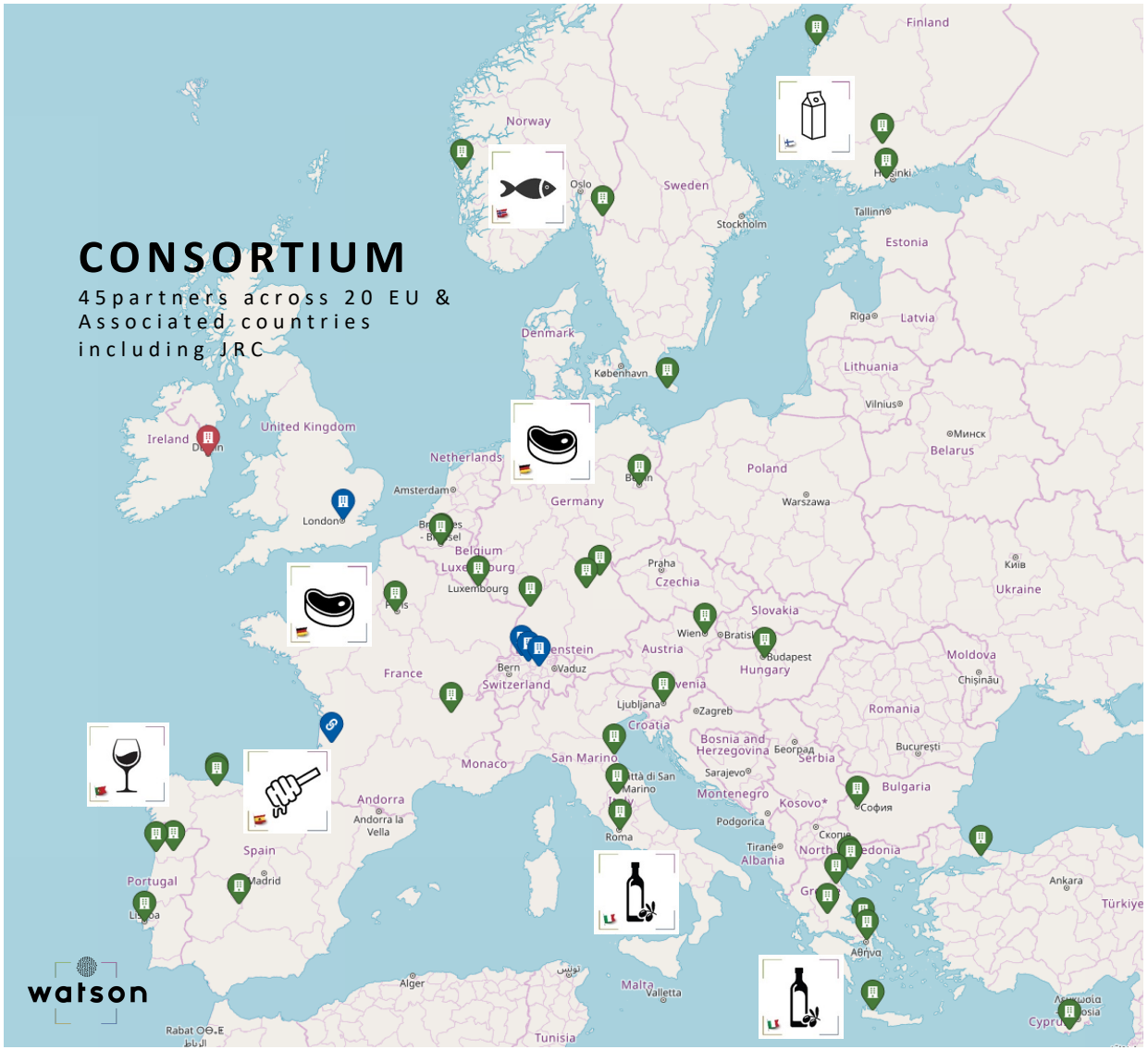

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- **The project is organized around 6 agri-food sectors:**
  - ❑ Tackling counterfeiting of Portuguese wine
  - ❑ Preserving the authenticity of Spanish northwest PGI honey
  - ❑ Rapid traceability of extra virgin olive oil in Italy and Greece
  - ❑ Identification of possible manipulations at all stages of the meat chain in Germany and France
  - ❑ Improved traceability of high-value products in cereal and dairy chain in Finland
  - ❑ Combating of white fish counterfeiting in Norway

- **Pilot sites: 6 use cases and validation campaigns**

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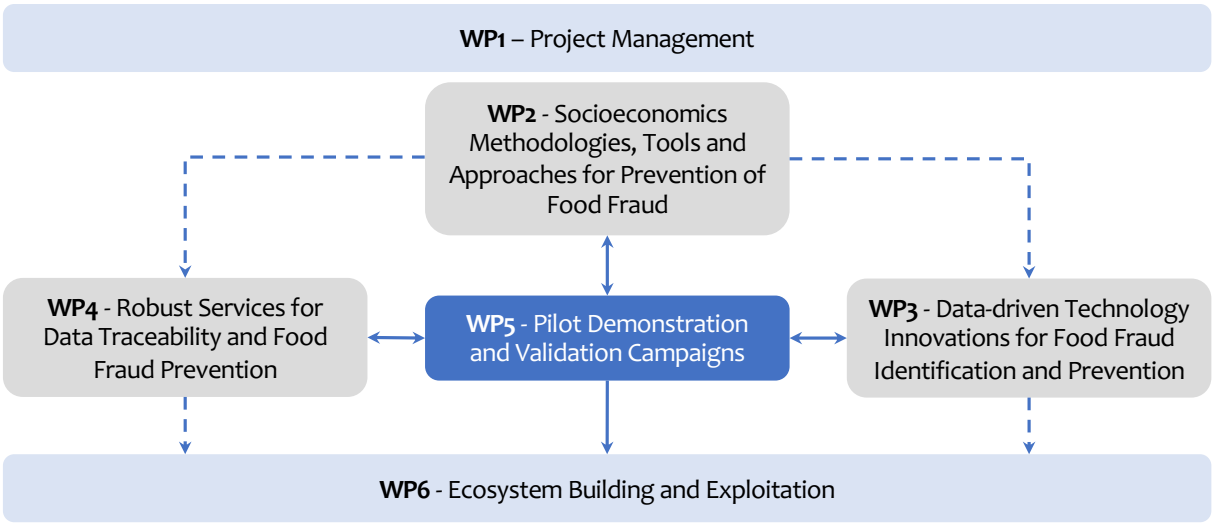
WORK PACKAGE STRUCTURE

Pert Diagram



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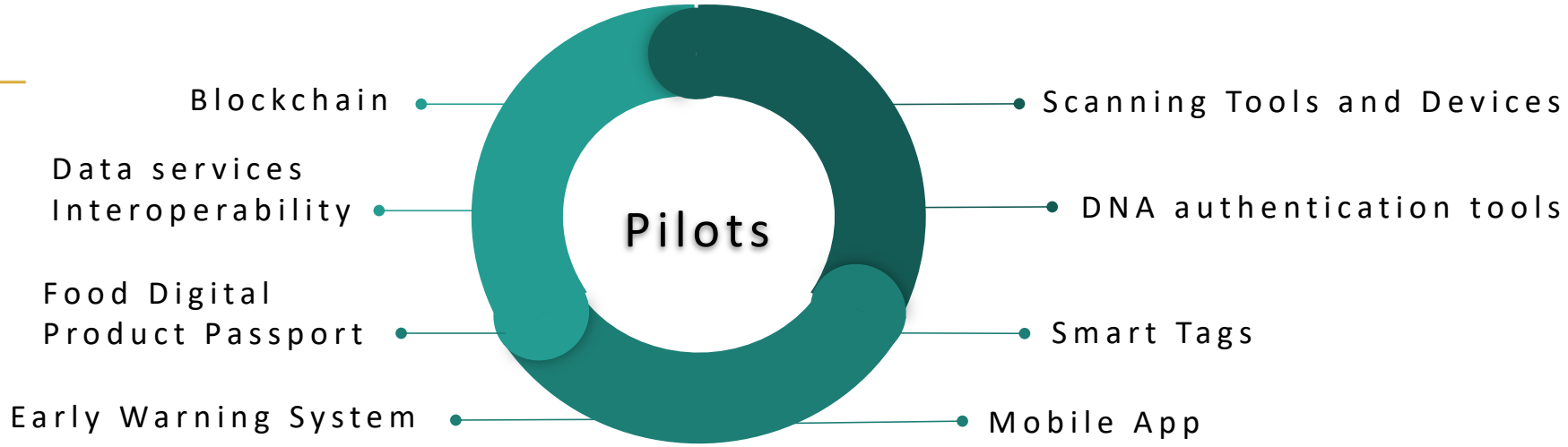
DIGITAL TECHNOLOGIES

6 Pilot Sites



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USE CASES

6 Pilot Sites

- **Tackling counterfeiting of Portuguese wine:** This pilot focuses on a blockchain-based platform that enable consumers to access all the information related to the wine they purchase (full history of dates, locations and sensor data). Technologies will cover real-time data collection from IoT sensors, reliable and secure data access through non-copyable labels.

- **Preserving the authenticity of Spanish northwest PGI honey:** This pilot explores the usefulness of implementing low-cost, portable devices based on near-infrared spectroscopy and hyperspectral imaging technologies combined with chemometrics in order to provide fast, non-destructive, easy to use, real-time results and low-cost analysis to stakeholders.

- **Rapid traceability of extra virgin olive oil with a digital DNA fingerprint:** This pilot aims to obtain DNA profiles of extra virgin olive oil products using low-cost and portable DNA based devices combined with machine learning techniques to process data, resulting in the creation of a 'digital DNA fingerprint'. The collected data will be accessible to stakeholders via a QR code on the product label.

- **Identification of possible manipulations at all stages of the meat chain:** This pilot develops a methodological framework to detect and prevent meat mislabelling. Analytical tools include molecular methods such as DNA barcoding as well as mass spectrometric methods with rapid sample preparation and short chromatography runs.

- **Improved traceability of high – value products in the dairy chain:** This pilot targets the weak points of the dairy chain that deal with the use of ingredients, shelf-life and origin of the product. An item-level track and trace solution will be implemented which can track and trace items and their raw materials on product level, act as a call for action for consumers and verify the quality of the item.

- **Combating counterfeiting of Norwegian white fish:** This pilot implements a blockchain-based platform that support real-time data collection from IoT sensors and enterprise systems collecting data throughout the fish supply chain. Printed or electronic labels (QR Codes, NFC tags, RFIDs) will be developed to enable access to detailed product information through the digital product passport.

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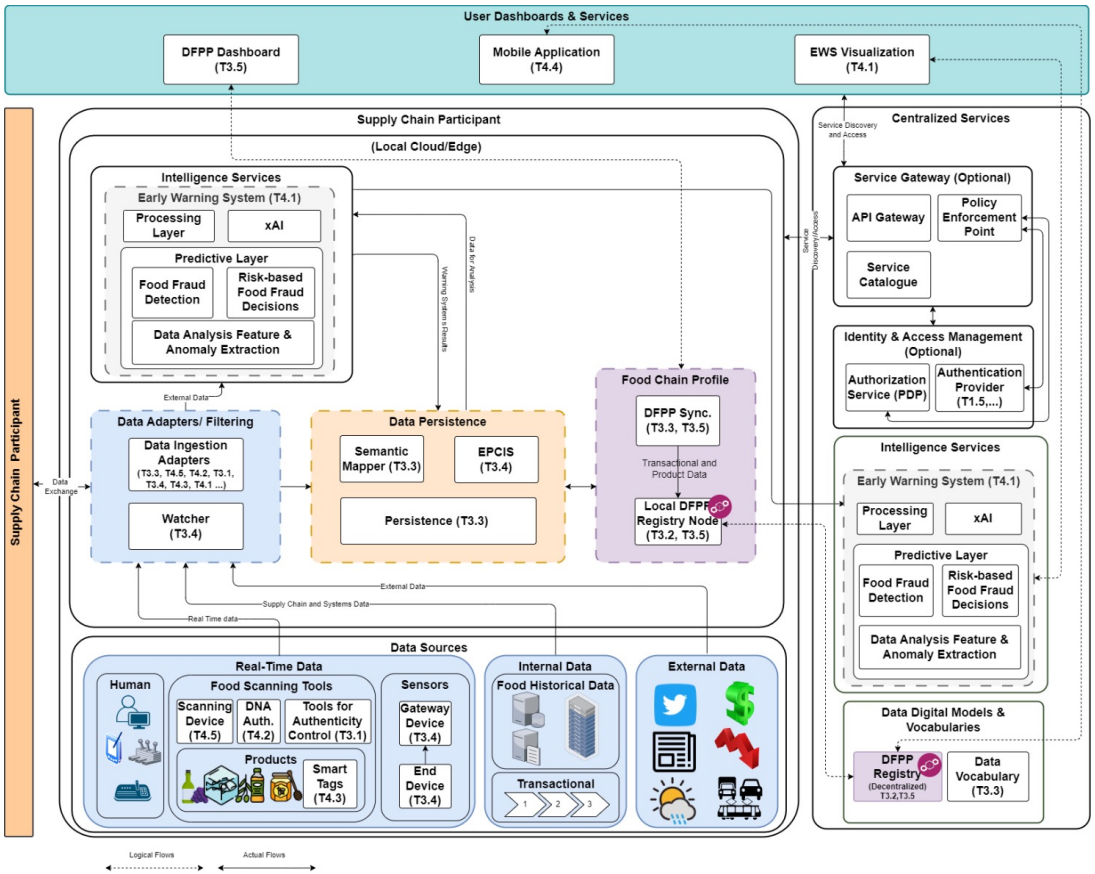
CONCEPT & APPROACH

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

- Three vertical pillars:
  - Interoperability
  - Blockchain
  - Traceability



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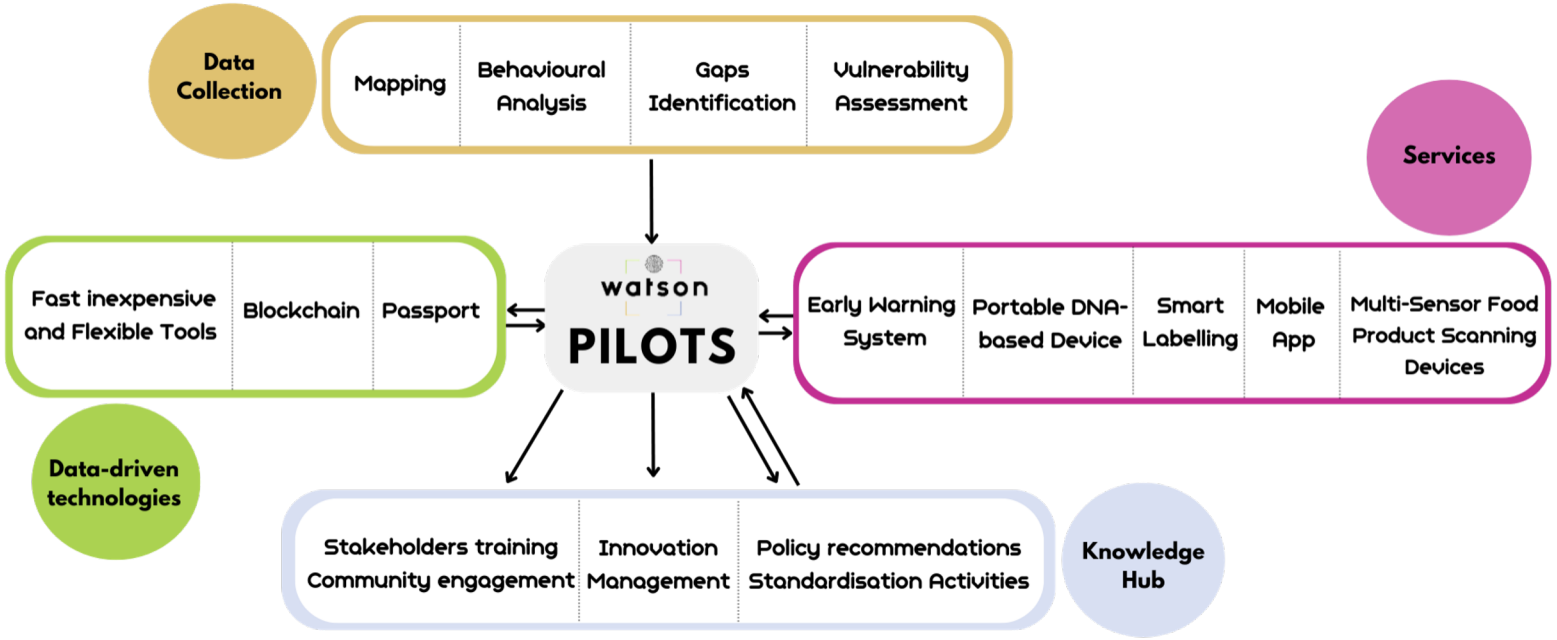
PILOT DESIGN METHODOLOGY



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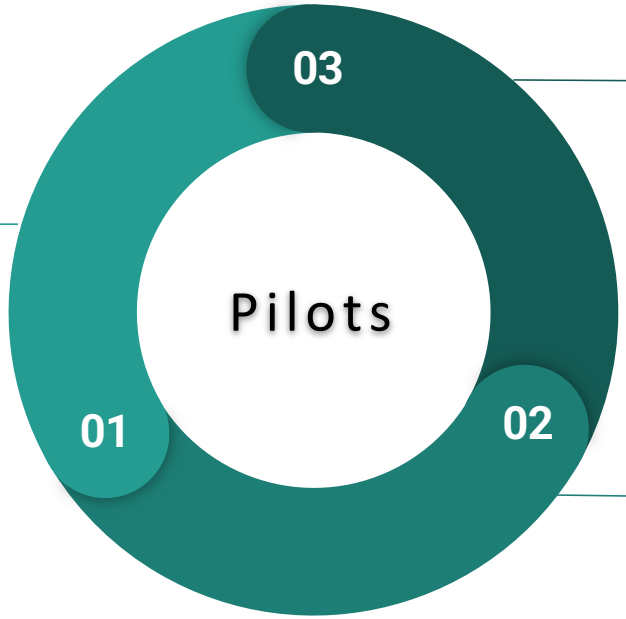
PILOT DEMONSTRATION

Validation Campaigns



1st round (Oct 24- Apr 25)
Pilot implementation
Stakeholder workshops
Monitoring

2nd round (May 25- Nov 25)
Pilot implementation
Stakeholder workshops
Monitoring
Final Evaluation
Best practices

Feedback analysis for improvement
Feedback to improve the Watson framework

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TARGET STAKEHOLDERS

Validation Campaigns

- Grape producers
- Wine producers
- **Consumers**
- **Visually impaired consumers**

- **Control authorities**
- Honey Producers
- **Consumers**

- Retailers
- Olive producers
- Olive oil producer
- **Consumers**

- **Control authorities**
- Retailers
- Quality control industry
- **Consumers**

- **Control authorities**
- Retailers
- Dairy products producers
- **Consumers**

- **Control authorities**
- FIsh catchers
- Fish products producers
- **Consumers**

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METHODOLOGY

4-step approach

Initial version of **Watson** methodological framework and systemic innovations for ***authenticity & traceability*** in the food systems

M12 Research & Innovation Flame

- ❑ Early Warning System
- ❑ Blockchain and Smart Contracts for Data Traceability
- ❑ IoT Infrastructure and Big Data Analytics
- ❑ Interoperability of Food Systems
- ❑ Digital Food Product Passport
- ❑ Multi-sensor Food Products Scanning Devices
- ❑ Smart Packaging with Printed Intelligence
- ❑ Mobile Applications for Consumer Awareness

Open Farm Days for producers' associations & retailers

M06 The Baseline

User needs and requirements; dissemination and exploitation plans; quality and project management

Interviews with actors of 6 different supply chains from farm, wholesale, primary and secondary processing to retail

Quantitative (online) Consumer Surveys in 4 EU countries

M36 Consolidation

Final framework's evaluation, final business plan, dissemination and exploitation reports and policy recommendations

TV Mini-series on Food Safety, Authenticity & Traceability

Final version of **Watson** methodology along with the integrated technology solutions and mobile apps for all the stakeholders in the food chain

Research & Innovation Fire M18

- ❑ Early Warning System for Food Fraud Prevention based on the **Watson** framework
- ❑ Blockchain platform for interconnection of systems in the food chain
- ❑ Multi-Sensor food product scanning device for food safety
- ❑ Mobile application for consumers awareness
- ❑ Digital food product passport for data integrity and traceability

Demonstration Flame M26

First execution round of validation campaigns and **Watson** framework evaluation

- ❑ Tackling counterfeiting of **wines**
- ❑ Preserving the authenticity of Spanish northwest PGI **honey**
- ❑ On-site authenticity testing of **extra virgin olive oil**
- ❑ Identification of possible manipulations at all stages of the **meat** chain
- ❑ Improved traceability of high-value products in cereal and **dairy** chain
- ❑ Combating counterfeiting of Norwegian fish

Training Seminars for consumer associations and citizens

Demonstration Fire M32

Final version of **Watson** integrated framework and the validation campaigns evaluation

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PATHWAYS TOWARDS IMPACT

Outcomes

- **OUT1:** A robust knowledge base of the underlying reasons for and drivers of food fraud (economic and social) and the extent of food fraud
- **OUT2:** Innovative (tools and devices to prevent fraudulent practices by improving traceability and safeguarding authenticity and fostering solutions for fraud prevention
- **OUT3:** Improved assistance to control bodies and authorities in fraud prevention
- **OUT4:** Improved transparency through digital solutions that meet consumer demand for food transparency, with a focus on demonstrating authenticity of food
- **OUT5:** Contribution to further development of policies for food authentication and traceability and for fighting food fraud
- **OUT6:** Support official control by providing guidance on detection and mitigation of fraudulent practices

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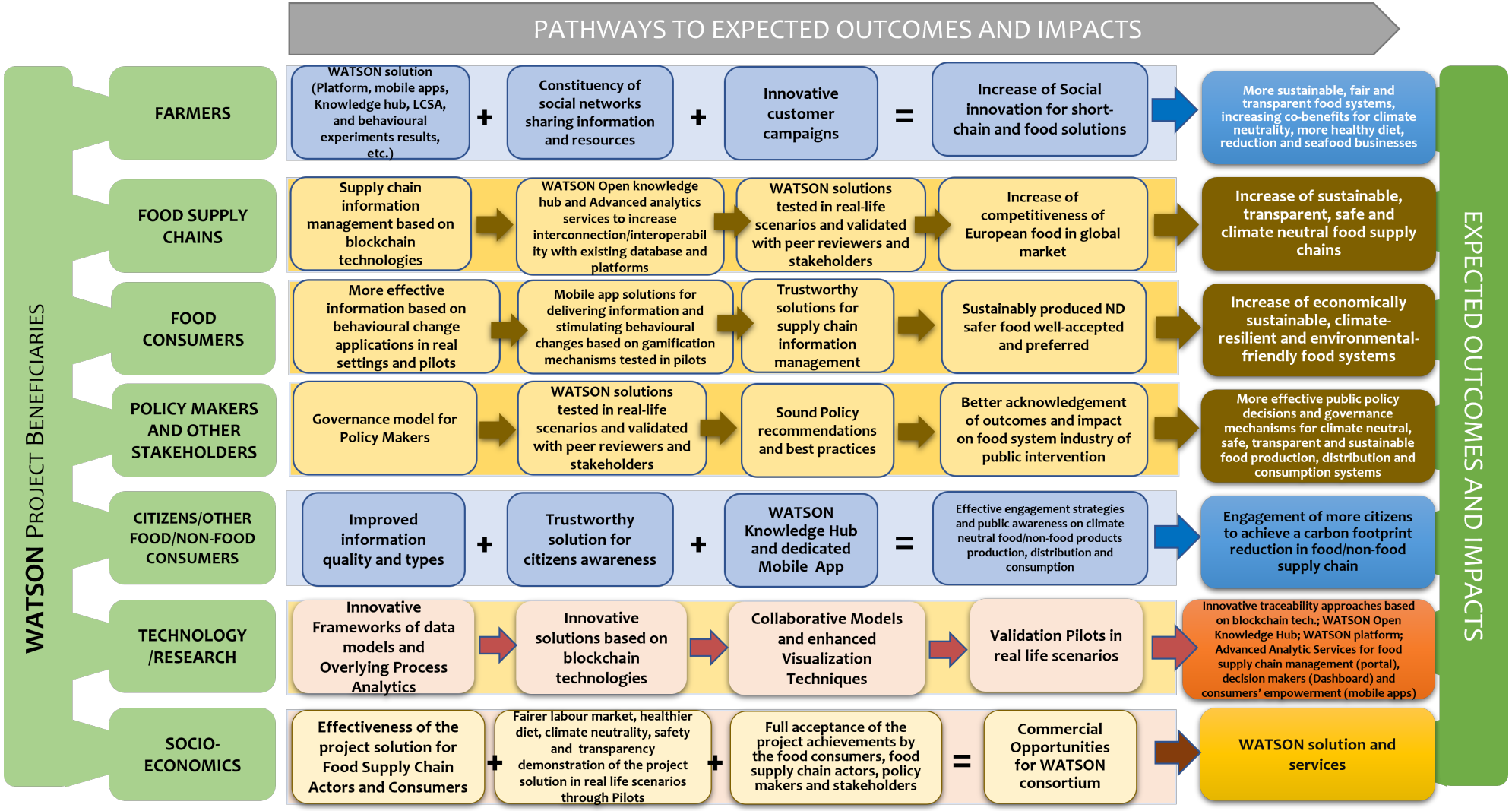
PATHWAYS TO EXPECTED OUTCOMES AND IMPACTS
WATSON PROJECT BENEFICIARIES
FARMERS
WATSON solution (Platform, mobile apps, Knowledge hub, LCSA, and behavioural experiments results, etc.)
+
Constituency of social networks sharing information and resources
+
Innovative customer campaigns
=
Increase of Social innovation for short-chain and food solutions
More sustainable, fair and transparent food systems, increasing co-benefits for climate neutrality, more healthy diet, reduction and seafood businesses
FOOD SUPPLY CHAINS
Supply chain information management based on blockchain technologies
WATSON Open knowledge hub and Advanced analytics services to increase interconnection/interoperability with existing database and platforms
WATSON solutions tested in real-life scenarios and validated with peer reviewers and stakeholders
Increase of competitiveness of European food in global market
Increase of sustainable, transparent, safe and climate neutral food supply chains
FOOD CONSUMERS
More effective information based on behavioural change applications in real settings and pilots
Mobile app solutions for delivering information and stimulating behavioural changes based on gamification mechanisms tested in pilots
Trustworthy solutions for supply chain information management
Sustainably produced ND safer food well-accepted and preferred
Increase of economically sustainable, climate-resilient and environmental-friendly food systems
POLICY MAKERS AND OTHER STAKEHOLDERS
Governance model for Policy Makers
WATSON solutions tested in real-life scenarios and validated with peer reviewers and stakeholders
Sound Policy recommendations and best practices
Better acknowledgement of outcomes and impact on food system industry of public intervention
More effective public policy decisions and governance mechanisms for climate neutral, safe, transparent and sustainable food production, distribution and consumption systems
CITIZENS/OTHER FOOD/NON-FOOD CONSUMERS
Improved information quality and types
+
Trustworthy solution for citizens awareness
+
WATSON Knowledge Hub and dedicated Mobile App
=
Effective engagement strategies and public awareness on climate neutral food/non-food products production, distribution and consumption
Engagement of more citizens to achieve a carbon footprint reduction in food/non-food supply chain
TECHNOLOGY /RESEARCH
Innovative Frameworks of data models and Overlying Process Analytics
Innovative solutions based on blockchain technologies
Collaborative Models and enhanced Visualization Techniques
Validation Pilots in real life scenarios
Innovative traceability approaches based on blockchain tech.; WATSON Open Knowledge Hub; WATSON platform; Advanced Analytic Services for food supply chain management (portal), decision makers (Dashboard) and consumers' empowerment (mobile apps)
SOCIO-ECONOMICS
Effectiveness of the project solution for Food Supply Chain Actors and Consumers
+
Fairer labour market, healthier diet, climate neutrality, safety and transparency demonstration of the project solution in real life scenarios through Pilots
+
Full acceptance of the project achievements by the food consumers, food supply chain actors, policy makers and stakeholders
=
Commercial Opportunities for WATSON consortium
WATSON solution and services
EXPECTED OUTCOMES AND IMPACTS

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SYNERGIES WITH THE OTHER PROJECTS

Relevant to Watson activities

- **COMMUNICATION & DISSEMINATION**
  - Promotion through project social media channels
  - Participation in cluster-thematic conferences, workshops, fairs and exhibitions
  - Collaboration in scientific papers, technical and mainstream articles
- **RAISING AWARENESS & STAKEHOLDERS' ENGAGEMENT**
  - Organisation of joint workshops in relation to pilot activities
  - Participation in demonstration campaigns, technology validation and open days
  - Exchange knowledge and best practices

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PARTNERS

THANK YOU FOR YOUR ATTENTION!

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FACTS

- **Funding scheme:** HORIZON-CL6-2022-FARM2FORK-01-11
- **EU contribution:** € 9.744,008 million
- **Total cost:** € 11.093,884 million
- **Duration:** March 2023 – February 2026
- **Consortium:** 45 partners across 20 EU & non-EU countries
- **Pilot sites:** 6 Use cases on agri-food value chains
- **Project Coordinator:** University College Dublin

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