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Author (s)	Annalisa Addis, Jon Switters (LIC)
Review & Edit	Claudia Coral, Dagmar Mithöfer (HUB), Lourdes Alvarellos, Maria Beatriz de la Calle Guntinas, Alain Maquet (JRC), Sotiris Gayalis (NTU), Zhijun Wang, Sarah Nolan, Dimitrios Argyropoulos (UCD)
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Executive summary

This policy brief summarises preliminary findings of the Watson project regarding vulnerability to fraud across six agri-food supply chains: olive oil, honey, wine, meat, dairy, and fish. This paper also introduces the technological solutions being developed by the Watson consortium, and which will be piloted in the second phase of the project, including a food fraud early warning system that will equip food authorities with critical insights.

While the project is still ongoing, it is already possible to draw out some policy recommendations to strengthen control measures and reducing food fraud opportunities, which can be summarised as:

- Investment in technological infrastructure
- Regulatory harmonisation
- Capacity building and training
- Consumer education initiatives
- Collaborative innovation.

Concerted policy action around these areas could help guarantee safe and sustainable food production, while also protecting consumer rights and letting markets thrive.

Keywords: Food fraud, technological solutions, policy recommendations, regulatory harmonisation

Project summary

Watson is a 3-year project that has been funded by the EU's research and innovation framework programme, Horizon Europe, to combat fraudulent practices in the food supply chain. Watson's interdisciplinary consortium of 47 partners (40 Beneficiaries, 2 Affiliated Entities and 5 Associated Partners) across 20 countries will develop a holistic traceability framework that will integrate data-driven services, intelligence-based toolsets and risk-estimation approaches, enabling food safety authorities to identify and prevent fraudulent activities.

The project aims to improve the sustainability of food chains by reducing food fraud. This will be achieved through systemic innovations that (a) 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, (b) equip authorities and policy makers with data, knowledge and insights in order to have the complete situational awareness of the food chain and (c) raise the consumer awareness on food safety and value, leading to the adoption of healthier lifestyles (mid-term) and the development of sustainable (and greener) food ecosystems.

Watson will develop a digital technology reference architecture integrating novel technologies such as AI-supported early warning system for food safety authorities based on the processing of various data with connection to food fraud related database; Resilient Data driven and IoT-based Services for Improved Tracing and Tracking; Fast, Inexpensive and Flexible Tools for Authenticity Control, Distributed Ledger Technology (DLT) and Data Analytics, which enable transparency within supply chains through the development of a rigorous, traceability regime, and novel tools for rapid, non-invasive, on the spot analysis of food products.

The proposed framework is tested and demonstrated in six use cases across different European countries considering different operational procedures and diverse environments:

(1) Tackling counterfeiting of wine in Portugal.
(2) Rapid traceability of extra virgin olive oil in Italy.
(3) Improved traceability of high-value products in cereal and dairy chains in Finland.
(4) Preserving the authenticity of PGI honey in Spain.
(5) Identification of possible manipulations at all stages of the meat chain in Germany.
(6) Combating of fish counterfeiting in Norway.

Watson aspires to improve sustainability of food chains by increasing food safety and reducing food fraud through systemic innovations that increase transparency in food supply chains by improved track-and-trace mechanisms, equip food safety authorities and policy makers with data, knowledge and tools, and raise consumers' awareness on food safety and value.

Abbreviations

AI	Artificial Intelligence
DLT	Distributed Ledger Technology
EU	European Union
EVOO	Extra Virgin Olive Oil
FAO	Food and Agriculture Organisation
HSI	Hyper-Spectral Imaging
IoT	Internet of Things
ISO	International Organization for Standardization
JRC	Joint Research Council
LIC	The Lisbon Council for Economic Competitiveness and Social Renewal AISBL
NFC	Near Field Communication
NIR	Near Infra-Red
NTU	National Technical University of Athens
PDO	Protected Designation of Origin
PGI	Protected Geographical Indication
QR	Quick Response
RFID	Radio Frequency Identification
SAH	Smart Agro Hub
UCD	University College Dublin

EUROPEAN
POLICYBRIEF

Introduction

DETECTION AND PREVENTION

This policy brief summarises preliminary findings of the Watson project regarding vulnerability to fraud across six agri-food supply chains. This paper also introduces the technological solutions being developed as part of the Watson project, and it includes recommendations for policy interventions linked to the findings.

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Food fraud is a complex problem that undermines both consumers and industry players. Among the various definitions of food fraud, one of the most articulated is provided by FAO (2018): "Any deliberate action of businesses or individuals to deceive others in regard to the integrity of food to gain undue advantage. Types of food fraud include, but not limited to, adulteration, substitution, dilution, tampering, simulation, counterfeiting, and misrepresentation." From this definition, it is clear that food fraud is a multi-faceted issue that may have a range of different negative consequences at various levels. Clearly, one of the key concerns are the public health hazards linked to consumption of toxic substances used as adulterants, which can sometimes prove fatal. Even in the absence of immediate health risks, deception is a violation of consumer rights. But there are also huge economic consequences, as the global cost of food fraud has been estimated at around 30 billion EUR per year. Legitimate food industry actors may see their market share reduced when competitors adopt fraudulent practices, and entire agri-food chains suffer losses when major fraud-related scandals are uncovered, undermining consumer trust. Agri-food fraud has also been associated with other forms of illegal practices including violation of worker rights, tax fraud and/or environmental crimes. Furthermore, when food fraud is uncovered that poses a health risk, the affected products are sometimes ordered to be destructed, thereby adding to the problem of food waste. In addition, there are other ways in which food fraud can negatively affect the environment, for instance in cases of illegally caught fish deceivingly sold as sustainable, or conventionally farmed products mislabelled as organic (Wüthrich 2024).

Indeed, combating food fraud is a key element of the Farm-to-Fork Strategy (European Commission, 2020), aiming to make food systems fair, healthy and environmentally friendly in line with the European Green Deal (European Commission, 2019). The development of accurate methods and technologies to prevent as well as reliably detect fraudulent action goes to the benefit of consumers, honest food industry actors, control authorities, and the environment more in general. It is in this context that the Watson project has been developed and funded. The project provides a methodological framework, combined with a set of tools and systems for the detection and prevention of fraudulent activities throughout the whole food chain, thus accelerating the deployment of transparency solutions that can benefit food systems in the EU and beyond. Watson relies upon emerging technologies such as artificial intelligence (AI), internet of things (IoT) and Distributed Ledger Technology (DLT), which enable transparency within supply chains through the development of a rigorous, traceability regime, and novel tools for rapid, non-invasive, on-the-spot analysis of food products. The results will be demonstrated in six use cases: a) prevention of counterfeit alcoholic beverages, b) preservation of the authenticity of PGI honey, c) on-site authenticity check and traceability of olive oil, d) the identification of possible manipulations at all stages of the meat chain, e) the improved traceability of high-value products in the dairy chain, f) combat of fish counterfeiting. The Watson project aspires to improve sustainability of food chains by increasing food safety and reducing food fraud through systemic innovations that increase transparency in food supply chains by improved track-and-trace mechanisms, equip food safety authorities and policy makers with data, knowledge and tools, and raise consumers' awareness on food safety and value.

Evidence and analysis

This section presents preliminary findings of the Watson project across the six pilot supply chains (olive oil, wine, honey, meat, dairy, fish), drawing primarily on the results of a gap analysis and of a food fraud vulnerability assessment, both of which are described in detail in Deliverable 2.3.

The food fraud vulnerability assessment covered thirty fraud factors: experts in each supply chain assessed each factor, giving them a score of low, medium of high vulnerability. In the analysis, the thirty factors were then grouped into indicators of:

- **opportunities,** i.e. complexity of adulteration of the raw materials and/or the final product,
- **motivation**, factors referring to the profitability of fraud, and
- **control measures**, i.e. the strength of anti-fraud practices at various levels. [1]

[1] The methodology and results of this assessment are described more in detail in the Guidelines for capitalising on systemic enablers and overcoming systemic barriers to implementation of authenticity and traceability solutions in food systems (Deliverable D2.3).

This assessment showed that the honey, olive oil, and wine supply chains had the highest frequency of vulnerable factors. Overall, indicators of **opportunities** were most frequently reported as "high" vulnerabilities across all the examined food supply chains. This was particularly evident for the honey supply chain, a product that can be adulterated relatively easily. The second leading category of vulnerabilities was **motivation**, particularly relevant in the honey, olive oil, and wine food supply chains, all products that can attract premium prices. Finally, vulnerabilities linked to **control measures**, which look at the strength of anti-fraud practices at various levels, appeared to be less critical than the other two categories, yet still quite problematic, as all supply chains were found to be lacking food fraud detection systems for raw materials and final products.

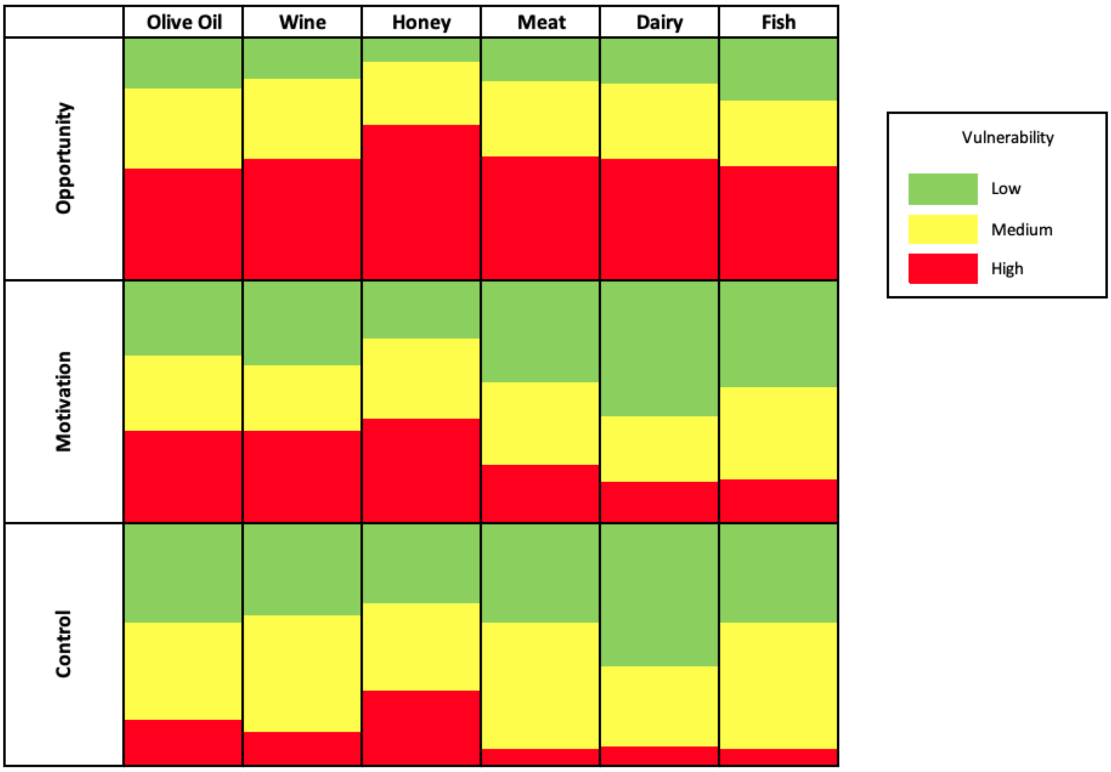

Figure 1 Vulnerability frequencies of the 6 Watson pilots across the categories of opportunity, motivation and control

Figure 1 above visually summarises the frequency of the different vulnerabilities. Despite some common elements, each of the six food supply chains have very specific vulnerability profiles, characteristics and needs that deserve to be examined separately in the following paragraphs.

Olive Oil

Olive Oil (OO), and particularly Extra Virgin Olive Oil (EVOO), a staple in the cuisine of Mediterranean countries, is generally considered to be at high risk of fraud. Opportunity factors such as the technical simplicity of adulterating the product (by adding cheaper vegetable oils) and/or mislabelling (misrepresenting origin and/or quality) are particularly relevant here, as well as motivation linked high economic value of the product, especially in case of premium EVOO with a Protected Geographical Indication (PGI) or Protected Designation of Origin (PDO) certification. On the control side, it is worth noting that this industry is characterised by a complex and fragmented supply chain, with several weak spots where fraud is more likely to occur such as the olive orchard, milling stage, packaging facility, olive oil distributors and retailers. The lack of clear incentives and legal or regulatory mandates for businesses to adopt fraud prevention systems is another critical factor. The Watson solution for the EVOO supply chain relies on DNA fingerprinting: an indisputable and accessible source of information that can identify the olive varieties in each sample, and substitutions with other vegetable oils. The development of an on-site EVOO DNA kit will significantly improve the current EVOO fraud identification, as it will allow real-time processing of samples without having to rely on laboratory infrastructures. Besides preventing and detecting adulteration, improved traceability will help to increase consumer trust that the product is compliant with quality and safety standards, ultimately benefitting the entire industry. However, collaboration and a strong regulatory framework, as well as incentives for small and medium producers, will be key to ensure widespread adoption of enhanced traceability systems.

Wine

The wine supply chain is also complex and fragmented. Here, fraud risks are mostly linked to opportunities such as easiness to mix lower quality grapes, or to misrepresent the origin and/or variety of the grapes used in winemaking. These are coupled with the motivation provided by economic factors, especial when geographical indications are involved. Fraud incidents can happen at multiple stages of the supply chain, and control points are often reliant on information supplied by producers and bottlers, who may gain advantages from misrepresenting the true characteristics of a wine such as grape origin and variety, harvest year or certifications. Another weak point is transportation, flagged as a phase where enforcement of quality standards (including temperature) is challenging. Controls by health authorities often focus on post-production verification, cross-checking accounting data, but they can also involve testing of samples. Overall, there is room for improvement in traceability and broader fraud prevention in the wine supply chain, but costs and complexity of implementation are significant barriers. The Watson solution for improved traceability in the wine supply chain is centred around a blockchain platform that will also incorporate data from IoT sensing devices, inexpensive wine colour inspection devices. The blockchain platform will also support an early-warning system which will combine real-time data with historical data. Lastly, smart labels providing access to information stored on the blockchain will also be tested in this context.

Honey

The honey supply chain is also complex and involves several actors, including small-scale producers. As seen above, in comparison to the other examined supply chains, the honey chain displays the highest proportion of high vulnerability factors, something that is consistent with findings from previous research. In this specific case, adulteration is not technically challenging due to the liquid nature of the product allowing for dilution with syrups, but another phenomenon is the falsification or misrepresentation of origin or floral variety as these can command a higher price (e.g. PDO or PGI). This shows how opportunities and motivation are interlinked and can contribute to heightened vulnerability. At the control level, information relies on self-reporting and is sometimes collected manually and stored on spreadsheets. There are limited checks on imported honey, which is a weak spot for fraud. Furthermore, there is a lack of clear and common standards for honey types within the EU that can be exploited by fraudulent actors. On this respect, the recent adoption of directive 2024/1438 is a welcome step forward, as it mandates more stringent and clearer rules for honey labelling indicating countries of origin and percentages in case of blends (European Union, 2024). Regarding detection of honey adulteration, currently available technologies tend to be expensive and taking several days), in addition to requiring expert interpretation of the results. Improved fraud prevention systems must balance the needs for transparency and traceability with concerns from producers, especially around costs and effort. The Watson solution exploits the potential of using low cost, portable/miniaturised near-infrared (NIR) and hyperspectral imaging (HSI) technologies, capable of detecting honey adulteration in real-time, at a low cost, while also being easy to use. These will be coupled with AI and machine learning tools to create a digital product passport that will provide full traceability information to the consumer.

Meat

The meat supply chain is also complex involving numerous stages starting from the farm where the livestock is raised to the slaughterhouse, transportation, processing facilities, retail and finally to the consumer. Despite not being rated among the most vulnerable supply chains due to existing traceability and control systems, food fraud related to meat has extensive implications, involving potentially serious health risks to consumers, in addition to economic loss for consumers and legitimate producers. Some examples of food fraud in this supply chain include fraudulent claims about origin, breed, feed and/or age of the animal, addition of foreign proteins during processing, addition of water to increase weight in poultry, replacement of fresh meat with frozen and thawed meat, or substitution with different meat species in processed foods such as ground meat. Furthermore, maintaining correct temperatures is also essential to guarantee safety. In principle, greater distance from production site and processing are perceived to increase the risk of fraud. In this sector, controls are carried out at every stage from farm to retail, including controls at border inspection points. Identification of farmed animals is a legal requirement in the EU, and there are IT systems to handle the data. Further independent inspections take place in certified supply chains (such as organic) or other quality standards (e.g. International Organization for Standardization (ISO)) that contribute to enhanced traceability. Experts in this supply chain, while reporting that current traceability systems are generally perceived as adequate, highlight the need to keep pace with potential new frauds, which requires continuous vigilance and innovation in fraud detection and prevention strategies The implementation of a more efficient traceability system is expected to contribute to faster food recall processes, as it enables the isolation of problematic products and ingredients from the root cause, thereby preventing further loss and potential health risks. The Watson solution for the meat supply chain will establish a framework combining several tools, in molecular methods such as DNA biochip, DNA barcoding, DNA metabarcoding to identify animal species, as well as mass spectrometric methods with rapid sample preparation and short chromatography runs for the detection of undeclared additions of foreign proteins.

Dairy

The dairy supply chain has the lowest frequency of "medium" and "high" vulnerability factors of the six chains examined for the Watson project. Nevertheless, there are instances of food fraud, ranging from mislabelling or misapplication of production standards (especially of cheeses with indication of origin) and undeclared substitution of animal proteins with plant-based alternatives. Dilution with water and cheaper kinds of milk or other liquids seems to be less prevalent thanks to enhanced detection methods. The adulteration of milk and dairy with other substances to extend shelf life does not appear to be frequent but is extremely serious due to the harm that may be caused by potentially toxic additives. While the dairy supply chain is overall reported to be secure due to its comprehensive analyses and stringent checks and technology-enabled traceability, fraud remains a possibility, especially in cases of complex chains involving global trade, or when dairy is included in other processed foods. Indeed, direct routes from farms to dairy processing without intermediate warehouses minimize vulnerabilities. At the same time, like in the meat supply chain, the risk of evolution of fraudulent practices requires constant vigilance and efforts to keep abreast of new potential threats. A potential area for improvement identified by experts is consumer engagement. The Watson solution relies on an item-level track and trace system that will enable live information on the product – from source ingredients and quality to recycling indications and will also allow consenting consumers to be directly contacted by the producer in case of recalls. Furthermore, new tools for authenticity and transparency verifications will be made available to food authorities.

Fish

The fish supply chain encompasses the catch, processing, and distribution of seafood products. In the Watson project, the focus is specifically on the Norwegian white fish supply chain. According to the food fraud vulnerability assessment, the frequency of "high" fraud vulnerability factors in this supply chain – just over 21% – is lower than in any of the other examined supply chains; nevertheless, this still constitutes a non-negligible risk, and furthermore, the frequency of "medium" vulnerabilities is significant at over 40%. Fraud may involve misreporting of catch data, mislabelling of species (cheaper fish labelled and sold as premium), misrepresentation of origin, fraudulent certification labels for products that do not comply with the relevant standards, use of additives, unauthorised use of antibiotics in aquaculture, as well as illegal fishing practices that may deplete stocks. The effectiveness of existing traceability systems, including barcodes and lot numbers, hinges on collaboration and seamless integration into a comprehensive food fraud prevention framework, encompassing both procedural and technological elements to safeguard the integrity of the supply chain. EU labelling legislation provides an important regulatory framework. At the same time, reliance on self-reporting and concerns about effectiveness of inspection leave some room for fraudulent practices. Technological advancements, such as integrating electronic information from sea to market, are deemed necessary to strengthen fraud prevention efforts. The Watson solution hinges on the development of a blockchain-based platform that will allow to check the authenticity and quality of the product. Data will be sourced in real-time from IoT sensors throughout the supply chain to ensure adequate storage, production and transportation conditions, and will be directly transmitted to the blockchain platform. Printed or electronic labels (QR Codes, NFC tags, RFIDs etc.) on packages and/or boxes will enable access to the detailed product information. The labels may also include advanced technologies like 2D and 3D holograms, colour-shift inks, digital watermarks and invisible printing that will prevent copying or cloning. The development of an interoperable blockchain for fish traceability will significantly improve both the quality control and the authenticity aspects of the global fish market. The proposed solution will be tested on Norwegian white fish, but it will also be applicable to salmon and snow and king crab supply chains.

Policy implications and recommendations

From the evidence presented above it is clear that, despite important differences across supply chains, heightened attention and concerted action against food fraud are essential to guarantee safe and sustainable food production, while also protecting consumer rights and letting markets thrive. Some general recommendations include:

- **Investment in technological infrastructure**: The adoption of advanced technology tailored to sector-specific needs is essential to keep up with technological advancements and new fraud threats. Keeping in mind that not all technological solutions are universally applicable across supply chains, the Watson project is developing and testing a range of tools that will enable rapid fraud detection, as well as improved transparency and traceability. Widespread adoption of similar technological advancements can be supported via financial incentives, especially for small businesses who may otherwise struggle to keep up. Another key element is ensuring streamlined authorisation and accreditation processes, so that food control agencies can promptly deploy cutting-edge technologies and tools for improved food fraud detection and prevention.
- **Regulatory harmonisation**: Authorities should promote more uniform and consistent regulations and standards at least within the EU common market, as current discrepancies could be exploited for fraudulent practices. Cohesive regulatory frameworks can ensure consistency in quality management and certification standards within the EU, and, where possible and relevant, also at global level. At the same time, it will be essential to avoid overregulation, and balance regulatory needs with industry concerns through dialogue with expert stakeholders.
- **Capacity building and training**: Robust training programmes can enhance technological literacy among supply chain participants, empowering them to effectively utilise and benefit from new technologies. Different stakeholders face varying food fraud risks based on their positions in the food supply chains. Specifically, it is recommended that farmers, fishermen, and processors receive some

training on digital equipment to improve their acceptance of food traceability systems based on blockchain and the IoT. The wholesalers and retailers need targeted training to understand rapid food fraud detection methods and the latest laws and regulations. In this way, the entire food supply chain can better ensure improved awareness and ability to prevent food fraud.

- **Consumer education initiatives**: Educational campaigns aimed at improving consumer awareness about food product origins, production methods, and quality assurance standards are needed. At the same time, consumers should be encouraged to understand the role of digital food traceability systems in detecting and preventing food fraud. The educational campaigns could improve consumer confidence and their ability to make informed choices that are not just based on price, which is generally beneficial to legitimate industry actors.
- **Collaborative innovation:** Due to the complexity of most food supply chains, industry collaboration and knowledge sharing are key to accelerate innovation in authenticity verification and traceability, leveraging successful case studies and best practices from leading companies.

Overall, policy action can effectively strengthen control measures, and it can also contribute to reducing food fraud opportunities. In addition, the Watson project is also working on a food fraud early warning system that will provide authorities with forecasts on potential food fraud incidents, so that they are equipped with critical insights on possible instances of food fraud related phenomena at both national and EU levels, along with an understanding of how such threats may change.

Sustainability and legacy

The Watson Project has produced guidelines for capitalising on systemic enablers and overcoming systemic barriers to implementation of authenticity and traceability solutions in food systems (Deliverable 2.3) as well as a set of practice abstracts on the lessons learnt so far (Deliverable 6.8).

The second half of the project (September 2024 – February 2026) will see the development and testing of the solutions for improved traceability through digital food product passports and distributed ledger technologies; early warning systems for food safety authorities to detect and prevent food fraud, as well as fast, inexpensive and flexible tools for authenticity control and system interoperability. A second policy brief – due to be released in February 2026 – will present a final set of policy recommendations.

Research Parameters

The Watson project aims to combat fraudulent practices in the food supply chain by developing a holistic traceability framework that will integrate data-driven services, intelligence-based toolsets and risk-estimation approaches, enabling food safety authorities to identify and prevent fraudulent activities. The project's interdisciplinary consortium includes 47 partners (40 Beneficiaries, 2 Affiliated Entities and 5 Associated Partners) across 20 countries, who will contribute to the achievement of the project's objectives:

1) **Design** and **develop** a holistic traceability framework that will integrate data-driven services, intelligence-based toolsets and risk-estimation approaches, enabling food safety authorities and food chain stakeholders to identify at early stages and prevent fraudulent activities while improving food products' traceability.
2) **Validate** and demonstrate the effectiveness of the proposed Watson methodological framework and toolset through six validation campaigns in six different subsectors of the EU food system that will pave the way for rapid uptake of the proposed framework and its systemic solutions, with the active engagement of several food chain stakeholders.
3) **Advance** the inspection and control capabilities of relevant authorities through robust, reliable and rapid methods and toolsets based on emerging technologies that ensure traceability and prevent fraudulent activities in the food chain.
4) **Ensure** wide communication and scientific dissemination of the innovative Watson results to the research, academic, and international community, raising awareness and promoting multi-stakeholder cooperation and information-sharing to tackle fraudulent activities in the food chain.
5) **Mainstream** project results towards relevant policy making organisations and standardisation bodies to foster science-enabled policy reforms related to traceability and authenticity in food systems aiming to increase the global competitiveness of the EU food sector.

To do so, Watson adopts multidimensional and integrated approaches by proposing a unifying, holistic, systemic innovation framework across the whole food supply chain through its intelligent early warning system that integrates processing, operational and organisational levels of the sector, taking at the same time the social, economic and sustainability factors into account. Through extensive desk research and monitoring of the state-of-the-art, Watson is working on a comprehensive and integrated conceptual model, which will be validated in real operating environments through six use cases dedicated to six different food products. The project methodology is be based upon the identification of the operational challenges that the food chain stakeholders face in the context of data availability, traceability and transparency. The project investigates the characteristics of each case of the pilot food chains and correlates them with food fraud risk. Watson will present the status of food chains operations in terms of core concepts, processes, responsibilities, procedures and supporting technologies for increased traceability throughout the whole food chain.

Project Identity

Project name	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.

Coordinator Dr. Dimitrios Argyropoulos, University College Dublin, Dublin, Ireland.

dimitrios.argyropoulos@ucd.ie

Consortium

1. UCD - University College Dublin, Ireland
2. INR - Institut National De Recherche Pour l'agriculture, l'alimentation et l'environnement, France
   2.1. Bordeaux Sc Agr - Ecole Nationale Superieure des Sciences Agronomiques de Bordeaux Aquitaine, France
3. CNR - Consiglio Nazionale delle Ricerche, Italy
4. CER - Center for Research & Technology, Greece
5. VTT - Teknologian Tutkimuskeskus, Finland
6. MRI - Max Rubner-Institut, Federal Research Institute of Nutrition & Food, Germany
7. SIN - Sintef Nord As, Norway
   7.1. SIN_DIG - Sintef As, Norway
8. INE - Instituto de Engenharia de Sistemas e Computadores, Tecnologia e Ciência, Portual
9. NTU - National Technical University of Athens, Greece
10. HUB - Humboldt-Universität zu Berlin, Germany
11. INT - Netcompany – Intrasoft, Luxembourg
12. SYN - Synelixis Solutions S.A., Greece
13. BIO - Biocos Ike Bio, Greece
14. ASI - Asociación de Investigación Industrias de la Carne del Principado de Asturias, Spain
15. RFF (Formerly FSH) – Reframe Food, Greece
16. SAH - Smart Agro-Hub, Greece
17. UBI - Ubitech Limited, Cyprus
18. DBC - Diadikasia Business Consulting Symvouloi Epicheiriseon Ae, Belgium
19. UPC - Upc Konsultointi Oy, Finland
20. ZPS - Zveza Potrošnikov Slovenije Društvo, Slovenia
21. UNC - Unione Nazionale Consumatori, Italy
22. DEC - Associação Portuguesa Para A Defesa Do Consumidor, Portugal
23. *(Original beneficiary #23 IGP replaced with beneficiary #46 IGPMA)*
24. MIG - Migros Ticaret Anonim Sirketi, Turkey
25. LIC - The Lisbon Council for Economic Competitiveness and Social Renewal Asbl, Belgium

26. IFA - Iseki Food Association, Austria
27. *(Original beneficiary #27 PDA1 replaced with associated partner #47 PDA)*
28. EUF - European Food Information Resource, Belgium
29. ADV - Associação Para o Desenvolvimento da Viticultura Duriense, Portugal
30. APR - Soc. Agricola Organizzazione di Produttori Aprol Umbria Soc. Cooperativa, Italy
31. HAI - Hämeen Ammatti Instituutti, Finland
32. LGL - Bavarian Health and Food Safety Authority, Germany
33. BWE - Bulgarian Winemaking & Export Association, Bulgaria
34. BAU - Universitat Bayreuth, Germany
35. DOF - The Norwegian Directorate of Fisheries, Norway
36. HER - Hermes As, Norway
37. ESP - Espersen A/S, Denmark
38. EUN - Euronews, France
39. MET - Metro Anonymi Emporiki Kai Viomichaniki Etaireia Eidon Diatrofis Kai Oikiakis Chriseos, Greece
40. UVMB - University of Veterinary Medicine Budapest, Hungary
41. REG - Resilience Guard Gmbh, Switzerland
42. MIT - Mitera Gmbh, Switzerland
43. FIB - Research Institute of Organic Agriculture, Switzerland
44. WCS - Wellics Ltd, United Kingdom
45. JRC - Joint Research Centre- European Commission, Belgium
46. IGPMA - Consejo Regulador de la Indicacion Geografica Protegida Miel de Asturias, Spain
47. PDA - Consejería de Medio Rural Y Cohesión Territorial del Principado de Asturias, Spain

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For more information	Contact: • Watson Coordinator: Dr. Dimitrios Argyropoulos dimitrios.argyropoulos@ucd.ie • Watson Manager: Ciara O'Connor ciara.oconnor@ucd.ie • Policy Brief Author: Annalisa Addis annalisa.addis@lisboncouncil.net
Further reading	1. Guidelines for capitalizing on systemic enablers and overcoming systemic barriers to implementation of authenticity and traceability solutions in food systems (Deliverable 2.3), August 2024 2. Practice Abstracts – Batch 1 (Deliverable 6.8), August 2024 3. Key Stakeholders Expectations, Socioeconomic Drivers and Vulnerability Assessment of Food Systems (Deliverable 2.1), August 2023

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