



BERLIN THINKING



# ICT-AGRI-FOOD FUNDED PROJECTS SEMIAR 2024 BUSINESS VALORISATION WORKSHOP

## Report on the concept and conduction of the workshop

Explanation of the methodological background, workshop objectives, the visual material used and the final conduction and outcomes.

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FIRSTLY  
**THANK YOU**  
FOR THE GREAT PARTICIPATION



First of all, I would like to take the opportunity to thank the representatives of 26 research and innovation projects funded under the ICT-AGRI-FOOD co-fund for joining this workshop session. In total we had over 60 researchers actively participating in this business valorization workshop supported by facilitators and the advisory board of the ICT-AGRI-FOOD Era-Net.

In this summit we've seen 19 mature projects that already started in 2019 meeting the 7 new innovation projects that started in 2022 all funded under the ICT-AGRI-FOOD co-fund. This composition allowed a lot of valuable knowledge exchange between the research projects and many of them identified constructive synergies. I am looking forward to the next steps of each project to test their solutions in real market environments.

ICT-AGRI-FOOD plays key role in the European agrifood innovation ecosystems as a funding network bridging research and applied innovations in the market. Only research results that successfully scale and find application in the market, can help to reach the ambitious goals of the European Green Deal and the EU Farm2Fork strategy for the transition of our broken food system.

**Alexander Berlin**  
CEO of Berlin Thinking

# WORKSHOP REPORT

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### 1. PURPOSE & OBJECTIVES OF THE WORKSHOP

The main goal of a valorisation workshop is to facilitate the exchange of knowledge, expertise, and best practices among researchers, innovators, entrepreneurs, industry experts, and stakeholders. It focuses on strategies to enhance the commercialization or practical implementation of innovative concepts, technologies, or research outcomes.

Key elements of this valorisation workshop were:

- **Identify synergies across projects:** Pitching each other cutting-edge research, technologies, or innovations developed by universities, research institutions, or businesses to find synergies.
- **Knowledge Exchange and Collaboration:** Providing a platform for networking, discussions, and collaboration among researchers, industry professionals, and entrepreneurs to explore potential partnerships or collaborations.
- **Entrepreneurship and Business Development:** Offering insights into the process of transforming research or innovative ideas into marketable products or services, including aspects of business planning, market analysis, funding, and intellectual property rights.
- **Technology Transfer and Commercialization Strategies:** Discussing strategies for technology transfer, licensing, or commercialization pathways to bring innovations from the laboratory to the market.
- **Access to Funding and Support:** Providing information about available funding opportunities, investment sources, and support mechanisms to help innovators and entrepreneurs in their valorisation efforts.
- **Success Stories and Case Studies:** Showcasing successful examples of valorisation where research or innovations have been effectively translated into commercially viable products or solutions.

Overall, this valorisation workshop serves as a platform to bridge the gap between research and practical applications, aiming to foster innovation, collaboration, and economic growth by facilitating the transformation of ideas into marketable products or services.

#### 1.1. Objective

The major objective of the workshop is to equip the research project of ICT-AGRI-FOOD with the necessary knowledge and concepts to successfully transform scientific results into market-ready solutions. Each project partner should be able to identify business potentials and develop the fitting business models for each targeted stakeholder. This reaches from models for B2B collaborations with distributors, data providers or service partners to the financial exploitations with end-consumers.

The workshop puts a specific emphasis on the identification of important stakeholders and partners that can leverage the uptake of the solution in the market or complement the benefits to the end-user. As this workshop brings 26 digital research projects together that already have many stakeholders in common, it fosters the identification of synergies by grouping projects in the workshop by their respective sector focus. This leads ideally to joint projects that focus on a further development of the final services or by running joint market tests to assess if the solutions are market-ready and if can create enough traction.

### 2. METHODOLOGY & APPROACH

The methodology of this valorisation workshop builds upon approved business concepts like the Business Model Canvas (BMC)<sup>1</sup> by Alexander Osterwalder, the partnership canvas and the 50 business models components of the Business Model Navigator developed by the University of St. Gallen<sup>2</sup>.

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<sup>1</sup> <https://www.strategyzer.com/library/the-business-model-canvas>

<sup>2</sup> <https://www.alexandria.unisg.ch/server/api/core/bitstreams/d71e2821-d8f8-4cc1-a1ee-97baff7d9e48/content>



However, each section of this workshop is specifically tailored to the agrifood industry and the specifics of agricultural solutions and stakeholders.

In the first part of workshop entitled with "Market2Value", the participants define the value proposition towards specific actors in the food value chain and quantify the economic impact that it creates. They develop a first business model approach toward on the one hand their end-customers and on the other hand towards possible partners that are already working the targeted end-customers. In the last part of the first workshop session the participants design a market testing scenario that proves the previously defined value proposition and collects feedback on the business model acceptance in terms of pricing, payment, contractual conditions or services.

In the second part of the workshop entitled with "Partners2Value", each project starts to map its current and future partners in areas such as R&D, product development, distribution, technology, customers and governmental actors. Specific emphasis is here on the assignment of roles within future projects or in the process of further product development. In the next exercise, the participants calculated their further funding needs for activities like product development, R&D, distribution & sales, marketing & communication and hardware or software investments. They identified potential funding opportunities like Horizon Europe, EIT Food, ESA or ICT-AGRI-FOOD co-fund and lined out already a first draft pitch for a future project. In the last activity, the participants were invited to draw up the data flow within their digital solution. The importance here was to identify interfaces towards input data providers that offer the necessary interoperability and to design data output interfaces that allow seamless data integration into other applications.

## **2.1. Synergy pitches**

At the beginning of each workshop session, 2 representatives of research and innovation projects were invited to the stage and to pitch potential synergies between their two projects. They had 1 minute to come up with ideas on how to collaborate and on how to combine their solutions.

The approach of inviting two representatives to the stage for a rapid-fire pitch on potential synergies between their research and innovation projects is a strategically crafted method that infuses the workshop with dynamism and creativity. Following a series of passive presentations, this interactive session serves as a catalyst for heightened engagement. The time constraint of one minute adds an element of urgency, prompting participants to think on their feet and generate innovative ideas swiftly. By challenging the representatives to rapidly brainstorm collaboration possibilities, the exercise not only identifies immediate synergies but also encourages participants to think beyond conventional boundaries. This dynamic format fosters a sense of shared purpose and interconnectedness among diverse projects, creating an environment where participants envision novel ways in which their work can complement and amplify each other's impact. Moreover, the rapid-fire pitch initiates a creative momentum that transcends the immediate exercise, influencing the entire workshop's atmosphere and promoting a culture of collaborative thinking and active participation.

## **2.2. Division into 2 parts**

Dividing the business valorization workshop into two parts, as outlined in the "Market2Value" and "Partners2Value" segments, is a strategic and effective approach. The first part, "Market2Value," focuses on honing the value proposition and business model, engaging participants in a targeted exploration of their impact within the food value chain. By concentrating on end-customers and potential partners, participants can delve deeply into the specifics of their offerings, ensuring a clear understanding of economic impact. The incorporation of a market testing scenario adds a practical dimension, allowing for

immediate feedback on critical aspects such as pricing, payment structures, contractual conditions, and services. This initial phase provides a solid foundation for the second part, "Partners2Value," where attention shifts to building robust partnerships and securing necessary resources. Mapping current and future partners across diverse domains and calculating funding needs sets the stage for a comprehensive strategy. The seamless transition from defining value to strategic partnering and resource planning ensures a holistic and well-rounded approach to business valorization, empowering participants to navigate both the market dynamics and collaborative aspects of their projects with a strategic mindset.

**2.3. Introduction to every part by examples and explanation of the exercise**

Every workshop activity was introduced by a 5-10min presentation of the moderator backed by some real world examples on why this specific activity is important. Each example derived from other successful research and innovation projects like IoF2020 where either spin-offs made it successfully to the market or research results were implemented into existing market products.

By anchoring workshop activities in concrete examples like these, participants can grasp the practical significance of each step, fostering a deeper understanding of how these methodologies have contributed to the success of real-world projects in the research and innovation landscape. Here is short overview of the examples used in the workshop as references:

**BUSINESS SESSION 1 – VALUE 2 MARKET**  
**VALUE PROPOSITION**

**MaxPrecisionMAP**  
 Precision soil maps for farm automation.

**Customers & Provider**  
 Farmers | FMIS  
 500 / ar/aves | 0.000 / data report  
 tecnova | AgGateway

**Major Challenge**  
 Soil quality can differ a lot even on single field and geo data on exact composition of soil is needed to enable smart farming applications.

**Core Product Features**  
 Visual Scan - Rough measurement of soil humidity by 10 sensors / no providing water storage capacity with accuracy of 60%. Basic Google maps satellite material.  
 Smart Map - It's providing full picture of soil richness (nitrogen) and 98% accuracy in water capacity. More advance satellite material.

**Here is what we aim to improve (KPIs)**

Water usage	-5%
Soil richness	+5%
Satellite image quality	+5%
Satellite image quality	+5%

These values derive from comparison of a standard farms performance prior to the installation of our system and after.

All illustrations illustrate a simplified reality and are only an example.

**IOF2020 USE-CASE**

This use-case on precision soil maps for farm automation gives an excellent overview on how to structure a value proposition and how it can be presented in a pitch presentation.

**COMPANIES:**  
**TECNOVA, AGGATEWAY**

Horizon Europe | Precision Farming | USP

**365FARMNET APP MODEL**

The app store approach of 365FarmNet shows an interesting business model for the joint distribution of digital services on one marketplace with a centric operating system that ensures interoperability and data handling while third-party services add functionalities.

**COMPANIES: 365FARMNET**

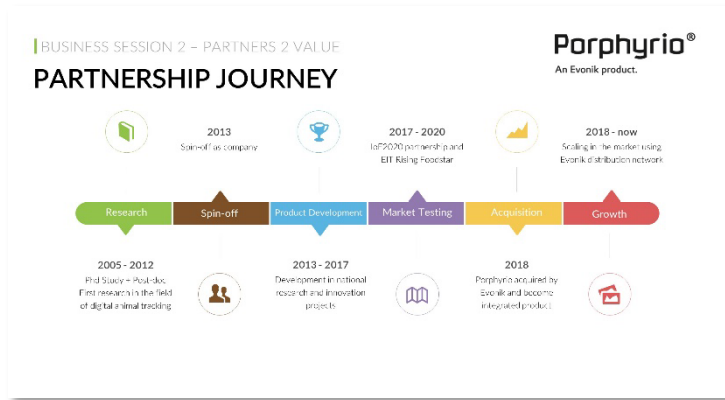
FMIS | Precision Farming | Business Model

**BUSINESS SESSION 1 – VALUE 2 MARKET**  
**PLATFORM BUSINESS MODEL – 365FarmNet**

**Basic**  
 365Crop | 365Cattle | € / month

**Special**  
 AMAZON | YARA | LIAS | GIGAF | meteoblue | AGRAVIS | 365FarmNet | GEA

- 365FarmNet provides the basic functionalities, add on modules are provided by our partners
- The partner receives up to 70% of the revenue of their integrated module
- 365FarmNet delivers the shopping/billing system and the first level support



## PROPHYRIO STORY

Porphyrio is a Belgium company that started as a spin-off of the KU Leuven, developed its solution for precision animal monitoring of poultry and pigs in several research and innovation projects and finally was acquired by Evonik. A good example for successful partnership.

### COMPANIES: PORPHYRIO

Spin-off story | Animal Monitoring | Exit

## 2.4. Division into sector groups supported by advisory group

Dividing the 26 research and innovation projects into five distinct groups—Precision Farming (Fruits), Precision Farming (Arable), Animal Farming, Food Production Innovations, and Sustainable Supply Chains—proves to be a strategic and purposeful organizational approach. This grouping is tailored to the specificities of the projects, allowing for a more focused and in-depth exploration of shared challenges, methodologies, and opportunities within each domain. Precision Farming, whether for fruits or arable crops, benefits from a concentrated discussion, enabling researchers to exchange insights on technological advancements and best practices unique to each sector. Similarly, the Animal Farming and Food Production Innovations groups foster a deep dive into the intricacies of their respective areas, encouraging collaboration and knowledge exchange among projects with similar thematic focuses. The Sustainable Supply Chains group ensures that projects align their strategies with broader sustainability goals, promoting a comprehensive perspective on the environmental and social aspects of the value chain. This division not only streamlines discussions but also facilitates cross-pollination of ideas within each thematic cluster, optimizing the workshop's effectiveness in addressing the diverse challenges and opportunities across the broader spectrum of research and innovation projects.

Distinct experts from different organisation joined each table to share their professional insight with project participants and to guide them with their expert knowledge. These experts rotated after each activity to another table. This way each project got in touch with every advisor at least once.

## 2.5. Workshop material and digital follow-up

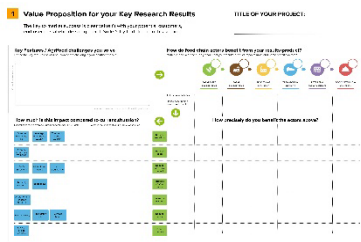
Each project received 6 pieces of A2 papers with a printout template for each of the 6 workshop activities. In respect for the environment and to save printing costs, each paper was printed on both sides. Additionally, each table received post-its, pens and a set of stickers representing business model components.

The workshop templates were also created as a digital version on [Mural board](#). After the workshop the moderator digitalised all the available written notes from the 26 teams on the 6 workshop activities.

# THE WORKSHOP MATERIAL

A2 Printouts, business model component stickers, pens, post-its

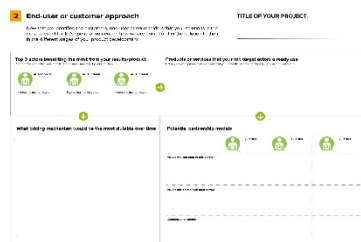
## VALUE PROPOSITION



### KEY BENEFITS FOR END-USERS AND PARTNERS

“ This activity paper provided a template to map the key features of the solution, define the target users and their benefits.

## CUSTOMER APPROACH



### BUSINESS MODELS FOR END-USERS & PARTNERS

“ This template helps to design a business model approach toward 3 key end-users, map other partners and collaboration models.

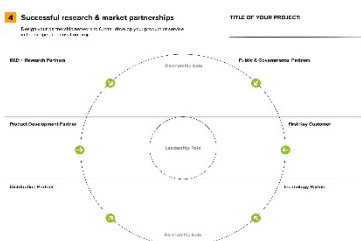
## MARKET TESTING



### SCENARIOS TO TEST THE MARKET ACCEPTANCE

“ This template visualizes a potential market testing scenario targeting a specific end-user group and testing specific indicators.

## SUCCESSFUL PARTNERSHIPS



### PARTNERS AND ROLES IN FUTURE PROJECTS

“ This template is intended to map and define roles for current and future partners in an project or in further product development.

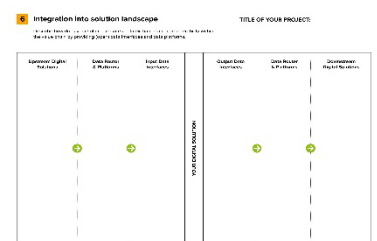
## FUNDING OPPORTUNITIES



### FUNDING NEEDS AND NEW PROJECT SCATCH

“ This template helps to map the funding needs for the further development and the identification of fitting funding programmes.

## DATA INTEGRATION



### ENSURE DATA EXCHANGE ACROSS SERVICES

“ This template focusses on the data interfaces for input and output of open data to ensure interoperability and data exchange.



## EXPERT ADVISORS

Projects received expert advice from sector specialists

**MARIE  
RUSSEL**



**SENIOR PROGRAMME  
OFFICER**

She coordinates the activities of the OECD Fruit and Vegetables Scheme. Before she worked at the French National Centre for Scientific Research and the French National Institute for Agricultural.

**MARIA  
GERNERT**



**TP ORGANICS  
COORDINATOR**

As Coordinator of TP Organics, she is advocating for research and innovation in organic and other agroecological approaches that contribute to sustainable food systems.

**OLIVER  
BECU**



**PROJECT MANAGER &  
BUSINESS DEVELOPMENT**

Oliver manages a large portfolio of European-scale projects: initiate and coordinate partnerships addressing new business cases and manage projects from start to market roll-out.

**XENOPHON  
TSILIMPARIS**



**PROGRAMME  
MANAGER**

He is responsible for designing, launching & implementing policies supporting & implementing policies supporting small and medium sized enterprises (SMEs) to become innovative through ICTs.

### **3. PART 1.1: VALUE PROPOSITION FOR KEY RESEARCH RESULTS**

The value proposition of innovative research results is paramount as it encapsulates the unique and transformative aspects of the findings, conveying their significance to stakeholders. A compelling value proposition serves as a powerful communication tool, articulating how the research outcomes address specific challenges, meet market demands, or contribute to advancements in a particular field. It not only attracts the attention of potential collaborators, investors, or end-users but also establishes a clear differentiation from existing knowledge or solutions. The value proposition essentially acts as the beacon guiding the translation of research into practical applications, ensuring that the innovative results resonate with those who can contribute to their implementation or benefit from their implications. In essence, a well-crafted value proposition is instrumental in garnering support, resources, and recognition for the impactful outcomes of innovative research.

#### **3.1. Mapping of key features of current results/solution**

Mapping the key features of an innovative solution or product and assessing its current market readiness is crucial for several reasons. Firstly, it allows the projects to gain a comprehensive understanding of the unique aspects that set the innovation apart from existing solutions or products. This comparative analysis helps in identifying competitive advantages and areas for improvement.

Secondly, evaluating the level of innovation in comparison to existing alternatives provides insights into market gaps and potential opportunities for disruption. Understanding how well the innovation addresses current challenges or meets unmet needs allows businesses to position their product strategically.

Additionally, mapping key features aids in crafting effective marketing strategies. Highlighting the innovation's distinctive features and demonstrating its superiority over existing solutions can be a powerful tool in attracting customers and investors.

#### **3.2. Benefits for supply chain actors**

Defining the benefits of a solution for actors in the food supply chain is pivotal for the successful integration of research and innovation projects into real-world applications. The food supply chain is a multifaceted network comprising farm asset production, farm production, processing industry, transport and storage, retail and end-consumers, and food catering and canteens. Each link in this chain faces unique challenges and opportunities. By meticulously describing the characteristics of the actors targeted by a particular solution, service, or product, researchers and innovators gain a nuanced understanding of the diverse needs and contexts within the supply chain. For instance, in farm asset production and farm production, solutions that reduce work time, lower costs, and minimize negative environmental impacts resonate well. Transport and storage actors may prioritize increased ease of work and risk reduction in logistics. Retailers and end-consumers often appreciate cost-effective, convenient solutions, while food catering and canteens may seek innovations that enhance operational efficiency or reduce environmental footprints. This comprehensive understanding enables developers to tailor their innovations, ensuring they address the specific pain points and aspirations of each actor. Clearly communicating these benefits not only fosters stakeholder buy-in but also underscores the adaptability and value proposition of the research and innovation projects, ultimately contributing to their successful implementation and sustained impact across the food supply chain.

**1 Value Proposition for your Key Research Results**

TITLE OF YOUR PROJECT: \_\_\_\_\_

The key to market success is clear value fit with your potential customers, end-user or stakeholders in general. So let's try to define it in this section.

<b>Key Features / Agrifood challenges you solve</b> Define the key features of your solution or the challenges your solutions solves	<b>How do food chain actors benefit from your results/product?</b> Mark the part(s) of the supply chain that your results/product impacts most and name specific actors																																																																													
<p><b>How much is this impact compared to current situation?</b>                      EU statistics for an average European farm (2018 FADN data)</p> <p>What is the impact of your product or solution?</p> <table border="1"> <tr> <td>Average work units 1.6</td> <td>Average work hours 2,225h</td> <td>Total work hours 3,560h</td> </tr> <tr> <td>Average farm costs 73,900€</td> <td></td> <td></td> </tr> <tr> <td>GHG Emissions</td> <td>High nitrate levels</td> <td>Low biodiversity</td> </tr> <tr> <td>Physically hard work</td> <td>No holidays</td> <td></td> </tr> <tr> <td>Average farm income 96,300€</td> <td></td> <td></td> </tr> <tr> <td>Price volatility</td> <td>Production risks</td> <td>Climate change</td> </tr> <tr> <td>Lack of skilled workers</td> <td></td> <td></td> </tr> </table>	Average work units 1.6	Average work hours 2,225h	Total work hours 3,560h	Average farm costs 73,900€			GHG Emissions	High nitrate levels	Low biodiversity	Physically hard work	No holidays		Average farm income 96,300€			Price volatility	Production risks	Climate change	Lack of skilled workers			<p><b>How precisely do you benefit the actors above?</b></p> <table border="1"> <tr> <td></td> <td>FARM ASSET PRODUCTION</td> <td>FARM PRODUCTION</td> <td>PROCESSING INDUSTRY</td> <td>TRANSPORT &amp; STORAGE</td> <td>RETAILER &amp; END-CONSUMER</td> <td>FOOD CATERING &amp; CANTINES</td> </tr> <tr> <td>Reduce worktime</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reduce costs</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reduce neg. Env. Impact</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Increase ease of work</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Increase income</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reduce risks</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other impact</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		FARM ASSET PRODUCTION	FARM PRODUCTION	PROCESSING INDUSTRY	TRANSPORT & STORAGE	RETAILER & END-CONSUMER	FOOD CATERING & CANTINES	Reduce worktime							Reduce costs							Reduce neg. Env. Impact							Increase ease of work							Increase income							Reduce risks							Other impact						
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1<sup>st</sup> Part of “Value2Market” workshop session

# VALUE PROPOSITION

## THE APPROACH

This workshop session maps the different features of the solution deriving from the research projects and defines the precise benefits that it entails for the respective target stakeholders. These benefits were then quantified against statistical market data.

## WHAT WE DID IN THE SESSION



Mapping key features of the solution



Identification of stakeholders along the food supply chain



Lining out benefit for each targeted actor



Quantifying the benefit for the individual target actor

## 4. PART 1.2: END-USER & CUSTOMER APPROACH

Developing a comprehensive business model, including pricing and payment mechanisms, for an innovative solution is crucial for its successful adoption and sustainability. This strategic approach ensures that the value proposition aligns with the financial expectations and capacities of potential key customers or end-users. A well-crafted business model provides transparency on the costs associated with the solution, offering clarity on what customers are paying for and how the pricing structure reflects the product's value. Additionally, defining payment mechanisms tailored to the preferences of the target audience enhances accessibility and acceptance. The business model not only serves as a roadmap for financial viability but also helps in establishing a competitive edge by demonstrating a clear understanding of the market dynamics. It facilitates informed decision-making for both the provider and the customer, fostering trust and long-term relationships. Ultimately, a thoughtfully designed business model contributes to the successful integration of the innovative solution into the market, ensuring its sustainability and scalability over time.

### 4.1. Business model & pricing mechanism

Developing tailored business models for the three top food chain actors that stand to benefit the most from a solution is instrumental in ensuring the successful integration and widespread adoption of innovative products or services. By customizing the pricing and payment mechanisms to suit the unique needs and preferences of each key actor, the solution becomes more appealing and aligned with their operational and financial considerations. For instance, a "pay per use" model might be suitable for processors and retailers who may prefer a flexible payment structure based on their specific usage patterns. On the other hand, farmers in the production phase might find a "leasing" or "result-based" pricing model more fitting, aligning costs with the outcomes or services delivered by the solution. The retail and end-consumer segment could benefit from models such as "subscription" or "freemium," offering flexibility in access and payment. The diverse array of potential pricing mechanisms, including "buy & own," "flat rate," "dynamic pricing," "pay what you want," and others, allows for nuanced and strategic approaches that accommodate the financial dynamics and preferences of each actor within the food chain. This approach not only enhances the solution's market fit but also contributes to the overall sustainability and scalability of the innovation across the entire food supply chain.













### 4.2. Partnership business models

Identifying the products and services already utilized by top potential customers or end-users is essential as it lays the groundwork for strategic partnerships that can enhance the overall value proposition of an innovative product or service. Recognizing these existing tools and solutions provides valuable insights into the current operational landscape, allowing innovators to align their offerings more effectively with the needs and preferences of their target audience. Moreover, these providers of complementary products and services represent potential partners for future collaborations. Establishing partnership models requires a thoughtful consideration of mutual benefits. In such collaborations, innovators can offer their partners added value by enhancing the features or capabilities of existing tools, expanding the range of services, or contributing to overall efficiency. In return, innovators stand to gain from the established market presence and customer base of their partners. Compensation models for such collaborations could involve revenue-sharing agreements, joint marketing efforts, or shared intellectual property. These symbiotic partnerships not only amplify the value proposition for end-users but also foster a collaborative ecosystem that drives innovation, efficiency, and market growth.

**2 End-user or customer approach**

TITLE OF YOUR PROJECT: \_\_\_\_\_

Now that we identified the customers, end-user or stakeholders that your solutions is the most relevant for, let's spend a moment on how we are going to offer the solution to them in the different stages of your product development.

<p><b>Top 3 actors benefiting the most from your results/product</b> Put here the actors that you identified to be most impacted by your solution</p> <div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">               ACTOR NAME              Interesting market actors         </div> <div style="text-align: center;">               ACTOR NAME              Interesting market actors         </div> <div style="text-align: center;">               ACTOR NAME              Interesting market actors         </div> </div> <p style="text-align: center;">→</p>	<p><b>Products or services that your top target actors already use</b> List any relevant products or solutions that your potential clients are already using in their daily work</p>																
<p><b>What pricing mechanism would be the most suitable over time</b></p> <p>Time ↓</p>	<p><b>Potential partnership models</b></p> <table border="1"> <thead> <tr> <th></th> <th style="text-align: center;">PARTNER </th> <th style="text-align: center;">PARTNER </th> <th style="text-align: center;">PARTNER </th> </tr> </thead> <tbody> <tr> <td>Values you can offer to this partner</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Values this partner can offer to you</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Compensation model</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		PARTNER 	PARTNER 	PARTNER 	Values you can offer to this partner				Values this partner can offer to you				Compensation model			
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2<sup>nd</sup> Part of “Value2Market” workshop session

# CUSTOMER APPROACH

## THE APPROACH

The participants pick 3 top actors from the first activity and develop a business model & payment scheme for each of them. In a second step they look at the products and services already used by their potential customers to identify future partners on the market.

## WHAT WE DID IN THE SESSION



Select and name top 3 customers



Development of a pricing and payment mechanism



Identification products and services already used



Preparation of partnership models with other providers



## **5. PART 1.3: MARKET TESTING SCENARIOS**

Validating business models and ensuring user acceptance through real-world market tests is crucial for the success of any innovative solution. Market testing scenarios, especially with smaller groups of target customers within a limited timeframe, provide invaluable insights into the practical viability and acceptance of the developed product or service. By conducting these targeted tests, innovators can assess the actual response of their intended user base, identify potential challenges, and refine the solution based on real-world feedback. This approach mitigates the risk of scaling a product that may not resonate with the market, allowing for necessary adjustments and improvements early in the development process. Specific market testing scenarios enable a focused examination of key aspects, such as pricing structures, user interface, and overall functionality. Through these iterative tests, innovators can fine-tune their business models, ensuring they align seamlessly with user expectations and market dynamics. This proactive validation not only enhances the chances of market success but also optimizes resource allocation by prioritizing features and functionalities that truly resonate with the end-users.

### **5.1. Characterisation of the market testing scenario**

Defining a clear market testing scenario is pivotal for accurately assessing the viability of business models and user acceptance. By articulating specific assumptions to be tested regarding business models or user acceptance, innovators gain clarity on the objectives and parameters of the market test. Determining the characteristics and size of the test user group ensures a representative sample that reflects the diversity of the target audience, providing insights into various perspectives and preferences. Additionally, establishing a well-structured time plan for the market testing phase is essential for managing resources efficiently and obtaining timely feedback. This systematic approach allows for the measurement of key performance indicators, enabling data-driven decision-making. In essence, a well-defined market testing scenario serves as a roadmap for focused experimentation, helping innovators gather meaningful insights to refine their solutions, optimize business models, and enhance user acceptance within a specified timeframe.

### **5.2. Indicators for market success**

Defining clear indicators is crucial for measuring the market success in a testing scenario and obtaining actionable insights. For business model acceptance, an indicator might involve the percentage of test customers opting for the premium version; for instance, achieving 8 out of 10 test customers choosing the premium version could signify success. In terms of user acceptance, a key indicator could be a post-use questionnaire rating, with a success threshold set at reaching 7 points out of 10. Additionally, to gauge the broader impact of the solution on the agrifood supply chain, indicators could include metrics like worktime reduction or environmental impact. Establishing the methodology for measuring these indicators is equally important – whether through surveys, usage data analysis, or other means. Success criteria should be precisely defined, linking indicator values to tangible outcomes. This meticulous approach ensures that market testing goes beyond subjective impressions, providing quantifiable data that guides strategic decision-making and, ultimately, substantiates the market viability and impact of the innovative solution.

**3 Access to market and market testing**

TITLE OF YOUR PROJECT: \_\_\_\_\_

In order to validate the business models towards our customers or partners, it is necessary to run market tests in specific scenarios and with a smaller group of people. In this exercise we design these market experiments.

<b>Market Testing Scenario 1</b> <small>Describe the business case that you would like to validate</small>	<b>Indicators for market success</b> <small>Describe what you would regard as a success</small>	<b>How to measure the success</b> <small>Describe ways or tools to measure this success</small>
Assumption to test	Business model acceptance	
Test group characteristics / size	→ User product acceptance	
Timeplan	Actual impact of your solution	
<b>Market Testing Scenario 2</b> <small>Describe the business case that you would like to validate</small>	<b>Indicators for market success</b> <small>Describe what you would regard as a success</small>	<b>How to measure the success</b> <small>Describe ways or tools to measure this success</small>
Assumption to test	Business model acceptance	
Test group characteristics / size	→ User product acceptance	
Timeplan	Actual impact of your solution	

3<sup>rd</sup> Part of “Value2Market” workshop session

# MARKET TESTING

## THE APPROACH

This template supports the design of 2 market testing scenarios with clear definitions of the assumption to be tested, the target test group and a timeplan. In a second step the user defines success indicators that will be measured during the testing and which value regarded a success.

## WHAT WE DID IN THE SESSION



Design of two market testing scenarios



Definition of success indicators for the testing



Develop a methodology for measuring the indicators



Setting clear values for your indicator to define a success

## **6. PART 2.1: RESEARCH & MARKET PARTNERSHIPS**

Mapping potential partners within your network is a strategic imperative for future product development and the successful integration of innovative solutions into the market. Identifying partners who can contribute to research, product development, distribution, or serve as early adopters as target customers is essential. A partner map serves as a dynamic tool that not only facilitates the composition of future research and innovation projects but also aids in the strategic formation of spin-offs, backed by the research institution's results. By systematically charting potential collaborators, innovators can leverage complementary expertise and resources, fostering synergies that enhance the overall robustness of their projects. This proactive approach not only streamlines collaboration efforts but also maximizes the potential for impactful outcomes, whether through joint projects, mutually beneficial distribution channels, or the establishment of spin-offs that capitalize on the research institution's intellectual contributions. Ultimately, mapping potential partners ensures that innovation is not only cutting-edge but also well-positioned for successful implementation and sustained growth in the dynamic landscape of research and development.

### **6.1. Partner characteristics**

Clustering partner mapping into distinct categories such as "R&D & Research Partners," "Product Development Partners," "Distribution Partners," "Public & Governmental Partners," "First Key Customers," and "Technology Partners" is essential for strategic clarity and targeted collaboration. Each category represents a critical facet of the innovation lifecycle, and organizing potential partners accordingly streamlines efforts to identify, approach, and engage with them effectively. By categorizing partners based on their specific roles and contributions, innovators can tailor their outreach strategies and collaborations to meet the unique needs of each partner type. Precisely mapping potential partners with the names of organizations, and ideally contacts, adds granularity to this process, enhancing the efficiency of partnership development. Knowing the specific entities that align with each category allows for more focused engagement, ensuring that research and innovation efforts are aligned with the right expertise, resources, and market connections. This systematic approach not only optimizes collaboration but also lays the groundwork for a robust network that spans the entire spectrum of the innovation ecosystem, ultimately fostering successful development, distribution, and adoption of innovative solutions.

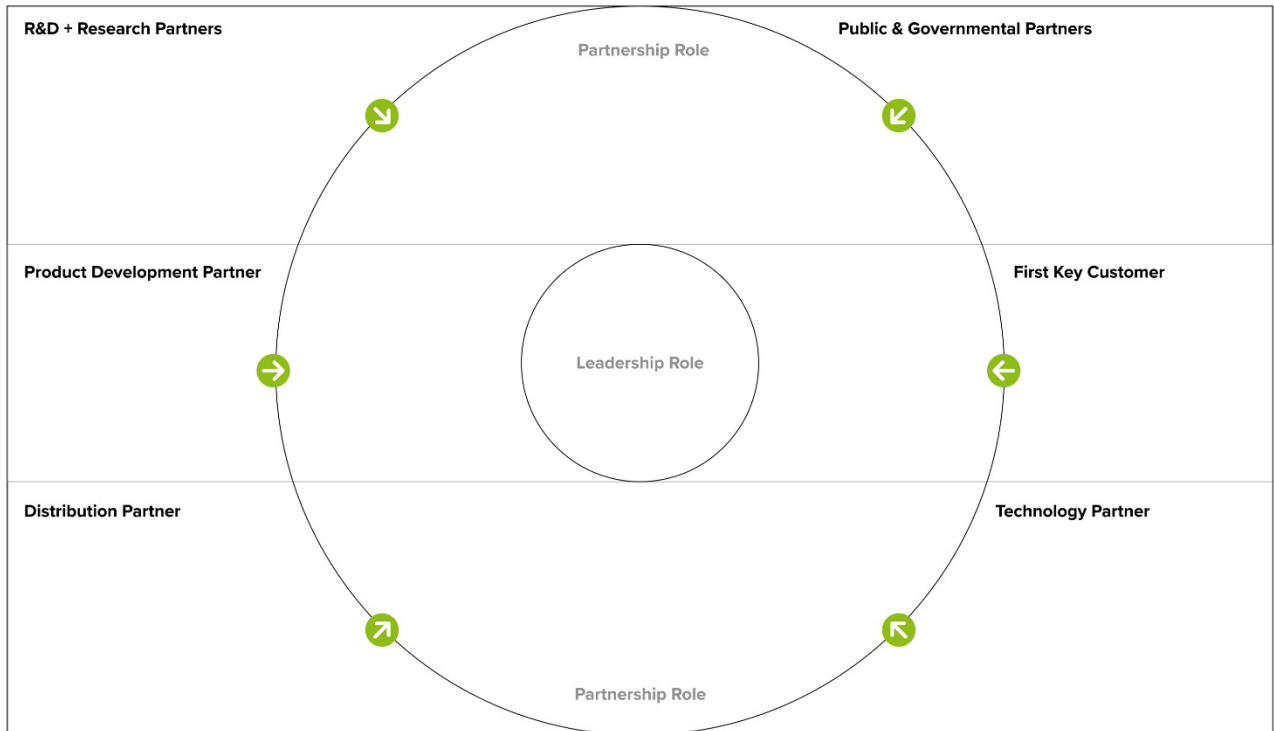
### **6.2. Roles in partnerships**

Defining potential roles for partners within the specified categories is crucial for establishing clear expectations and fostering effective collaboration in future projects or product development. These roles not only delineate the responsibilities of each partner but also ensure that their expertise is strategically harnessed. Whether through simple partnership roles or more leadership-oriented positions, such as a distribution partner leading sales and distribution efforts, assigning specific responsibilities enhances accountability and synergy within the collaboration. This proactive approach not only optimizes the division of labor but also allows each partner to leverage their strengths, contributing meaningfully to the success of the overall initiative. Clearly defining roles ensures that every partner plays a purposeful and integral part in the project or product development, fostering a collaborative environment where each entity's contributions align with their capabilities and strategic positioning within the broader innovation ecosystem.

**4 Successful research & market partnerships**

TITLE OF YOUR PROJECT: \_\_\_\_\_

Design your partnership network to further develop your product or service in the scope an innovation project.



1<sup>st</sup> Part of “Partner2Value” workshop session

# MARKET PARTNERSHIPS

## THE APPROACH

In this session the participants map their partner network by clustering them into 6 different groups and assigning different potential roles that they could play in future projects or in the further product development.

## WHAT WE DID IN THE SESSION



Identifying potential partners



Grouping the partners and assigning contacts



Assigning different partnership roles



Identifying a group of leading partners

## **7. PART 2.2: FUNDING & INVESTMENT OPPORTUNITIES**

Planning the future funding of product development and market testing is paramount for ensuring the sustained growth and success of innovative initiatives. Diverse funding sources offer unique advantages, and a strategic approach is essential to secure the necessary resources. Leveraging Horizon Europe, EIT Food, or the ICT-AGRI-FOOD co-fund provides access to European funding programs dedicated to research, innovation, and agricultural technology. The European Innovation Council (EIC) further offers a range of funding schemes, such as EIC Pathfinder, EIC Transition, and EIC Accelerator, supporting various stages of development. Private funding from venture capital investors and strategic investments by corporate partners can inject additional capital, fostering scalability. Moreover, impact investments, particularly for solutions aligning with climate farming, EU Green Deal targets, biodiversity protection, and water management, present an avenue for financing with positive environmental impacts. A well-thought-out funding strategy that considers a mix of public and private sources ensures resilience and flexibility in navigating the dynamic landscape of agricultural innovation.

### **7.1. Funding needs and financial timeline**

Quantifying the funding needs of a project, spin-off, or startup is a critical exercise that brings financial clarity and strategic foresight to the innovation journey. Articulating the funding requirements for different aspects such as product development, research & development, distribution & sales, marketing & communication, and hardware or software investments provides a comprehensive overview of financial demands. Equally important is the development of a funding timeline that outlines when these financial resources will be required over the next five years. This timeline serves as a strategic tool, aligning funding needs with project milestones and critical phases. By understanding the specific points in time when funding is essential, innovators can proactively approach various funding sources, whether it be public grants, private investments, or venture capital, ensuring a timely infusion of resources. The workshop participants' exercise of mapping suitable funding sources to match identified needs enhances financial planning and lays the foundation for a sustainable and well-supported innovation trajectory.

### **7.2. Funding sources and future projects**

Identifying the best-fitting funding sources from the array of options defined earlier is paramount for translating innovative ideas into actionable projects. By aligning the specific characteristics of a project with the strengths of potential funding sources—whether from Horizon Europe, EIT Food, the ICT-AGRI-FOOD co-fund, or private investors—innovators can tailor their approach to secure the most appropriate financial support. Crafting a first sketch of a future research and innovation project is equally crucial, as it serves as the initial blueprint for potential partners and investors. This early-stage pitch outlines the project's objectives, anticipated impacts, and collaborative opportunities, providing a compelling narrative that captures the essence of the innovation. The pitch not only articulates the vision and value proposition but also invites potential partners to envision their role within the project. This strategic approach not only enhances the chances of securing the right funding but also lays the foundation for meaningful partnerships, ensuring that the project is poised for success from its inception.



**5 Further funding and investment opportunities**

TITLE OF YOUR PROJECT:

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Plan your future investment needs for the further development of your solution and the funding opportunities in the coming years.

<p><b>Funding Timeline for further product development</b> Mark future funding sources to fuel your further product development in the coming 3-5 years</p>	<p><b>Interesting funding strands / calls</b></p>						
<p><b>Your investment plan / financial demand</b></p> <table border="1"> <tr> <td>Product Development</td> <td>Distribution &amp; Sales</td> <td>Hardware Investment</td> </tr> <tr> <td>Research &amp; Development</td> <td>Marketing &amp; Communication</td> <td>Software Investment</td> </tr> </table>	Product Development	Distribution & Sales	Hardware Investment	Research & Development	Marketing & Communication	Software Investment	<p><b>Potential project sketch and pitch drafts</b></p>
Product Development	Distribution & Sales	Hardware Investment					
Research & Development	Marketing & Communication	Software Investment					

# 2<sup>nd</sup> Part of “Partner2Value” workshop session

# FUNDING OPTIONS

## THE APPROACH

This activity maps the funding needs for the further product development, market testing or the market entry. It develops a timeline to match the funding needs with available public and private funding sources. Lastly it drafts a first project sketch to pitch it to partners.

## WHAT WE DID IN THE SESSION

- 

Assessing future funding needs
- 

Develop a timeline for future funding
- 

Identify fitting funding opportunities
- 

Draft a project draft to pitch to partners

## **8. PART 2.3: DIGITAL DATA INTEGRATION**

In the final activity of the business valorization workshop, the focus shifts towards ensuring open data exchange and digital interoperability of solutions derived from research and innovation projects funded by ICT-AGRI-FOOD. This critical step acknowledges the interconnected nature of modern agricultural technologies, where seamless data flow between different digital tools and solutions is paramount. The goal here is to establish a framework that facilitates collaboration with other digital tools, ensuring compatibility and interoperability. This activity addresses the potential scenarios where external tools may need to input data into the developed solution or vice versa, emphasizing the importance of creating an ecosystem where diverse agricultural technologies can seamlessly exchange and integrate data. By fostering open data standards and interoperability, these initiatives not only enhance the overall efficiency and effectiveness of the solutions but also contribute to the creation of a robust and interconnected digital infrastructure within the agrifood sector.

### **8.1. Data input and output interoperability**

Mapping upstream digital solutions holds immense importance in enhancing the decision support capabilities of an agricultural solution. Identifying and integrating relevant data from various sources upstream, such as farm machinery or existing software systems like Farm Management Information Systems (FMIS), enriches the solution's capacity to provide comprehensive insights. For farmers, the seamless integration of data from diverse machinery manufacturers and compatibility with established software systems is crucial for a unified and efficient workflow. Solutions that prioritize interoperability, leveraging platforms like Data Connect or Agrirouter, play a pivotal role. These data platforms and routers act as intermediaries, translating different data models between applications, ensuring a smooth exchange of information. Emphasizing open data models and interfaces from the outset is key. By incorporating these principles into the design, solutions become inherently interoperable, fostering a collaborative ecosystem where diverse digital tools seamlessly integrate, ultimately maximizing the utility and attractiveness of the agricultural solution to end-users.

### **8.2. Data exchange and interoperability platforms**

Ensuring data interoperability in the agricultural sector is paramount for unlocking the full potential of digital technologies. Open-source platforms, exemplified by FIWARE - Smart Farming, offer standardized frameworks for developing and integrating smart agrifood solutions. The Orion Context Broker acts as a linchpin, breaking down information silos by seamlessly integrating data from diverse sources such as drones, sensors, and machinery. The extended CKAN portal facilitates the publication of real-time data, allowing third parties to access contextual information, subject to defined terms and conditions. Crucially, data/API access control functions ensure secure and restricted data access, and API management supports auditing and monetization strategies.

In the agricultural machinery sector, solutions like Agrirouter and Data Connect play pivotal roles in facilitating seamless data exchange. Agrirouter stands out by connecting agricultural machinery of different brands with various software solutions, ensuring efficient data flow within the Agrirouter default setting. DataConnect, a collaborative effort by major manufacturers including CLAAS, John Deere, CNH, and 365FarmNet, pioneers a multi-manufacturer open cloud-to-cloud solution. Unlike previous limitations where farmers with mixed fleets had to rely on individual manufacturers' portals, DataConnect enables real-time data transfer from all machines to a preferred system. Another significant player, DjustConnect, prioritizes safe and efficient data sharing, respecting the privacy and preferences of farmers and horticulturists. By providing access to accurate data, these solutions contribute to streamlined administration and enhanced advisory tools across the entire agricultural food chain, fostering a more connected and efficient ecosystem.

**6 Integration into solution landscape**

TITLE OF YOUR PROJECT: \_\_\_\_\_

Describe how does your solution ensures data exchange and interoperability within the value chain by providing (open) data interfaces and data platforms.



# 3<sup>rd</sup> Part of “Partner2Value” workshop session DATA INTEGRATION

## THE APPROACH

This last session emphasises the importance of data exchange and interoperability in the field of digital solutions for the agrifood sector. It encourages that participants to think about open data standards and the integration into European data platforms.

## WHAT WE DID IN THE SESSION



Apply open data models to ensure data exchange



Think about other solutions data input



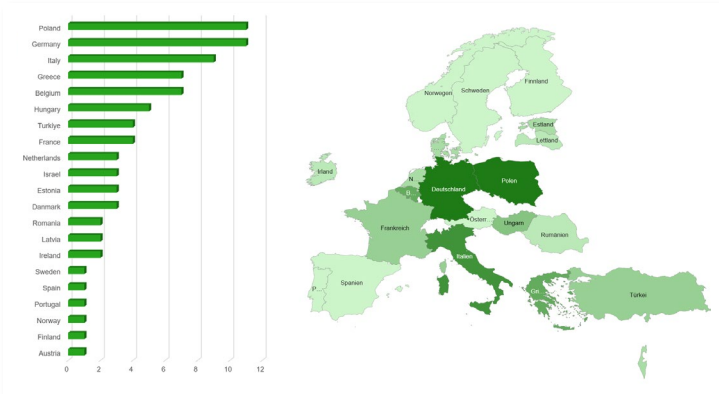
Think about the output of data to other solutions



Learn about open data spaces

9. WORKSHOP STATISTICS AND FOLLOW-UP

26 projects funded under the ICT-AGRI-FOOD co-fund took part in the business valorisation workshop at the Seminar in Warsaw on 30 January – 01 February 2024. For 19 projects this was the closing event as they already started in the 2019 call. While for 7 projects it was their kick-off seminar as they started in the 2022 Joint Call. Please find the descriptions of the different research and innovation project in the Annex of this report. Find in the following some statistical information about the participants of the workshop:



**GEOGRAPHICAL SPREAD**

82 people participated in the workshop coming from 20 European countries, Turkey and Israel. The strongest representation was from Germany (11), Poland (11) and Italy (9). This represents 40% of all European countries and 63% or all EU member states.

**RESULT: WELL BALANCED**

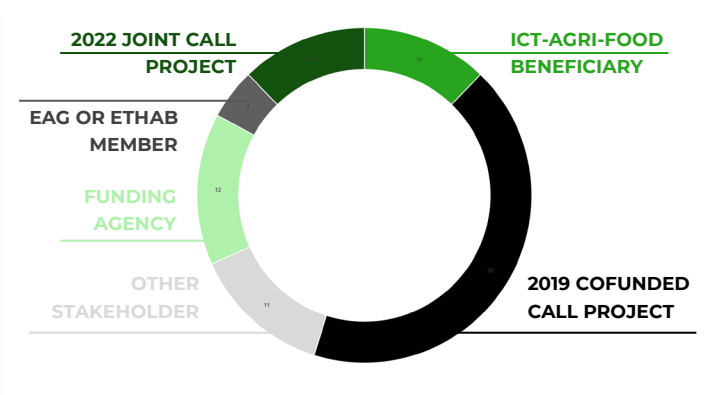
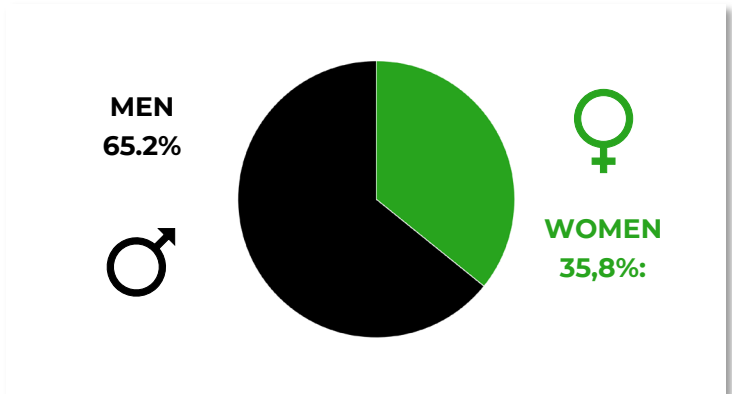
Tip: More Eastern European countries

**GENDER REPRESENTATION**

The typical gender gap within the agricultural sector is clearly visible also in the gender representation of this workshop. Two-third of all participants are male and only one-third are women. This clearly needs to still improve.

**RESULT: UNBALANCED**

Tip: Attract specifically women



**TYPE OF PARTICIPANTS**

A majority of 55% of all participants is part of projects funded by ICT-AGRI-FOOD either in the 2019 call (43%) or the 2022 call (12%). The other stakeholder groups are well balanced.

**RESULTS: WELL BALANCED**

Tip: Select more projects in next call

## ADCATER

ADVANCED DIGITAL SOLUTIONS FOR PROFESSIONAL FOOD AND NUTRITION CATERING

“ ADCATER will develop advanced ICT technologies and integrate them into a **Smart Food Catering Supply Chain platform** that provides: economic efficiencies to growers and suppliers; personalized nutrition accuracy to diners/patrons, wholesalers and caterer; and verification of personal, organizational and global nutritional policies. This will be achieved by **harnessing computer vision & deep learning technologies to identify and decode images of prepared food “served to plate before meal” and “left in plate after meal”**, applying advanced analytics to derive valuable information such as: served meal ingredients, the degree of adjustment & dietary gaps to diner profiles, batch traceability data, effective and up-to-date nutritional supervision, food waste, correlation between consumer consumption and health.

**CHALLENGES:** Food Waste, Personalized Nutrition      **VALUE CHAIN:** Farmer, Wholesaler, Catering

## ADDferti

A DATA-DRIVEN PLATFORM FOR SITE-SPECIFIC FERTIGATION

“ ADDferti aims to design and develop a **fully-automated ICT-based data driven platform for VRFI**. Given the increasing demands for water and food under global warming, one of the great challenges is how to increase food production by using less water for irrigation. Another issue is the homogeneous application of not only water but N, P and K by the majority of farmers in Europe and beyond. This results in over- and under-applications over different parts of the field, leading to poor yield and management of farm input, and negative environmental consequences, e.g., N and P leaching, or water scarcity. The **solution would be adopting variable rate fertigation (VERI), to apply the right rate at the right time**, and place using advanced sensing, modelling and control technology.

**CHALLENGES:** Precision Farming      **VALUE CHAIN:** Service Provider, Machine Manufacturer, Farmer

## ANTONIO

MULTIMODAL SENSING FOR INDIVIDUAL PLANT PHENOTYPING IN AGRICULTURE ROBOTICS

“ ANTONIO develops and implements advanced perception systems based on **multi-sensor platforms and sensor processing algorithms to enable agricultural vehicles** to perform plant phenotyping and precision agriculture tasks, such as precise local application of pesticides. The envisaged idea is based on an **integrated sensor network, including mobile sensors mounted onboard of robotic vehicles and drones, stationary sensors deployed in the field, and smart insect traps**. Information coming from the fixed sensing devices as well as robots and drones will flag "attention spots" in the crop for further local investigation by the robotic platforms. This approach will lead to precise detection of pests and weeds/plants, and this narrow temporal and spatial scale of detection ability can treat the specific site instead of the entire crop or field.

**CHALLENGES:** Precision Farming      **VALUE CHAIN:** Machine Manufacturer, Farmer



## BeeConnected

ANTICIPATING MECHANISMS OF HONEYBEE COLONY MORTALITY WITH CONNECTED BEEHIVES

“ BeeConnected aims at **understanding mechanisms underlying winter mortality risk of honeybee colonies** and to identify early-warning indicators that could help beekeepers limiting colony losses and related economic deficits. We will combine our expertise in various scientific fields, including behavioural ecology, molecular biology, engineering, computer science, and modelling. In close collaboration with beekeepers, we will carry out a **large-scale monitoring of beehives along combined gradients in climate (continental, temperate and Mediterranean) and landscape**. The monitoring will combine traditional field observations with automated systems using multiple low-cost sensors to track the bee swarm in real time and in three dimensions inside the beehives. The final goal is to derivate decision-support tools for beekeepers to sustain their professional activity.

**CHALLENGES:** Honeybee Mortality

**VALUE CHAIN:** Beekeeper

## GOHYDRO

A SMART-SENSING AI-DRIVEN PLATFORM FOR SCALABLE, LOW-COST HYDROPONIC UNITS

“ GOHYDRO aspires to culminate in the production of a platform that will be a shifting paradigm of how **AI-driven technological innovation can become an affordable, accessible-by-all tool applicable to all forms of urban farming**. In a nutshell, the proposal aims at creating a form of an easy-to-use e-agronomist which will assist any grower to fine-tune and optimize her hydroponic production. Within this framework, GOHYDRO aims at developing a cost-efficient smart-sensing ICT platform capable of monitoring the crops' health and nutrient content of hydroponically cultivated microgreens to optimize the cultivation process and allow the harvest of the best possible products. Hydroponics has emerged as one such solution, as it requires no arable land, reduces the usage of clean water and can be used in any urban setting.

**CHALLENGES:** AI, Urban Farming

**VALUE CHAIN:** Service Providers, Farmers

## FINDR

FAST AND INTUITIVE DATA RETRIEVAL

“ FINDR's objective is to provide universal, transparent, and unifying **access to Earth Observation (EO) data** for sustainable and resilient food production. The project will implement an ICT platform to enable faster and better-informed decisions by making existing EO data sources directly comparable and inter-compatible. This is reached by the implementation of **data-finding, data-forecasting, and data homogenization algorithms**, leveraging the technological advantages of cloud computing, big data, and machine learning. The overall vision is to unlock many of the most immediate potential benefits, like more efficient use of water in irrigated agriculture, optimized fertilizer use, automated irrigation management, that are still waiting for their adoption on large scales by the food producers.

**CHALLENGES:** Access to Satellite Data

**VALUE CHAIN:** Service Providers, Farmers

## HALY.ID

TOOLS FOR MONITORING OF THE BROWN MARMORATED STINK BUG & OTHER PESTS

“ HALY.ID aims to replace the current **monitoring of the brown marmorated stink bug** (*Halyomorpha halys*) by non-reliable traps with an **autonomous monitoring system based on new emerging technologies like drones, computer vision and IoT devices**. The brown marmorated stink bug (*Halyomorpha halys*), an invasive Asian species, in 2019 has already reached 28 European countries, causing damages for millions of euros. The final goal is to collect images of the most dangerous pests in our countries (*H. Halys*, *Psila rosae*) with vision chips carried by unmanned vehicles, mined via machine learning on the edge-devices, in order to direct interventions. We also intend to exploit hyperspectral vision for detecting pest damages non-visible in the marketable fruits. By logging this information and sharing it across the value chain it provides transparency and quality assurance to the consumer.

**CHALLENGES:** Disease Detection

**VALUE CHAIN:** Farmer

## IMPPeach

INTEGRATED MODEL & DIGITAL PLATFORM FOR HARVEST PREDICTION OF CANNED PEACHES

“ IMPPeach develops a **digital platform for the harvest prediction for canned fruits**, powered by a predictive model based on Machine Learning, Remote Sensing and IoT. The platform will provide remote sensing (satellite) data of the orchards and corresponding vegetation indexes to derive parameters like plant vitality and other phenological parameters. It provides also climatic, soil conditions, cultivation and fruit data (e.g. irrigation, size, growth rate) by an IoT sensor network and manual field scouting. This data feeds into a prediction model for harvest dates and yields based on the data analysis by AI/ML algorithms and into a distributed FMIS that integrates all collected data, supports data exchange between farmers and the fruit canning business and integrates the predictions with the MRP process.

**CHALLENGES:** Precision Farming, AI

**VALUE CHAIN:** Service Provider, Farmer

## LivestockSense

ENHANCING SUSTAINABILITY OF ANIMAL FARMS BY REMOVING BARRIERS FOR ICT ADOPTION

“ LivestockSense aims to **draw farmer's attention on the importance of environmentally friendly animal housing**, especially air quality and its impact on health, welfare and productivity of livestock. In relation to sociological research, the project wants to understand the real causes of resistance to precision livestock farming (PLF) systems, i.e. exploring the attitude of farmers to PLF systems, their requirements for the operation of these systems and the provision of information, as well as their **knowledge of the decision-making roles ICT technologies** can play on farms. Demonstrate the role of PLF systems can play in delivering economic and environmental benefits through building a data-driven ICT tool

**CHALLENGES:** Precision Farming, Education

**VALUE CHAIN:** Farmer (livestock)

## MERIAVINO

### MULTISCALE SENSING FOR DISEASE MONITORING IN VINEYARD PRODUCTION

“ MERIAVINO project advocates a multidisciplinary approach, which is based on several scientific fields to address the problem of disease and yield estimation in vineyard. The proposed methodology consists of inter-combining and implementing IoT, **remote sensing and big data with a multi-scale approach in order to interconnect the vineyard parcels**, as well as to develop a non-invasive, eco-friendly and low-cost technology for vine disease detection/warning. In order to reduce economic loss of both quantity and quality, and the environmental impact, various sensors, data fusion techniques and artificial intelligence and machine learning methods are combined along with the development of re-printable sensors for effective vineyard monitoring. The project results are then analysed and geo-visualised on compatible MobApp for end-users for decision-making and early prevention.

**CHALLENGES:** Precision Farming, AI

**VALUE CHAIN:** Farmer (vineyard)

## MUSHNOMICS

### DATA-DRIVEN INNOVATION IMPROVING THE PRODUCTIVITY IN MUSHROOM VALUE CHAIN

“ MUSHNOMICS aims to demonstrate the feasibility of dynamic data-driven analytics for multidomain mushroom production environments in order to **optimize yield, lower costs and improve the economic viability** of this agrifood sector. The project will develop ICT technologies for use in the agrifood domain exclusively focusing on mushroom value chain, combining smart sensors, AI, Deep Learning and Big Data analytics. The multi-factor, multi-discipline MUSHNOMICS team will lead to the development **of ICT platform in the mushroom value chain**, which will be demonstrated at TRL7 for post-project exploitation by the SMEs. The project team constitutes has a wide geographical spread with partners from Ireland, Denmark, Romania and Hungary

**CHALLENGES:** Indoor Farming, Precision Farming, AI

**VALUE CHAIN:** Farmers (Mushrooms)

## PLAN P

### DIGITAL SPECTRAL TOOLS FOR PRODUCTION OF SUSTAINABLE FOOD WITH PLANT PROTEINS

“ PLAN P develops a digital solution for the conception and production of sustainable food based on plant proteins. Data linked to the **external and internal quality of the dispersed systems such as emulsions and foams will be acquired by hyperspectral analysis, an efficient and non-invasive technology**. Instead of using Deep Neural Networks in regards of AI, the project will use a multi-model approach, where a set of components, each using different machine learning methodologies, will be trained and evaluated. The development of sensors will ensure online a quality diet with reduced waste. The multidisciplinary approach of the partnership will ensure the transfer of the innovations to companies.

**CHALLENGES:** AI, Quality Assurance, Spectral

**VALUE CHAIN:** Food Processors

## POSHMyCo

### SELECTIVE HARVEST BASED ON MYCOTOXINS CONTENT ASSESSMENT IN CEREAL CROPS

“ POSHMyCo develops a **system to evaluate the spatial distribution of mycotoxin contamination** by Fusarium. Recommendation will be made for selective harvest and preventive site-specific spraying of fusarium fungicide aiming at **reducing the risk of mycotoxin contamination in wheat and barley grains**, which is expected to maximize the yield price, while minimize the risk to human health and livestock. Fusarium species are the main cause of trichothecene type B contamination in cereals. Mycotoxins are considered to have a significant impact on food and feed safety. Currently producers do not have a validated methodology to **determine toxin contamination levels before harvesting the grain**.

**CHALLENGES:** Disease Detection

**VALUE CHAIN:** Farmer (Arable)

## SHEET

### SUNBURN AND HEAT PREDICTION IN CANOPIES FOR EVOLVING A WARNING TECH SOLUTION

“ SHEET aims to analyse the apparent **temperature distribution at the fruit surface employing terrestrial remote sensing with automated conveyor in apple, sweet cherry, and grapes**. Furthermore, the project wants to validate the findings on fruit damage considering the peak and duration of radiation and temperature degrees and develops a prototype of a warning **IoT solution to inform growers on the risk of damage**. The varying training systems of woody plants and efficacy of physical protection measures based on shielding effects have an effect on the heat distribution in the canopies and crop damage in varying climate conditions. Time series analysis of fruit temperature in heat periods due to global warming are needed.

**CHALLENGES:** Quality Assurance, Food Waste

**VALUE CHAIN:** Farmer (Fruits)

## SoCoRisk

### IMPLEMENTATION OF SOIL COMPACTION RISK ASSESSMENT SYSTEM

“ SoCoRisk aims to generalize the use of the decision support tool for prevention of soil compaction called Terranimo. Therefore, the project will identify and address potentials and barriers of using the decision support tool in Europe through a transdisciplinary approach with the involvement of soil scientists, agronomists, and social scientists. End-users will have a central role in the project: 4 to 5 farms will be chosen as case studies in each the five participating countries (Norway, Sweden, Denmark, Switzerland, Italy). Soil quality is threatened due to traffic with modern agricultural machinery. Compaction of the subsoil is effectively persistent. Soil ecosystem services related to protection of the environment are significantly affected by subsoil compaction.

**CHALLENGES:** Soil Compaction

**VALUE CHAIN:** Farmer

## SPECTROFOOD

AGRIFOOD QUALITY ESTIMATION USING SPECTRAL TECHNIQUES

“ SPECTROFOOD aims to enhance the monitoring of fruits and vegetables quality, with advanced monitoring, using **hyperspectral imaging** in both pre- and post-harvest stages. This will identify links at temporal and spatial relations between **production practices and quality characteristics in post-harvest and storage**. The collected data and generated relations will be stored in a user-friendly and interactive platform, which will be created to present the monitoring data at the different supply-chain stages. Four use-cases have been identified in four countries to **monitor leeks, mushrooms, sweet cherries and apples, as well as broccoli**. The specific needs to be monitored will be identified with close cooperation with the relevant stakeholders.

**CHALLENGES:** Quality Assurance    **VALUE CHAIN:** Farmer, Food Processor, Retailer, Consumer

## SustainIT

RELEASING THE POTENTIAL OF ICT FOR SUSTAINABLE MILK AND BEEF CATTLE VALUE CHAINS

“ SustainIT aims to identify institutional, economic and social barriers of widespread adoption of ICT, and **develop conceptual governance, innovation ecosystems and business models for releasing the full potential of ICT** in milk and beef cattle value chains. The project uses action research methods in the living lab setting to co-design the study frameworks and survey questions, test validity of the propositions, develop conceptual solutions. Living labs will include ICT developers, technology providers, farmers, processing industry, retailers, consumers, policy makers, researchers, and innovation brokers. The SustainIT project involves five partners from Estonia, Finland, Sweden and Germany.

**CHALLENGES:** Education, Adoption Barriers    **VALUE CHAIN:** Farmers (livestock, dairy)

## TailBiteAdvice

AN ICT-BASED REAL-TIME ADVISORY TOOL TO MINIMISE TAIL BITING IN FATTENING PIGS

“ TailBiteAdvice aims to research, develop and demonstrate an on-farm **advisory tool for assisting the farmer in the reduction of tail biting by combining multiple remote detection algorithms** for both tail biting and several adjustment parameters including enrichment engagement, aggression, feeding and drinking behaviour, and climate. Further, the project aims to identify and discuss opportunities and barriers to the implementation of this in combination with previously developed abattoir tool (TailCam® developed by DMRI) for automatic detection of tail lesions and tail length by including multiple actors across nationalities. Combined, the two tools will create a data driven ICT-based approach to provide the farmer and other stakeholders with knowledge on how to prevent tail biting and as a result, lower the need for tail docking.

**CHALLENGES:** Animal Monitoring    **VALUE CHAIN:** Farmer (pigs)



## UTOPIA

### AUTOMATED OPEN PRECISION FARMING PLATFORM

“ UTOPIA will focus on **a single (standardized) platform where (robotic) paths, monitoring strategies can be set and the drones/USV's/AGV's automatically deployed** when certain conditions are met. Precision-farming needs large-scale adoption to increase production at such a level that it significantly contributes to minimizing the gap between actual and required world-production of food. Increasing the measurement and actuation intervals of e.g. monitoring for pests and watering are expected to contribute to e.g. increased yields. This would also increase the burden on the farmer, as the measurement-time and data-processing time increases significantly. This can be mitigated with Automated (cooperative) Precision Farming with the use of autonomous driving vehicles, vessels, drones and dedicated installations mounted on regular agricultural machinery.

**CHALLENGES:** Precision Farming, Drones

**VALUE CHAIN:** Farmer

## Oenotrace

### TRACE SUSTAINABLE PRACTICES IN WINE-GROWING UNDER FULL TRANSPARENCY

“ Oenotrace aims to use digital tools and advanced algorithms to **automatically track sustainable practices in viticulture with full transparency**. Initially, the requirements for sustainability indicators and the digital ecosystem will be identified with strong stakeholder involvement. For a specific use case in Germany, an IoT network will be established to trace individual steps within the wine value chain. Using data from experimental sites in Germany and Italy, agronomic algorithms using grapevine models will be developed, calibrated and validated to provide recommendations for precise irrigation and site-specific spraying. A data platform will integrate all data streams and algorithms to finally provide information on the sustainability of primary production via a web front-end for different stakeholders.

**CHALLENGES:** Transparency, MRV

**VALUE CHAIN:** Farmer, Certifier, Governments

## ET4D

### SENSOR SYSTEM FOR ENVIRONMENTAL MANAGEMENT & TRANSPARENCY OF DAIRY FARMING

“ ET4D brings together companies, academic research institutions and universities to foster information flow in dairy farms and way down to the consumers and other interest groups in the milk value chain via a web application. We will expand and validate an existing semi-commercial data management system with embedded sensors for environmental monitoring in dairy cattle barns. We will demonstrate our system in multiple countries with various technological, climatological and socioeconomical boundary conditions. We will analyse and improve the connectivity performance on case study farms and study expectations and information needs of different potential data users along the milk value chain.

**CHALLENGES:** Interoperability, Data Exchange

**VALUE CHAIN:** Farmers (livestock, dairy)

## SCI for Sustainable Sugar

### PROPOSING A SATELLITE CONTROLLED INCENTIVE SYSTEM FOR SUSTAINABLE SUGAR BEET

“ SCI aims to increase the efficiency of sugar production by **creating an incentive system to encourage agricultural production habits increasing both yield and the root quality** of the sugar beet. Scoring will be achieved according to root quality and yield that are primarily estimated via satellite observations. Integrating satellite control to incentive system will convince farmers to follow guidelines with greater care. This incentive system will provide fertilization/irrigation guidelines to farmers to reach higher scores, meaning better rewards. The secondary role of the satellite monitoring system is to help farmers as an early warning system by monitoring crop health, water stress, and nitrogenous status. For the dissemination of knowledge among farmers and to ease the adaptation; observations will be shared with farmers via freely distributed mobile app.

**CHALLENGES:** Sustainability

**VALUE CHAIN:** Farmer (sugar beets)

## Star

### GIVING SMELL SENSE TO AGRICULTURAL ROBOTICS



The ability to single out healthy fruits/plants from those with problems and to selectively start the harvesting or apply a remedy without wasting resources or contaminating the environment is critical for precision farming. This project develops a **unifying framework to combine different sensor modalities** that include standard (e.g., RGB-D cameras) with novel sensors (e.g., gas sensors), methods for creating accurate maps to facilitate operations on a narrow scale with a smaller environment footprint, artificial intelligence algorithms for data processing and decision support, and applications to make relevant information easily visible to the farmer. STAR will enable a fully automated ICT-based platform for fruit freshness assessment/health monitoring in vineyards.

**CHALLENGES:** Precision farming, interoperability

**Value Chain:** Farmer (fruits)

## APP4FARM

### ARTIFICIAL INTELLIGENCE APPLICATION FOR FARMING



APP4FARM defines an ICT infrastructure allowing the farmer to monitor nitrogen loss, allowing efficient management of nitrogen-based fertilisers. This will ensure control of farming costs and nitrogen oxide emissions in the atmosphere leading to the improvement of both GHG levels (N<sub>2</sub>O) and local air quality (nitrogen oxides, secondary inorganic aerosol, and ozone). The infrastructure will include a monitoring system allowing to trace all the meteorological data and nitrogen emission levels, driving a Decision Support System that will give the farmer all the measured data and the forecasts up to 3 days in advance. Our solution ensures to the consumer the **full traceability of the production conditions and the transparency on the environmental impact**, supporting the decision makers to define the “green tag” along the whole supply chain.

**CHALLENGES:** Precision Farming, Data Exchange

**VALUE CHAIN:** Farmers, Certifiers

## SUSPOT

### TRANSPARENT SUSTAINABILITY IN THE POTATO PROCESSING CHAIN BY DATA SHARING



The project will investigate, develop, test, and use state of the art data sharing technologies in the whole potato value chain from producer to consumer to implement data driven decision making and to increase transparency and sustainability at a European scale. Ultimately by realizing end to end data sharing on European level the project wants to take an important step towards making the potato processing chain future proof for sustainability. Today retail and EU citizens (as food consumers) want to have access to more sustainability data on the products in the shelves in the stores. In most cases the data used today is very general and determined by statistics, rather than actual specific data on the sustainability impact that specific product has. The SusPot project wants to address this challenge on an European level.

**CHALLENGES:** Sustainability, Transparency

**VALUE CHAIN:** Farmer, Food Companies, Retailer

## TOP4HoneyChains

TRUSTABLE AND SUSTAINABLE OPEN PLATFORM FOR SMART HONEY VALUE CHAINS



The primary concern of TOP4HoneyChains is to **increase effectiveness and efficiency of traceability and transparency for achieving smart honey value chains as a whole honey-food system** supported by TOP along data driven innovative digital services. For instance, an apiary will be able to access to the quality test results of their original honey and the blends of each honey, which contributes to traceability and transparency of the chain. The consumer will be able to access information (turning relevant data into a meaningful form that serves a purpose) about the apiary practices and test results. We will develop policy to implement incentives for honey producers to increase their quality and thus to achieve platform adoption for the users (beekeepers, packing organizations, beekeeping associations and cooperatives, exporting and importing organizations, regularity bodies, consumers).

**CHALLENGES:** Transparency, Quality Assurance

**VALUE CHAIN:** Beekeeper, Retailer