D2.3.1 REPORT ON STUDY VISITS IN BELGIUM AND FINLAND

Work Package 2 – Connect & expand

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Date: 31.10.2025

Full Title	Stimulating Innovation eXperiments in Food prOcessing Live Demonstrators			
Project number	101158281		Acronym	SIXFOLD
Start date	01.09.2024		Duration	24 months
Granting authority	EISMEA European Innovation Ecosystems			
Project Coordinator	SeAMK			
Date of delivery	Contractual	M14	Actual	M14
Type	R - Report		Dissemination level	PU - Public
Lead beneficiary	Technische Hochschule Ostwestfalen-Lippe			
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Reviewer(s)	Name and surname (Affiliation)			
Keywords	Belgium, Finland			

Document Revision History				
Version	**Issue date**	**Stage**	**Changes**	**Contributor**
1.0	31.10.2025	Final	First version of the document	
	Enter a date	Select	Short description of changes	Affiliation
	Enter a date	Select	Short description of changes	Affiliation

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Executive Summary

This documentation summarizes the key findings and results of two strategically conducted study visits. These served as key milestones of the project and were consistently conducted using collaborative co-creation and design thinking methods. The overarching goal was to bring together experts, researchers, and industry partners to discuss the most important challenges and future-oriented potential in the agricultural and food sector. The focus was on the essential role of Living Labs as innovation accelerators in Europe.

The two visits had different thematic focuses:

- First study visit (Kortrijk, Belgium, May 6-7, 2025): The focus was on the complex topic of data management and digitalization as a service for industrial food processing (the "Tech Lane").
- Second study visit (Seinäjoki, Finland, June 24-25, 2025): The focus was on the challenge of consumer acceptance of novel foods (especially precision fermentation) and the role of living labs in sampling and testing new products.

After an in-depth problem analysis and thematic introduction, four key themes were identified in both workshops. The subsequent group work focused on developing concrete solutions for these themes. The problem-solution canvas provided a methodological framework for translating these approaches into potential, implementable solutions.

Introduction

The main objective of SIXFOLD is to promote the twin transition of the European agri-food industry and accelerate the adoption of deep-tech innovations. To this end, SIXFOLD is building a regional network of Living Labs across the EU that serves as a dynamic ecosystem for experimentation and collaborative knowledge exchange. To disseminate this knowledge and identify barriers, study visits to four different Living Labs have been organized. These visits include workshops focused on finding solutions to specific "barrier cases" (regulatory, technical, or operational hurdles) that are blocking deep-tech innovations in the sector.

First Study visit: Digitalization and Data Challenges in Kortrijk, Belgium

The first study visit took place from May 6th to 7th 2025 in Kortrijk and was organized by Flanders Food. The choice of location was strategic because three different Living Labs are located here, making the location a "tech lane" for the relevant topics of food, technology, digitalization, and deep tech.

The discussions focused on data as a common denominator, which is crucial in various environments, from the production line to the Living Lab. The visit focused on data challenges in an industrial food processing plant as an example. Key topics were data acquisition methods (e.g., sensors), data monitoring and visualization, and data architecture and management. Critical aspects such as data sovereignty and confidentiality were also discussed, and a demonstration illustrated how real-time data drives operational roles (supervisors, cobots, AMRs) and their decision-making.

Second Study visit: Novel Food - Acceptance and Precision Fermentation in Seinäjoki, Finland

The second study visit, organized by the Seinäjoki University of Applied Sciences (SeAMK), took place from June 24 to 25, 2025, in Seinäjoki, Finland. Seinäjoki, the heart of Finland's "Food Province" South Ostbrothnia is home to the largest meatpacking plant in the Nordic countries and contributes almost a fifth of Finland's total food production. The SEAMK Food Labs support local SMEs and larger companies through intensive collaboration in education and research.

This case addressed a watershed moment in the food system: new foods and production methods, especially precision fermentation and cell-based meat, offer significant opportunities but market launch faces high regulatory hurdles and can overwhelm end consumers. The focus was on how living labs support companies and customers in sampling and testing novel foods, and on the challenges that can arise when organizing trial runs and tastings.

1. Understanding the context

The Agrifood system

The innovative agri-food system is very complex with a diversity of stakeholders from the quadruple (Citizens, Government, Industry, Academia) or sometimes even quintuple helix (including the Environment). As stated in D1.3, new players such as integrators take an increasingly important role in this system, facilitating the uptake of development in deep tech along the value chain from farm to form.

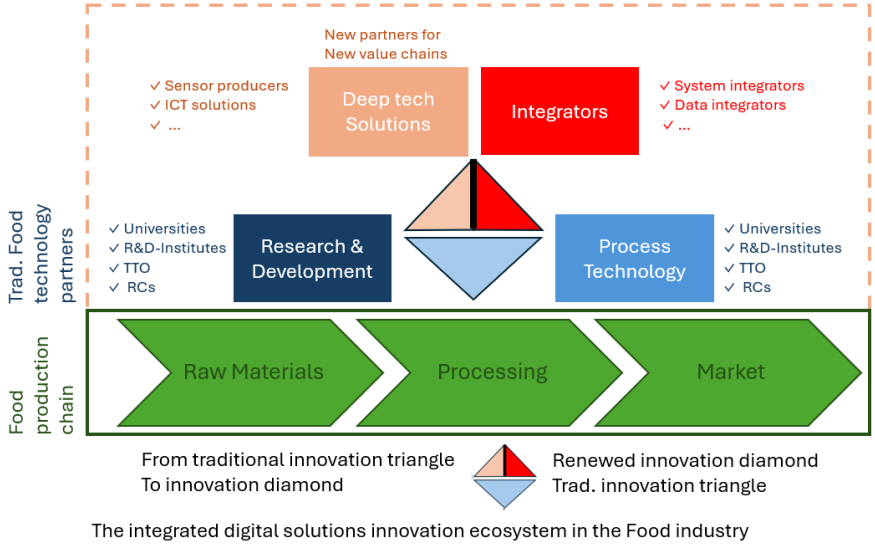


FIGURE 1: LIVING LABS AS BRIDGES.

Living Labs serve as a crucial bridge, linking the supply side of (deep) tech and integration solutions as well as innovations deriving directly from research with the demand side, companies within the agri-food chain that face real-world challenges. By facilitating collaboration between development, validation, and real-life implementation, Living Labs create a mutually beneficial environment for all stakeholders.

Positioned at the heart of the ecosystem, Living Labs foster cross-sectoral collaboration, driving the advancement of deep tech solutions for the food industry and ensuring innovation is both impactful and applicable in real-world settings.

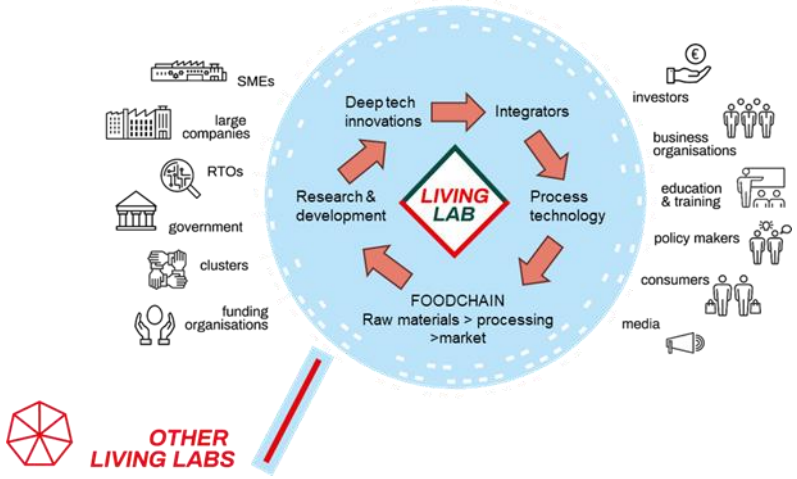


FIGURE 2: LIVING LABS AS INNOVATION HUBS FOSTERING CROSS-SECTORAL COLLABORATION, DRIVING THE ADVANCEMENT OF DEEP TECH SOLUTIONS FOR THE FOOD INDUSTRY.

Within this project, we use the network of the well-established partnership of smart solutions 4 Agrifood (SS4AF) in its function as network of Living Labs to join forces and gather stakeholders along the values chain and quadruple helix (4H) ecosystem to tackle barriers that prevent deep tech innovations in the agrifood ecosystem.

To do so, the methods of co-creation and design thinking are increasingly popular ways to engage stakeholders, promote out-of-the-box thinking, gain unexpected answers and build trust between different actors.

Why study visits?

To raise awareness and enhance knowledge on the existing Living Labs for testing deep tech innovations in the agri-food industry and to exchange on best practices and different approaches, study visits will be organised to 4 different Living Labs located in the regions of the SIXFOLD partners.

Most importantly, workshops will be setup during these study visits, to explore and find solutions for the Barrier Cases .Via these study visits all relevant stakeholder in the agri-food innovation ecosystem, agri-food companies, deep tech innovators, regional authorities, funding agencies, RTOs, clusters and other innovation intermediaries, will get acquainted with various regional Living Labs in the EU and the ecosystem of supportive organisations revolving around them and learn about the specific expertise and knowhow they can provide.

Also, these intensive exchanges will increase knowledge on experimentation frameworks for testing innovations and more concretely on the capabilities of these individual Living Labs, how they are operated and managed, how the different Living Labs can complement and support each other, and what is lacking. Competition and duplication within EU regions limit the development of critical scale in Europe. Collaboration between complementary EU regions is more effective, efficient and sustainable than competition.

2. Co-creation and design thinking as tools

2.1 Co-creation

The term co-creation dates back to the 1970s and was shaped further during the early 2000s [1].

At the core of the co-creation approach is the belief that involving diverse stakeholders in the innovation process leads to better results. This approach emphasizes the collaborative development of ideas and solutions, actively contributing the knowledge and perspectives of all participants. This collaborative design not only leads to solutions for implementing technologies, but also to a deeper understanding and greater acceptance of the developed innovations.

The co-creation approach, which involves collaborating closely with various stakeholders, yields significant benefits that go beyond simple problem-solving. By actively listening to and integrating diverse perspectives, it fosters "out-of-the-box" thinking, generating input one might never have considered independently. Furthermore, co-creation helps avoid the "tunnel vision" that often arises from deep immersion in a challenge, leading to unexpected answers and uncovering questions whose existence was previously unknown. Crucially, the joint discussion and collaborative work on challenges and innovations actively builds trust among all participants.

A key success factor for co-creation processes is clear and transparent communication. Therefore, it is essential to establish common communication rules at the beginning of the process that promote open and honest exchange. These rules define how we interact with each other, what expectations we have of those involved, and how we create a climate of trust together.

At the beginning of the workshops were therefore agreed with participants on the following communication principles:

- Be yourself! We want to know what you think! We value your unique perspective and encourage you to authentically contribute your thoughts and ideas. Don’t try to tell us what you think we want to hear—your honest opinion is valuable.
- We want to hear your opinion. There are no wrong answers or stupid questions. Every contribution is welcome and important. Don’t be afraid to share your thoughts or ask questions, even if they seem insignificant at first.

[1] Prahalad, C.K.; Ramaswamy, V. (2004). The Future of Competition. Harvard Business School Press. pp. 8. ISBN 1-57851-953-5.

- Do not judge others' ideas, opinions, or feelings, but respect the diversity of perspectives. Ask clarifying questions to build understanding, but avoid trying to convince others of your view. Always provide honest yet constructive feedback. Use "What if" questions to stimulate new thinking, rather than responding with a dismissive "yes, but."
- Some things are confidential. We may share sensitive information throughout the process. It's important that we all recognize and respect the confidentiality of certain content.
- Let us know if you feel uncomfortable with something. Your well-being is important to us. If there are topics that make you feel uncomfortable or have concerns, please speak up.

We communicated these principles after people got to know each other, and a first base of trust was already established.

2.2 Design Thinking

When designing a new product or service it is crucial to understand the users' challenge you try to solve and if the product or service that is being developed provides an answer to this challenge. Design thinking helps to do this in a fast, flexible and efficient way within five different stages which are explained below, each with a specific goal. The basic principle within this methodology is to put the user first.

Within this methodology, the involved stakeholders are considered partners that are experts in their own situation and needs. They are not study objects, which can be the approach in classical innovation processes.

Key features of design thinking include that challenges are considered from different perspectives, that it is iterative and interactive, and assumptions should be recognized and challenged.

The stages of Design Thinking are defined as follows:

1. Empathize: Understanding user needs and contexts.
2. Define: Making the problem statement(s) concrete.
3. Ideate: Generating creative solutions.
4. Prototype: Creating tangible representations of solutions.
5. Test: Gathering feedback and refining the solution.

During our workshops, we followed this approach and the stages of Design Thinking while also taking the principles of the Co-Creation approach into account.

3. Report on study visit in Belgium

This section describes the two-day study visit in Kortrijk, Belgium, which aimed to develop innovative solutions for data management challenges in partner projects together with various stakeholders.

Day 1 introduced participants to data management challenges through visits to Living Labs Sirris and Veg-i-Tec. After setting the scene with the SIXFOLD project and SS4AF partnership outline, participants were introduced to co-creation approaches. The day focused on identifying barriers using the "5 Whys" method, prioritizing them with "Impact-Effort" analysis, and reformulating challenges into solution-oriented "How Might We" questions. The day concluded with reverse brainstorming, dot voting, prioritization, and initial plenary presentations.

Day 2 began with a reflection on Day 1 outcomes. Participants formed interest-based groups to deepen problem understanding using problem-solution canvases, followed by plenary presentations. The workshop concluded with commitment circle exercises to define concrete next steps, followed by a visit to the Flanders Make Living Lab.

3.1 Visits to the Living Labs

3.1.1 VEG-i-TEC

VEG-i-Tec provides pilot infrastructure and scientific expertise to the vegetable and potato processing industry to drive innovation. This way, they bridge academic research with industrial practice, focusing on product and process optimization, 'Smart Food' applications, circularity, and sustainable water management. In doing so, VEG-i-TEC supports efficient resource use, by-product valorisation, and innovative solutions for a sustainable future.

FIGURE 3: SIXFOLD STUDY VISIT PARTICIPANTS VISIT THE VEG-I-TEC LIVING LAB IN BELGIUM.

3.1.2 Sirris

Sirris is situated in the House of Manufacturing on Kortrijk Campus. It has installed the 'Industrie 4.0 Made Real Experience Center' with a focus on 'smart assembly'. In this lab, companies can gain hands-on experience with the latest smart assembly technologies and test new ideas, and collaborate in co-creation with the expertise and guidance of the other research labs.

FIGURE 4: SIXFOLD STUDY VISIT PARTICIPANTS VISIT THE SIRRIS LIVING LAB IN BELGIUM.

3.1.3 Flanders Make

Flanders Make is a co-creation centre to help companies transition to smart, digital factories with cutting-edge Industry 4.0 technologies. The focus is on digital twins, smart robotics, and automation, with a central place for the operator.

FIGURE 5: SIXFOLD STUDY VISIT PARTICIPANTS VISIT THE FLANDERS MAKE LIVING LAB IN BELGIUM.

3.2 Workshop Session: Day 1

3.2.1 Summary

After setting the scene, participants were introduced to the co-creation approach and communication rules.

Following this, barriers and problems in data management were identified in 3 small groups using the "5 Whys" method. These problems were then prioritized using the "Impact-Effort" method and reformulated into solution-oriented "How Might We" questions.

The day concluded with a brainstorming of potential solutions (reverse brainstorming), prioritization through dot voting, and an initial presentation of the most promising ideas to the plenary.

After the first day, Workshop moderators gathered to select suitable ideas and methods to proceed on day 2.

FIGURE 6: PARTICIPANTS OF THE FIRST SIXFOLD STUDY VISITS IN BELGIUM.

3.2.2 Empathize, Define, and Frame the problem

These phases were done separately in three small groups. Stated below is a summary of the outcome. The group discussions highlighted different viewpoints for companies (especially SMEs) and living labs.

The outcome of each group is summarized in Annex 1.

For Companies/ especially SMEs:

Participants identified several major challenges from a company viewpoint:

Lack of a Coherent Data Strategy: A significant challenge is the absence of a clear data strategy at the company level. This issue affects a wide range of internal and external stakeholders, including:

- Internal: IT departments, management, sales teams, operations staff, and HR.
- External: Living Labs, government bodies, industry associations, suppliers, and buyers.
- The impact of this strategic gap is felt in key areas such as food safety, cybersecurity compliance, and meeting demands from large retail partners.
- Ultimately, it hinders core business processes, negatively impacts efficiency and reputation, and obstructs strategic goals like growth, funding, sustainability, and the twin transition (green and digital).

Building the Right Infrastructure: Constructing adequate infrastructure for data capture presents a major hurdle. This requires significant investment in knowledge, financial resources, time, and skilled personnel. A clear vision for return on investment is essential, as is the need for specialists who can translate between disciplines like data science and food technology. The lack of clear roadmaps for digitalization exacerbates this challenge.

Communication Gaps: Effective communication about data is a common barrier. Differences in personalities, professional backgrounds, and departmental languages (e.g., between IT and other units) can lead to misunderstandings. This often results in an inability to plan holistically, leading to unsatisfactory outcomes, unfinished products, and costly, unplanned iterative cycles.

Reluctance to Change: Resistance to change within organizations is a significant factor. This is driven by the rapid pace of innovation, which can make technology feel outdated quickly, uncertain results from cost-benefit analyses, and employee apprehensions rooted in fear of new processes, mistrust, and concerns about making mistakes.

Data Sharing: Multiple difficulties surround the sharing of data. These include the sheer volume of untapped data, a lack of trust stemming from fears over losing competitive advantage, technically complex and error-prone transfer processes, and legal uncertainties regarding data release and protection regulations.

Data Utilization and Visualization: Transforming data into actionable insights is a key challenge. Problems include the unavailability or poor formatting of relevant data, the significant effort required to make raw data accessible and appealing, and inefficient processes caused by varying data formats and skill levels. Many stakeholders get lost in a “data jungle” due to a lack of user-friendly information presentation.

For Living Labs

From the Living Lab point of view, adding to the issues above, the following aspects were seen as major when thinking about data and its challenges:

A main problem lies in the measurement of criteria: Participants observe that essential, intangible success factors—such as the perceived profitability and usefulness of a solution, or the knowledge gained and the sharing of ideas and inspiration—are typically not quantifiable metrics that formally contribute to the overall success evaluation of the Living Lab.

Furthermore, significant collaboration difficulties arise, especially concerning data sharing among different parties:

- Legal concerns may frequently impede the necessary data exchange (data sharing issues).
- The Living Lab is sometimes perceived as not important enough to warrant the sharing of sensitive company data.
- It is crucial that the data originator maintains access to their data.
- At its core, data sharing in collaborative projects is a major challenge because companies fear losing knowledge and the exchange demands a high level of trust among all collaborating partners.

3.2.3 Problem Framing

Within this phase, the identified problem areas were narrowed down to concrete issues. Using “How Might We” questions, impact-effort matrices, and dot voting, participants selected key challenges to tackle:

Strategy for Digitalization: One group emphasized that the main problem for many companies and Living Labs is the lack of a strategy for digitalization and data usage, which results in inaction. This omission not only harms business and innovation opportunities but also directly affects critical areas such as food safety and cybersecurity, impacting all major business functions. The underlying structural hurdles identified included: the fear of starting because the problem is perceived as too big to handle, lacking skills among company employees, a corporate strategy not designed for data management, and the deterrent effect of high necessary investments.

Roadmap for DAAS in Living Labs: A second group focused on creating a Roadmap for Data Sharing and "Digitalization as a Service" (DaaS) activities within Living Labs. A primary concern identified was the lack of knowledge regarding data sharing and digitalization, both internally and in collaboration with partners. This led to the core questions: How might we raise awareness among companies/Living Labs about the specific potential benefits of digitalization, and how might we address the lack of digitalization vision in both companies and Living Labs? While emphasizing the importance of a long-term strategy, the group stressed that users must not be overwhelmed by the overall plan. An ideal concept should therefore enable small steps with clearly defined expenses and empathically guide users along their path toward digitalization.

From Data to Actionable Information (DAAS): The third group worked with the step from data to actionable information and digitalization as a service (DAAS) activities with a special emphasis on data visualization.

The participants have the costs and key performance indicators for central parameters in the context of data visualization:

- The Costs associated with Cooperation among SMEs, Living Labs (LLs), and Research were defined as Knowledge, with SME Competencies serving as the corresponding Key Metric.
- The cost of a Case Study was primarily considered Personnel, with the Skill Set of Employees being the relevant Key Metric.
- The Costs for implementing DaaS (Digitalization as a Service) were viewed as Technology Doubts (RISKS), while the Usability of Data was identified as the crucial Key Metric.
- The overarching strategy emphasized starting small and modular, with Return on Investment (ROI) as the decisive Key Metric.
- Further expansion and scaling should be driven by convincing the board and securing grant vouchers for SMEs and LLs.

In the following plenary session, participants discovered a lot of similarities in their group approaches. For example, the human factor with a fear of starting data sharing and digitalization and reluctance to change was described in all groups as a crucial barrier for all digitalization activities.

Due to the heterogenous group composition, groups stressed on different users. Whereas some saw SME as the main actors and users, others regarded Living Lab personnel as main user.

All groups agreed on the necessity of strategy for digitalization as the most important step. This needs to be well defined and understandable, as well as portionable as to to fit many sizes.

3.2.4 Reflection on day 1

Following the first day's workshop, the moderators met to reflect on the content and set the framework for the second day. Building on the plenary session's reflections, it was agreed that the participants would focus on three main topics and would work in new, self-defined groups. Regarding time management, the moderators decided to focus the next day's work on the "Problem Solution Canvas" to avoid overloading the programme and to ensure sufficient time for valuable discussions. The overarching goal of this structure was to steer the groups toward establishing concrete commitments for future cooperation concerning the topics addressed.

3.3. Workshop Session: Day 2

3.3.1 Empathize Part 2 and Prototype – Making Concepts Tangible

On day 2, participants started the workshop session with a short recap of day 1 and a small energizer, where the participants had to deliver a two-word takeaway for day 1. Some of the words mentioned here were: inspiring, intense, co-creative, innovative, networking, impressive, and Living Lab.

Participants were then informed about the three potential topics and the further plan for the day. The group moderators and co-moderators were then assigned, and people could decide to join the group they were most interested in.

In the groups, participants decided to adjust the topics to reflect the process better.

3.3.2 Strategy for digitalization in foodtech SMEs

This group focused on a plan of action designed to achieve a long term or overall aim. The group focused on the central problem of a lack of data strategy in many companies, especially SME. The aim was to provide a plan to guide SMEs through the “Data jungle”.

A teaser for the group can be described as “Regulation is coming, are you prepared?”. The solution should be inspiring for SME and also put them to action. For this, the solution should be able to quickly show or demonstrate results rather than be based on just words as this is more convincing. Ideas that could be presented to SMEs should thus be tangible solutions that clearly state what to measure and include a proof of concept. The overall solution should include a plan for various levels of digitalization and show SMEs how to take concrete steps towards achieving their goals, taking a lean and mean approach especially for interoperability.

A human-centered approach and a level of trust for talking to participants was also seen to be very important. The solution should be worked on with already existing groups and support services such as EDIH or SS4AF, as creating a new food tech initiative would be like planting a new tree in the already existing jungle and even more confusing to companies.

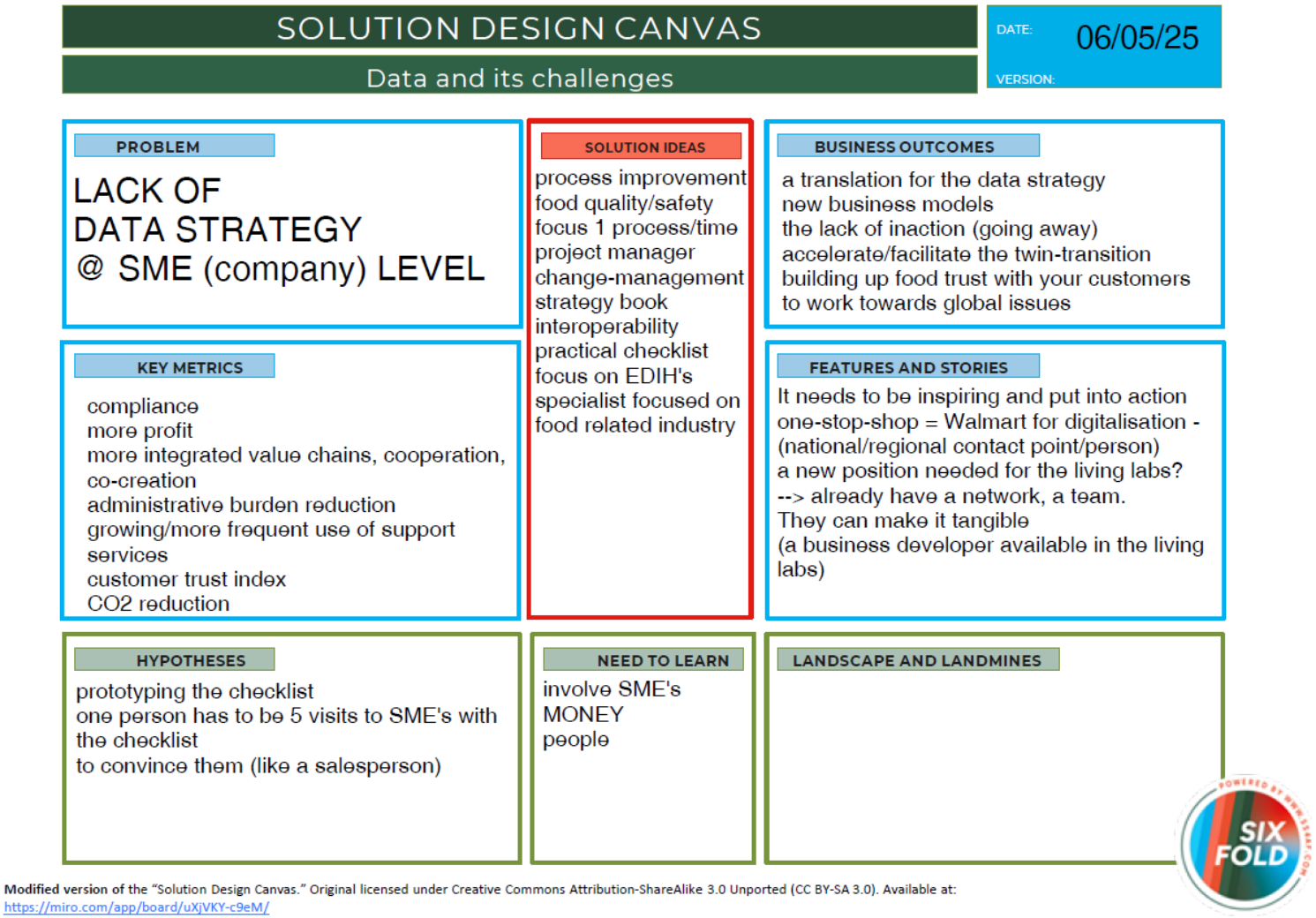


FIGURE 7: CANVAS FOR "STRATEGY FOR DIGITALIZATION IN FOODTECH SMES".

3.3.3 Digitalization as a Service in Living Labs

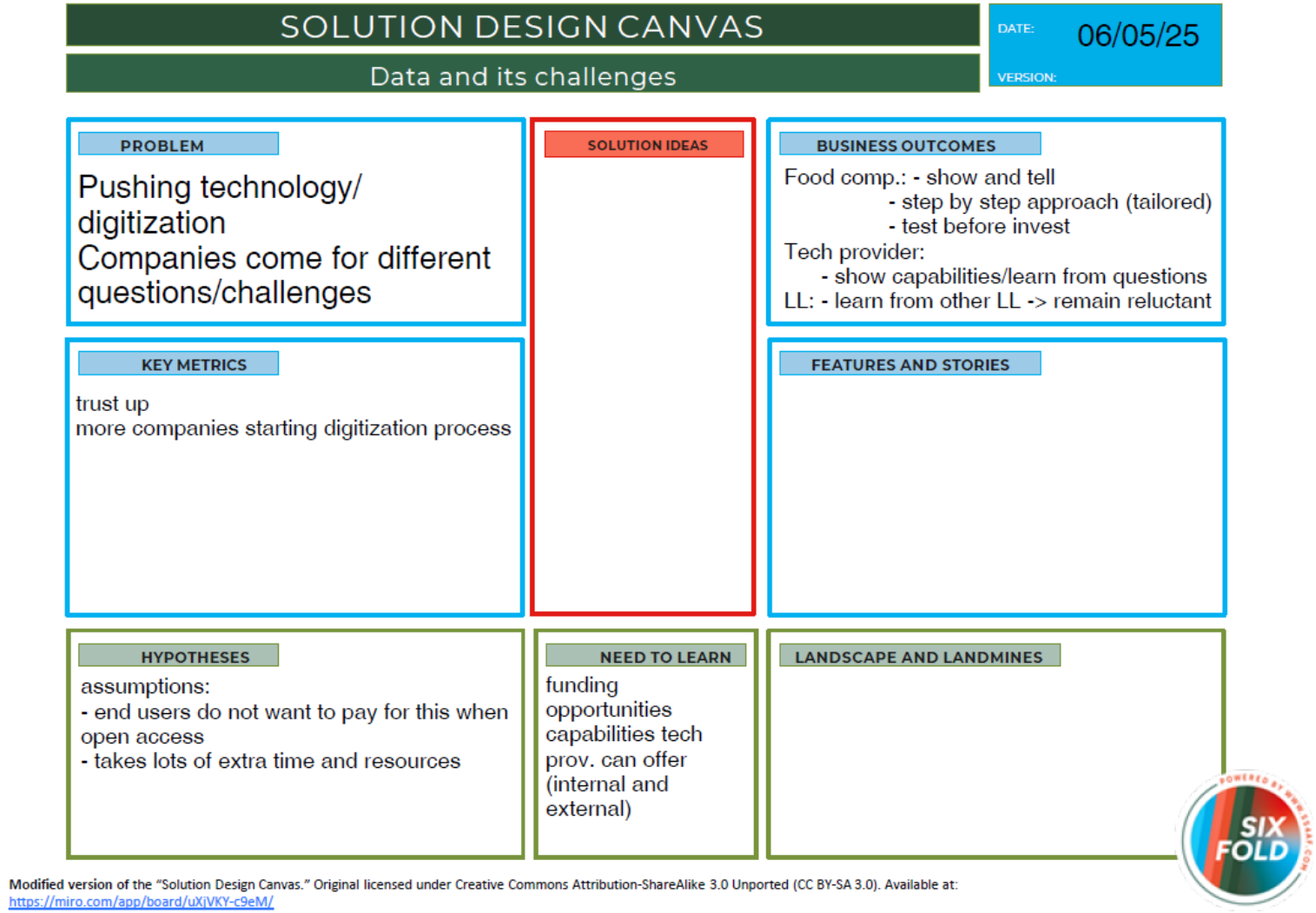
After adjusting the topic in after a brief group discussion, this group focused on the problem that companies coming to Food oriented Living Labs often come for a different question than digitalization. However, it was agreed that in many cases, digitalization can often close a significant knowledge gap and add great value to a possible solution.

The aim is therefore to add digitalization as an extra layer to a project. It is important to show a step-by-step approach to lower the barrier and start with an easy step. Participants pointed out that Living Labs can serve as a reference with tests and test cases so it is significant to make them fit for the purpose with state-of-the-art technology and approaches.

On the company's side there is a high need of security especially when data use is involved. A problem is also the fact that the more services are offered, the more expensive a project will be and the more time it will take. Living Labs should thus be informed about possibilities for companies to use innovation vouchers and other financing options.

It was further pointed out to be important that different Living Labs with varying scopes work together to obtain best results and evolve quicker.

By talking through a real-life example from a company that came to a participating Living Lab for product development, participants worked through the discussed framework. It became clear, that the prerequisites and needs are different each time and Living Labs should not restrict themselves too much by offering just one possibility of working together but be open to different approaches.



Modified version of the "Solution Design Canvas." Original licensed under Creative Commons Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0). Available at: https://miro.com/app/board/uXjVKY-c9eM/

FIGURE 8: CANVAS FOR "DIGITALIZATION AS A SERVICE IN LIVING LABS".

3.3.4 Data visualization: From data to actionable information - DAAS

The newly formed workshop group dedicated its efforts to the barrier case of data visualization, identified on the preceding day and operating under the guiding principle: "Form Data to Actionable Information - DAAS."

Following a comprehensive revisit of the topic and a detailed analysis of the extant difficulties, a series of central challenges and points of discussion emerged:

- In the realm of data visualization, the risk of misinterpretation was identified as a significant problem. An unsuitable or misleading representation of data can rapidly lead to an incorrect understanding of complex issues. Closely linked to this is the problem of data transfer. Errors or inconsistencies during data transmission can considerably impair the quality of the visualization, consequently leading to erroneous conclusions.
- Another central question concerned the relevance of the data: Which data are truly meaningful and required for visualization to generate genuine added value? In this context, the importance of metadata was also underscored, as it is indispensable for understanding the context and quality of the visualized information.
- From a business perspective, the initial investment in tools and training for data visualization was frequently cited as a hurdle, as the immediate benefits are not always readily apparent. Furthermore, concerns regarding data security certification play a crucial role, particularly when dealing with sensitive company data.
- The upstream processes of data acquisition, documentation, and transcription were also identified as potential sources of error that can be reflected in the visualization. To address these challenges, the development of a template for needs analysis was deemed sensible to clearly define which data are relevant for specific inquiries.
- The difficulty in finding a common data language and connecting different data sources presented another important point of discussion. Different formats and terminologies complicate the integration and overarching analysis of data.

Subsequent to this problem analysis, the creation of a template was developed as a promising solution approach. Using the question "How to read time series data?" as an example, a Solution Design Canvas was created to develop a concrete visual solution.

As a result of these efforts, a concept for the visual representation of time series data emerged, utilizing two types of diagrams. In both diagrams, the x-axis represents the time progression, while the y-axis represents a quantitative value, such as temperature or energy consumption.

The first diagram visualizes critical threshold values. An upper and a lower limit define a tolerance range, while a center line represents the average value.

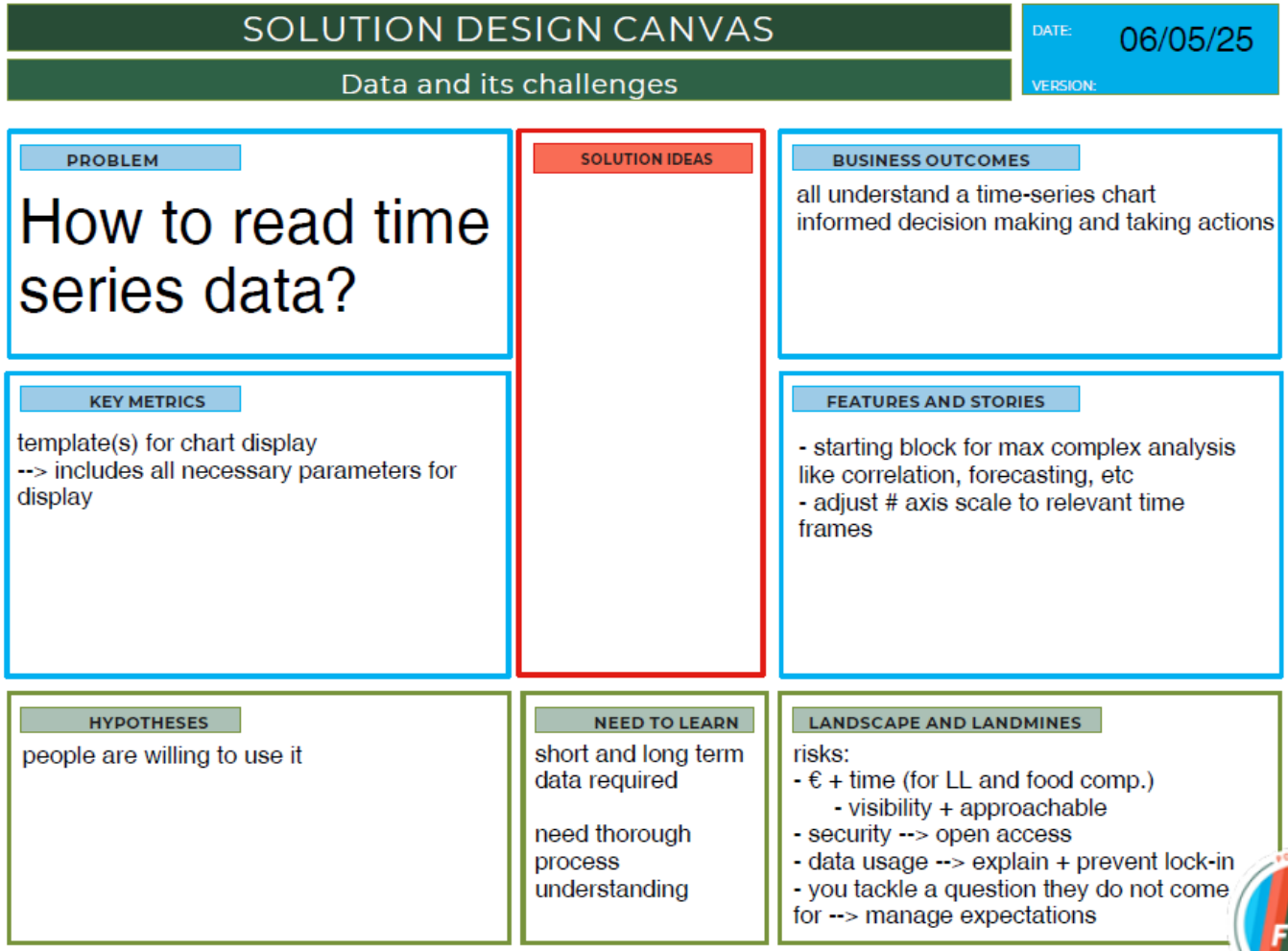
Should the measured time series exceed the upper or lower limit, this is interpreted as an indicator of a necessary action.

The second diagram offers a more differentiated analysis by comparing different time periods. A short-term line shows the current measurement in relation to the measurements of the last few days or weeks. A significant deviation of the current measurement from this short-term trend can be a signal for the responsible employee that an intervention may be required. Additionally, the long-term line visualizes the current measurement in comparison to the measurements of the last few years. This long-term perspective can provide management with important insights into structural changes or trends that may necessitate measures for future cost reduction.

In summary, the developed solution demonstrates, in a simplified and intuitive manner, how data can be visually prepared to make them quickly and easily accessible, thereby establishing a foundation for more informed decision-making.

As a primary concrete action, the creation of an informative handout was decided upon, which summarizes the key findings and potential solution approaches, making them accessible to a wider audience. Furthermore, a strong interest in initiating a follow-up project was expressed. This project could, for instance, focus on the development and testing of practice-oriented templates for effective data visualizations, thereby facilitating practical application within the business context and making a direct contribution to the improvement of data comprehensibility and utilization.

FIGURE 9: GROUP 3 DISCUSSION AT THE SIXFOLD STUDY VISIT IN BELGIUM.



Modified version of the "Solution Design Canvas." Original licensed under Creative Commons Attribution-ShareAlike 3.0 Unported (CC BY-SA 3.0). Available at: https://miro.com/app/board/uXjVKY-c9eM/

FIGURE 10: CANVAS FOR "DATA VISUALIZATION: FROM DATA TO ACTIONABLE INFORMATION -DAAS".

3.3.5 Test & Feedback and Plenary Session

After the group sessions, the results were shared in the plenary for further discussion and feedback. Participants were also encouraged to commit to developing the solutions further.

- **Group 1 (Strategy for SMEs):** The discussion focused on how to make digitalization plans less overwhelming for SMEs. Suggestions included Living Labs taking a guiding role, offering quick "Digiscans," and training "Digitalization Business Developers" within Living Labs.
- **Group 2 (DAAS in LLs):** The discussion explored how Living Labs see the DAAS approach, noting that their purposes can differ (e.g., education-focused vs. industry-service-focused), which affects how data management is integrated.
- **Group 3 (Data Visualization):** The simple, intuitive visualization example was well-received. Participants saw its potential as a tool to be used in Living Labs to demonstrate the possibilities of data and digitalization.

3.3.6 Commitment circle

Group 1: Strategy for digitalization in foodtech SMEs

Participants agreed to scan similar approaches that already exist and check what is feasible and less feasible of these existing solutions.

Next, Living Labs will be encouraged to do some testing with stakeholders.

Group 2: Digitalization as a Service in Living Labs

There were some discussions on what could be the next step for the group. Participants agreed on looking at the add-on feature of digitalization which supports other Living Lab services (e. g. product development) and reflect this also with collaborating SMEs. Also, the group wants to promoting or convincing the people of the four LL that are more closely attached to the project now to think about what they have and how they can incorporate a digital service.

Creating a closer contact between the LL and a sharing of experiences should also be a next step.

Group 3: From data to actionable information (DAAS)

An easy visualization tool that can be modified according to the specific data needs is to be developed by group members. It will then be showcased what it can do and bring.

Living Labs are further encouraged to take part in this development process.

There is a plan to write a short blog article about this topic.

3.4 Results of the survey

A survey was done via an online tool to ask participants anonymously about their perception of the study visit overall and of specific aspects.

The full results can be seen in Annex 2.

Not all participants took part in the survey. Of the 11 participants who answered the questions, most were project partners or part of the participating cluster organisations (81%). 20% were integrators or tech and digital solution providers. Most people were project or program managers.

Concerning the overall perception, most people ranked the study visit as very good (64%) or good (36%) on a scale from very good to very poor. Overall organisation was ranked the same.

The information provided in advance was seen as sufficient to most people (73% yes, 27% partly). Considering the visited Living Labs, most participants ranked them as very suitable (82%) or suitable (18%).

The workshops met people's expectations (82% yes and 18% partially).

Different aspects of the workshops were ranked differently, with structure and process and practical relevance as well and content relevance being good on a scale from very good to very poor.

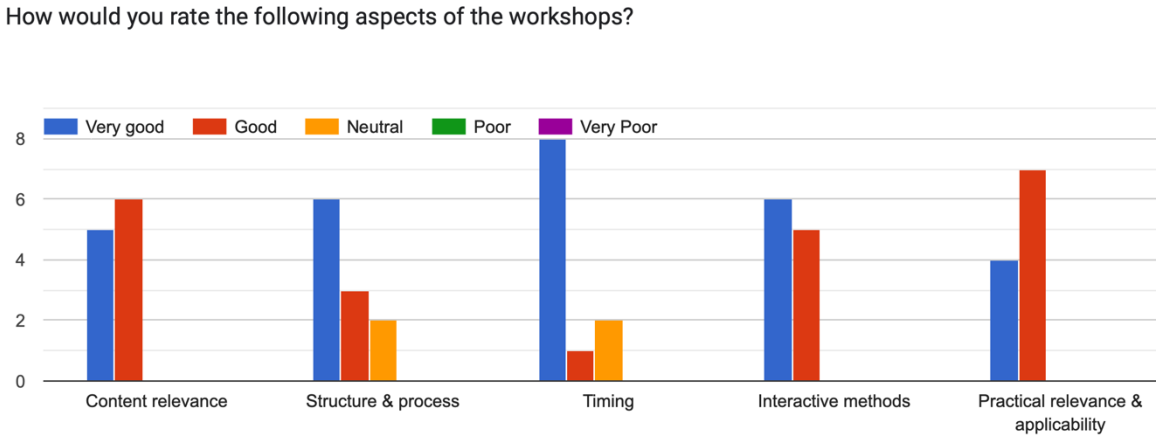


FIGURE 11: RESULTAS FOR THE QUESTION "HOW WOULD YOU RATE THE FOLLOWING ASPECTS OF THE WORKSHOP?

Participants found the individual workshop phases to be very helpful to helpful. There were mixed opinions on the co-creation methodology, which ranked from very good (64%) to good (36%).

Reverse brainstorming and the problem solution canvas were seen to be especially helpful to participants. All participants would attend similar workshops in the future.

Participants provided detailed feedback on various aspects of the event:

- **Positive Experiences:** Respondents frequently highlighted the positive atmosphere, valuable networking, and inspiration gained from the Living Lab visits and expert interactions. The group discussions and brainstorming sessions were particularly appreciated. The opportunity to learn about regional needs and brainstorm solutions freely was seen as a major benefit.
- **Valuable Insights from Living Labs:** The hands-on insights into different Living Labs were considered highly valuable. Participants gained practical knowledge on topics such as setting up data sources, implementing digital twins, and understanding the management and service models of various labs. Learning about common and different approaches across regions was especially useful.
- **Useful Workshop Methods:** The individual workshop phases were found to be helpful. Specific methods like reverse brainstorming and the problem-solution canvas were singled out as particularly effective. All respondents expressed interest in attending similar workshops in the future.

Areas for Improvement and Suggestions:

While satisfaction was high, participants offered constructive suggestions to enhance future events:

- **Programme Density:** The primary feedback was to reduce the intensity and density of the programme, allowing for more time to reflect, digest information, and network.
- **Pre-Workshop Information:** Providing more detailed information about fellow attendees and their organizations beforehand was suggested to improve networking and context.
- **Workshop Focus:** For the co-creation sessions, suggestions included providing a smaller selection of pre-defined, concrete problems to solve and handing out contextual documents to create a common starting point for all participants.
- **Participant Composition:** There were contrasting views on participant focus. Some suggested inviting more SME representatives to better understand their needs, while others recommended a stronger focus on how Living Labs themselves can be improved.

Key Takeaways and Future Applications:

Participants confirmed they would apply the insights gained in their work. The brainstorming tools and canvas methodologies were frequently mentioned, along with the newly gained perspectives on common challenges. The importance of involving all stakeholders in solution development was a key learning.

When asked about specific concepts to pursue further, respondents identified several areas:

- Digitalization as a Service (DAAS)
- Strategy development for Living Lab data management
- The Problem-Solution Canvas method
- Creating ecosystems within Living Labs
- Increasing awareness of the “twin transition” (green and digital) for businesses

3.5 Conclusion after the study visit

After the first study visit, some gleanings were collected for the further development of the next study visits.

With respect to the results of the survey that was handed out to all participants, as well as in agreement with the project group, the following points were addressed and changed to react according to the feedback:

- In general, less working time for one day was planned, and more time was given to networking, time to think, and the creation of a trustworthy atmosphere between participants.
- More time was calculated for the workshop sessions on the study visits
- Sessions are planned more concisely, and methods are reduced and adapted accordingly to give participants more room to think and discuss without overwhelming them
- Topics were narrowed down beforehand to get a clearer view of a possible outcome
- The feedback loop was adjusted in a simpler and more anonymous tool to get feedback from more participants.

In general, study visit 1 in Belgium and study visit 2 in Finland differ a lot already in the prerequisites. Whereas Kortrijk Campus in Belgium is home to multiple organisations and Living Labs are hosted by different institutions, the Seinajöki Campus Frami Food Living Lab is the only food and tech-related Living Lab in the less populated area and is hosted by the Seinajöki University of Applied Sciences.

4. Report on study visit in Finland

This part describes a two-day workshop aimed at developing innovative solutions to novel food regulatory and social acceptance challenges specifically precise fermentation products and how can living labs assist with these challenges.

Day 1

The 1st Day introduced participants to the co-creation approach, with a particular focus on the "empathize" and "define" steps in the context of precision fermentation. It also explored how Living Labs could support solutions to challenges related to regulation and social acceptance.

The day began with shared framing and an emphasis on the theme, followed by a keynote speech on cellular agriculture and its regulatory aspects, and the establishment of collaborative workshop norms.

Participants then divided into pre-assigned groups **A** and **B**.

A group continued workshopping in booths and **B** group goes to SEAMK FoodTec to experience extrusion showcase of High-Moisture extrusion using Hemp Protein.

A group participants divided into pre-assigned groups (1, 2 and 3) and began workshopping in booths to define how living labs could support overcoming challenges related to precision fermentation regulation and social acceptance.

During the first 45 minutes, each group focused on regulatory challenges, working with two canvases: the first for user stories and stakeholder mapping, and the second for challenge mapping. After 45 minutes, the groups switched topics and repeated the process, now focusing on social acceptance challenges using the same two types of canvases. These canvas methods helped participants dig deeper into real-world problems and explore how they might be addressed through Living Lab approaches.

Groups **A** and **B** then switch activities after the lunch break.

Day 1 ended with plenary discussion and final reflection where each group's canvases are showcased on the auditorium stage. Groups presented their findings briefly in the plenary. This was followed by an open discussion to deepen shared understanding.

Participants got the chance to vote on the most important topics with green and red post-it dots directly on the canvases displayed. Top-voted topics were selected as input for Day 2's ideation. Moderators synthesized overlapping topics and merge related topics.

Final reflections included shared feelings and insights after the 1st Day, quick discussion with nearby participants about the day and lastly introduction to Day 2.

Day 1 ended with a networking dinner and a brewery tour.

Day 2

The 2nd Day focuses on ideation, prototyping, and testing. The day starts with the opening of the day and introduction to workshop session 2.

After the opening, all participants engage in an ideation activity focused on identifying challenges related to precision fermentation regulation and social acceptance that Living Labs could help address.

The method used is 1-2-4-All: participants first ideate individually, then in pairs, and finally in groups of four. Each group then selects and presents their two best ideas, one related to regulation and one to social acceptance.

Afterward, the whole group reviews and discusses the selected ideas together. The insights and outputs from this activity are then used in the later workshop booth sessions.

After the ideation phase, participants move together to the SEAMK Foodlab, where they experience the Spray Dryer Showcase and Membrane Filtration Showcase, and hear a presentation about the Future Frami Food Lab project and the SEAMK Foodlab concept.

Following the showcase, participants return to the auditorium and then divide into their pre-assigned groups (1, 2, 3, 4) before moving to their designated working booths.

In the booths, each group works with problem-solving canvases, drawing on outputs from Day 1 and the morning ideation session. 1 full Problem-Solving Canvas has 8 headings; these headings are split into separate canvases. Each group completes two full canvases:

- One addressing regulatory challenges related to precision fermentation (45 minutes)
- One focused on social acceptance challenges related to precision fermentation (45 minutes)

Following the booth work, all participants return to the auditorium. Each group or group moderator presents their canvases and proposed solutions. This is followed by a Q&A session, cross-group discussion on the ideas presented, and a collaborative conversation on commitment and next steps for the most relevant solutions.

The day concludes with a wrap-up session, where the facilitator summarizes key learnings, lessons, and introduces upcoming SIXFOLD events.

Finally, the second day and the workshop conclude with a networking BBQ event.

4.1 Day 1 of the study visit in Finland

4.1.1 Introduction & Context: Setting the Scene and emphasize

The morning focused on introducing participants to the challenges in novel food regulations. First, the premises of SEAMK, the hosting university, were introduced and a quick overview of the programme was given.

4.1.2 Empathize: Keynote speech on Cell Agriculture

In this section, participants hear a keynote speech on Cell Agriculture and its regulation and social acceptance from professors Kaisu Riihinen and Anneli Ritala who are experts on cellular agriculture and regulation at VTT, which is the largest research and technology company and research centre conducting applied research in Finland. After participants got acquainted with each other and were divided into the different working groups, the different sessions started.

4.1.3 Empathize: Extrusion Showcase at the SEAMK Food Lab

Whereas some groups started the workshops with the development of a problem statement, the other group had the chance to empathize by getting a hands-on experience with state-of-the-art extrusion technology at the SEAMK Frami Food Lab. In the afternoon, groups changed accordingly. The workshop groups mapped user insights, stakeholder perspectives and challenges with precision farming related to the following topics: Stakeholders and user stories, key challenges in regulation and social acceptance.
In Conclusion, participants discussed results in the plenary session and decided which topics they wanted to work on further on day 2.

SEAMK Food Labs

SEAMK Food Labs is a trailblazer in the food region, serving as a platform for education, research, and pilot projects in food production development. Food production is in the middle of a transformation. Changes and new approaches are needed across the industry when increasing the sustainability of food production. This adjustment demands a comprehensive understanding of the entire food chain and solutions that take inter-sectoral relations into account. This is where SEAMK's expertise comes in, SEAMK Food Labs provide modern laboratory environment where sustainable food solutions can be tested and piloted.

The laboratory agenda introduced participants to the topic of Extrusion. The core focus was the Demonstration of High-Moisture Extrusion Using Hemp Protein. Complementary to this, attendees were informed about the basics of the process, specifically what Extrusion is, the principles of the process, and its applications in the food industry, including plant-based meats, snacks, and texture modification.

FIGURE 12: SHOWCASING EXTRUSION AT SEAMK FOOD LAB.

4.1.4 Define: User story mapping & Challenge mapping

During a workshop session, participants were invited to map user stories as well as challenges in order to define the problem.

The User stories & Stakeholders

Participants were invited to reflect on the following key areas:

1. **User Pain Points/User Stories**: The central question here was where Living Labs could be used in a real-life context. Participants were asked to describe situations or experiences where Precision Fermentation causes confusion, conflict, or friction.
2. **Stakeholder Stories/Actor Mapping**: This section focused on identifying who the people or groups involved in or affected by these situations are. The task was to map the key actors (e.g., consumers, regulators, Start-ups, retailers, media, etc.).

Key challenges in Regulation & Social acceptance canvas

This activity centered on filling the canvas with three central topics to transform identified problems into opportunity-focused questions.

Filling the Canvas: Key Topics

- Regulatory Challenges on Novel Foods: This involved pinpointing aspects of regulation seen as unclear, outdated, or difficult to navigate, specifically identifying concrete bottlenecks, uncertainties, or missing frameworks.
- Social Acceptance Issues on Novel Foods: The discussion focused on the question, "What concerns, resistance, or misunderstandings arise around Precision Fermentation (PF)?", considering aspects like trust, ethics, transparency, and communication.
- Connection to Living Labs: The aim was to explore how these challenges might be explored, tested, or improved through Living Lab methods, highlighting opportunities for user involvement or co-creation.

From Problems to Possibilities: "How Might We" (HMW) Questions

In this key phase of the innovation process, the goal is to convert identified problems into opportunity-focused questions. Instead of highlighting what is missing, the so-called "How Might We" (HMW) questions shift the focus toward possible solutions and spark creative thinking. Each HMW question typically starts with the phrase "How might we...". This approach offers several benefits: it challenges old thinking by helping teams move beyond usual ideas; it boosts creativity due to its open format; it stays focused on the main problem without limiting creativity; it encourages optimism by suggesting that a solution is possible; and finally, it allows for the exploration of many options, as a well-phrased question opens different ways to solve the problem.

4.1.5 Results of the workshops

Following a brief introduction of the participants, the workshop rules, and the methodology, attendees engaged in an intensive discussion about Precision Fermentation (PF), its opportunities, and the associated conflicts and challenges.

Key Challenges of Precision Fermentation

Regulation and Governance

Several critical points were identified here:

- Lobbying: There is a lack of a strong lobby for PF, while powerful opposing lobbies exist from the meat industry and anti-GMO groups.
- Regulatory Hurdles: There is a lack of a regulatory "sandbox"; innovation and testing face risk-averse regulation, which lags behind technological development.
- Legal Ambiguity: Standardized processes and legislation are missing.
- Lack of Information: There is a shortage of expert advice available to bring new products to market.
- Long EU approval phases and funding discontinuity, as Living Labs often struggle to survive after EU project funding ends without further subsidies.

Role of Local Governments

For local decision-makers, the following aspects emerged:

- Lack of Support: Traditional agriculture is subsidized, but there is virtually no support for PF startups yet.
- Influence of Local Levels: Local and regional governments can play an important role by conveying the concerns of agriculture, which is a primarily local sector, to national and European authorities.

Scientists and Technologists

The central problem here is Brain Drain, as specialists and scientists migrate to easier, more regulation-friendly environments, leading to a loss of knowledge.

Consumers

The consumer discussion revolved around:

- Price: This is a significant deciding factor.
- Conservatism and Education: Consumers are more conservative; there is a high need to educate consumers, as "we don't accept what we don't know."
- Time Aspect: It takes time to change minds, which must be supported by education.
- Long-term safety of the product.

B2B Industry

B2B actors focused on the price-volume dilemma: The price of the product is directly linked to the volume of production, as PF is not yet produced in large quantities.

User Stories & Stakeholder Activity

Subsequently, participants developed user stories centered on the identified stakeholders, resulting in several core themes:

- Awareness/Education: Real case studies and education from a young age are crucial for building acceptance.
- Location Attractiveness: The question of why Start-ups go abroad highlights regulatory hurdles.
- Farmers' Need for Advice: Farmers/producers often do not know who can help them develop new products. Living Labs could serve as advisors and support providers here.
- Peer-to-Peer Advice: Exchange from producer to producer or farmer to farmer could enhance the movement, given that producers are reluctant to risk investments to "try out innovation."

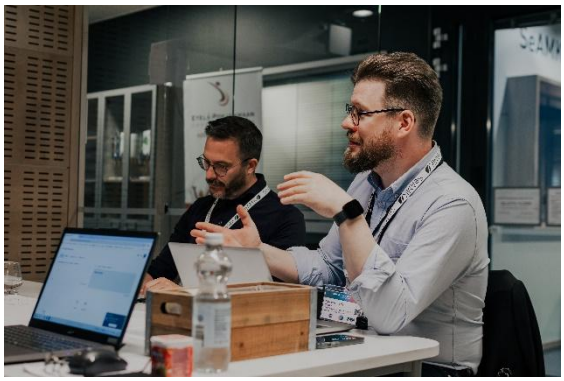


FIGURE 13: GROUP DISCUSSION AT THE STUDY VISIT IN FINLAND.

The Role of Living Labs in Establishing Precision Fermentation

The discussion illuminated both the limitations and the potential of Precision Fermentation (PF). The hypothetical question of what would happen without a regulatory framework showed that although economic efficiency would be easier to demonstrate, high demands for expensive fermenters, downstream processing, and a lack of experience would remain ongoing challenges. Even with regulatory changes, many factors like high investments, stable sales figures, and the lengthy time-to-market process would stay the same. The principle of "survival of the fittest" applies: the stronger the organization behind the innovation, the more likely it is to survive in the jungle of ingredients.

Living Labs' Contribution to PF Implementation

Living Labs (LLs) can play a crucial role in accelerating PF implementation:

- Research & Development (R&D): Supporting scale-up, maximizing yield in downstream processing, improving taste, and meeting technical requirements.
- Market and Business Development: Providing marketing support, market understanding, and application support for sales to acquire customers (business development).
- Networking & Coordination: They serve as a meet-up place for all stakeholders to accelerate the scale-up process, and they link actors and investors.
- Knowledge Transfer & Education: LLs can inform regulators neutrally, offer training for both students and staff, and provide education for the general public.

Financial Challenges and Support

Despite the potential, there is a pressing need for financial support. This could be created through business alliances where larger companies assist start-ups (creating win-win situations). Furthermore, specific projects and funding for Living Labs themselves, as well as alternative financing models, are necessary. Government aid is often difficult to secure because the problems and risks, unlike in other sectors, are not perceived as large enough (which could otherwise be viewed as company favouritism).

Next Steps for Living Labs

LLs should join forces and connect in a network of LLs to develop business cases and legal support. The critical question of whether LLs give users what they want, instead of what they need must be addressed. Within the network, the sharing of ideas and experiences, as well as the sharing of information on failures, is important to avoid redundant work and offer services not yet provided by the network.

Solutions for Regulatory and Social Challenges

LLs can specifically help by ensuring the management and organization of sustainable structures (independent of project money). Their task is to translate complex tech or policy concepts into accessible language, reduce misinformation, guide producers on where to go and how to implement new products, and provide an overview of pilot producers through a network. Central to their role is building trust in new products, storytelling, and organizing roundtables with stakeholders.

"How Might We" Questions for the Future

- The activity culminated in solution-oriented "How Might We" (HMW) questions:
- How might we connect business and Living Labs?
- How might we create better incentives?
- How might we find funding for SME trials?
- How might we find/create better tools for funding?
- How might we create user stories and educate people to make them more open to innovation with respect to precision fermentation?

FIGURE 14: WORKSHOP ATMOSPHERE AT THE STUDY VISIT IN FINLAND.

4.1.6 Plenary discussion and Wrap-up of the day 1

Following the group work, each team presented their findings on the auditorium stage and giving a summary (5 minutes per group) focused on the elaborated user stories, key challenges, and relevant stakeholders. The flipcharts can be found in Annex 3.

A subsequent 30-minute plenary discussion helped to deepen shared understanding and identify the following overarching themes and insights:

Key Discussion Points

- Regulatory Environment: The urgent need for regulatory sandboxes to enable innovation was stressed.
- Talent and Incentives: Regulatory constraints lead to brain drain, as researchers and developers move to regions with easier regulations. Simultaneously, researcher incentives to collaborate with companies must be established.
- Market Dynamics: The principle of "survival of the fittest" often governs the market. It was noted that marketing should be integrated into the process from the start so that the narrative can be defined during development.
- Learning and Collaboration: Instead of just "failing fast," the goal should be learning fast. This involves avoiding "reinventing the wheel" by looking beyond borders and learning from global examples, such as the Singaporean chicken sandboxes, viewing them as opportunities, not competition. Participants should complement each other, not just on products, but also on aspects like testing panels, and work in multidisciplinary teams from the start.
- Cultural and Communication Gaps: Cultural differences were seen as both a blessing and a curse. The lack of a unified language among technical, regulatory, and scientific stakeholders necessitates good translation of complex concepts. The question of whether clinical trials for food are needed, similar to those for pharmaceuticals, was raised.
- Education and Acceptance: To break down prejudices and foster acceptance, the educational problem must be addressed by ensuring children come into contact with novel food from an early stage.
- Role of the Living Lab: LLs have a role in facilitating multidisciplinary teams and supporting the scaling phase.
- Subsidies: Subsidies can have a negative influence if there is no proper overview and if they are limited to specific, restrictive areas.

Next Focus Topics

Based on these discussions, the groups agreed to continue their work in new, self-selected groups on the following key areas on day 2:

- User stories and stakeholders (for precision fermentation and fermentation in general)
- EU Network of Living Labs to support innovation in precision fermentation
- Adressing key challenges in acceptance and regulatory issues
- Knowledge Transfer for precision fermentation for Living Labs

In conclusion, the participants praised the workshop as both very intensive and very productive. The mix of practical considerations of the topic and fruitful discussions was particularly well-balanced. The day was rounded off in the evening with a brewery tour.

FIGURE 15: BREWERY TOUR FOLLOWED BY TASTING.

4.2 Day 2 of the study visit in Finland

4.2.1 Opening of the Day 2

Day 2 begins with a brief PowerPoint presentation outlining the agenda for the day, providing information about Workshop Session 2, and highlighting key insights from Day 1.

4.2.2 Empathize: Spray Drying Showcase at SEAMK/Future Frami Food Lab & Presentation of Foodlabs Concept

This event aimed to highlight the deep tech solutions Spray Drying and Membrane Filtration. Their advancements, underlying principles, and diverse applications were presented to illustrate their crucial role in shaping a sustainable future for food production. The agenda included an introduction to the ongoing "Future Frami Food Lab" project and the broader FoodLabs concept as a platform for experimentation and collaboration. Furthermore, participants were given a practical demonstration of membrane filtration, an introduction to the basics of spray drying, a live demonstration on the spray dryer, and the presentation of a finished spray-dried product.

FIGURE 16: LAB VISIT DURING THE STUDY VIIT IN FINLAND.

4.2.3 Prototype: Fill out Problem-Solving Canvases

Based on the identification of the most important challenges on Day 1, the workshop focused on developing solutions for the four defined key topics. The groups were free to approach their solutions individually; the Problem-Solution Canvas was only offered as a methodological tool to support and structure the brainstorming process, but its use was not mandatory.

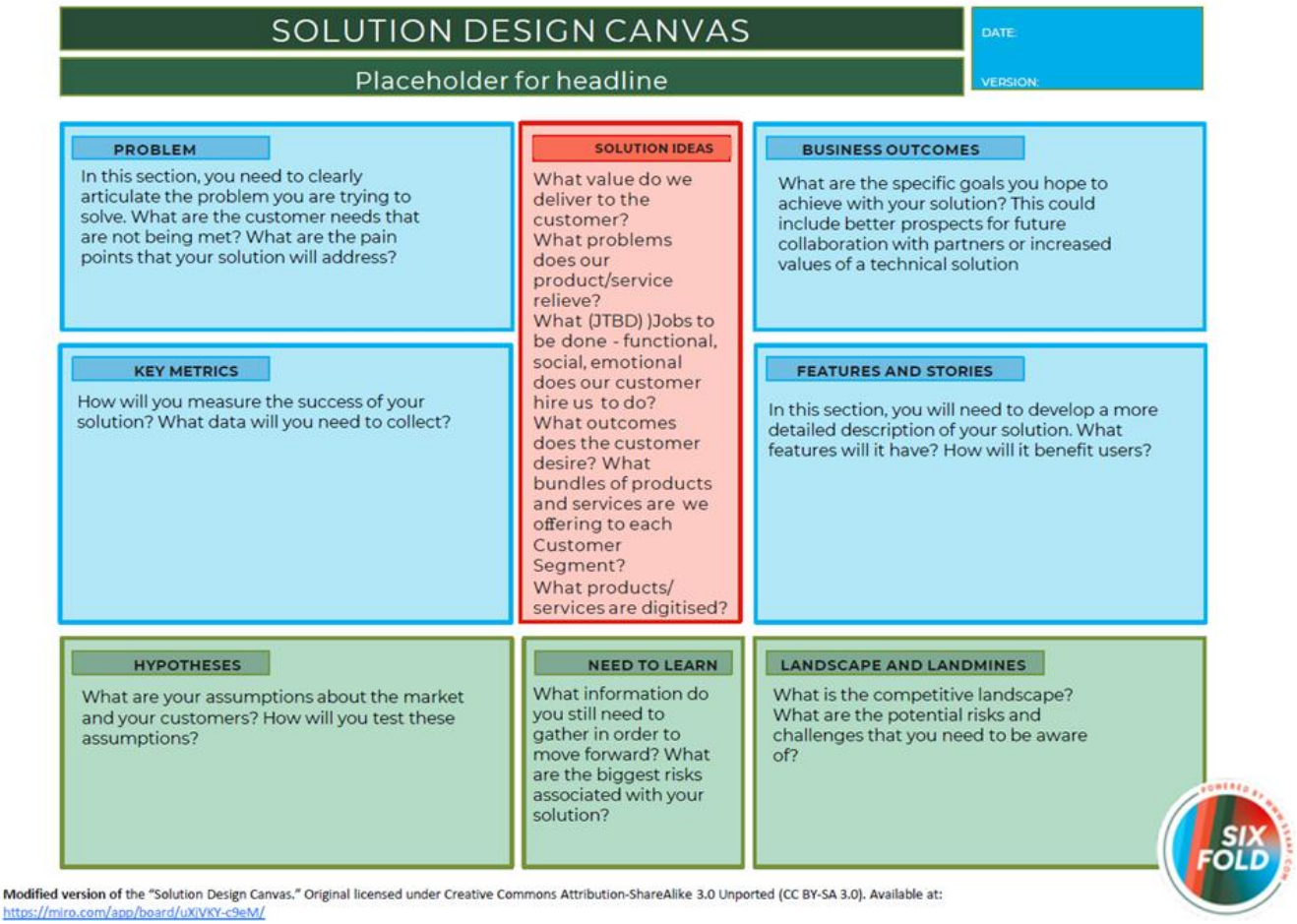


FIGURE 17: SOLUTION CANVAS FOR THE WORKSHOPS ON DAY 2.

Group: User stories and stakeholders (for precision fermentation and fermentation in general)

The working group began by identifying user stories and key bottlenecks related to precision fermentation.

The group held an intensive discussion on marketing strategies, highlighting packaging and labeling as crucial aspects alongside the product itself. Participants debated whether a different nomenclature for the product, such as "cultivated meat," would help consumer acceptance. To increase acceptance, testing would be very important, but this is often not permitted for Novel Food or is tied to excessive bureaucracy. A central solution idea proposed was to launch educational programs starting at a young age and collaborate with chefs to develop new recipes. Participants identified several critical hurdles:

- Financing and Regulation: The need for high investments can be a problem, especially for smaller companies, while subsidies are not always supportive. The group saw an opportunity to study markets that introduced precision fermentation some time ago. Furthermore, the lack of scale-up capabilities due to strict regulations was identified as a bottleneck, where Living Labs could be a game changer.
- Technical and Logistical Bottlenecks: Scale-up itself is difficult. The availability and stability of the feedstock need to be guaranteed year-round. Additionally, the efficacy of technology improvement and energy efficiency need to increase.

The collected points condensed into the following main challenges:

- The food processing industry generally suffers from a poor image.
- Not enough effort is put into marketing and storytelling, and there is a great fear of negative public image.
- The topic of food is generally very sensitive and closely linked to culture.
- Language and definitions play an important role in public perception.

Developing Solution Ideas

To improve the acceptance and knowledge level regarding novel food technologies, the group developed concrete proposals for education and awareness. These include creating lifelong learning opportunities through continuing education and self-education tools. The topic should be integrated into kindergarten and school programs at an early stage. Public outreach is to be achieved through workshops, seminars, and open demo days, with easy language, school visits, and free tastings considered key measures. Practical examples like Novel Food cooking calendars, testing boxes, and retail campaigns should illustrate the possibilities. Furthermore, a positive communication strategy is crucial, involving sharing success stories and strongly focusing the narrative on the positive aspects of the technology, particularly sustainability.

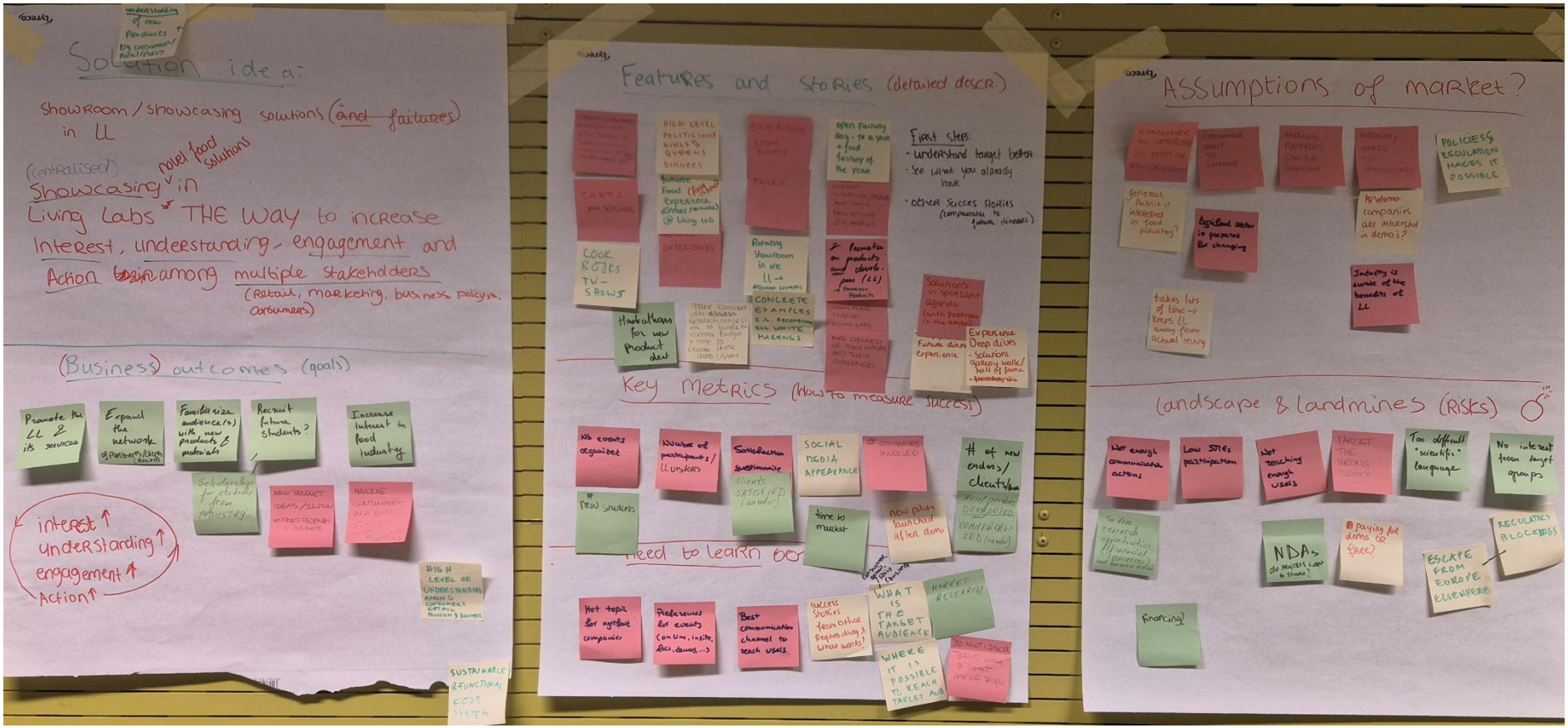


FIGURE 18: SOLUTIONS FOR "USER STORIES AND STAKEHOLDERS".

Group: EU Network of Living Labs to support innovation in precision fermentation

The group discussed in depth how a Network of Living Labs can boost innovation in precision fermentation by better coordinating the different phases of product development.

Current vs. Ideal Development Cycle

Currently, the process begins with Research and Development (R&D) in labs, followed by applied development and scaling up in pilot facilities and companies. Actors like technology providers, consumers, retailers, regulators, and marketing teams only join in the pre-industrial phase. In the later industrial phase, consumers and marketing/sales dominate.

The group defined the ideal product development pathway as a more integrated approach: Research, companies (development and marketing), technology providers, engineers, and regulators should be included from the start to facilitate the entire process. Consumers and formulators would join during the applied development phase. Finally, during the scaling process, pilot facilities, technology providers, consumers, retailers, formulators, regulators, and marketing and sales would all be involved.

Challenges and Solutions

A key difficulty lies in the different language used by policymakers and industry, which results in misunderstandings and knowledge gaps.

To enable the ideal, collaborative development pathway shown in this scheme, the group proposes:

- Multidisciplinary Testing: This should be facilitated by pilots, such as future experience dinners ("Dine like in 2024") and storytelling.
- Learning from Best Practices: Utilizing examples from other countries where the products are already established to address concerns (e.g., regarding food safety).

Living Labs can thus act as mediators and enablers to bridge the gap between basic research, market demands, and regulatory realities.

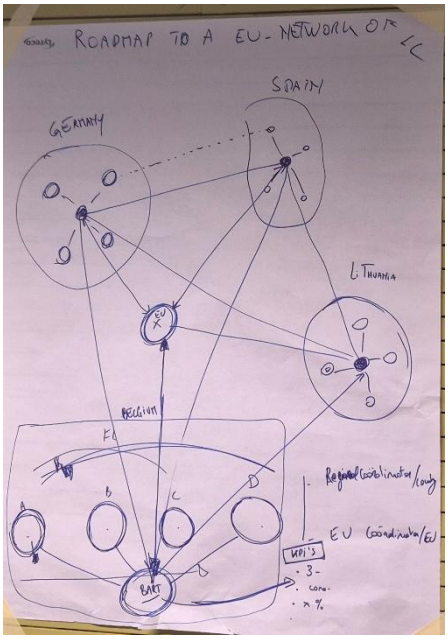


FIGURE 19: SOLUTIONS FOR "EU NETWORK OF LIVING LABS".

Group: Addressing key challenges in acceptance and regulatory issues (Regulatory Sandboxing)

The working group identified the main problem as the lack of knowledge regarding the requirements for approval processes for new precision fermentation products. To address this, Living Labs or other supporting entities should focus on communicating what is possible rather than just highlighting restrictions.

Development of a Regulatory Tool

The group decided to pursue the idea of developing a decision-making tree or a GPT-based tool covering basic requirements and food safety issues in Europe.

The Benefits of Such a Tool

The tool would speed up research and development, make it easier to start, and increased transparency would lead to a clearer process and higher consumer acceptance. Centralized and secure expertise and knowledge could lower the cost of advice for individual Living Labs. Furthermore, the workflow could serve as a blueprint for similar regulatory challenges, and being an exploitable asset, it would generate sustainable revenue.

Challenges and Lessons to Learn

Before implementation, learning needs and potential "landmines" were identified: It is necessary to clarify what information is truly relevant, how to best gather and organize data, and what the best way is to translate expertise into a simple tool. Regulatory "landmines" include staying up-to-date with Europe-wide regulatory changes and managing possible gaps in the decision-making tree, especially regarding discrepancies between guidelines and real-life challenges (How to find the right balance and level of detail?).

Key Metrics and Staged Approach

A staged approach was chosen for key metrics, starting small and scaling up agilely depending on who uses it and how often. Success should be measurable quantitatively (before/after comparison) using parameters such as: number of proposal attempts, failure rate, and success rate of start-ups during the process—though the availability of this data was questioned.

Future Actions

The tool is intended not only to streamline processes but also to increase the impact and narrative for precision fermentation in general, by addressing how consumers can improve the adoption of novel food. This can be achieved by Living Labs educating consumers, and authorities smoothing the process.

The next key actions are as follows:

- Define basic requirements/content.
- Define priorities in the decision-making tree.
- Implement a test and feedback phase (iterative cycles).
- Improve and progressively roll out and deploy the tool as a blueprint for other processes.

Finally, it was emphasized that a business model for the tool needs to be developed to scale the business and ensure its sustainability.

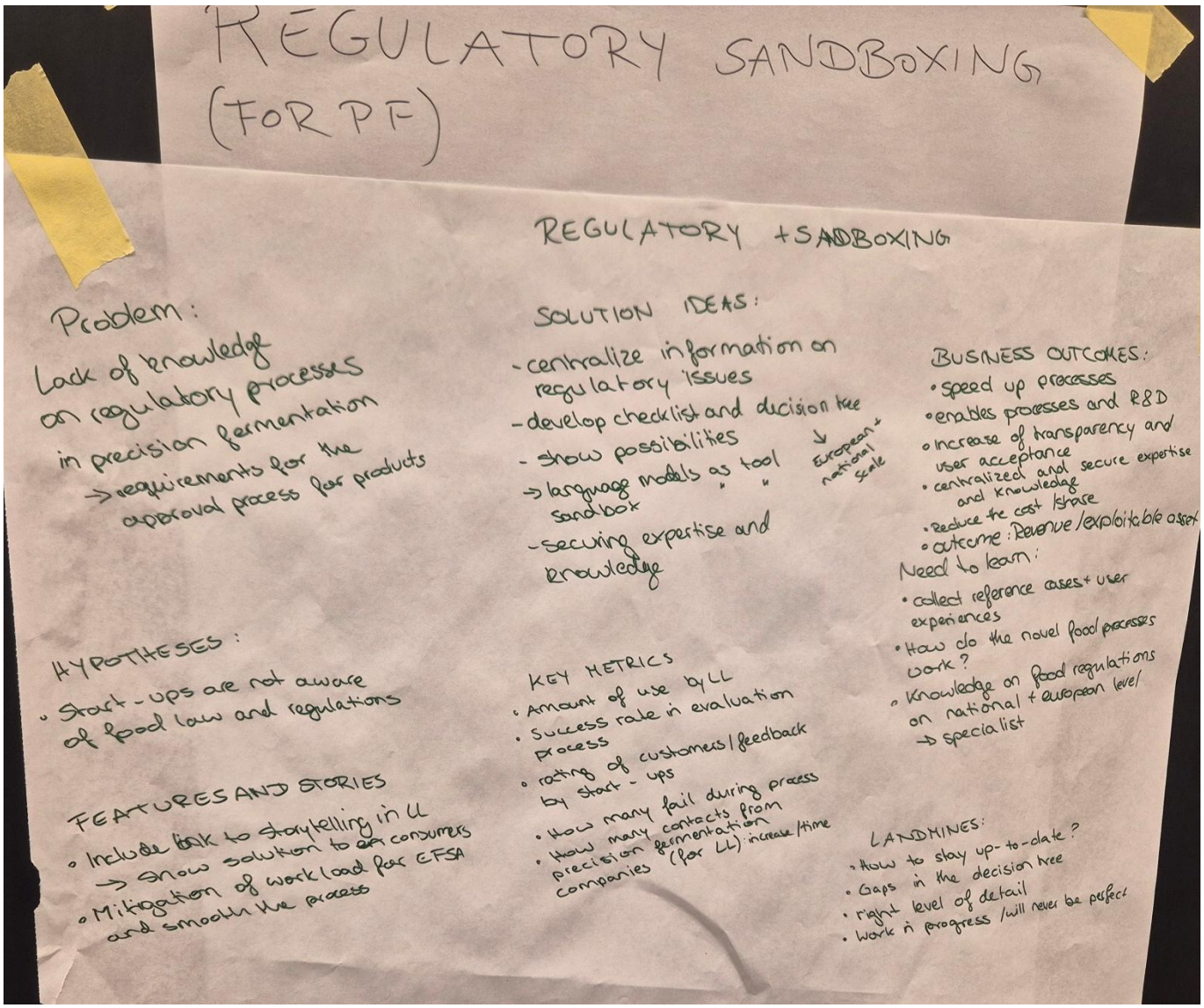


FIGURE 20: SOLUTIONS FOR "REGULATORY SANDBOXING".

Group: Knowledge Transfer for precision fermentation for Living Labs (Copy-Pasting Knowledge)

The working group, initially named "Copy-Pasting Knowledge," quickly realized this term did not capture the reality-as circumstances are always individual. Instead, they recognized the enormous potential of strategic knowledge sharing between Living Labs in the food processing industry to drive innovation across Europe.

The core of this synergy lies in building a common infrastructure for knowledge transfer. The group identified several ways to realize this exchange:

- Personnel Exchange: Establishing Lab Exchange Programmes for technicians to transfer practical knowledge directly.
- Knowledge Databases: Creating central databases to increase the findability and accessibility of information, facilitating the replication of similar cases and successful approaches.
- Process Standardization: Developing a comprehensive "Manual for Living Labs" to share best practices and fundamental operational and management knowledge.

The Living Lab Network Toolbox

A Toolbox was conceptualized as a central instrument for bundling this information. It is intended not only to share general project data but, more importantly, to learn from experience and collect knowledge about trainings, failures, best practices, resolved problems, and open questions.

Furthermore, the Toolbox should provide detailed information on the capabilities of individual Living Labs to enable targeted collaborations. This includes:

- Specialized Analytics.
- Used Digitalization approaches/Methods.
- Available Equipment and Data sharing possibilities.

Management and Strategy as Core Knowledge

Participants placed particular value on the exchange of management strategies. Collective experience should help overcome hurdles more efficiently. Concrete ideas for this included:

- Starter Guidance: Developing a guide that covers the functions, best practices, and a manual for starting a Living Lab.
- Manager Exchange: Creating a platform for the exchange among Living Lab managers.

- Regulatory Expertise: Sharing knowledge about regulatory barriers and successful strategies to overcome them.

Overall, this approach aims to transform isolated test beds into a networked eco-system where collective learning and shared expertise can exponentially increase innovative power.

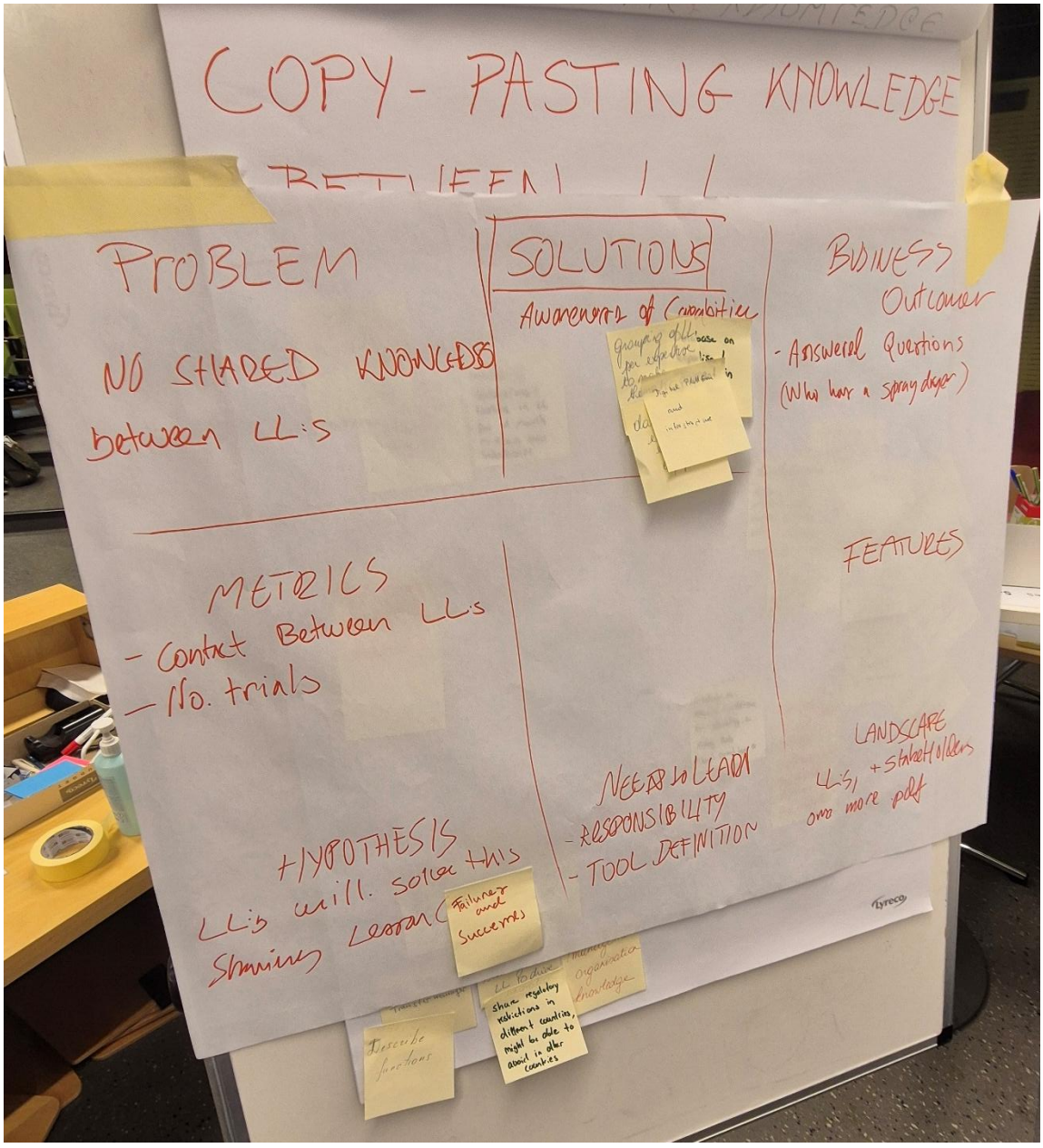


FIGURE 21: SOLUTIONS FOR "KNOWLEDGE TRANSFER".

4.2.4 Group reflection & Wrap-up of the Day 2

After intensive group work at the thematic booths, the participants gathered in the auditorium, where each group or the group moderator presented the solutions and ideas they had developed.

Commitment Circle: Transforming Ideas into Action

The formal conclusion of the workshop was marked by the Commitment Circle. In this 15-minute segment, each group committed to one concrete action they would undertake as a direct follow-up to the workshop's outcomes.

To ensure the sustained development of the knowledge gained and to move beyond the ideas sketched on the canvases, mandatory follow-up actions were also agreed upon. This includes the organization of subsequent virtual meetings within the respective topic areas, aimed at deepening, concretizing, and transforming the solutions outlined in the canvases into operative work packages.

Following this, participants had the opportunity to provide final feedback on the workshop and sign up for the online feedback survey.

Wrap-up and closing of the study visit in Finland

The main event of Day 2 concluded with a 30-minute, facilitated Wrap-up Session. Here, participants reflected on the most important learning outcomes ("What did you learn today?"), summarized the Key Learnings of the entire workshop, and reaffirmed the relevance of the developed solutions. The moderators also provided an outlook on the next SIXFOLD events, which will serve as a platform for progress checks on the agreed commitments. All attending experts were warmly thanked for their valuable participation and for generously sharing their knowledge and experience. They were strongly encouraged to remain actively involved in the future phases of the project and, crucially, in the European Network of Agrifood Living Labs within the SS4AF Community.

The official workshop ended here, followed by a brief thank you and information regarding the planned evening activities

ANNEXES

ANNEX 1 – Workshop notes from the Workshops held in Belgium

ANNEX 2 – Survey: Study visit Belgium

ANNEX 3 – Workshop notes from the Workshops held in Finland

ANNEX 1 – Workshop notes from the Workshops held in Belgium

Day 1

GROUP 1

Identify problem / challenge

➔ Who is involved? – Affected – part of the solution

1. **LACK OF DATA STRATEGY (food related) "at company level (SME)"**

- IT-department / IT-responsible (in combo with consultant)
- Management / CEO
- Sales
- Operators/operations — Who is not involved?
- HR/ institutes
- Living Labs
- Government (EU data Act…)
- Associations
- Suppliers / resources
- Buyers (B2B for sure – B2C?)

Conclusion = A whole "ecosystem of data"

2. **When does it become a real issue?**
   - If it affects a / your business opportunity

Food safety Cyber security act Request from big companies from retail

2a. processes
- Production / operations
- Sales / marketing — - FINANCE!
- Procurement
- HR

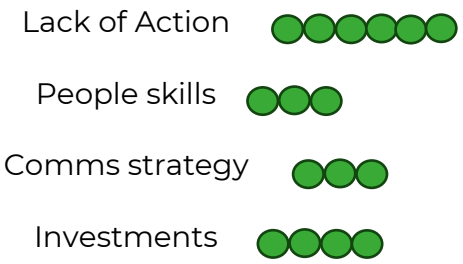
2b. impact
- Less selling / business
- Waste
- Bad reputation
- Less efficient

2c. goals hindered by
- Growth, expansion
- funding
- Twin transition
- Sustainability

3. How can we make the problem worse

Not collection data
Not analysing the data
Waiting -> not starting small (problem is too big to handle)
Only discuss with management, not operators
Not investing in sensors
Not investing time -> not prioritizing
Tax data sharing
Not hiring the right skilled people
Not asking for help (associations, initiatives of federations, clusters, ...)
Not working cross – border / no partnerships
Forget the people
Old equipment
Lack of training

4. Underlying structures / causes (Dot voting)



GROUP 2

Data strategy (lack of)
Costs
Retro fitting
standardisations, frequency

Different users

Different knowledge levels

How might we include all stakeholders (operators)

Different tools / software

How might we create a checklist for data

Lack of standardizations

You only get out what you put in

Not sure what to do with the collected data

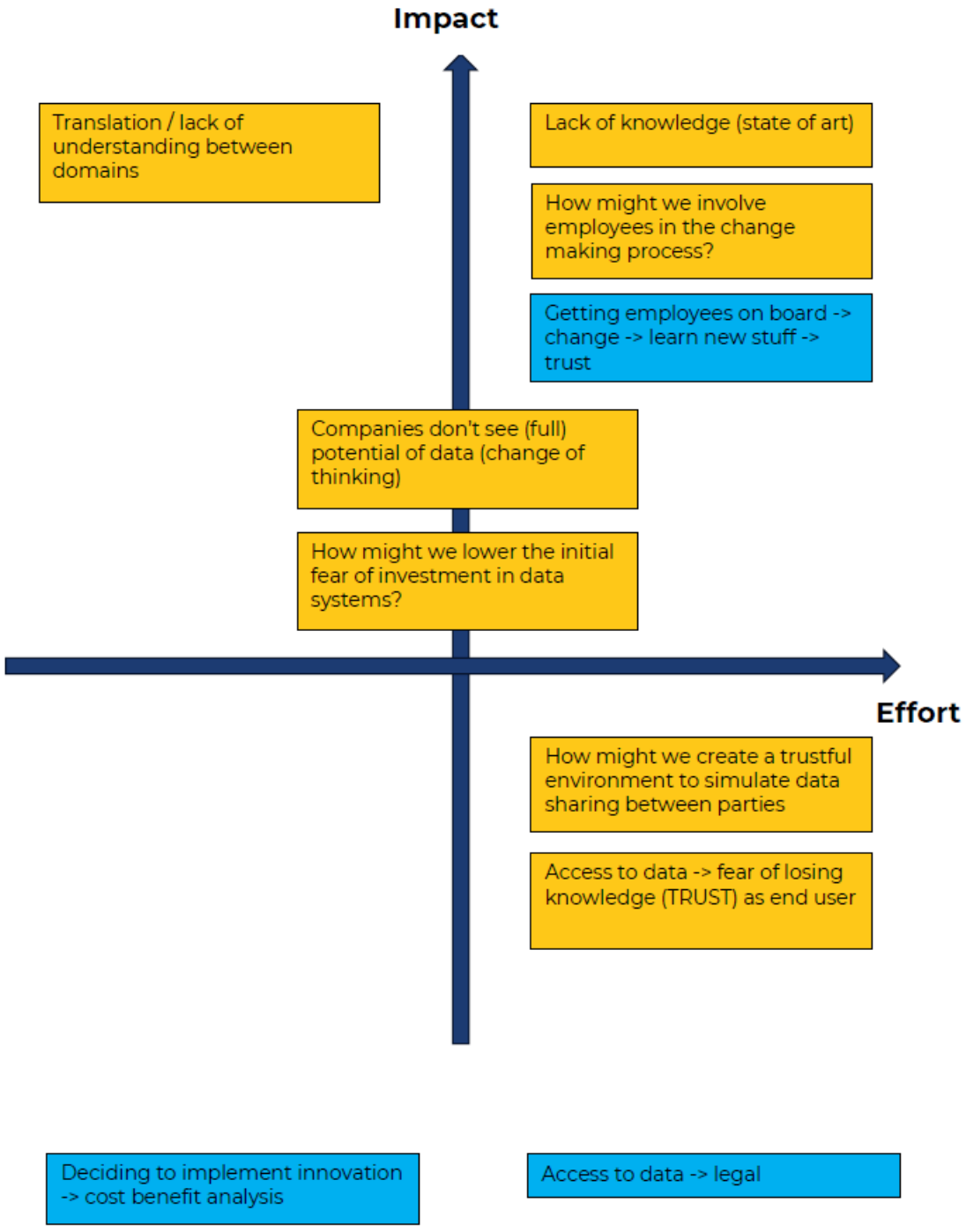
Lack of data quality

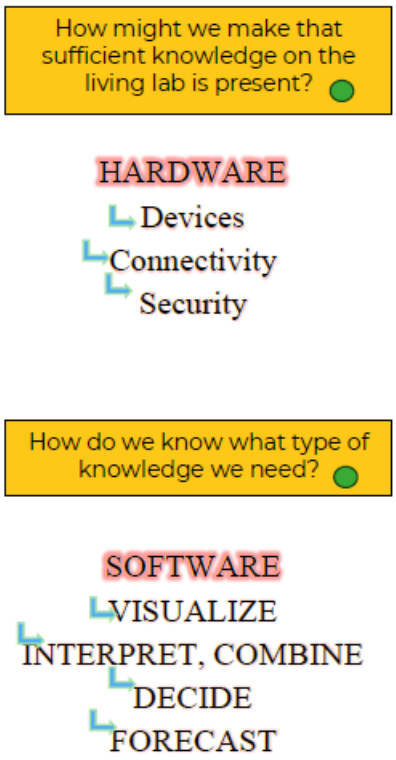
How might we know what we need (data)

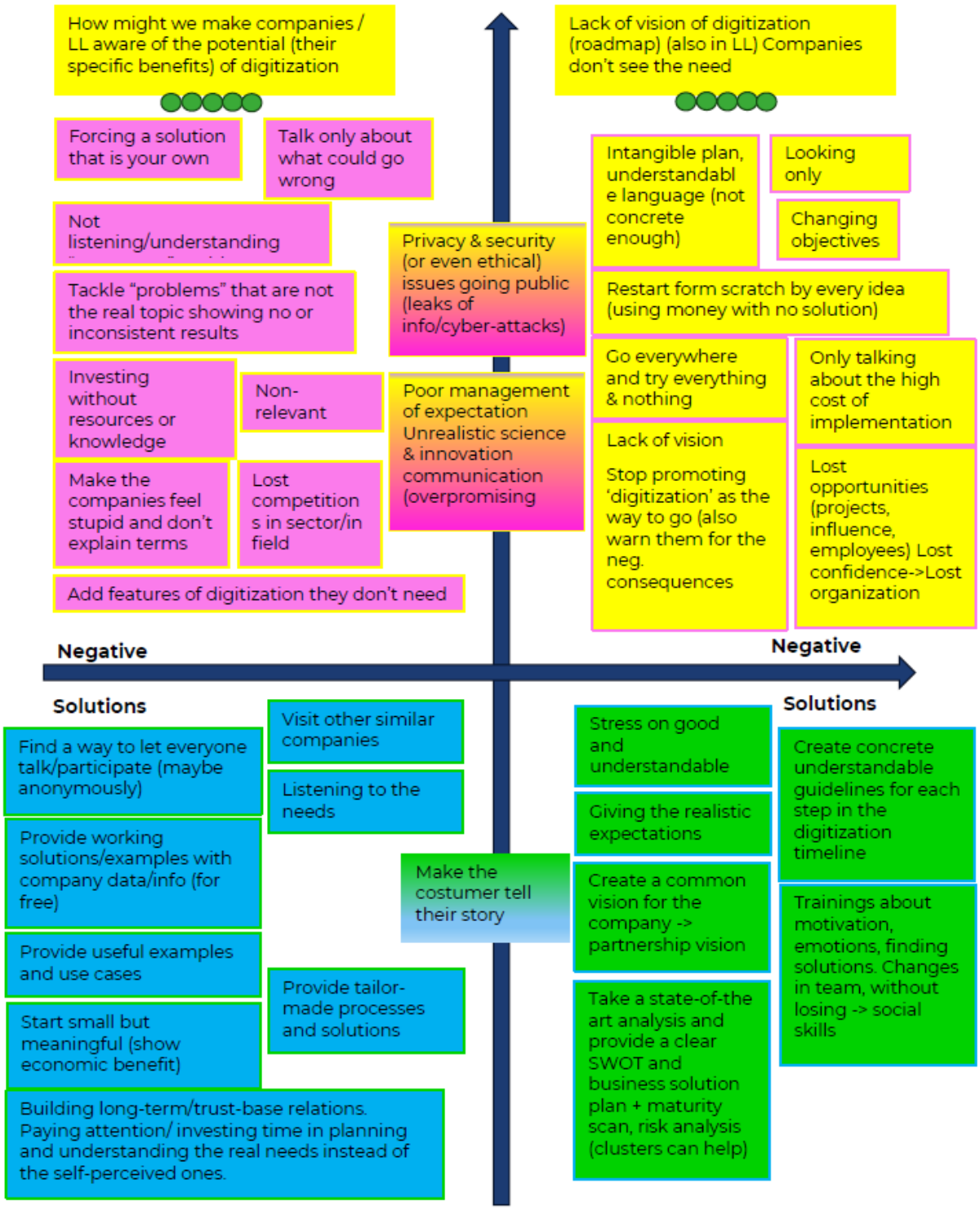
Different Aims Lack of trust

Different business models

How might we create a common ground (for sharing)


Impact
Translation / lack of understanding between domains
Lack of knowledge (state of art)
How might we involve employees in the change making process?
Getting employees on board -> change -> learn new stuff -> trust
Companies don't see (full) potential of data (change of thinking)
How might we lower the initial fear of investment in data systems?
Effort
How might we create a trustful environment to simulate data sharing between parties
Access to data -> fear of losing knowledge (TRUST) as end user
Deciding to implement innovation -> cost benefit analysis
Access to data -> legal


How might we make that sufficient knowledge on the living lab is present?
HARDWARE
Devices
Connectivity
Security
How do we know what type of knowledge we need?
SOFTWARE
VISUALIZE
INTERPRET, COMBINE
DECIDE
FORECAST


How might we make companies / LL aware of the potential (their specific benefits) of digitization
Lack of vision of digitization (roadmap) (also in LL) Companies don't see the need
Forcing a solution that is your own
Talk only about what could go wrong
Not listening/understanding
Tackle "problems" that are not the real topic showing no or inconsistent results
Investing without resources or knowledge
Non-relevant
Make the companies feel stupid and don't explain terms
Lost competitions in sector/in field
Add features of digitization they don't need
Privacy & security (or even ethical) issues going public (leaks of info/cyber-attacks)
Poor management of expectation Unrealistic science & innovation communication (overpromising
Intangible plan, understandable language (not concrete enough)
Looking only
Changing objectives
Restart form scratch by every idea (using money with no solution)
Go everywhere and try everything & nothing
Only talking about the high cost of implementation
Lack of vision
Stop promoting 'digitization' as the way to go (also warn them for the neg. consequences
Lost opportunities (projects, influence, employees) Lost confidence->Lost organization
Negative
Negative
Solutions
Solutions
Find a way to let everyone talk/participate (maybe anonymously)
Visit other similar companies
Listening to the needs
Provide working solutions/examples with company data/info (for free)
Provide useful examples and use cases
Start small but meaningful (show economic benefit)
Provide tailor-made processes and solutions
Building long-term/trust-base relations. Paying attention/ investing time in planning and understanding the real needs instead of the self-perceived ones.
Make the costumer tell their story
Stress on good and understandable
Giving the realistic expectations
Create a common vision for the company -> partnership vision
Take a state-of-the art analysis and provide a clear SWOT and business solution plan + maturity scan, risk analysis (clusters can help)
Create concrete understandable guidelines for each step in the digitization timeline
Trainings about motivation, emotions, finding solutions. Changes in team, without losing -> social skills

GROUP 3

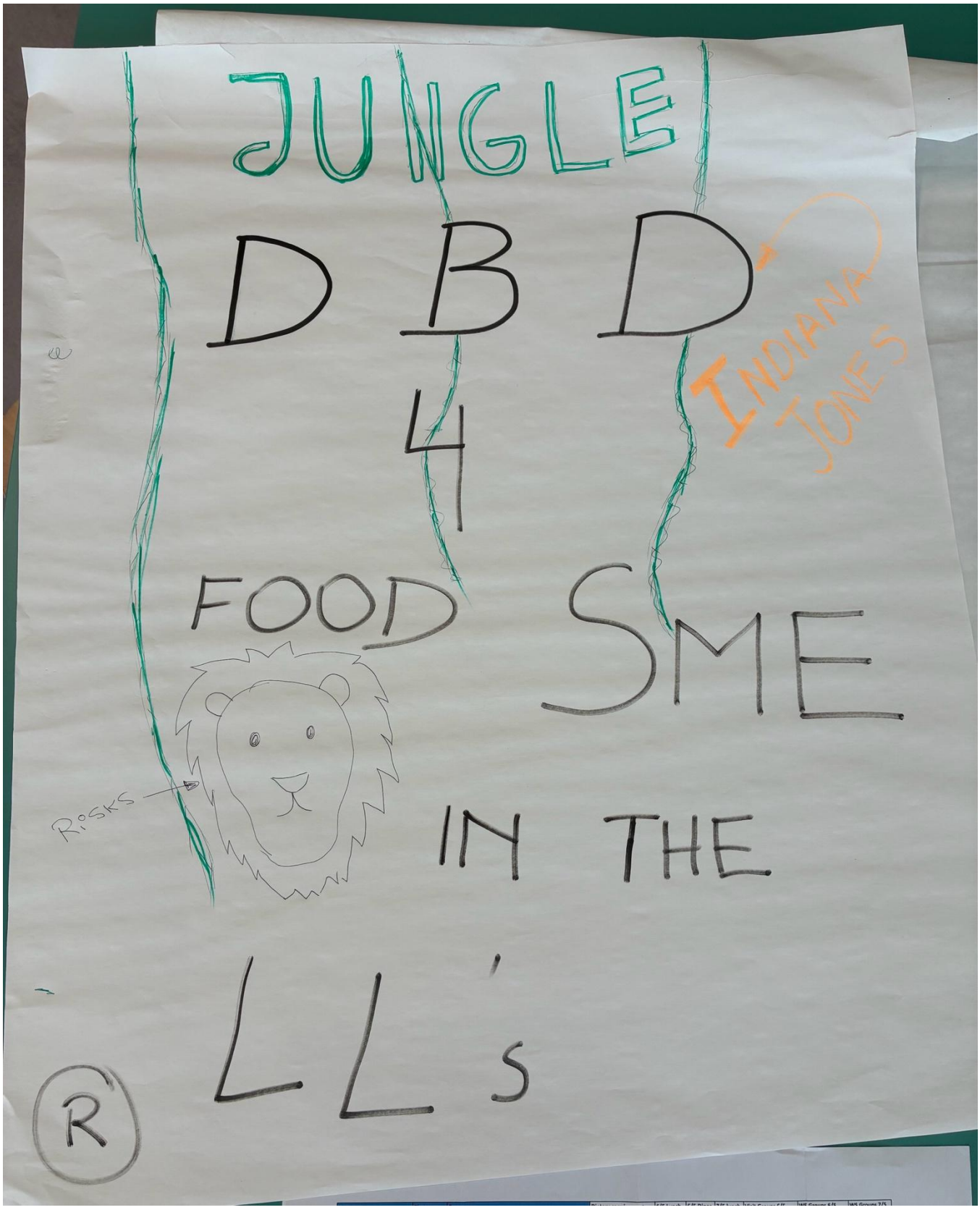
Data visualization	Costs	Key metrics
Cooperation SME's, LL's, research	Knowledge	SME competencies
Case study	Personnel	Skill set employees
DAAS	Technology doubts (RISKS)	Usability of Data
Start small, modular		ROI
		Expanding further by convincing the board and grant vouchers for SME's and LL's

Day 2

GROUP 1: Strategy for digitalization in Food Tech SME's

A plan of action designed to achieve a long term or overall aim

- Regulation is coming are you prepared?
- SME's want to get inspired
- Show (results) don't tell (in order to convince)
- Business developer Helping SME with checklist
- Inspire, put to actions, All from SME perspective
- Why digitalisation is a perquisite for a sustain. future
- Human centred approach
- Lean & mean for interoperability
- Levels of trust of customers in business
- Formal standards for data use storage exploitation
- Levels of digitalization in SME's (how to take steps?)
- Levels of digitalisation
- Use of support services such as EDIH
- Idea for solutions
  -tangible actions
  - what to measure
  - proof of concept
- a new Food-tech initiative is like planting a new tree in the jungle


JUNGLE
D B D
4
INDIANA JONES
FOOD SME
RISKS
IN THE
LL'S
R

Plenary feedback

Digitalization strategy for a food SME!

1) Who
   - Digitalisation specialist?
   - Person

2) Really like the idea
   - Approachable solution
   - How to make it not to overwhelming?
     -> Taking businesses by hand
     -> LL are unique position know the new things coming but also talk to the SME's

3) You have seen Veg-i-tec how you see this function?
   - Digiscan proposed by FF

4) 1st should be for free
   - Where do they stand
   - What are usecases for you
   - Take them by hand to show solutions

Challenge -> training for DBD

➔ Aim is to have DBD in the LL so they have the knowledge of the (specific) sector.

5) What is the difference with an integration?
   -> it is not an integrator it is to inspire

6) FF is doing this – but it is not for free.
   - It takes 1 day (0,5 day for scan and 0,5 day for report)

   Funding of VLAIO we can offer it for €1200 not linked to living lab

7) In Flanders we have challenges to get SMEs to LL because they need to pay.

1e step = inspire = open the door
2e step = solution of FF digiscan

- How often do you do today the service?
- Not easy to sell today. FF know for product not digitalization change.

Commitment circle

- Similar approaches are existing & check what is + and – of these existing
- Do some testing with stakeholders

GROUP 1: Roadmap for data(sharing) and DAAS activities in LL.

Problem

Pushing technology/digitalization
Different people from company in eperiments
Companies com for different question (product/ingredient)

Show step by step -> adding value
Lower barrier
Start with easy step
Add digitalization as an extra layer
LL's as reference with tests/cases -> make them state of art/fit for purpose

Need/landmine

Security
Explain end users about data use
More services you offer -> more expensive (project) + more time required → Vouchers funding
Difference between LL's
No time for "extra's" -> funding for basis

Food company

Test cases
First steps -> step by step (what they can handle)
Test-before-invest

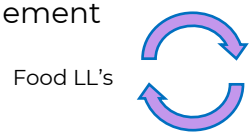
Tech provider

Use/show capabilities -> ask in beginning
Learn form question of end users
Knowledge

LL's

Working together -> evolve quicker
Complement – work with student

Role for this



Need: remain relevant -> no extra -> need!

Example

Company x: ingredients + spices
Question: test recipe with more sunflower (extrusion)
Intake: talk about challenges -> product in value chain
Company details/type of machines/software
Structure

expectation: chat they want? How big?

Start project: data collected/ingredient
Focus on questions/be part of solutions (use sensors + machines you have)
Machine collects data -> students use data
-> External experts
End:
Show results on question they came with
Show them what you saw more
Dive deeper: STEP 2

Plenary feedback

Daas activities in LL (add on as digitization in LL)

How do the LL see this?

- LL want to give the best service to a company and data is part of this to-day

(Markus) Our LL purpose is education as mentioned in LL is a challenge

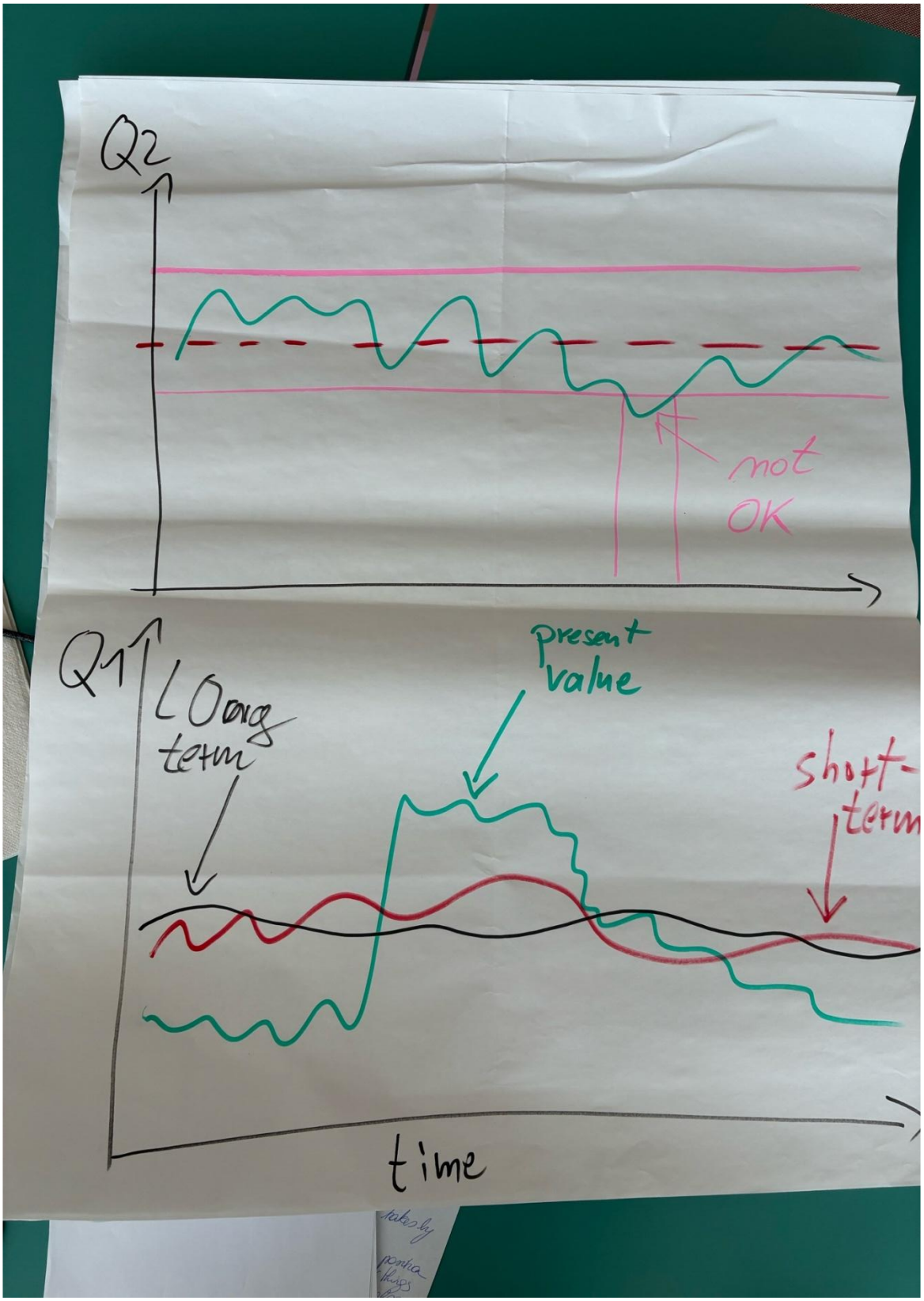
Commitment circle

What could be the next step?

- How does the add-on look-like & reflect with SME's
- Promoting or convincing the people of the 4 LL to think about what they have now and how they can incorporate a digital service

Share the experiences of what we already have now

GROUP 3: From data to actionable information (DAAS)



Plenary feedback

DAAS data to achievable information

- Could it be possible to have these … formats in the LL's
- Markus will try to make this happen on the refrigerator

Commitment Circle

- How would it look like in the LL's situation encountered by others to learn from each other?

- Show how to do it and showcase what it can do & bring

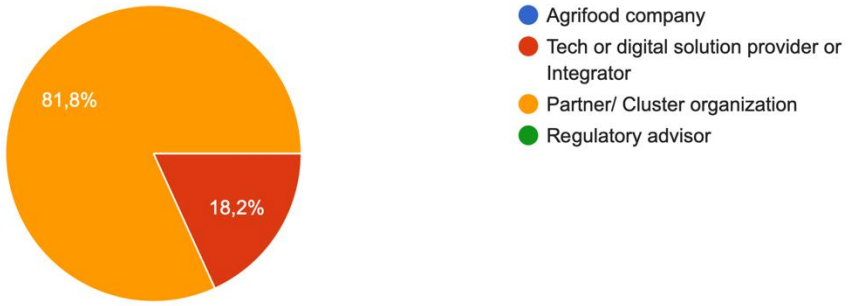
- Comment from Ari we thought about an open available dataset -> but soon it looked like a snowball because data -> metadata
  & no budget because too big but visualization is possible.

What are the next steps?
- *Short article (Markus with the help of Ulrich)*

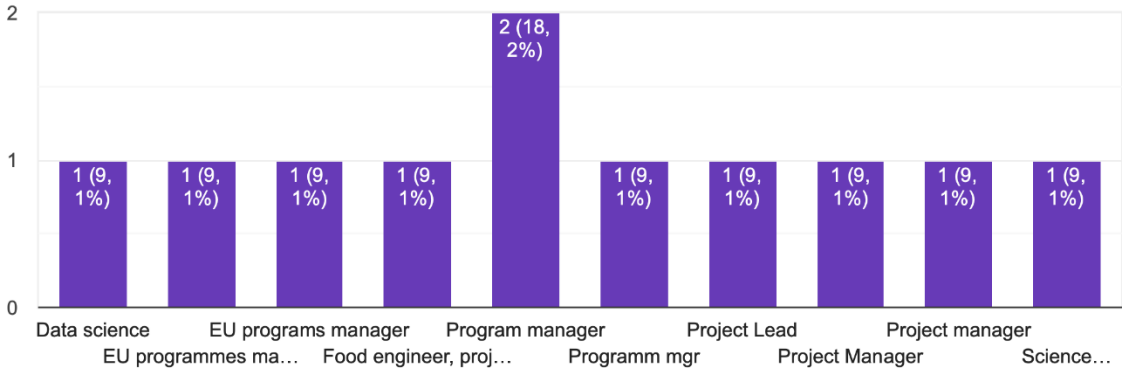
ANNEX 2 – Survey: Study visit Belgium

We received 11 answers only

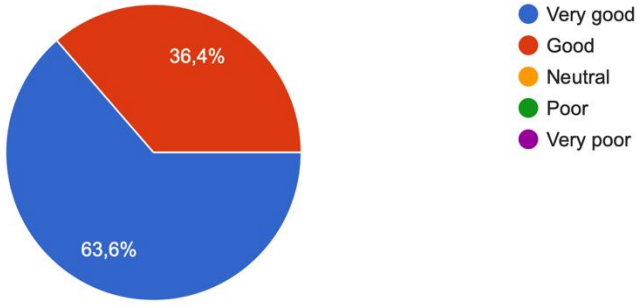
Choose you type of company are you active in.
11 antwoorden



What is your function or profession
11 antwoorden

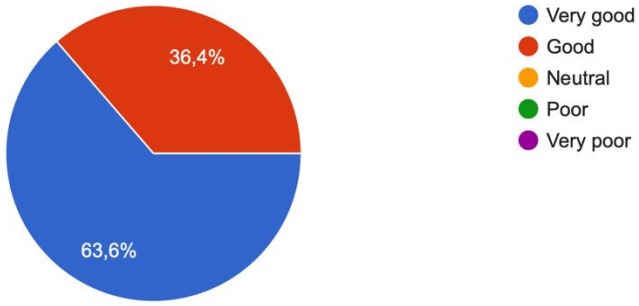


How would you rate the study visit overall?
11 antwoorden



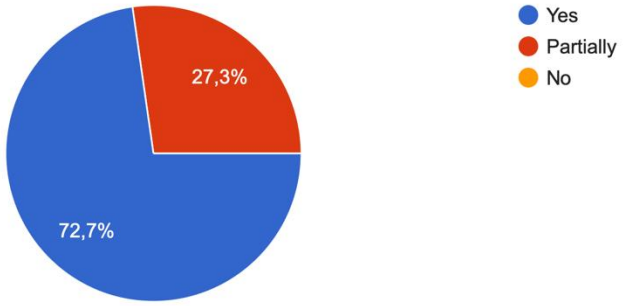
How would you rate the organization of the study visit?

11 antwoorden



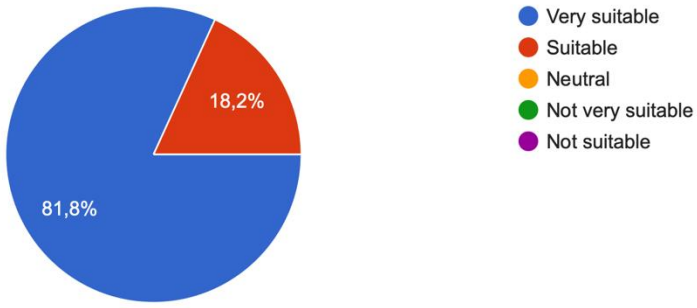
Was the information provided in advance sufficient?

11 antwoorden



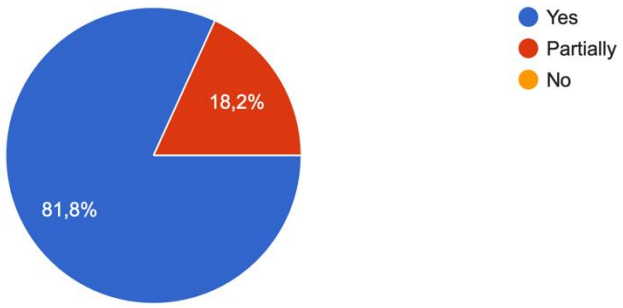
How would you rate the selection of Living Labs visited?

11 antwoorden

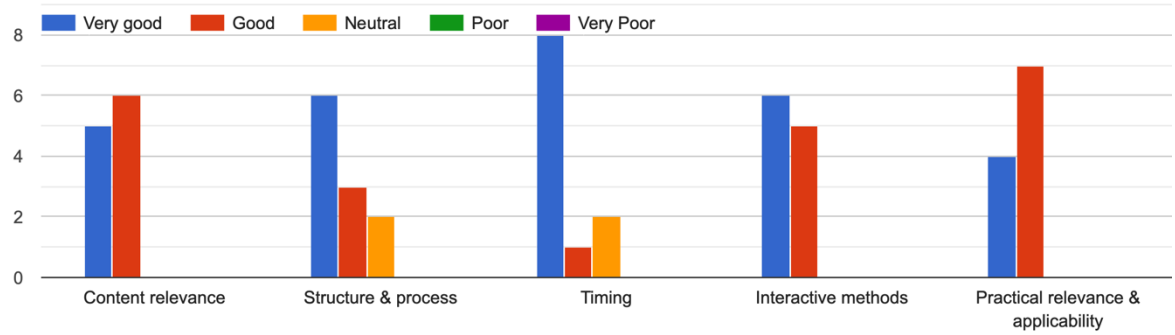


Did the workshops meet your expectations?

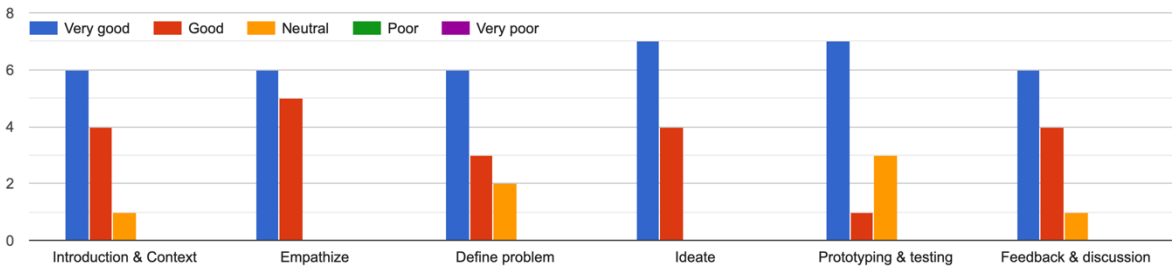
11 antwoorden



How would you rate the following aspects of the workshops?

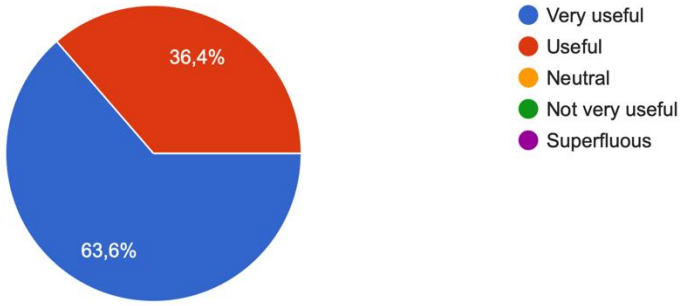


How helpful did you find the individual workshop phases?



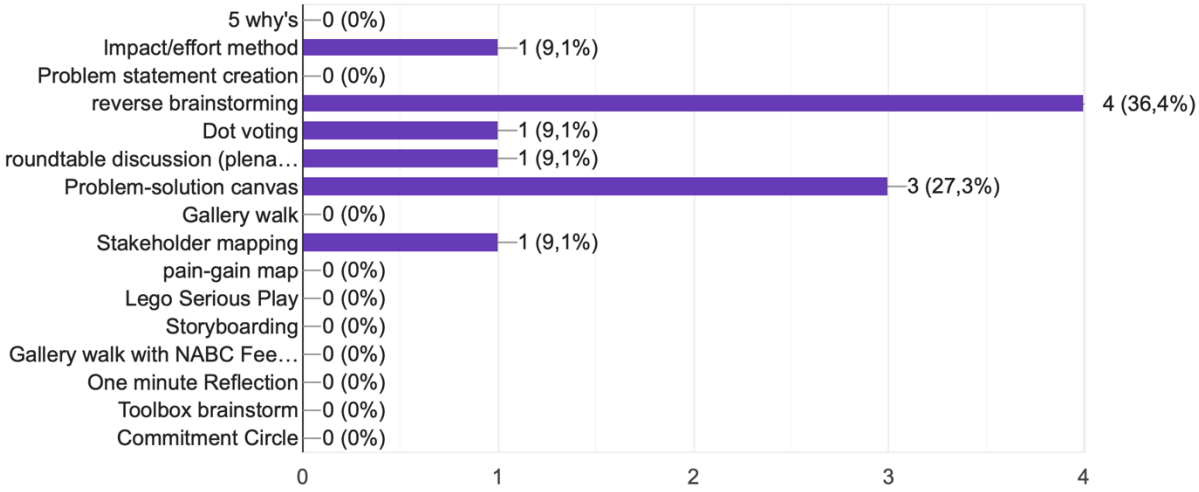
How do you rate the use of the co-creation methodology in the workshops?

11 antwoorden



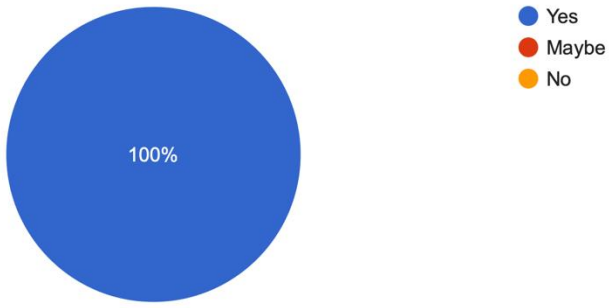
Which methods did you find particularly valuable?

11 antwoorden



Would you attend similar workshops in the future?

11 antwoorden



What did you particularly like?

- Brainstorming among the participants
- Networking
- The interaction
- The people and the location
- Living labs
- The opportunity to learn about the needs (regarding data and/or digitalisation) of agrifood actors in other EU regions; and to dedicate to think about new solutions without the constrains of a call.
- Inspiration within the living labs, the group discussions and the challenges and opportunities of others
- Inspiring talks
- Practical in person demonstrations
- Open discussion
- Positive atmosphere, meeting new people. Getting inspired. Interesting visits

What could have been improved

- Invitation extended not only to experts but also SME representatives to get to know deeper their needs, beliefs and expectations of Living labs
- No comment
- The density of the program
- Perhaps a tighter guidance on the topic, and shifting focus from SMEs to living labs / and how they came better help SMEs)
- Best is to have workshop in first part of day
- I'd have liked to have more information about attendants and entities, not just name, either during the introductions or beforehand (maybe you sent it to us and it was an internal delivery issue).
- Make the program a bit wider. It was quite tight, especially when the energy went down. It is hard to make it concrete
- Alignment of the Problems we want to solve
- For the co-creation part, provide optional (existing) concrete problems to solve. For a better focus during the task.
- Time to reflect and digest on outcome of brainstorms and workshops
- Company visit, before brainstorm

What insights did you gain from the Living Labs?

- Getting to know the degree of technology development and also examples of the application in different cases
- Best practices sharing
- Interesting
- Many! How to setup data sources, eee a proper digital twin in action etc.
- Ideas, how to create living lab in my institution.
- How others address similar needs, common and different approaches. I'd highlight that the SME ecosystem faces similar challenges around Europe.
- How they handle their data, how they are in contact with companies and help them (services), what infrastructure they have
- Inspiration on what is possible
- Factory and manufacturing examples and inner workings.
- There is more possible than we might think
- New tech, different governance, inspiration

Do you have any suggestions for improving the co-creation methods?

- No
- It would be very positive to invite also SME representatives to know their point of view about living labs. Do they know what a living lab is? Have they used a living lab before? What would expect from a living lab?
- A smaller selection might be better
- First to give some examples of implemented situations
- Encouraging the active involvement of all participants, building multidisciplinary teams.
- Less methods, scoping a bit more (more we went in all directions in the initial phase which made it harder to dive deep in a few topics).
- More guidance?
- Concrete problems to solve.
- N/a
- Fewer methods, more time. Document with context and common starting point

What insights from the workshops will you apply in your work?

- The importance of involving all possible stakeholders when defining the needs and services to be offered to SMEs
- Brainstorming
- X
- How to do timeseries
- Canvas
- New perspectives of common problems and needs, collaboration to build shared solutions, active listening and understanding.
- We will dive deeper in the digitisation as a service
- Showcasing use cases
- Reverse brainstorming

Were there any concrete solutions or approaches you would like to pursue further?

- Increase the awareness about twin transition need for every enterprise, to accomplish government and law requirements and how Living lab could help/accompany in this journey
- No
- Problem solution canvas
- Time series article
- Creation of ecosystem in living lab
- I need to think deeper to answer this.
- How to create a layer on the food questions with technology
- Strategy for LL data management
- In general problem solving
- DaaS
- Not really

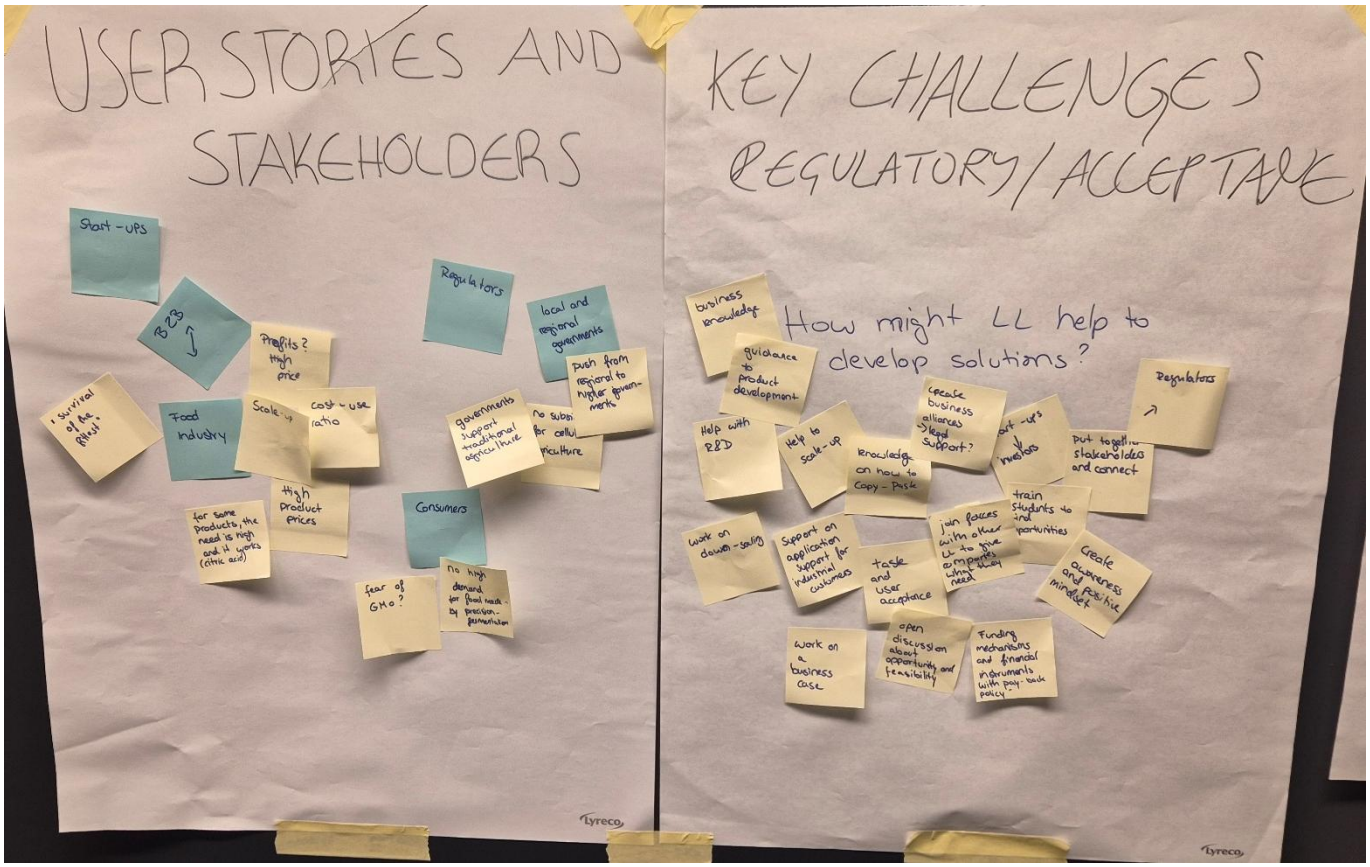
Do you have any comments or feedback about the event?

- No
- Good way for allowing growing ideas among different background people
- Great job!
- All was well organized
- It was a bit intense (all this kind of activities are). Having information in advance could help attendants to have more knowledge on the topic beforehand, but we would loose spontaneity.
- No. Thanks for Perfect Organisation
- No more comments
- N/a
- Very nice! Great group

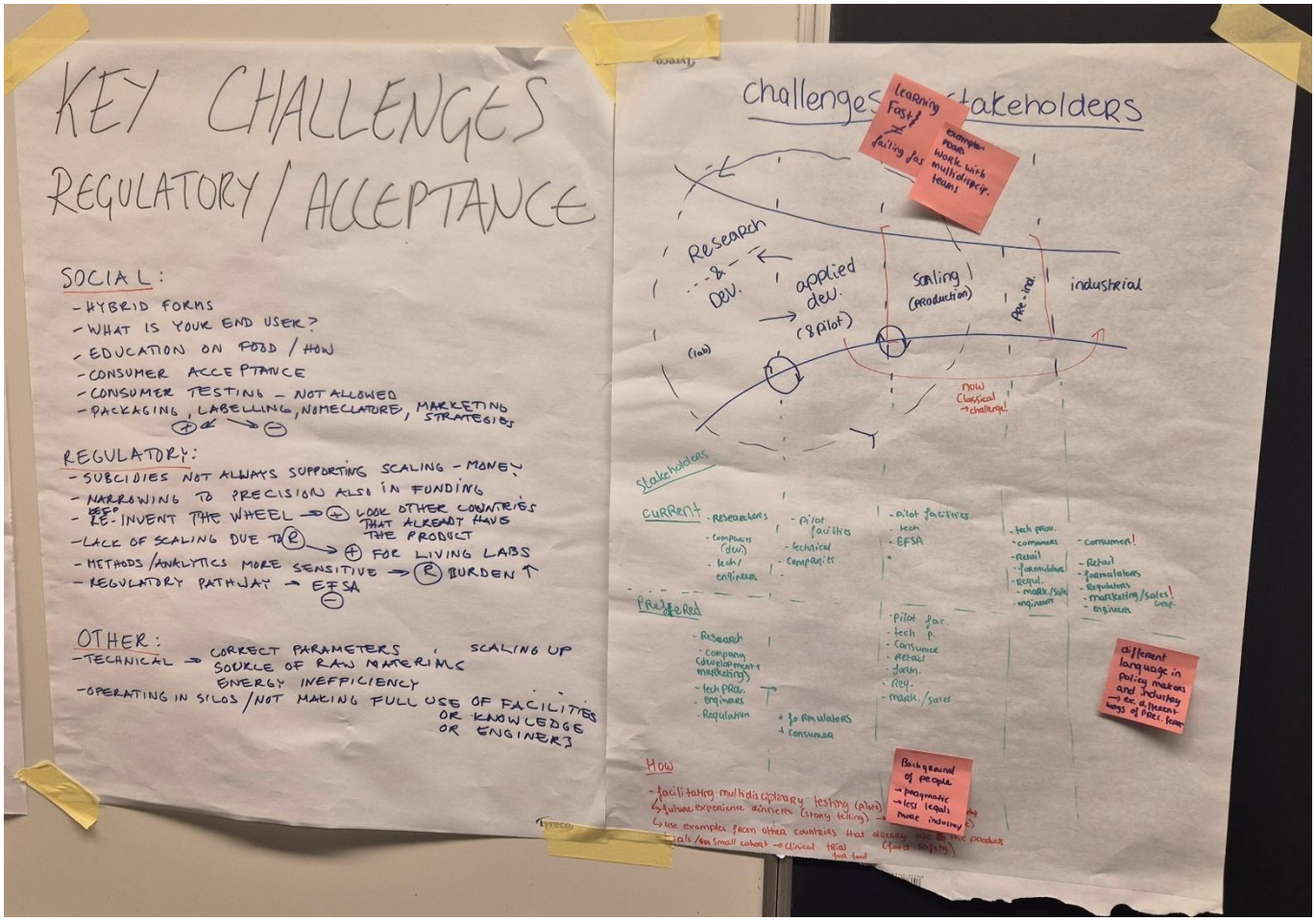
ANNEX 3 – Workshop notes from the Workshops held in Finland

Day 1

GROUP 1

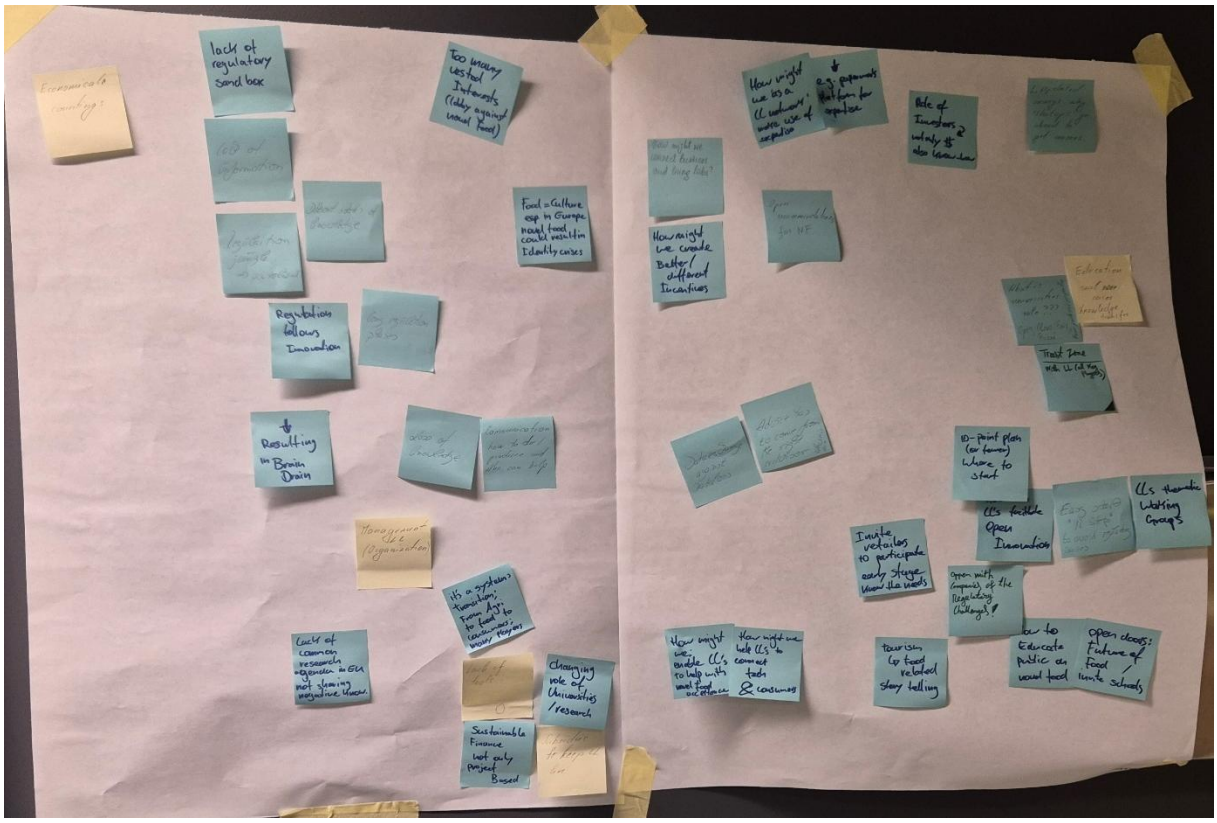


GROUP 2

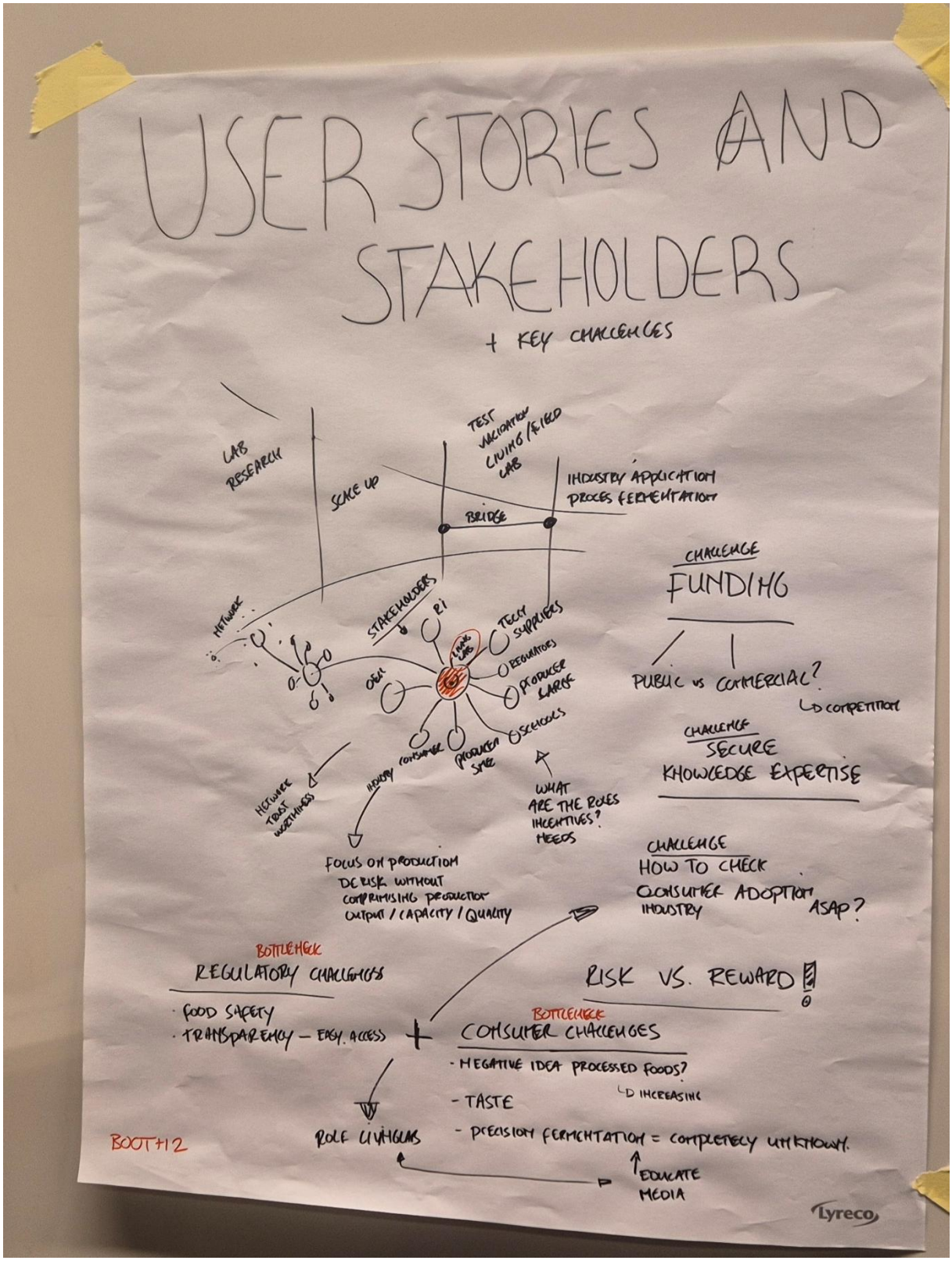

KEY CHALLENGES
REGULATORY / ACCEPTANCE
SOCIAL:
- HYBRID FORMS
- WHAT IS YOUR END USER?
- EDUCATION ON FOOD / HOW
- CONSUMER ACCEPTANCE
- CONSUMER TESTING - NOT ALLOWED
- PACKAGING, LABELLING, NOMECLATURE, MARKETING STRATEGIES
REGULATORY:
- SUBCIDIES NOT ALWAYS SUPPORTING SCALING - MONEY
- NARROWING TO PRECISION ALSO IN FUNDING
- KEEP RE-INVENT THE WHEEL → + LOOK OTHER COUNTRIES THAT ALREADY HAVE THE PRODUCT
- LACK OF SCALING DUE TO R → + FOR LIVING LABS
- METHODS / ANALYTICS MORE SENSITIVE → R BURDEN ↑
- REGULATORY PATHWAY → EFSA
OTHER:
- TECHNICAL → CORRECT PARAMETERS, SCALING UP
SOURCE OF RAW MATERIALS
ENERGY INEFFICIENCY
- OPERATING IN SILOS / NOT MAKING FULL USE OF FACILITIES OR KNOWLEDGE OR ENGINERS
challenges stakeholders
Research & Dev.
applied dev. (8 pilot)
Scaling (production)
industrial
Stakeholders
Current
Preferred
How

GROUP 3

USER STORIES AND STAKEHOLDERS
Start-ups
B2B
Profits? High price
Regulators
local and regional governments
Food industry
Scale-up
High product prices
Consumers
fear of GMO?
KEY CHALLENGES
REGULATORY/ACCEPTANE
How might LL help to develop solutions?
business knowledge
guidance to product development
Help with R&D
Help to scale-up
Regulators
work on a business case
Tyreco


lack of regulatory sand box
Too many vested Interests (lobby against novel food)
Food = Culture esp in Europe novel food could result in Identity crises
Regulation follows Innovation
Resulting in Brain Drain
Changing role of Universities / research
Sustainable Finance not only project Based
How might we create Better / different Incentives
Role of Investors
10-point plan (or fewer) where to start
LL's facilitate Open Innovation
LL's thematic Working Groups
Invite retailers to participate early stage know the needs
Tourism to food related story telling
Open doors: Future of Food / invite schools

GROUP 4


USER STORIES AND STAKEHOLDERS
+ KEY CHALLENGES
LAB RESEARCH
SCALE UP
TEST VALIDATION LIVING/FIELD LAB
INDUSTRY APPLICATION PROCES FERMENTATION
BRIDGE
NETWORK
STAKEHOLDERS
RI
TECH SUPPLIERS
REGULATORS
PRODUCER LARGE
SCHOOLS
PRODUCER SME
CONSUMER
INDUSTRY
NETWORK TRUST WORTHINESS
WHAT ARE THE ROLES INCENTIVES? NEEDS
FOCUS ON PRODUCTION DE RISK WITHOUT COMPRIMISING PRODUCTION OUTPUT / CAPACITY / QUALITY
CHALLENGE
FUNDING
PUBLIC vs COMMERCIAL?
COMPETITION
CHALLENGE
SECURE KNOWLEDGE EXPERTISE
CHALLENGE
HOW TO CHECK CONSUMER ADOPTION INDUSTRY ASAP?
BOTTLENECK
REGULATORY CHALLENGES
· FOOD SAFETY
· TRANSPARENCY – EASY ACCESS
+
RISK VS. REWARD!
BOTTLENECK
CONSUMER CHALLENGES
- NEGATIVE IDEA PROCESSED FOODS?
INCREASING
- TASTE
- PRECISION FERMENTATION = COMPLETELY UNKNOWN.
EDUCATE MEDIA
ROLE LIVINGLABS
BOOTH 12
Lyreco