D3.2 IE EXECUTION PLAN

WP 3

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BioSense Institute

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LIST OF ABBREVIATIONS

Abbreviation	Explanation
CC	Competence Centre
DIH	Digital Innovation Hub
EP	Execution Plan
FIE	Flagship Innovation Experiment
IE	Innovation Experiment
KPI	Key Performance Indicator
MVP	Minimal Viable Product
OC	Open Call
RC	Regional Cluster
WP	Work Package

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PROJECT SUMMARY

Digital technologies enable a transformation into data-driven, intelligent, agile and autonomous farm operations, and are generally considered as a key to address the grand challenges for agriculture. Recent initiatives showed the eagerness of the sector to seize the opportunities offered by ICT and in particular data-oriented technologies. However, current available applications are still fragmented and mainly used by a small group of early adopters. Against this background, SmartAgriHubs (SAH) has the potential to be a real game changer in the adoption of digital solutions by the farming sector.

SAH will leverage, strengthen and connect local DIHs and numerous Competence Centres (CCs) throughout Europe. The project already put together a large initial network of 140 DIHs by building on its existing projects and ecosystems such as Internet of Food and Farm (IoF2020). All DIHs are aligned with 9 regional clusters, which are led by organizations that are closely related to national or regional digitization initiatives and funds. DIHs will be empowered and supported in their development, to be able to carry out high-performance Innovation Experiments (IEs). SAH already identified 28 Flagship Innovation Experiments (FIEs), which are examples of outstanding, innovative and successful IEs, where ideas, concepts and prototypes are further developed and introduced into the market.

SAH uses a multi-actor approach based on a vast network of start-ups, SMEs, business and service providers, technology experts and end-users. End-users from the agri-food sector are at the heart of the project and the driving force of the digital transformation.

Led by the Wageningen University and Research (WUR), SAH consists of a pan-European consortium of over 160 Partners representing all EU Member States. SAH is part of Horizon2020 and is supported by the European Commission with a budget of €20 million.

EXECUTIVE SUMMARY

The H2020 SmartAgriHubs (SAHs) consortium consists of more than 164 partners from all over Europe coordinated by Wageningen Research. BioSense Institute (BIOS), as a leader of WP3, together with co-leader the Flanders Research Institute for Agriculture, Fisheries and Food (ILVO), and Gradiant as participating organisation is responsible for the implementation and monitoring of all European Regional Clusters (RCs), Flagship Innovation Experiments (FIEs) and Innovation Experiments (IE) within the project.

This report is the second iteration of IE execution plan deliverable. While the first one (M14) focused on the execution plans (EPs) from 28 initial FIEs, the second iteration is analysing and presenting project proposals (execution plans) from the Open Call (OC) IEs contracted during the second reporting period. More precisely, subject of this deliverable are EPs from the following five OCs:

Full name of the project	Short name of the project	Number of approved proposals/finalised on 15.10.2121	Comment
RESPOND1 to the COVID-19 Crisis	RESPOND1 DIHs	13/13	All 13 projects are finalised.
RESPOND2: SAH2SMEs	RESPOND2 SMEs	8/8	All eight projects are finalised.
RESTART the European Agri-Food Economy after the COVID-19 Crisis	RESTART	5/1	Four projects are ongoing, and are subject to this deliverable
EXPAND the SmartAgriHubs Community Network	EXPAND	6/0	Five projects are contracted by 15.10.2021 and presented within this document
PREPARE Innovation Experiments for Digital Transformation with Teams in the Agri-Food Economy	PREPARE	16/0	16 projects have been selected, 15 have been approved for financing. This deliverable presents 14 contracts that are signed by 15.10.2021.

Table 1 - Overview of the five OCs

At the time of writing this report, three OCs were closed – Respond1 DIHs, Respond2 SMEs and Prepare, while in the upcoming period new projects are expected from the RESTART, EXPAND and SERVICE OCs. Until 15.10.2021, 47 projects have been approved under five different OC, while 45 projects are subject to this deliverable. Two projects that are already approved for financing will be contracted shortly and for this reason are not presented. At the time of the deliverable submission, 23 OC projects are running in total from the Restart, Expand and Prepare OCs.

Considering that several OCs are still running, as described above, the final number of IEs implemented under SAHs is not known at this moment and will depend on the available project resources. More precisely, the following OCs are still open for project's submissions:

- EXPAND to be closed on 29.06.2022. New proposals are approved on ongoing basis.

- SERVICE OC is currently open. The first batch will be closed on 10.11.2021, therefore this open call is not part of the deliverable, while
- RESTART OC was closed on 29.09.2021, winners form the last batch will be announced in October/November 2021.

Deliverable *D2.6-2: Periodic Reports on SmartAgriHubs Network Expansion by Open Call,* in a greater detail elaborates and analyses the OC mechanisms.

Project that are currently running but are not part of this deliverable as well as those projects that will be implemented during the third reporting period will be presented as part of D3.4-3, due M48, as this report is the last iteration of D3.2.
The selection of the OC proposals was based on several criteria that vary within different OCs. Nevertheless, all experiments had to present innovativeness, the endorsement by existing Digital Innovation Hubs (DIHs), and the degree to which it unites end-users and technology providers, by solving various agricultural challenges.

While deliverable D3.2-1 had the objective to provide a comprehensive and detailed FIEs' implementation plan, in order to assure successful execution of all experiments, deliverable D3.2-2 has the same goal but switches its focus to the OC IEs. The main aim of this deliverable is to define the working dynamic in order not only to anticipate and respond to possible emerging issues with the available resources, but also to set a base for the IEs progress monitoring, to check whether project is on-track and aligned with the planned working activities. Unlike FIE EPs which had a predefined EP template, IEs had only predefined template elements, as envisaged in the OC fiche. Also, five OCs (OC RESPOND1 – DIHs, RESPOND2 – SMEs, EXPAND, RESTART, PREPARE) had different requirements, therefore IE EPs are not all structured in the same way. Nevertheless, all minimum requirements, will be presented in this deliverable.

All IEs are divided in nine Regional Clusters, based on their geographical coverage (UK & Ireland, Scandinavia, France, North West Europe, Central Europe, North East Europe, Iberia, Italy & Malta, and South-East Europe). However, some of the main outcomes of this deliverable show that the RCs are not evenly represented in the OCs – RC NWE has been the most represented throughout the project whereas RC Scandinavia did not have a single project within these five OCs. Concerning the project final solutions, they are widely spread across the agri-food sector, each of them solving different obstacles through innovative approaches in the agri-food field. The most common end-solutions are platforms mainly targeting farmers, producers, and SMEs in the various fields of the agri-food sector. This deliverable also provides analyses of gender balance within the project teams as well as among the coordinators.

The deliverable presents a detailed overview on IE EPs, outlining the main responsible partners, specific activities that need to be included, as well as expected results within the experiment and is divided in five main chapters:

Chapter 1 – Approach and methodology explaining the background of the OCs – common elements and differences, including modality of work conducted;
Chapter 2 – Open Call Description – five OCs and IEs under these OCs are briefly described;
Chapter 3 – Analysis and results - analyses the IEs, general statistics and results;
Chapter 4 – Conclusion;
Chapter 5 – Annex 1 – Open Call Execution Plans.

This is the public version of the deliverable.

1. APPROACH & METHODOLOGY

While predefined EP template was applied with initial 28 FIEs, the OC IEs were not provided with such form. The five OCs fiches included mandatory template elements. This is the first main difference in the approach. Annex 1 gathers all EPs form OC IEs that are subject to this deliverable, and their diversity in structure is evident from there. Nevertheless, it is important to emphasize that all OC proposals had to fulfil certain requirements in order to be selected for funding.

For all proposers the minimum requirements were the same, with certain specifics within different OC. The common general requirements for the proposers include the following:

- Proposals must be a legal entity established and based in one of the EU Member States or a H2020 Associated country as defined in H2020 rules for participation;
- Proposals must be directly responsible for the preparation, management and execution of the Project, and;
- Proposals cannot receive any other funding for the same activities in the Project;
- Proposals can't be a (direct) Beneficiary of the Grant Agreement No. 818182;Organisations that have a sub-contract with a SmartAgriHubs beneficiary are generally eligible, if there are no other links to beneficiaries that could cause a conflict of interest;
- Proposals should usually be submitted by a DIH and include at least one Digital Innovation Hub as proposing and coordinating partner. This can deviate for OCs directly calling for SMEs like the open call RESPOND2 SAH2SMEs;
- DIHs and CCs participating in a proposed project, must register in the SmartAgriHubs portal before submitting a proposal (https://www.smartagrihubs.eu/portal/network). DIH(s) and CC(s) submitting a proposal to SAHs need to explain their qualification and the offered service portfolio. It is not required to undergo a specific external certification procedure at proposal stage. CCs must also describe their systems/ competences to be used in the development of the IE(s);
- IEs shall only be presented in one proposal submitted to SmartAgriHubs and not in several;
- The current SAHs beneficiaries (i.e. specifically DIHs and CCs) will however be able to support the proposed project with up to 10% of the funding requested in the proposal. If you expect an added value by an involvement of a SmartAgriHubs beneficiary, please explain this in your proposal. This shall be generally agreed with the related SmartAgriHubs beneficiary before submitting your proposal.

Other than these general requirements/criteria, all IE EPs had to align with the several more specific requirements, including:

- Envisaged type and purpose of involvement of current SAH partner(s);
- Expected amount of effort required;
- Type of results and experiences that shall be used from one of the current FIEs, also explaining how it would be (commercially) used;
- Number of meetings, trips or other activities required by existing partners;
- Allocation of min. 75% of the overall budget to the support of small, medium, and micro enterprises. Small and medium-sized enterprises (SMEs) are defined in the EU recommendation 2003/361;
- Involved SMEs shall sign an SME declaration;
- Proposers and related organisations intending to receive funding from SAHs need to be registered legal entities. This does not exclude micro enterprises, like represented by farmers and their operations that are registered entities, while possibly only including the farmer as individual owner of the registered entity;
- The proposal needs not to identify supporting CCs or specific IEs at time of submission, but proposers need to clearly elaborate a digitisation strategy and their envisaged offering for IEs as well as explain their DIH service portfolio and the reusability potential of the final results.

Furthermore, all IEs had to comply with an overall and specific content related requirements, presented in their proposals:

- Abstract of the project, project activities, established partnerships with the consortium and signed letters of intent (LOI);
- Outline – explanation of the overall idea;
- Strategies and services that highlights regional, cross-regional and international collaboration objectives, strategies and offered services;
- Replicability – a strategy to create a sustainable impact;
- Funding Scheme – explaining the assignment of requested funding and outlining the mobilisation of additional funding, as well as budget planning;
- Timing of activities, milestones and related deliverables;
- Description of partner organisations within the established consortium as well as CVs of key individuals;
- Declaration concerning unique proposal submission and SME declaration.

Based on these obligatory requirements, proposals were evaluated by the evaluation committee. One of the criteria for a proposal to be selected is that the above-mentioned minimum requirements are fulfilled. More details on the evaluation of the proposals is available in D2.6.-2. Proposals with the positive outcome were contracted afterwards.

1.1 SPECIFIC ELEMENTS OF EACH OC

Even though all OC projects had to fulfill minimum requirements as described above, each OC addressed different issues and expected outcomes, as presented within Table 1:

	OC RESPOND		**OC EXPAND**	**OC RESTART**	**OC PREPARE**
	DIH	SME			
Open Call Topic	Open call for hackathon type of activities that will RESPOND to the effects of the COVID-19 crisis and use opportunities to fight against the COVID-19 pandemic from the perspective of what digital innovation can contribute to mitigate consequences in the agri-food domain.	Pan-European on-line Challenge calling for SMEs to RESPOND to the effects of the crisis and use opportunities to fight against the COVID-19 pandemic from the perspective of what digital innovation can contribute to minimize the consequences of the crisis to the European agri-food economy.	DIHs that propose a thorough strategy to support the digital innovation in their region and facilitate the set-up and realisation of Innovation Experiments (IEs).	Proposals shall address opportunities that can mitigate the consequences of the COVID-19 pandemic in the agri-food domain, from the perspective of what digital innovation can contribute.	Open call for DIHs that are supporting teams in the planning and definition of Innovation Experiments for digital transformation in the Agri-food economy
Type of activity supported	- On-line Hackathons - Focused Challenges	Digital solutions responding to the effects of the crises	Setting up Innovation Experiments in agrifood sector; Validating the	- Online & offline Hackathons - Focused Challenges - Datathons	DIHs can propose activities and services that support companies and/or

	OC RESPOND		OC EXPAND	OC RESTART	OC PREPARE
	DIH	SME			
	- Datathons		services offered by DIHs and Competence Centres; Facilitating experience exchange and critical mass of the European Network of DIHs and CCs.		organisations in the definition and planning of IEs.
Potential Proposers	Activities shall be proposed by one or several DIHs.	Activities shall be proposed directly by SMEs and/ or start-ups from member states or associated countries.	Activities shall be proposed by one or several DIHs.	Activities shall be proposed by one or several DIHs.	Activities shall be proposed by one or several DIHs.
Expected Results	The main objective is to generate ideas for potential IEs that are responding to the effects of the COVID-19 crisis.		Proposed project shall result in a specific number of IEs directly enabled and supported by DIHs.	Results of hackathon type of activities can be presented as conceptual implementations or also Minimum Viable Products that can serve as implementation baseline for a follow-up by the involved teams or by other third parties.	A specific objective of this PREPARE open call is to prepare a proposal for an IE that can be submitted in the EXPAND open call.
Available Funding	10,000 to 30,000 Euro	30,000 to 50,000 Euro	100,000 to 500,000 Euro In the proposals, sources of additional funds that are intended to be mobilised, should be identified. The DIH should in total mobilise one part from SmartAgriHubs funding and four additional parts from other public or private funding sources.	10,000 to 60,000 Euro	max. contribution of 20,000 Euro

Table 2 - Specific elements for each Open Call

2. OPEN CALLS DESCRIPTION

To gain better understanding of each project approved, this chapter provides a brief explanation of each OC, and a description of projects contracted and implemented under each OC. However, it should be noted that three iterations of D2.6 Periodic Reports on SmartAgriHubs Network Expansion by Open Call are report in more detail on the realization of the SmartAgriHubs open calls, while D2.7: Open Call - Documents package: Package consists of Call document, delivered in M18, describes key documents used to define and communicate OCs. As previously mentioned, until the end of the current reporting period (M36), six OCs were launched: RESPOND1 DIHs, RESPOND2 SMEs, EXPAND, RESTART, PREPARE and SERVICE, all OCs except SERVICE are subject of this deliverable. More specifically, in Chapter 3, EPs from 45 projects under five OC are presented - 22 projects are already finalised under RESPOND1 DIHs, RESPOND2 SMEs, and Restart, while 23 projects are currently running under RESTART, EXPAND and PREPARE OCs.

2.1 OC RESPOND

During the RESPOND Open Call, the SAH community directly tackled the challenges faced in the agri-food sector due to COVID-19. The focus of the RESPOND Open Calls is on hackathon type of activities proposing solutions to minimise the effects of the crisis. Additionally, these activities helped to identify what role digital innovations can play to mitigate the consequences of the COVID-19 pandemic in the agri-food domain. The RESPOND Open Call was open between the May, 12th and June, 3rd 2020 17:00 CEST. There were two open calls, one for DIHs and the other for SMEs proposals. Both OCs were realised in the period from July to December 2020 and received funding from SmartAgriHubs. 21 proposals were selected for funding - 13 under RESPOND1 DIHs and eight under RESPOND2 SMEs.

2.1.1 OC RESPOND1 – DIHs

Proposals within OC RESPOND had to include at least one DIH. SAHs considered that proposals requesting a contribution from 10,000 to 30,000 Euro would allow to support the realisation of activities appropriately.

Call Topic: Open call for hackathon types of activities that will RESPOND to the effects of the COVID-19 crisis and use potential opportunities to fight against the CORONA COVID-19 pandemic from the perspective of what digital innovation can contribute to mitigate consequences in the agri-food domain. Such activities can be specifically:

- **On-line Hackathons:** In the scope of a hackathon, different topics are prepared, describing key opportunities and threats that have a special importance. Along the realisation of a hackathon experts are invited that can coach individuals and organisations aiming at the elaboration of a digital innovation, like new business models, process/product innovations or solutions for situations like imposed by the COVID-19 pandemic. A hackathon can be organised as an online format, to maximise the participation.
- **Focused Challenges:** The purpose of a challenge is to mobilise specific end-users that are experiencing a specific problem, where a digital innovation could help easing the situation. Solutions offered and implemented by technology providers should satisfy the formulated requirements. Usually, such activities are represented by an agile interaction of end-users and innovators, resulting in tangible solutions for a real-world application scenario. Good examples to organise challenges are immediate crisis threatening performance and safety of the agri-food chain, as well as basic threats and opportunities, that could be addressed by digital innovations for a higher sustainability, efficiency and/or effectiveness of the agri-food systems.
- **Datathons:** Organisations active in the agri-food domain are providing real data from operational business processes, where a datathon would bring this together with innovators aiming at the development of digital innovations (i.e. practical solutions) that can exploit the data for a specific purpose. Such purpose can be either located at

the data providers themselves, but also in any other stakeholder in the agri-food or related chains. The overall motivation is to use this type of digital innovation for generating added value information, knowledge and/or services that could make the agri-food system more sustainable, efficient, or effective. The role of DIH(s) with related innovation services can be central in this type of activities for community building, strategy development, project development and provision of technology infrastructure. On top of that, hackathon type of activities can be considered as innovation programmes with focused actions, involving stakeholders like the following:

- End-users, like farmers
- Agri-food chain related service providers
- Technology providers, like equipment manufacturers or software solution providers
- Innovative teams e.g. recruited from universities or startup initiatives DIHs and CCs.

Expected Results: The main objective is to generate ideas for potential IEs that are responding to the effects of the COVID-19 crisis. Results can be presented as conceptual implementations or also Minimum Viable Products that can serve as implementation baseline for a follow-up by the involved teams or by other third parties. The activities shall facilitate networking of organisations and individuals, aim at the mobilisation of talent.

Potential Proposers: Activities shall be proposed by one or several DIHs in accordance to their definition in the SmartAgriHubs open call programme document.

All 13 selected proposals from the OC RESPOND1 – DIHs will be briefly presented below.

OC RESPOND - DIH 1 - HACK4FOOD – TO FEED THE FUTURE (H4F)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

It aims at stimulating the development of digital innovations in order to tackle three identified challenges currently faced by the Agrifood sector in the Emilia-Romagna region, as a consequence of the COVID-19 crisis:

1. Achieving more integrated agri-food chains and improved efficiency, food safety, product traceability to mitigate the effects of the market downturn in animal, vegetable, fish and aquaculture production;
2. Preventing and mitigating the increase in agricultural and food waste generated by the COVID-19 crisis in an economic system already destabilized by the climate change;
3. Managing the food surplus for the benefit of those vulnerable groups who have been particularly affected by COVID-19 (e.g. elderly people).

To this purpose, talents were attracted and mobilized through the organization of a two-day on-line hackathon early October 2020. The participants were: wannabe and early stage start-uppers, R&D employees, farmers, university researchers & students. The hackathon gave the participants the opportunity to get in touch with different knowledge and skills and create tangible future innovation projects and experiments that can be applied in the agri-food sector thanks to the active engagement of mentors, stakeholders and the consolidation of the regional innovation ecosystem.

OC RESPOND - DIH 2 - Solutions that strengthen the supply-demand relationship along the agri-food chain based on circular economy and last mile delivery strategies in times of COVID-19 (StrengthAgriChain)

Duration of the project - three months and six days, from 28.08.2020 to 04.12.2020.

The agri-food sector has faced a major challenge due to the COVID-19 crisis, which has had an impact at different levels. In particular, the pandemic has disorganised distribution channels, leading to the loss of some of them during lockdowns such as the HoReCa channel,

and also has involved rebalancing supply to adjust to consumer shift. In this scenario, many producers have been put under stress to reorganise themselves and reach consumers in ways they did not do before, and consumers have needed to rely more than ever on local products. Considering the previous context, there is a real need to strengthen short distribution channels, particularly with greater emphasis in the case of fresh products, in which consumers can get direct access to producers and vice versa. However, the public health crisis has made this goal even more difficult to achieve, posing extra challenges from different points of view, in terms of logistics, ensuring food safety, traceability, or food preservation.

Thus, this proposal aimed at organising a "Focused Challenge" demanding new digital innovations and solutions that respond to these needs, actively boosting circular economy and last mile delivery strategies, empowering both producers and consumers and bringing opportunities for mutual benefit.

OC RESPOND - DIH 3 - Agri-food solutions using island-centred design in three Islands, Canary Islands – Madeira Islands – Azores Islands (AgrIsland Hackathon)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

AgrIsland Hackathon addresses the organization of an online hackathon with the objective of generating digital solutions to support the agri-food sector on European islands. Islands have a very particular nature compare with mainland both in economical and societal terms. On top of that, in regions like Canary Islands, Madeira or Azores (Macaronesian islands belonging to Spain and Portugal), the agri-food sector is looking at digital transformation and digital solutions as assets to overcome some stuck problems and needs. Therefore, it is the perfect moment to launch AgrIsland Hackathon, the creation of digital innovations for the support of islands' agri-food sector.

AgrIsland Hackathon will build upon agri-food Macaronesian issues confirmed by regional stakeholders to draft the requirements demanded for each type of solution. As a result, digital solutions developed during AgrIsland Hackathon will be fully aligned with real needs, and therefore, reuse of solutions is granted. In this sense, top 15 digital solutions will participate in the Design Factory, a supporting programme to provide them with tools and mindset to design services and product with a user-centred approach.

OC RESPOND - DIH 4 - LONG LIFE TO SAFE FRESH - What to start and accelerate? (LL2FRESH)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

One of the important responses to the effects of the COVID-19 crisis is sustaining the shelf life of fresh food, which directly involves scalable innovations in food security and tackling food waste. LL2FRESH is envisaged as a focused challenge and represents an online co-creation programme that aims to optimise shelf-life of food and to shake novel and innovative technologies to foster the development of innovative value chains, novel packaging solutions, food-treatment methods and the next-generation additives.

By gathering key Stakeholders of the food industry and innovators in multidisciplinary working teams, LL2FRESH will reinforce the consciousness for sustainable solutions that comprise the overall food/transportation value chains in an immersive co-creation programme that will support the creation of five projects with marketing and implementation potential in the food industry.

OC RESPOND - DIH 5 - Hack AgriFood 2020: RESPOND to the COVID-19 crisis (HACK'20)

Duration of the project - four months and 15 days, from 15.07.2020 to 30.11.2020.

AgriFood Lithuania DIH is organizing annual international agriculture and food technology themed events, including the Hack AgriFood hackathon. This year the hackathon is planned to be held within a broader series of events – the AgriFood Digital Innovations Week. In response to the challenges raised by the COVID-19 pandemic and the crisis leading it, 2020

edition of the hackathon will focus on solutions for the primary food production value chains that help tacked the issues caused by the crisis. The hackathon will be held in two parts:

- On-line challenge and datathon type event for experiences international teams of professional innovators (SMEs, projects, etc.);
- On-site hackathon for beginner innovators (startups, researchers, student, etc.) in Lithuania.

Together with direct involvement by end-users (small and medium sized farmers, the agriculture and food industry), other stakeholders and experienced international mentors, teams will create innovative solutions for the agrifood sector that increases its resilience to the ongoing COVID-19 or similar future crises. In addition, teams will gain wide international exposure to competence networks and opportunities to aid in their solution developed and commercialization after the hackathon.

OC RESPOND - DIH 6 - The COVID 19 INSPIRE Hackathon 2020 (INSPIRE)

Duration of the project - four months, from 01.07.2020 to 31.10.2020.

The COVID 19 INSPIRE Hackathon will be already the 17th hackathon organised by the Plan4All association. It will be based on the model of the INSPIRE Hackathon, which is not a single event, it's a process that is designed to efficiently exploit the achieved results of previous hackathons on developing new innovations. The concept of the INSPIRE Hackathon has the following elements that complement each other:

- Tools and applications: the policy is that tools and applications that are developed during the hackathons are open source software for the benefit of forthcoming hackathons and domain experts; Data: INSPIRE Hackathon has an access on domain datasets through partnership network; Know-how and skills: hackathon puts effort of participant's capacity building through mentoring, facilitating, webinars, hands on doing and social learning; Mentoring: for hackathon participants are offered possibilities of mentoring and they can decide to try to extended solution in own business or further developed solution with existing subjects;
- Reuse of results: exploitation of the IE results can be done through hackathon participants, regional stakeholders, cooperative projects and partners are empowered to exploit the results;
- Community: INSPIRE Hackathon movement has formed a large global community that gathers together smart agriculture, agri-food system and geospatial experts to a common social space to learn, share and innovate new future;
- Communication and dissemination: hackathon shares the news, blogs and publications via Plan4all & CCSS Digital Innovation Hubs (DIH), social media and web-pages of Plan4all and CCSS, and co-organizing partners;
- Long time frame: the INSPIRE based virtual Hacks last usually 2 or 3 months and are in reality some forms of small IEs connecting virtual teams from different organisations.

Traditionally, the INSPIRE Hackathons have been organized in two parts: remote part and in-situ part. In spring 2020 Plan4all organized the first fully virtual hackathon in Kampala, Uganda and in Dubrovnik, Croatia with excellent success. This experience will be utilised in organising the COVID-19 INSPIRE Hackathon 2020. The INSPIRE Hackathons are both a regional and global events. They reach out global participants and large visibility as they include virtual participation. Each hackathon is addressing a certain geographical area (e.g. Dubrovnik and Kampala) to discover local needs and challenges, and to engage regional stakeholders (e.g. universities, decision makers, municipality authorities) to maximise exploitation of the results. Each INSPIRE Hackathon is also focused on some concrete topic.

OC RESPOND - DIH 7 - Improve short food supply chains management through digital innovations (FoodLogProximity)

Duration of the project - five months, from 01.07.2020 to 30.11.2020.

During the COVID lockdown the usual supply chains have been strongly disrupted. In some cases, food supply was not ensured, and local supply did not reach the customers resulting in spoilage and tensions. Short supply chains are called for by everyone, but they need to be organized and optimized in order to reach a better efficiency. With this strong conviction, the FoodLogProximity initiative is proposed by three clusters: Agri Sud-Ouest Innovation (DIH) specialized in agri-food, Digital 113 digital cluster (DIH) and We4log cluster of logistics, together with Promus developing novel logistic concepts. In response to the needs expressed by local authorities FoodLogProximity will be deployed in three stages: an expression of interest meant to gather food supply territorial challenges and to identify companies with solutions to address them; a special Idea-day hackathon meant to gather all the people involved and come-up with consortium and project ideas offering solution to address the challenges. Finally, a Ripening phase will provide support to the selected solutions to bring them to concretization and practical experimentation. The FoodLogProximity initiative is a unique partnership, deeply rooted in the regional context of south-west France that will act as a demonstrator open to Europe for replication.

OC RESPOND - DIH 8 - Resilience through Automation and Digital Acceleration in Response to COVID-19 (RADAR)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

The Coronavirus pandemic has disrupted the agri-food sector in many ways. The proposal focuses on the impact lockdown restrictions and social distancing has had across Europe on mobilising the agricultural workforce and its support services. Challenges have been identified in two sectors as demonstration cases for the development of solutions through hackathon events:

- Shortage of labour supply for harvest operations in horticulture;
- Reduced mobility of vets to conduct farm diagnoses and prescription.

The following activities will be undertaken:

1. Engagement of technology companies, end users and other stakeholders to develop and support solutions;
2. Hackathon activity – briefing webinar, team formation and virtual workshops, 2x 12hr hackathons (technical development and business planning), virtual pitches, mentoring support;
3. Prize – a bespoke programme of support ensuring action and realisation of solutions;
4. Communication and dissemination of outputs – sharing insights and outputs arising from the work programme, as well as sharing best practice insights with SAHs network.

OC RESPOND - DIH 9 - Hacking sustainable, safe and environmentally friendly food production and supply in SEE as a fight against pandemic scenarios (FARM2FORK HACK)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

Since beginning of the COVID pandemic, disruptions in the food production and supply have been witnessed, especially logistical challenges within supply chains, particularly because of cross-border and domestic restrictions of movement, social distancing, as well as labour issues. This may disrupt food production and supply, especially if they remain challenged for a long-term. High-value, and especially perishable commodities, are likely to be particularly affected. FARM2FORK HACK will be focused strategically into the SEE region (farmers, cooperatives, food producers and short food supply chains), while inviting pan-European "farm to fork" solution providers, innovators and enthusiasts, to propose innovative solutions which will have a very positive impact on areas identified as most affected by the crisis. The hackathon will be organized under the umbrella DIH AGRIFOOD - a »One-Stop-Shop« providing digital transformation services to target groups in the region, through a multi-partner cooperation, endorsed by the Ministry of Agriculture, Forestry and Food of the

Republic of Slovenia, a very active promotor of local food production and delivery and co-organized by the:

- ITC – Innovation Technology Cluster Murska Sobota;
- AGROBIZNIS - the leading communication channel in the region, fostering entrepreneurship and innovation in the area of sustainable food supply;
- DIH Slovenia – a national one-stop-shop for digital transformation.

OC RESPOND - DIH 10 – The cre'active marathon to find solutions to local food chain problems emerging from the COVID-19 crisis (Hack[72h])

Duration of the project - seven months, from 01.07.2020 to 31.01.2021.

The main goal of this initiative is to provide effective solutions around the themes of local food systems, work force, logistics, retail, connection to the consumer and especially - design, prototype and test operational solutions, to rapidly deploy them - identify, consolidate and enhance initiatives that were improvised at field level during the first stages of the crisis.

A team of DIH and Competence Centres (the Chamber of agriculture of Pays de la Loire, Végépolys Valley, Images & Réseaux) and their partners are coming together in this initiative to set up this 72h hackathon that will allow teams to set up a project for farmers and consumers.

The first step will be a call for identification of issues having emerged during the first phase of the COVID-19 crisis, especially under the lockdown conditions; then a call for "solution providers", identifying all stakeholders with a new idea or having set up an initiative under emergency condition: farmers either individually or as representative of groups of producers, SMEs and businesses, students, researchers, local authorities, employees from agricultural businesses. The hackathon team will provide 3 working days of collective reflexion, with support of mentors, experts and final users of the identified solutions (farmers, representatives of consumer). Between each session, the DIH and Competence Centres will provide guidance and support, which constitute a significant part of the Hack72h initiative.

OC RESPOND - DIH 11 - RO AgriFood Hacking (HAR 2020)

Duration of the project - four months, from 20.08.2020 to 19.12.2020.

Digitalization of the agri-food sector is a prominent theme in the EU's new food policy, the Farm to Fork strategy, which emphasizes that all actors in the food chain should harness technological and digital solutions to deliver on sustainability goals. Action to address the impacts of COVID-19 on our food and agriculture system needs to be accelerated and informed by innovative ideas and practices from around the world. Main theme: Development of digital innovative solutions to support the Covid-19 economic recovery and the platform of collaboration in the agri-food sector.

The primary objective of the RO Agri-Food Hacking - HAR 2020 is to generate immediate solutions that will RESPOND to the effects of the COVID-19 crisis and use potential opportunities to fight against the pandemic for the agri-food system. The second objective is to mobilize practical innovative digital solutions that tackle current deficient barriers of the Romanian agri-food environment through the use of technology and software, while responding to the needs, objectives and Covid-19 recovery measures of the industry, Ministry of Agriculture and Rural Development – MADR, Ministry for Economy, Energy and Business Environment – MEEMA by developing a collaborative platform of stakeholders and building on new Start-Up's.

OC RESPOND - DIH 12 – F:IGHT against Corona – Innovations Generated through Hackathon-Tackling (FARMHACK)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

The Farmhack is to take place as a virtual hackathon only and in close cooperation with companies and science. The challenges caused by the COVID-19 pandemic are to be tackled jointly. The individual challenges are current problems from companies in agriculture and the

processing industry. By accompanying the hacking teams through companies and science, students and other innovative masterminds will develop practical solutions to the challenges of the COVID-19 pandemic. These solutions are to be implemented directly in practice and further developed.

The Hackathon is backed by innovate!, a convention and broad network of innovative companies and partners who want to develop the agri-food value chain in a cooperative and holistic approach "from farm to fork". This means that the Farmhack is to become part of innovate! so that the solutions developed are maintained in the long term. The Farmhack thus combines the expert knowledge, motivation and ideas of the entire industry in one event complemented by ideas of further relevant industries such as health and IT, linking knowledge systems from the world of sciences, farming and entrepreneurship.

OC RESPOND - DIH 13 – The Future of Farm to Fork – digital solutions for short food chains (3F)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

When it comes to agricultural production volume, Kuyavian-Pomeranian Voivodship is one of the top three in Poland. The region is characterised by well-developed agri-food production and an extensive processing industry constituting over 30% of the total production in the voivodship. The COVID-19 crisis has shown how important the process of food reaching the consumer's table, and the systems or technologies used to ensure the quality and safety of the food are for the agri-food sector. One of the best solutions in these difficult times can be safe shopping in the "from farm to fork" formula.

Using this formula involves the necessity of developing IT solutions that provide small farms with tools that allow them to compete in price, security of supply and food quality with large business organisations. Only IT-supported ability to compete effectively on the market will allow small farms to function efficiently. The major objective of this proposal is to hold an on-line hackaton, resulting in digital solutions aimed at supporting local short food chains, which connect many producers with many consumers directly. These chains allow them to provide food supplies from the field to their customers' plate („from farm to fork"), when ensuring the safety of the delivery and the high quality of the products at the same time.

The solutions developed will support initiatives operating within the framework of short food chains and thus contribute to the mitigation of consequences of the COVID-19 in the agri-food sector.

2.1.2 OC RESPOND2 - SMEs

The open call was for SMEs, including start-ups aiming at direct realisation of digital innovations mitigating the effects of the COVID-19 pandemic in the agri-food sector. SmartAgriHubs considers that proposals requesting a contribution from 30,000 to 50,000 Euro would allow to support the realisation of activities appropriately.

Call Topic: Open call organised as a pan-European on-line Challenge calling for SMEs to RESPOND to the effects of the crisis and use potential opportunities to fight against the CORONA COVID-19 pandemic from the perspective of what digital innovation can contribute to minimize the consequences of the crisis to the European agri-food economy. Solutions must be directly proposed by SMEs and have a clear pan-European added value and well documented potential for rapid replication.

Expected Results: The main objective is to generate ideas for potential IEs that are responding to the effects of the COVID-19 crisis. Results provided by SMEs shall include at least conceptual implementations or also Minimum Viable Products that can serve as baseline for a follow-up by the involved proposers or by other parties. The activities shall facilitate uptake of developed solutions, networking of organisations and individuals, as well as aim at the mobilisation of talent.

Potential Proposers: Activities shall be proposed directly by SMEs and/or start-ups from member states or associated countries according to H2020 eligibility rules.

All eight selected proposals in the OC RESPOND – SAH2SMEs will be briefly presented below.

OC RESPOND - SME 1 – MISSION - Matching platform for agricultural skills

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

Developed in 2018, the solution 'Mission' has one clear goal: match needs between producers and workers, especially for seasonal peaks. This has been especially relevant to maintain food production when usual seasonal workforce, could not be mobilized. The main objective: connect all people, with or without skills, with farmers with labour needs.

Key topics that are addressed:

- Agriculture needs 200,000 seasonal workers in the coming months (April 2020) and more than 1,100,000 / year;
- The foreign workforce, which usually mobilized is no longer mobile;
- Citizens need to feel useful, and some more additional income;
- Maintain the food production;
- Vocations are born to work in our sector of activity.

OC RESPOND - SME 2 - Connecting Food's ROOTS platform (ROOTS)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

Connecting Food is a unique blockchain-based food transparency platform. We make food systems more sustainable by providing real-time food chain traceability. We also digitally audit each batch to ensure it meets product specifications, and if a batch is found to be non-compliant, it can be rerouted to other food chains, improving food safety and reducing food wastage.

Connecting Food proposes to adapt their existing B2B blockchain platform in order to quickly connect producers and retailers and increase the local sourcing of products. Our digital auditing technology will also certify product origins, identifying in real-time anomalies affecting food safety, and reassuring consumers in their local food systems.

The COVID-19 pandemic has revealed large gaps in the food supply chain. These gaps have included sourcing problems and large amounts of food wastage and have not been made easier by the difficulty of sharing data across the supply chain. This has also caused a food revolution that is having an impact on consumers' view of EU food systems. Consumers no longer implicitly trust food– they want to know where it came from, how it was made and by whom, causing a large focus on locally-sourced products. But how can they (and supermarkets) truly be sure of a product's origins & quality?

In the context of this call, the Connecting Food Roots platform will help ensure fresh food safety along the supply chain and facilitate access to data and services for easier digital innovation in the agri-food sector. It will start out with producers in the Paris Region, with the support of the Ile de France council, and can then be quickly scaled to other areas in Europe.

OC RESPOND - SME 3 - SMART FRUIT PACKER ROBOT (ROCKET)

Duration of the project – six months, from 01.07.2020 to 31.12.2020.

The company Riwo has a background cooperation with Munckhof in the fields: harvesting orchards, logistics and chain integration. The addressed problems are:

1. European manual workers are in danger: too many workers in one location, and too close together;
2. "Food loss" and "food waste" grows: damage to fruit increases, causing more waste;
3. Food availability will decrease: It becomes impossible to supply quality fruit all year round.

Key characteristics of the solution and end-users to be involved:

- The autonomously pick & place robot for various types of fruit with deep learning and vision technology;
- Picking & placing 50-60 apples/pears per minute, fixed size, by colour and quality. Result: higher yield, faster harvest, 'COVID-19 resistant';
- Taking on the challenge of bridging the gap between the need to increase food production to satisfy global needs and the availability of human labour by using robotic technologies;
- Implementation of the Minimum Viable Product at end-user Fruvo B.V., where approximately 50 tons of fruit per day is processed.

This RESPOND2:SAH2SMEs call is the baseline for a follow up through the network of applicants, with focus on owners of orchards with 50–500 hectares. Munckhof already delivers other units (e.g. the 'Pluk-O-Trak') throughout countries worldwide.

OC RESPOND - SME 4 - The first farmer-friendly digital platform tailored to organic food systems (FarmSuite)

Duration of the project - nine months, from 01.07.2020 to 31.03.2021.

Farm enterprises faced difficulties in adapting to new and changing market channels. Problems addressed:

1. COVID-19 has hampered access to traditional farmer markets and farm shops;
2. Sales and brand recognition is weakened by the lack of digitalizations of farm enterprises;
3. Less organized farmers responded to the emergency by implementing ineffective and inefficient solutions, which led to diseconomies and waste;
4. A great number of farm enterprises had several problems dealing with logistics and with managing inventory, orders and deliveries;
5. Need for product retargeting and rebuilding for B2B models;
6. Difficulties for consumers to get access to products from local producers they want to support.

Key characteristics of the solution:

- farmer-friendly platform codesigned with farmers;
- multi-device design to ensure quick access from everywhere;
- back-end for efficient orders groupage and smart delivery management;
- automatic creation of documents required by organic certification and for delivery;
- inventory management synchronized for different sales channels;
- price lists tailored to different market channels;
- modular platform for online sales;
- quick, easy and direct buying from local farmers;
- access to aggregated marketplaces (buying clubs/associations, artisanal shops and enterprises);
- possibility to pre-purchase products from producers on a subscription basis.

OC RESPOND - SME 5 - Enabling short food supply chains and local food systems (sostenibl.es)

Duration of the project – five months, from 01.08.2020 to 31.12.2020.

The main outcomes are:

- Open digital sales channels for SMEs in agri-food sector, that are adapted to new consumer trends, and where SMEs are empowered to sell their products at a fair price;
- Enable consumers to conveniently access local food and support the local productive fabric with their purchase, without having to increase their food expenditure.

Current problems SMEs face in the agri-food sector:

1. Lack of market access for SMEs → limitations in Horeca, tourism, and local markets;

2. Enormous losses in agri-food sector. Public guaranteed credit 100Bn € in Spain;
3. 9 out 10 companies are SMEs → most vulnerable are facing risk of closure;
4. Food waste → harvests rotting because of no sales;
5. Impact beyond borders: Spain is 4th largest food exporter in the EU (+53Bn in 2019).

We are building a digital farmers market (SaaS B2B2C) which will allow SMEs to sell their products directly to end consumers willing to buy healthy, local food. Main features of the solution:

- Create unlimited dedicated, fully customizable e-shops for every SME.
- Advanced but user-friendly analytics for each vendor.
- Accounting features to make bookkeeping hassle free.
- Dedicated mobile app for vendors.
- Multi-vendor shopping cart with just one single payment.
- Equipped with geocoding and geolocation technology.
- Rating and review system.
- Built-in direct consumer to farmer communication channel.

OC RESPOND - SME 6 - Software that enables the farm vet to closer support dairy farmers in managing cow health and production (Close-Cow-Care)

Duration of the project - five months, from 01.09.2020 to 31.01.2021. Veterinary herd health support is important for farmer and EU policy makers. The farm vet plays a crucial role in safeguarding animal health, food safety and economic viability of our dairy farms.

VETERINARY HERD HEALTH SUPPORT:

- Farm visit: optimal interval every one or two weeks;
- Ensure production and health;
- Safeguard food safety and public health.

COVID - 19: negative impact on the dairy industry in EU

DIRECT IMPACT LOCKDOWN:

- Only urgent visits possible;
- Only online conversations between farmer & vet.

INDIRECT IMPACT LOCKDOWN

- Less monitoring on fertility, milk quality and antibiotic use;
- Subclinical diseases are not or fewer often noticed ;
- Management measures are often taken too late to guarantee productivity and animal well-being.

IMPACT ON EU DAIRY INDUSTRY

- Low milk supply;
- Lower milk quality;
- Higher use of antimicrobials;
- Negative impact on well being;

IMPACT ON EU DAIRY FARMER

- Lower income;
- Higher labour demand.

PROBLEM SOLVER: Close-Cow-Care is an additional vetwerk tool for veterinary herd health support without the necessity of having to visit the farm.

OC RESPOND - SME 7 - Cooperative digital platform for farm-to-fork (CODIPLAF2F)

Duration of the project - six months, from 01.07.2020 to 31.12.2020.

During the COVID-19 pandemic, it has been made clear that our food supply chain could easily be disrupted and that local food supply should play a more important role in the future. Farm-to-fork (F2F) should be upscaled, whilst maintaining its local character. A fair price for

farmers will contribute to the attractiveness of the agricultural sector, ensuring local supply. Supply and demand should be matched, whilst ensuring food safety and freshness, taking into account the eater's convenience.

Linked.farm offers a digital F2F platform that matches supply and demand, connected to logistics (home delivery). The platform facilitates regional matching of offer and demand for fresh produce in decentralised settings and manages food transport along local supply chains to avoid food waste by pre-ordering. F2F is made easy for farms selling B2C, B2B (schools, hospitals, etc.) and recurring sales (subscriptions), supporting administration, logistics and invoicing. The platform offers a transparent marketplace to farmers and eaters.

Addressed problems:

1. Farmers are a disappearing species as they are not paid fairly for their hard work. During the COVID-19 pandemic the fragility of farmers depending on one customer in a long supply chain has been revealed.
2. Farmers have been incentivised to produce volume-driven, with intensive use of chemicals & water and a high dependence on subsidies.
3. This crisis has revealed that our long food supply chain is not very agile and that supply was not quickly adaptable to eater's demand. Moreover, the importance of logistics became clear.
4. On the other hand, farmers already selling F2F could hardly follow the exploding demand. It became clear that they had to collaborate for logistics and for a broader offer of products if F2F wanted to play a more important role in the future.
5. With the COVID-19 pandemic, eaters have taken back ownership of their eating patterns. They could not eat out anymore and realised the importance of food. Food used to be a convenience and expenditure declined to 12% of the family budget. This crisis might mean a turning point in this decline. Eaters want more transparency for their food. It has to be sustainably made, fair, healthy and local. They are lost though in the jungle of apps, labels, …
6. Consumers have better understood that the food system produces a lot of waste. (1/3 = waste). They have started buying from several farms but offer was not bundled.
7. In larger cities it became clear that people had no other option than buying their food in supermarkets where logistic problem arose. Home delivery for grocer's is still not widespread and options for fresh food were limited.

Solution Linked.farm has to offer: Linked.farm is a cooperative digital platform that helps you build your own local Farm-to-Fork (F2F) network. F2F is made easy:

- The digital platform matches supply and demand.
- The farmers are in charge of setting their price and stock, joining one or more hubs. They can join a logistic network operating under their own local name. The platform supports administration, logistics (home delivery, pick up places, B2B delivery to local stores, …) and invoicing. Transparency is provided through full traceability of products and transparent price setting.

OC RESPOND - SME 8 - Remote visual inspection of poultry farms – improving bird welfare and performance in a post-COVID-19 world (FLOX)

Duration of the project - four months, from 01.08.2020 to 30.11.2020.

COVID-19 has shown that in times of great uncertainty, data, analysis and expertise count in making decisions – as true for the livestock agri-food sector as it is for public health. The food security of the EU post-COVID-19 depends on decisions made now. While the media is full of reports about short-term effects (dairy farms dumping milk; understaffed farms culling millions of birds while demand continues to rise), long-term effects are also in discussion. These include a shift towards higher-welfare farming, efforts to 'shorten the supply chain', and greater use of AI to automate farm work and aid in decision-support. Digital innovations in response to this crisis must address immediate problems such as labour shortages and be fit-for-purpose in the long term. FLOX is an agri-tech SME with an initial focus on the broiler industry. In this project, we propose to give farmers the tools to monitor and manage their sheds and flocks – remotely. Our 'FLOX-cam' product replicates the expertise of a

stockperson; automating previously manual processes and delivering actionable data. This is key to improving bird welfare and performance while reducing zoonotic transmission risks between livestock and humans - by limiting how often humans enter sheds. It allows farmers to restart and continue operations even with minimal staffing - creating resilience to labour shortages and improving scale-up operations. FLOX fits the scope of this call as it responds to an urgent need in the agri-food sector, now and post-COVID-19. It's a future-proof solution with a compelling value proposition for farmers, and the potential to increase food supply, safety and security at scale.

2.2 OC EXPAND

This open call was launched on the 8th July, 2020 and the closure is announced on the 29th June, 2022 at 17:00 CEST.

Call Topic: Open call for projects that are proposing initiatives of Digital Innovation Hubs (DIHs) that propose a thorough strategy to support the digital innovation in their region and facilitate the set-up and realisation of IEs, equipped by own investments and supported by additional public and/or private funding. Besides the individual set up of IEs, it is considered of utmost importance that such supported initiatives:

- Validate the services offered by DIHs and Competence Centres (CCs);
- Facilitate experience exchange and critical mass of the European Network of DIHs and CCs.

The funding that is provided by SmartAgriHubs is exclusively available for developing, maturing, and providing DIH innovation services.

Expected Results: SmartAgriHubs considers DIHs as key stakeholders that should be attracted by this open call. They should propose projects to promote digital innovation in agri-food that will be realised in their own region or together with other regions. In their proposals, they should identify the sources of additional funds they intend to mobilise, while the contribution of SmartAgriHubs funds shall not exceed 20% of the total investments in the project. The proposed project shall result in a specific number of innovation experiments (IEs) directly enabled and supported by DIHs. Every supported IE shall realise a digital innovation in the agri-food economy, involving the related stakeholders, while being driven by end-users and specifically supported by DIHs and CCs, while the IEs are validating their supporting services. The proposed activities shall facilitate networking of organisations and individuals, aim at the mobilisation of talent. All results shall be presented in detail via the SmartAgriHubs Innovation Portal. The owners of the developed intellectual property need to provide a description for publication via the SmartAgriHubs communication channels, specifically explaining the following:

- IE and the digital innovations (to be) realised
- Approach for validation;
- Involved parties, infrastructure, and places;
- Value propositions;
- ICT challenges/ opportunities addressed;
- Software and hardware components developed and/or used.

The proposal needs to explain a strategy for the exploitation and ownership of the results (for instance explaining potential open-source strategies or in-kind contributions by third parties).

It is important to mention that evaluation of proposals under the OC EXPAND was done in several batches:

- Batch 1: 03.09.2020
  No proposal selected for funding

- Batch 2: 05.11.2020
  2 proposals selected for funding under EXPAND

- Batch 3: 17.02.2021
  2 proposals selected for funding under EXPAND

- Batch 4: 26.05.2021
  2 proposals selected for funding under EXPAND

- Batch 5 EXPAND: 29.09.2021
- Batch 6 EXPAND: 10.11.2021

Additional batches are planned until the closure of EXPAND on 29.06.2022.

Five out of six proposals form the OC are contracted by 15.10.2020 and are briefly presented below.

OC EXPAND 1 - Development and implementation of new artificial intelligence techniques in the production process of a winery to support decision making and improve food safety: A new Smart palletization system for the optimization in winery logistics (IntelWines)

The project is ongoing and planned to last 12 months, from 01.02.2021 to 31.01.2022.

The IntelWines project aims to investigate new techniques of precision viticulture and food safety that incorporate hybrid algorithms of artificial intelligence and Deep Reinforcement Learning capable of homogenizing processes and transferring the knowledge of experts to a system that guarantees the quality and health of the wine that reaches the consumer. The advance in precision viticulture techniques will come from "strategic" intelligent irrigation systems, while the advance in food safety will come from a novel monitoring system that allows the modelling of the level of sulphur in wines and follows its evolution, up to the bottle, to predict the degree of combination in the whole process, up to its consumption.

The IntelWines project aims to advance research and development in the following fields:

- Researching into precision viticulture technologies that use new algorithms and hybrid models based on both artificial intelligence and expert knowledge (case-based reasoning, deep reinforcement learning... etc.) For the automatic collection of parameters, IoT sensors (Internet of Things, connected devices) will be used to provide information in real time. The algorithmic models will improve some of the internal processes related to the quality of the wine such as: a Decision Support System to recommend the ideal moment for irrigation taking into account not only the environmental conditions and climate forecasts; and a learning system (Deep Reinforcement Learning) that allows the incorporation of expert knowledge but that, in addition, is capable of evolving and adapting its recommendations according to the results obtained, validated analytically in the winery.
- Research into new models that bring winemaking closer to the demands of consumption, among them the reduction of the sulphite content (a potentially allergenic substance of addiction, but irreplaceable in winemaking), without affecting the microbiological stability, evolution and quality of the product. By means of a model that studies the combination of sulphur in wine from free to combined of the analytical parameters of the wine, as well as the origin and the characteristics of the grape, it is intended to know the degradation kinetics of the active sulphur, correcting this parameter to the strictly necessary levels, never by excess and avoiding the defect, reducing in sum the external contributions of this compound. This precise knowledge of the process will allow us to define an optimal strategy to carry out the treatments on the barrels that are strictly necessary.

OC EXPAND 2 - Development of "win-win-win" business model for potato ecosystem (WWW.POT-DIGI.COM)

The project is ongoing and planned to last 18 months, from 01.02.2021 to 31.07.2022.

DIH ODYC will develop and mature its services to support the realisation of a specific IE: a crucial and ready to start Belgian initiative called POTCHAIN. This IE will finally bring & convince all actors to engage in digitization by creating new digital business models in the potato production sector in combination with a smart harvester.

In the last years we have seen a growing need to use more sophisticated data elements fully integrated in the process flow of potatoes. The POTCHAIN project is specific done with Agristo but it should and it is transferable to the broader processing industry. As a DIH we can play a unique role in combining three emerging developments:

1. data as product made available by other partners in the chain
2. use of own data for farmers advice
3. use of own data for customers' requests

Three challenges, or three opportunities where the solution lies in the innovative idea of the POTCHAIN project: the smart combination of advanced data across the entire chain (farmer, harvester, processor), provided that the appropriate technology for:

- the data acquisition
- smart data sharing (with respect for the data owner, i.e. the farmers)
- associated sustainable business model, i.e. a sustainable business model that goes way beyond monetization: striving for a healthy balance between financial, ecological and social goals that the organization wants to achieve.

This is fully in line with the three dimensions of sustainability (climate/environmental, economic, social/health).

OC EXPAND 3 - Pooled Resource Exchange on a Platform for Innovation Program Execution (PREPIPE)

The project is ongoing and planned to last 13 months, from 01.07.2021 to 30.07.2022.

In a world in which we have to think more and more about the big questions of survival and the challenges to tackle are becoming bigger - we create equal opportunities and work on an equilibrium for everyone who wants to create a real impact and start an IE in the section of agriculture and food. The key for the opportunities is within the ecosystems and can be encouraged by DIHs who can function as a matchmaker for IEs.

With this in mind we have developed two solutions streams which we would like to test collateral through the EXPAND Open Call and together with the SAH Network. One stream will be the building up of an eDIH platform and the second one the establishment of the Open Innovation Cycle. The coaching framework, tested first in the region of North West Germany, will be adopted to other cross-regional and international DIHs. Through an additional exchange between the DIH support feedback and exchange cycles between the hosts from which the IEs can benefit. Furthermore, the IEs and the host benefit from the real-time collaboration which makes the coaching process more efficient and effective. Through the companionship of the workflows teams can name demand task based and the host is enabled to search for network partners who can give the needed resources. This is also one of the key interactions we would like to test. Even if we know that these demands are within ecosystems we would like to learn more about matching algorithms, the needed value to exchange resources, for example against another resource, and which demand is needed form most of the teams. By building up a platform to support those processes we learn more about the IE development and can help to show and access the resources which are in the network on a regional, cross-regional and international scale so that IEs can be supported better and an impact on further projects can be made.

OC EXPAND 4 - Expanding and linking the Farm2Fork network to serve large canteens (F2FHUBCONNECT)

The project is ongoing and planned to last eight months, from 01.05.2021 to 31.12.2021.

Farm2Fork (F2F) is by nature local and decentralized. As the demand from centralized buying platforms for canteens is increasing, the DIH Linked.farm aims at supporting farmers and their F2F hubs at delivering to these canteens. This will be achieved through a state-of-the-art digital dedicated and integrated platform, including order management, logistics, full product traceability, WMS integration and integrating basic product transformation. Healthy, fresh, sustainable and local food should be available easily in schools, hospitals, elderly homes, etc.

The IE aims at supporting and linking different F2F hubs to supply these canteens, responding to the increasing willingness to include supply from local farms in open calls, which farmers or food hubs individually find hard to respond to. Our DIH will act as a first point of contact and redirect and coordinate demand, ensuring local (Sodexo) canteens are matched with local food hubs/farmers. If a fair price for farmers has to be ensured in F2F, this can only be done by collaboration within a network of farmers and logistic food hubs. The IE needs to be supported by digital innovation put in place by the DIH, especially in product traceability, CRM and ERP (supply chain) modules. The IE will also carry a component of initial product transformation (in collaboration with social workplace Manufast/Sociaago) to meet demand from the canteens (e.g. vegetables washing and cutting). The DIH will support integration with this product transformation as well. Linked.farm is a cooperative DIH offering a digital F2F (Farm-to-Fork) platform that matches supply and demand, connected to logistics (Warehouse Management System and delivery). The platform offers a transparent marketplace to farmers and eaters with full traceability of their products.

Linked.Farm empowers a network of independent F2F hubs and farmers and wants to connect with other DIHs and CCs throughout the SAH network to share knowledge and progress. Linked.farm wants to foster an agricultural innovative F2F ecosystem dedicated to excellence, sustainability and success with access to latest knowledge, technologies and experience gained on logistics, food security, labelling, administration, food traceability from field to fork through QR codes. The DIH is a one stop shop for all questions from farmers, food hubs and partners, supported by FERM (CC) for technical questions on food safety and regulations.

OC EXPAND 5 - AgriHub made in CzechoSlovakia (Plan4All)

The project is ongoing and planned to last 12 months, from 01.07.2021 to 30.06.2022.

The project AgriHub CZ&SK, the digital innovation hubs for Czech Republic and Slovakia, will promote digital innovation in the agri-food domain and will facilitate set-up and realisation of IEs in the region with additional mobilised funding. At the same time the project will support the interaction of different stakeholders in the chain of providing services for the arable farming sector and will integrate activities of different existing DIHs with existing leading technologies. AgriHub CZ&SK will become a platform, which will connect various stakeholders and cooperation from industry, training, start-ups support, farm consultancy and services to support the introduction of SmartFarming 4.0. This platform aims to build an environment, which will help to support networking of organisations and individuals, mobilisation of talents, in the agri-food chain and facilitate cooperation in order to build new smart, environmentally, socially and economically sustainable agriculture.

The proposed partnership of eight organisations offers a wide range of experienced capacities and relevant competence, with appropriate geographical coverage. Main ambition of the project is to boost digital innovation in a relatively immature environment with specific conditions central European space is facing after the recent societal changes. Main strategy of the project is to support efficient and progressive approaches, helping region and domain in smooth and fast transition to period addressing new societal and climatic challenges. This will be done in line with the main principles and objectives defined by the relevant global and European strategic frameworks. Platform proposes six main types of DIH services and identifies 15 types of target stakeholders groups, foreseen to be approached. Aside from the main focus on the agri-food domain, synergies with other domains and regions will play an important role. This will help to strengthen the end-user driven perspective in design and deployment of the IEs. These will provide the validation of the possible solutions addressing the needs and expectations expressed by the targeted stakeholders. With that, the project

has identified seven IEs foreseen to be designed and implemented with additional funding support.

2.3 OC RESTART

This OC was launched on Wednesday, July 08th 2020 and closed on Wednesday, September 29th 2021, 17:00 CEST.

Call Topic: Open call for hackathon type of activities that will contribute to a RESTART of the European Agri-Food Economy after the COVID-19 Crisis. Proposals shall realise potential opportunities that are addressing the effects of the COVID-19 pandemic from the perspective of what digital innovation can contribute to mitigate consequences in the agri-food domain. Such activities can be specifically:

- Online & offline Hackathons
- Focused Challenges
- Datathons

Proposals can have a direct as well as indirect impact on the effects of the COVID-19 pandemic.

Expected Results: The main objective is to generate ideas for potential IEs that are contributing to a RESTART of the European agri-food economy in the scope of the COVID-19 crisis. Results of hackathon type of activities can be presented as conceptual implementations or also Minimum Viable Products that can serve as implementation baseline for a follow-up by the involved teams or by other third parties. The activities shall facilitate networking of organisations and individuals, aim at the mobilisation of talent. All results will be presented in detail via the SmartAgriHubs Innovation Portal. The owners of the developed intellectual property need to provide a description for publication via the SmartAgriHubs communication channels, specifically explaining the following:

- Realised solution
- Approach for validation
- Involved parties, infrastructure and places
- Value propositions
- ICT challenges/ opportunities addressed
- Software and hardware components developed and/or used

The proposal needs to explain a strategy for the exploitation and ownership of the results (for instance explaining potential open-source strategies or in-kind contributions by third parties).

Key Topics facilitating a RESTART: Proposals could realise hackathons, challenges and datathons that have a direct as well as an indirect impact to mitigate effects of the CORONA COVID-19 or similar (future) pandemics. By such initiatives, the RESTART of the agri-food economy after the COVID-19 crisis shall be facilitated. The underlying idea is to support the European agri-food economy to better cope with the requirements of the "new normal" and maintain its global competitive position. Examples for topics that would match this underlying strategy are presented in the following:

- Helping specific sub-sectors and regional economies to recover from the COVID-19 pandemic impact, by new digital innovation potentials.
- Stimulating private investments in the agri-food sector and promoting opportunities across the European investment community.
- Proposals in line with the Farm to Fork Strategy that is at the heart of the European

Green Deal, aiming to make food systems fair, healthy and environmentally friendly.
- Enabling a significant contribution to the UN Sustainable Development Goals by initiatives in the agri-food economy.
- Introducing principles of circular economy in the agri-food sector.
- Generally disburdening agri-food stakeholders (e.g. farmers) from non-added value tasks, by e.g. automating monitoring and/or control of farming activities.
- Increasing the resilience of the agri-food chain.
- Increasing the availability and the shelf-life of agri-food related products.
- Tracking & tracing of food and related products/items from farm to fork, facilitating regional sourcing.
- Helping consumers to make informed decisions about the selection of their food.

Similarly as OC EXPAND, OC RESTART evaluated project proposals in several batches:

- Batch 1: 03.09.2020.
  No proposal selected for funding

- Batch 2: 05.11.2020.
  1 proposal selected for funding under RESTART

- Batch 3:17.02.2021.
  1 proposal selected for funding under RESTART

- Batch 4: 26.05.2021.
  3 proposals selected for funding under RESTART

OC RESTART was closed on 29.09.2021.

Five out of five proposals are signed at the time of the deliverable submission, and are briefly presented below.

OC RESTART 1 - Facilitating access to data and services for an easier digital innovation in the agri-food sectors (Platform ON:E AGRAR)

The project duration was five months, from 01.02.2021 to 30.06.2021.

It aims at developing a platform for the central networking of innovative actors in agriculture and the upstream and downstream sectors and put it into operation. Aim and purpose of this innovation activity is to develop a platform to link start-ups, SMEs and investors to generate tailor-made investments and cooperation between these actors. The central networking elements on the platform are interactive virtual event formats that address top target groups in the sub-sectors, compensate for the real contact that was possible before the Corona crisis and specifically promote their development. In this way, the platform offers a replacement for the previous regional or supra-regional haptic event formats, and despite the home office, the transparency and visibility of the individual actors is strengthened. Due to this, an exchange within the existing cluster is once again made possible. This also facilitates access to new, intensive cooperation.

In a first step, the platform is to concentrate on the network around the innovate Convention (mainly region Northwest Germany) and enable a "new normal" innovation culture. In contrast to the pre-corona trade fairs and conferences, the platform will be available for networking at all times and will not only be used selectively for events.

Participants go through an onboarding process. Industry focus / know-how / interests / experiences are queried. In addition, the upload of pitch decks customary in the market is intended to give medium-sized companies and investor start-ups insight into innovation potential.

The following event-journey might give an insight into possible interaction and new experience:

- Matchmaking: On the basis of the facts, "tribes" with similar interests are put together of 20 people each on a topic formulated from their interests (imagine it like a cluster analysis, the clusters are then titled and thematically filled by people);
- The deepening of social contacts within these tribes is interactively promoted through standardized kick-off short events. These participants get to know each other over several topics/tribes and have the opportunity to meet again between the events and exchange what they have seen and heard in the live streams or other workshops etc.
- A tribe can also meet again on the platform after the conference and formulate topics, possibly resulting in long lasting cooperation's = satisfaction of all, no time wasted with nonsense. Tribes can also come together due to regional connections. Participants could also choose 2-3 tribes from several suggestions before the conference begins.

OC RESTART 2 - Safe Automation for Farming Environments: Technologies to enable Precision Automation (SAFE-Tech)

The project is ongoing and planned to last six months, from 01.07.2021 to 31.12.2021.

The pandemic has accelerated the need for agricultural automation due to labour-supply challenges. Longer-term rising labour cost and the need for increased precision, demand greater on-farm automation. Meanwhile, with national lockdowns, and wider public health drivers, more people are using rural footpaths, which typically cross farmland. Increased public footfall on-farm, combined with increased automation, including fully-autonomous unmanned machines, leads to potential safety and security issues arising through human-machine encounters. Safety and security must be addressed before autonomous machines can be accepted by the market, regulators and the public, and become a reality on commercial farms. Our proposal seeks to identify through a hackathon, solutions for public safety around autonomous farm machines. We will work with the Innovate-UK funded Hands Free Farm, a testbed for autonomous farm machinery and drones. The Hands Free Farm team will provide expert input, and will integrate the winning solution at the Hands Free Farm. Our activity has the following workstreams:

1. Stakeholder scoping workshop
2. Engagement of technology companies, end users and other stakeholders
3. Hackathon
4. Prize – bespoke programme of support and implementation
5. Dissemination including a White Paper. This will make a significant contribution to the development of safe autonomous farm technologies.

OC RESTART 3 – INNOVATE FarmHack (IFH)

The project is ongoing and planned to last five months and 15 days, from 15.07.2021 to 31.12.2021.

The European agriculture sector has heavily been hit by the COVID-19 pandemic and has highlighted even more than before the importance of efficient and innovative ways of growing, processing, transporting and selling food to consumers. Digital innovation can play a major role to mitigate the effects of this crisis. That is why the Austrian Digital Innovation Hub (DIH) INNOVATE came up with the idea of the "INNOVATE FarmHack". DIH INNOVATE started operating in February 2021 and has since then surveyed the most pressing challenges in the Austrian (and Central European) agriculture ecosystem since the pandemic. The following challenges were identified:

1. Scarcity of skilled harvesting workers for speciality crops
2. Direct marketing for farmers via commodity exchanges or online platforms
3. Food traceability for supermarkets and restaurants via digital tool for consumers
4. Standard, affordable precision farming toolkit for small arable farms <1.000 EUR

INNOVATE FarmHack aims to mobilize creative individuals from farmers to coders, civil servants to technology providers in order to generate ideas for these challenges. The results shall

later be used as inputs for DIH INNOVATE and IEs. INNOVATE FarmHack will have dedicated challenge owners, mentors from the DIH INNOVATE team and challenge sponsors.

OC RESTART 4 - Accelerating European AgTech leadership for a resilient food economy (StrikeTwo)

The project is ongoing and planned to last 12 months, from 29.03.2021 to 29.03.2022.

Tech powered future of food StrikeTwo's overall objective is to accelerate the resilience of the agrifood economy with technology, specifically, to enhance European's AgTech competitiveness and leadership. StrikeTwo is a combination of a hackathon and an acceleration program, addressing the biggest challenges of our agrifood economy: consumer trust, farm income and sustainable supply chain management.

The three unique traits of StrikeTwo are:

1. Uniting the entire ecosystem: problem owners, solution providers, farmers, end-users and all other stakeholders come together in tracks.
2. Focused on real problems with matching technologies: tracks focus on issues like financing farm cooperatives with blockchain or enhancing the sustainability of embedded soy.
3. Resulting in collaboration and collective execution: key deliverables of StrikeTwo are its committed innovation roadmaps that pinpoint concrete commitments of each participant.

The New Fork, initiator of StrikeTwo, seeks the support of SmartAgriHubs to restart StrikeTwo in 2021, to enhance EU AgTech leadership for a resilient global food economy.

OC RESTART 5 – HIBA Accelerathon Smart-Agrifood (#HIBA-Accelerathon)

The project is ongoing and planned to last nine months, from 01.07.2021 to 30.03.2022.

Faced with the global crisis that the COVID-19 pandemic has generated, Finnova could face new challenges in order to re-boost Agri-food economic sector. #HIBA-Accelerathon Smart-Agrifood is an accelerator program initiative arranged by Finnova, which will work on new approaches and solutions against the problem of COVID-19 and mitigate the massive loss of employment and the cessation of agri-food activity. Faced with a notable and unpredictable impact, it is necessary to focus efforts on seeking new approaches aimed at creating survival mechanisms for companies in the sector, protecting the most vulnerable segments that work in the field of agri-food. At this juncture, we are committed to the regeneration capacity of the sector and to the innovation of the agents of the entrepreneurial ecosystem to continue advancing towards recovery and development. #HIBA-Accelerathon Smart-Agrifood will support and offered:

- Innovative solutions to common territorial challenges.
- Networking: developing strategies that allow them to make their idea known to relevant actors of the European institutions.
- EU financing: inform entrepreneurs, start-ups, SMEs and other end-user and target groups about the financing tools available to the European Union and seek partners to give it a European dimension.
- Mentoring: organizing information sessions with a group of experts in different fields.

2.4 OC PREPARE

This open call was launched 18.03.2021 and closed 26.05.2021.

Call Topic: Open call for Digital Innovation Hubs (DIHs) that are supporting teams in the planning and definition of IEs for digital transformation in the Agri-food economy. DIHs can

propose activities and services that support companies and/or organisations in the definition and planning of so called "IEs".
A specific objective of this PREPARE open call is to prepare a proposal for an IEthat can be submitted in the EXPAND open call. Because these IE proposals are not necessarily to be submitted in the EXPAND call, the more general objective is to plan and prepare the realisation of one or more IEs. Therefore, if selected for funding under PREPARE, the DIH's proposed activities and services shall result in the following results and contents of deliverables:

- Compilation of an appropriate team, able and committed to realise the IE from an end-user, business, technological and extended stakeholder perspective.
- Analysis of the technology readiness level of the envisaged innovation, the technical and economic feasibility and its relevance for the supported team to have an impact that could be realised in the scope of an IE.
- A budget planning for realising the IE(s). DIHs shall also include the financial plan, detailing the path to facilitate access to additional private investors and/or regional, national, European funding schemes provided by third parties.
- A project plan consisting in one or more IEs, explaining the timing of activities, milestones and deliverables. This could also be materialised in the form of a project proposal to be later on submitted to a relevant open call to further support the realisation of the aforementioned IE(s) (e.g. by the SmartAgriHubs EXPAND open call).
- Signed letter of intent by the main participants in an IE, stating their role and envisaged effort and in-kind contribution to be committed.

These results should serve as preparation for one or more subsequent proposals to the SmartAgriHubs EXPAND open call, other initiatives organising open calls and/or potential investors that offer funding for:

- DIH(s) that are supporting the realisation of IEs and/or
- Organisation(s) or consortia that are realising an IE.

Potential Proposers: Activities shall be proposed by one or several DIHs in accordance to the definition in the SmartAgriHubs open call programme document.

After closing the PREPARE OC, the evaluators have selected and approved 16 proposals, while 15 projects will be implemented and funded. The main reason why one project will not be financed is because one company has submitted two proposals and chosen to implement one of them. The proposals that have signed contracts until 15.10.2021 are briefly described in the next paragraphs.

OC PREPARE 1 - Building digital competencies for detecting and monitoring diseases in moUntain aGriculture fields (BUGs)

The project is ongoing and planned to last six months, from 01.07.2021 to 31.12.2021.

Mountain agriculture is a vital social-economic activity in Europe, including the alpine Province of South Tyrol, Italy. Here, apple orchards and vineyards are extensively cultivated. Besides the difficulty to cultivate in mountain terrain (steep slopes, difficult accessibility, extreme weather conditions), the plants are exposed to a combination of biotic and abiotic stresses that can derive into diseases caused by pathogens. It results in the loss of the yield and quality of products, economic losses, reducing food security with severe ecological impacts, and affects many ecosystem services (such as agrotourism). Here we present a digital strategy approach using advanced hardware and software technologies to map the presence of diseases in three different experiments: apple orchard, vineyard, and forestry. We aim at a non-invasive method to monitor plant diseases and deliver the information to farmers using web-based precision maps derived from machine learning algorithms based on ground and aerial infrared spectroscopy (hyperspectral/thermal).

OC PREPARE 2 - Monitorisation of mare behaviour during pregnancy and parturition (OnMareData)

The project is ongoing and planned to last six months, from 01.07.2021 to 31.12.2021.

Horse farms can play an important role in the revitalisation of rural areas, as horses are high-value animals which can contribute to their socioeconomic development. For horse farmers, the occurrence of abortion or dystocia is a big problem, as it can led to the loss of a high-value foal after many months of pregnancy. The objective of this IE is to develop and test a smart device based on a three axis accelerometer to automatically detect parturition (and other pregnancy issues), which will serve as an early-warning system for farmers. The remote detection and monitorisation of foaling could be used to track possible problems in order to avoid or reduce foal losses. The smart device to be developed will be based on an existing solution for cattle, and this PREPARE IE will be the first step to develop a fully commercial solution.

OC PREPARE 3 - Business model development for First Agriculture Digital Innovation Hub in Bosnia and Herzegovina (SMART VILLAGE)

The project is ongoing and planned to last four months, from 01.09.2021 to 31.12.2021.

The project aims to support a team of ten members with expertise in information technologies, spatial planning, economics and agriculture in the planning and definition of IEs for digital transformation of Agri-food economy in the North-Western part of BiH. IE implies on development of a business model of the First Smart Village in BiH, as a model capable to bring positive changes into rural areas, fundamentally relying on digital innovations inclusion into agricultural practice. We believe that DIHs inside rural communities should perform key rule on this path, principally relying on participatory approach of all motivated individuals, groups and entities.

OC PREPARE 4 - Vertical Wind Machine for preventing frost damage in nightshade vegetables (VertiFrost)

The project is ongoing and planned to last four months, from 01.09.2021 to 31.12.2021.

Frost risk occurs every year across agricultural regions of potato crops with the impact on farmers and the local economy being devastating. Occurrence of frost is determined by location & landscape factors, as well as climate. The objective of this proposal is to prepare for an experiment that will design, build, test and evaluate a small-scale Vertical Wind Machine for potato crops and other nightshade vegetables that are susceptible to frost. It is important to investigate not only the replacement of the cold air layer with warmer but also the effect of leaf vibration against frost. The results will verify the efficiency of the Vertical Wind Machines. Preliminary experiments, as well as technical & financial feasibility will take place within this PREPARE project.

OC PREPARE 5 - Supporting small grape and olive producers in applying agroecology and circular economy practices with the help of data-driven technology innovations (Agroecology Tech)

The project is ongoing and planned to last three months, from 01.09.2021 to 30.11.2021.

Climate change and environmental degradation result to an increasing pressure on farmers to adopt sustainable production approaches such as agroecology (http://www.fao.org/documents/card/en/c/I9037EN). At the same time, farmers are facing an increasing number of additional pressures, such as productivity pressures and skewed chain power that have a significant impact on their sustainability. Finally, there is a lack of appropriate Smart Farming (SF) tools for supporting the decision making of small producers that try to adopt agroecology practices. AgroecologyTech focuses on designing an IE that will develop IoT and AI-powered Smart Farming services for small organic grape and olive producers applying agroecology practices, to support their everyday decisions on irrigation, pest management and fertilization. In addition, the IE will focus on developing a monitoring tool to support decision making in the production of organic compost following circular economy practices.

OC PREPARE 6 – Data-driven IT platform for Food Loss & Waste (FLW)

The project is ongoing and planned to last six months, from 01.07.2021 to 30.12.2021.

At the EU policy level, the Green Deal's Farm to Fork Strategy targets halving FLW per capita by 2030. Considering the multiple stages in the supply chain where FLW is generated, the multiple actors involved, and the need for data to drive decisions, a robust data backbone requirement becomes evident. It is essential to integrate data flows from all food actors, including consumers. In Slovenia, the "Strategy for reducing food low and waste in the food supply chain'' is in preparation, elaborating on the current status of FLW in Slovenia, identifying needs at all important levels of FLW issue and proposing a set of possible measures and actions to fight against FLW systematically. Objectives of the FLW platform is to deliver and pilot an data-driven IT-based solution for capturing FLW data throughout the short food supply chain (SFSC) and providing analytics to address the requirements of the SDG Indicator 12.3.1 (Global Food Loss and Waste), the Delegated Decision (EU) 2019/1597 and the Implementing Decision (EU) 2019/2000. The second objective is to demonstrate the FLW monitoring & assessment solution in two Slovenian SFSCs, Green Point and Agraria Koper, to ensure its demonstration, applicability and replicability.

OC PREPARE 7 – Improving the repel of wolves in organic sheep farms in Lower Saxony and implementing an e-learning platform for biodiversity advisors in German (TIE)

The project is ongoing and planned to last seven months, from 25.06.2021 to 31.12.2021.

Two IEs are planned to be implemented in this proposal. The first IE deals with the repellent of wolves in Lower Saxony. In this IE, flexible digital solutions for the protection of sheep herds from wolf attacks are to be developed. Ultrasonic collars shall be implemented and modified for the use in sheep herds in Lower Saxony. A low cost and low energy surveillance system (ssy) is to be created, to prove wolf attacks in the field trials. The ssy serves also as base to develop applications for sheep owners to monitor their herds. To create satisfying solutions for most stakeholders, they should be part of the development and discussion process. To ensure this, regular workshops will be organized. In the second IE an e-learning platform for biodiversity advisors is to be developed. At the moment biodiversity advice is often given by farm advisors with other specifications or nature protection staff. Many regions in Germany have their own specifications for biodiversity advisory. It is necessary to bundle the existing know-how and develop a common tool for biodiversity advisory because of the expected increase of the need for near term qualified biodiversity advice for farms.

OC PREPARE 8 – Carbon Sequestration Modelling for Independent Monitoring Reporting and Validation (Carbon SMart-MRV)

The project is ongoing and planned to last six months, from 01.07.2021 to 31.12.2021.

Climate change due to greenhouse gas (GHG) emissions is a challenge that all industry sectors need to resolve to achieve Net Zero. Agriculture is responsible for 8.5% of global emissions and has done little to directly reduce these to date. Regenerative agriculture can play a large part, changing management practice, optimising soils, capturing carbon, increasing drought tolerance and biodiversity will make the sector more resilient and aligns closely to the EU Green Deal's Carbon Farming Strategy and the UK (United Kingdom) Environmental Land Management Scheme. Reliable and affordable methods of recording carbon capture are required, but need independent monitoring, reporting and evaluation to provide robust modelling tools. Effectively recording carbon capture will enable agriculture to enter the carbon credits market providing additional income. PREPARE activity will explore the following:

- Engagement with end users, technology companies and stakeholders.
- Costing of potential IEs
- Securing Letters of Intent
- Identifying potential funding streams.

OC PREPARE 9 – PREPARE for AgriTech

The project is ongoing and planned to last three months, from 01.08.2021 to 31.10.2021.

The project focuses on key areas such as climate change, agroecology, ICT, plant phenology correlated with aspects of nutrition, health (with foliar mycoflora screening) and photosynthesis. An analysis of the impact of technology on the environment and cost-effectiveness completes the study. Climate change mitigation and adaptation have become a global challenge for this generation, requiring the development of innovative solutions. The project responds to the identified needs and the general objective is to create innovative decision-making tools that can be subsequently transferred to the economic environment, especially to organic farms and those in conversion.

The goal of the project PREPARE for AgriTech is to support the team of SmartAgro DIH to plan and define a IE connected to the expertise of the DIH members and other potential partners. The IE will be submitted under the EXPAND Call of SmartAgri Hubs, as well as a more extensive proposal is planned for submission in this direction under Horizon Europe Cluster 6 call connected to agriculture technology.

OC PREPARE 10 - Facilitating SMEs access to digital technologies for stock and logistics management optimization (SMElogistAI)

The project is ongoing and planned to last five months, from 01.08.2021 to 31.12.2021.

Digital technologies are widespread among larger businesses to optimize stock management and logistics processes with impressive results in reducing costs and carbon footprint of operations. In the agri-food sector, by its nature, the optimization of these processes is critical. However, SMEs are lagging way behind, not only in the adoption of technology but also in the change of their mindset. Digital technologies feel far and inaccessible for many; and decision-making in these areas is rarely data-driven. Aragón DIH (ITAINNOVA) developed an AI based tool (Kajal1) which can improve SMEs competitiveness by addressing forecasting, replenishment and logistics planning, all critical aspects for production planning, cost management and customer success. Sostenibles DIH (Sostenibles Network) is a digital network with +150 SMEs members in the organic agri-food sector in Spain. With support from the RESPOND Open Call, developed a digital tool to facilitate SMEs access to the market, currently serving 50 SMEs nationwide. The consortium aims at preparing a project to facilitate the adoption of digital tools for stock and logistics management optimization among SMEs in Spain.

OC PREPARE 11 - Autonomous Weeding Robot (AWR) for Conventional and Ecological Farms (AWR)

The project is ongoing and planned to last four months, from 01.07.2021 to 31.10.2021.

Weeding is a highly complex task in agricultural, implemented by spraying large amounts of agrochemicals onto crops. Such chemicals pose negative effects on soil, water, climate and human health according to the WHO. Robots can offer an efficient alternative to the use of agrochemicals via precise mechanical weeding. Agricultural weeding robots are currently very expensive while not being precise enough for farmers to replace herbicides. Ant Robotics proposes to test an in-house designed autonomous weeding robot over 12 months in 2021 and 2022 with a consortium of farmers to evaluate the performance of high precision weed detection, autonomous path planning algorithms and various in-row mechanical weeding tools. Results will be published under an open-access academic publishing license. The weed detection software will be provided under an open source software license for adaptation to various agricultural regions and crop types, based on the improved second generation robot hardware resulting from these field trials.

OC PREPARE 13 - A digital ecosystem for integrated disease management in pear orchards (DIMAP)

The project is ongoing and planned to last nine months, from 01.09.2021 to 31.05.2022.

Pears are one of the most consumed fruits globally. As with most agricultural products, pests and diseases lead to large economic costs for pear producers, through lost production and disease management costs. Stemphylium vesicarium, Rosellinia necatrix and Erwinia amylovora are three of the main pathogens affecting pear production, both at a national and international levels, leading to losses of over 50%. DIMAP will bring together a diverse set of complementary partners, including 3DIHs, 2 SMEs, 3 producer associations and 2 academic institutions, with complementary expertises in fruit production, remote sensing, drone deployment, sensor development, soil analysis. This team will design an IE that uses state-of-the art precision agriculture for integrated disease management in pear orchards. This will provide early warnings and disease risk maps in a pathogen specific manner, leading to both economical and environmental benefits through a decrease in the application of phytochemicals and an increase in yields.

OC PREPARE 14 - Viticulture living-lab: Digital tools for a sustainable viticulture (DIG4VITIS)

The project is ongoing and planned to last six months, from 01.07.2021 to 31.12.2021.

Viticulture is one of the most promising sectors of EU agriculture, mainly in the region of Castilla y León (Spain) with eight areas under the rules of Designation of Origen in which D.O. Ribera del Duero is leader in the global sector. This sector has experienced a rapid evolution from traditional practices applying an elevated use of external inputs: fertilizers, pesticides, manual working, to more evolved practices involving different aspects from sensorization of meteorological variables or soil properties, to crop quality monitoring or in situ sustainability assessment evaluations. The project involves the creation of a living-lab, located in a winery and integrating of all the information, from soil properties, to climatic, environmental and sustainability indicators, in a web-based traceable monitoring and decision support system considering the participation of all chain value actors: from winegrowers to the final consumers.

The objective of the DIG4VITIS initiative is to establish a Living-lab of digitalized viticulture activities, grouping the complete route Farm to Fork: from winegrowers, technological companies, wineries, to the final consumers. Description of the IE: Viticulture living-lab DIG4VITIS will be placed in an experimental plot of Ribera del Duero in which the flowing initiatives will be implemented:

- High resolution mapping of soil with the use of geolocalized apparent EC measurement system and GIS technologies.
- Crop yield monitoring by satellite or aerial imaginary.
- Terrain analysis to control soil erosion and pollution risks.
- Agrometeorological, soil and plant test probes installation for precision irrigation and fertilization.
- Development of a digital tool for weeds control and pesticide management.
- Instant tool for GHGs accounting of viticulture production.
- Web base platform for viticulture biodiversity registration. All the data obtained will be integrated into an intelligent tool able to provide monitoring and assessment capabilities. Multicriteria optimization analyses will be used to process the information and support the decision-making processes in the field.

OC PREPARE 15 – R&D on the digitalization of the wine production workflow (DIGIWINE)

The project is ongoing and planned to last six months, from 01.07.2021 to 31.12.2021.
In 2021, SMEs of wine producers face high difficulties in staying in the market, due to the presence of large industrial competitors with great amounts of capital available for investments and a strong product price competitiveness (which not always is synonymous of quality). Digitalizing the workflow would benefit the enterprises of SME winemakers. The aim is a platform, first of all to ease the administrative duties of winemakers and thus giving them more time where it matters the most, in the vineyard and cellar. The second goal is putting forward their craftsmanship and their respect for terroir and climate in the spotlight. This will improve visibility, both internally (operational winemaker workflow) and externally

(government, customers), creating a solution for all the stakeholders related to the wine-making ecosystem. The key element is to unblock a new solution for winemakers to digitalize administrative relationships between government, wine producers and consumers.

3. RESULTS

After receiving all 45 IE EPs, WP3 has conducted an analysis showcasing common elements of the projects and their specificities, allowing better understanding of their planned impact. More importantly, the analysis allows better understanding of specific needs arising from DIHs, farmers, SMEs and other stakeholders involved from the agri-food sector.

3.1 OC RESPOND

As mentioned previously, OC RESPOND is the only OC that is closed and finalised, in a sense that all 21 projects are successfully implemented. More precisely, 13 projects from the RESPOND1 DIHs and eight from RESPOND2 SMEs are analysed below.

3.1.1 OC RESPOND1 – DIHs

The statistics show that most of the IEs within this OC were coming from the Iberian RC (23%), three other RCs (NEE, SEE and France) were represented with 15% and the rest of them with 8% (RC NEW, CE, Italy & Malta and UK & Ireland). RC Scandinavia was not represented within this OC. IEs are coming from nine different countries. Four of them are from France and Spain (15% each) and others come from Italy, Lithuania, Germany, Slovenia, Poland, Romania and the UK. The analysis are presented on the figures below:

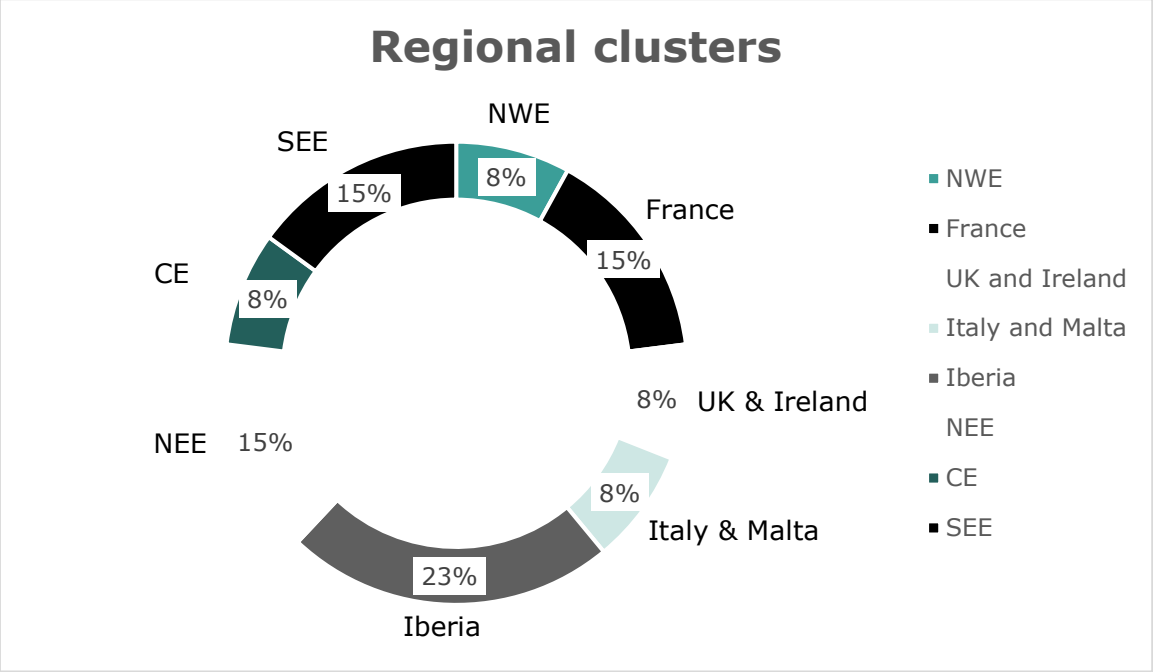

Figure 1 – Regional clusters share in OC RESPOND1 – DIHs

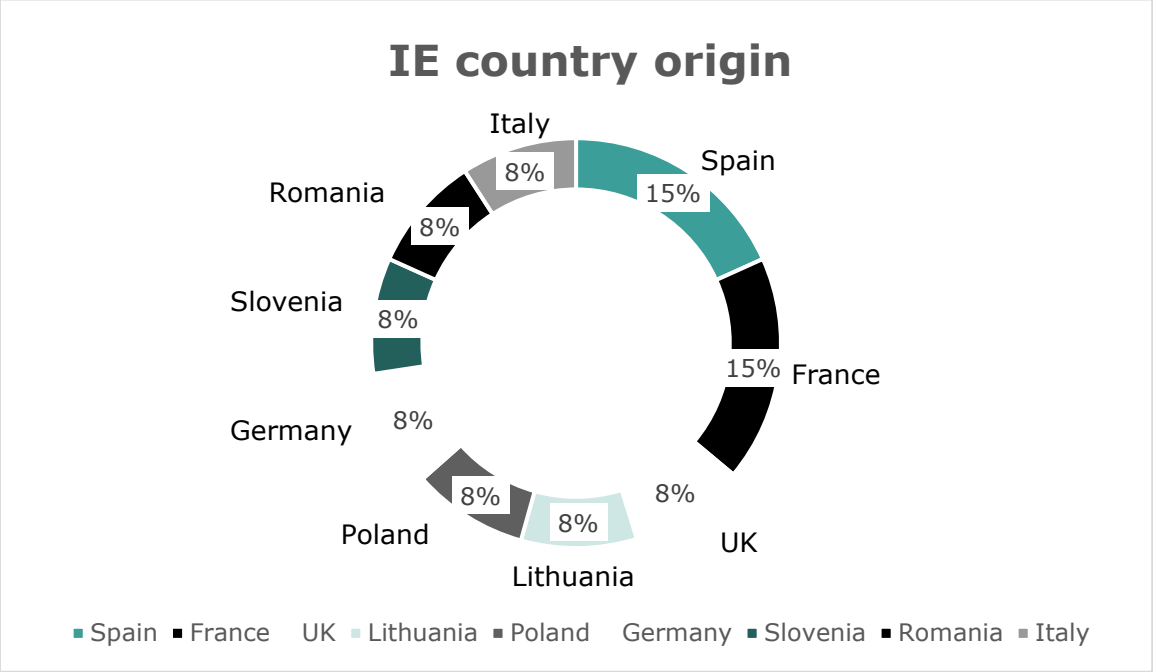

Figure 2 - IE country origin in OC RESPOND1 – DIHs

It can be noticed that the sectors the IEs were related to, were mostly evenly distributed. Not only that, but the majority was also working on solutions that could be applied in various sectors, which shows that the awareness about the importance of interoperability and intersectoral cooperation is highly raised. This is presented on Figure 3:

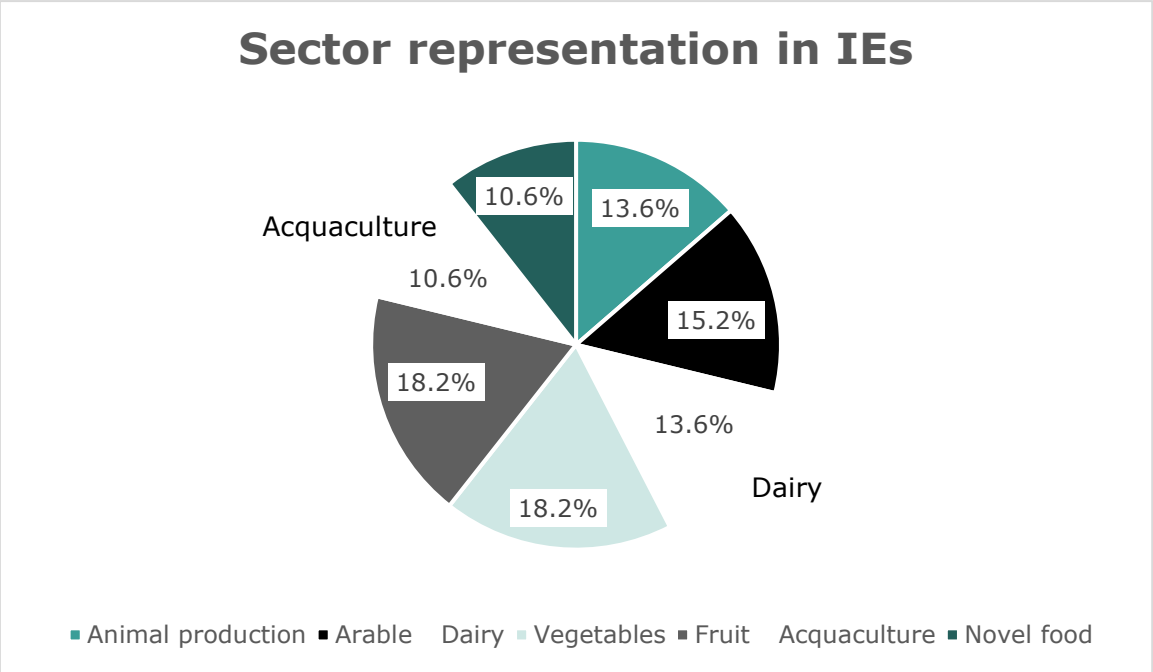

Figure 3 – Sector representation in IEs in OC RESPOND1 – DIHs

The majority of the projects within OC RESPOND1 – DIHs started on 01.07.2020 and no project started later than 28.08.2020. The shortest project lasted for four months, whereas the longest ones were six months. This leaves us to a conclusion that all projects except one finished by 31.12.2020. The one mentioned finished on the 31.01.2021.

As explained in the previous segment, this OC had a supported hackathon type of activities in order to fight against the COVID-19 pandemic from the perspective of what digital innovation can contribute to mitigate consequences in the agri-food domain. Therefore, the

majority of the events were hackathons (87.5%) and others were different types of challenges (12.5%). All of them address issues in the agri-food domain, however, some of them were focused on specific issues in this sector e.g. supply chains, food production, horticulture, veterinary or processing industry. The longest duration of the event was six days, but other than that specific case, the rest of them lasted for one day (38%), two (23%) or three days (15%). Not all the challenges had an envisaged specific number of teams. Still, it can be concluded that the average number of teams per event was nine, while three being the smallest number and 15 being the largest number of envisaged teams.

Even though the hackathons were related to the same field (digital innovation in agri-food), they addressed different number of challenges, as presented on Figure 4.

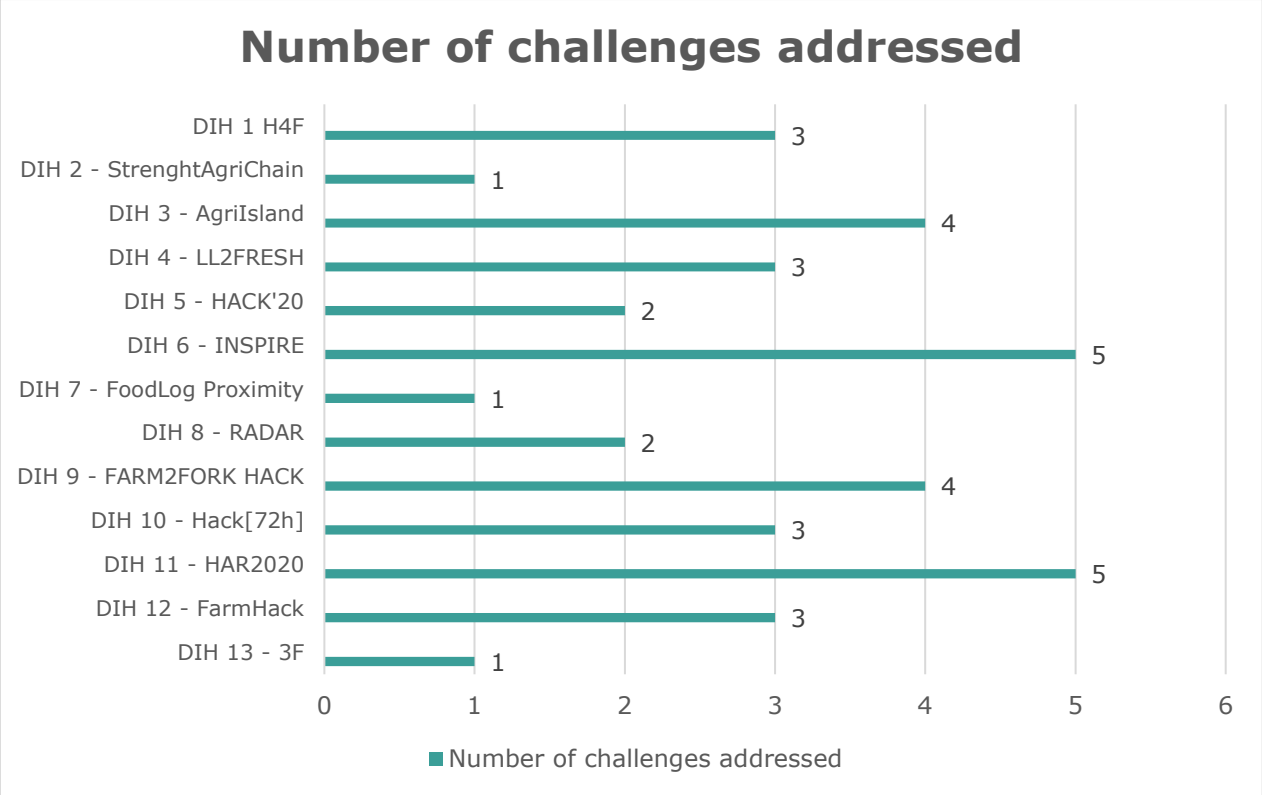

Figure 4 - Number of challenges addressed in the OC RESPOND1 – DIHs

Addressed Challenges: Since the main aim of OC RESPOND was to mitigate the COVID-19 pandemic consequences from the agri-food perspective, projects focused on various aspects and problems the pandemic has brought. It is noticeable that strengthening and digitalization of every part of the food value chain was needed. Therefore, some of the challenges included strengthening short distribution channels, achieving more integrated agri-food chains with improved efficiency, food safety and traceability, reinforcing resilience of the primary food production, etc. For all these actions, some projects have recognized that additional education on these novel topics are needed, therefore some of them addressed the challenges of educating individuals in the agri-food business. The education topics were different, and the end-goal was to teach them how to:

- respond to the crisis efficiently,
- forecast their supplies,
- mobilise agricultural workforce in an efficient manner.

Considering that almost all European countries had lockdowns at some point of the pandemic, the participants recognized the importance of supporting local production and short food chains. A lot of digital solutions (often platforms) were developed in order not to waste surplus foods but to donate it to the ones in need. Platforms also had a goal to connect local producers with local consumers. Therefore, that is another way to accelerate the local sales and overcome the issues that the pandemic has brought. Considering the restricted movements of citizens and workers, some projects focused on automation of processes to

reduce the needed human workforce. Some of them were quite sector-specific, e.g., focusing on veterinarians who could not come to the farms or providing innovative packaging solutions in order to extend the shelf-life of fruit and vegetables. Some hackathons were addressing national or regional problems, e.g., island inhabitants that have limited access to land and water.

Having in mind the addressed challenges, it is easy to specify **target groups** of the project. Common for almost all IEs were SMEs, food industry, retailers, food producers, farmers, but also the public sector, policy makers, local authorities and NGOs. The ones that were more specific included logistics companies and cooperatives, ICT companies and start-ups, entrepreneurs, packaging industry, developers, IT engineers as target group. It is important to mention that academia was also involved: students, R&D researchers, innovators, university researchers.

Reusability: One of the important aspects of this OC was reusability. The solution had to showcase their reusable element by different stakeholders. Almost all projects (except two) explained their strategy of reusability for the solution presented. Many of them presented the challenge results on the SAH Innovation Portal which is recognized to be an important dissemination channel. Some of the IEs offered prizes to the winners that included a designed programme to completely develop their ideas and facilitating the business model design and getting the first clients. Those DIHs had a more constructive approach, meaning that they had a clear concept of further development of the hackathon ideas, concepts and prototypes, e.g.:

- Foundation as new start-up, including financial support,
- Further development in the supervising company/end user,
- Application for a research project by a college/university support will be given for the application to public innovation support programs.

Another strategy included is cross fertilization of the results by promoting them in other sectors. This way, the results could be reused by stakeholders from other sectors and scaled up making an even bigger impact. The vast majority of DIHs included their own channels, links or even ecosystems for implementing successful dissemination. Synergies with other existing innovation support were also supposed to be fostered. When applicable, the projects were planned to be accompanied towards other existing initiatives that could further support their growth.
The Minimum Viable Product (MVP) was also a common strategy for reusability. To explain this further, this means that the results from hackathon would be presented as conceptual implementations or MVP that could serve as implementation baseline and cooperation/investing opportunity for a follow-up by the industry, corporations, investors and other stakeholders. Living lab services were important strategies implemented by only a few DIHs. The goal was that Living labs, which interested target group members (farmers, food producers, SFSCs), would provide deployment/testing/validation facility for solutions to be piloted and demonstrated to other interested parties. Some DIH proposers included local authorities and promoted the solutions on a city level.

The total number of **key participants** in 13 projects is 47. Out of those 47, we have identified nine SMEs, seven DIHs and three CCs. Other participants are different stakeholders including Centres of Innovations, networks, associations, clusters, NGOs R&D Technology transfer organisations, etc. These figures are presented below:

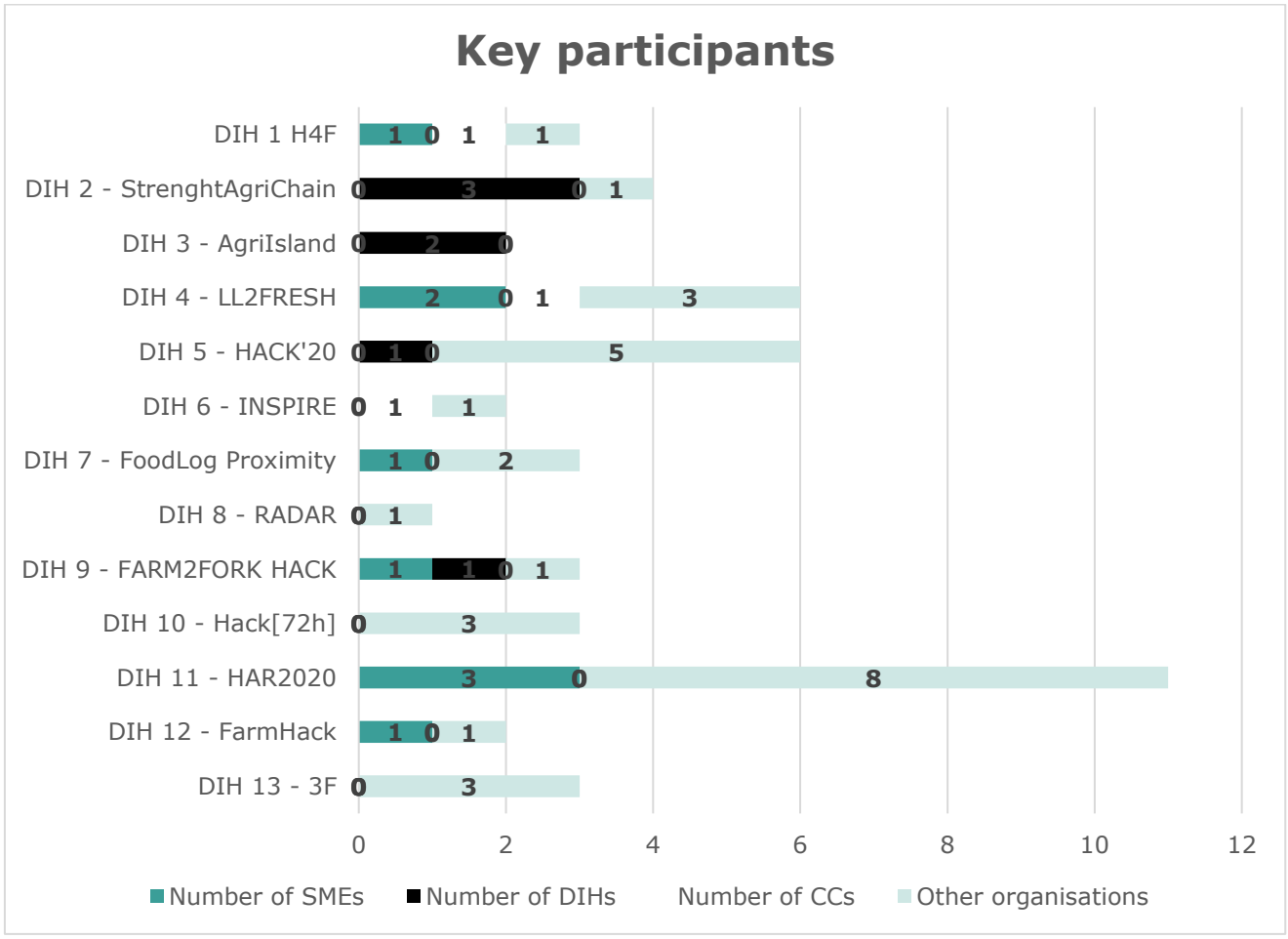

Figure 5 - Key participants in IEs in OC RESPOND1 – DIHs

All the proposers were DIHs. One of the components of their proposals was the DIHs **maturity self-assessment**. The results showed that when it comes to the overall DIH maturity, 77% scored high, 15% scored intermediate and 8% was assessed as low. These statistics are presented in Figure 6:

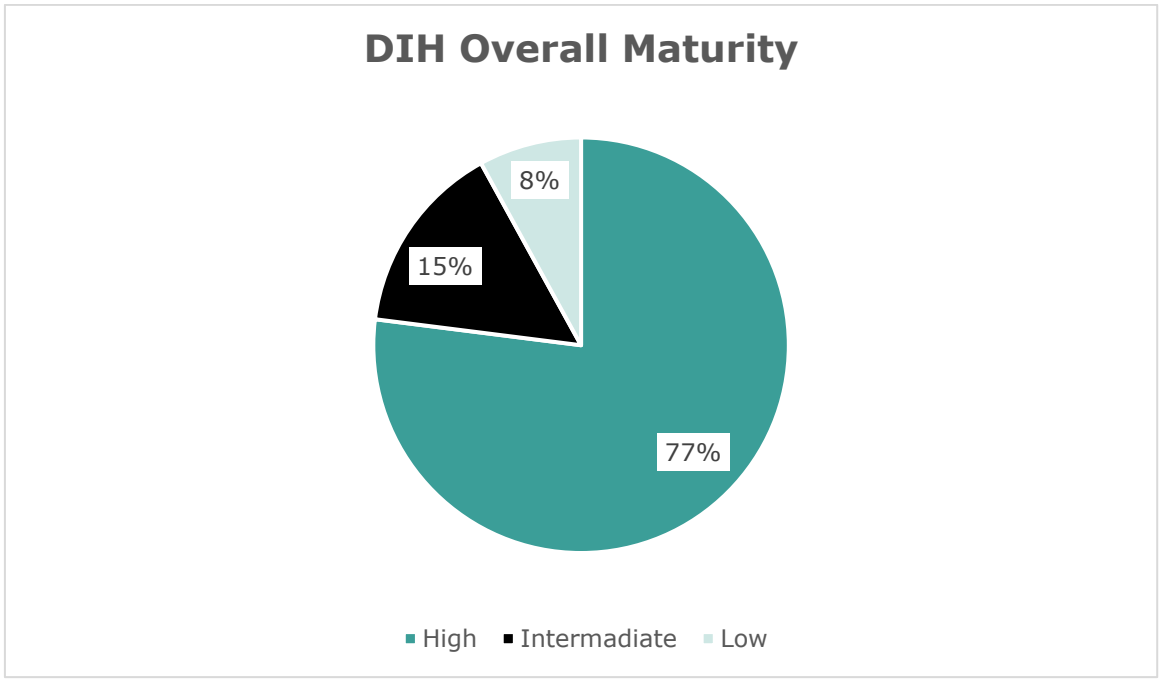

Figure 6 - DIH Overall Maturity in OC RESPOND1 – DIHs

This report also addresses the number of key individuals as well as the gender analysis. The total number of key individuals was 64, from which 34 were males and 30 females. This statistic is shown within Figure 7:

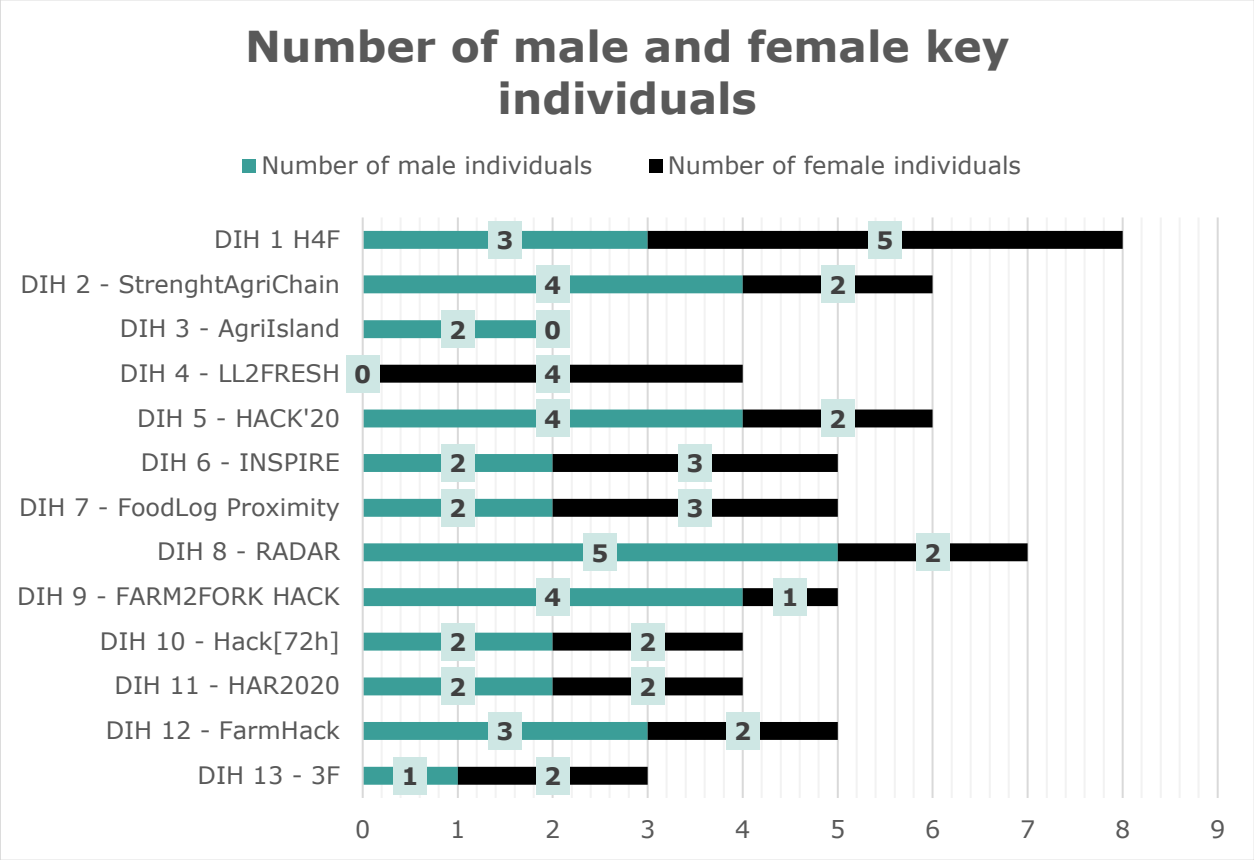

Figure 7 - Number of male and female participants in OC RESPOND1 – DIHs

It can be concluded that this OC was almost completely gender balanced when it comes to the key individuals within project teams – 47% female and 53% male key individuals. On the other hand, statistics shows that the coordinators were female-dominant – 62% female and 38% male, as presented below:

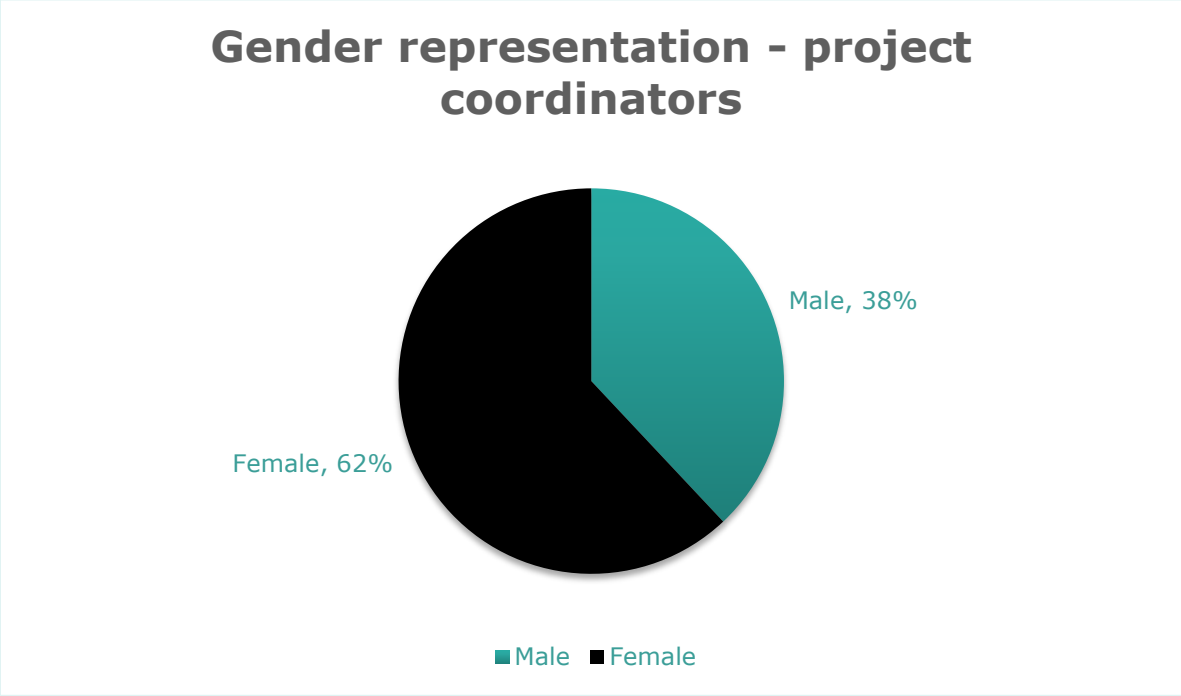

Figure 8 – Gender representation of the RESPOND1- DIHs project coordinators

3.1.2 OC RESPOND2 – SMEs

The statistics show that most of the IEs were coming from RC North-West Europe (37.5%). RC France is on the second place with a share of 25%, while RCs UK & Ireland, Italy & Malta and Iberia share the third place with 12.5%. RCs CE, NEE, SEE and RC Scandinavia were not represented within this OC. More specifically, France is the country with the greatest number of IEs from the OC RESPOND2 SMEs. Five other countries (Spain, the Netherlands, Belgium, Italy and UK) have the same share of 14.29%. The analysis are presented within the charts below:

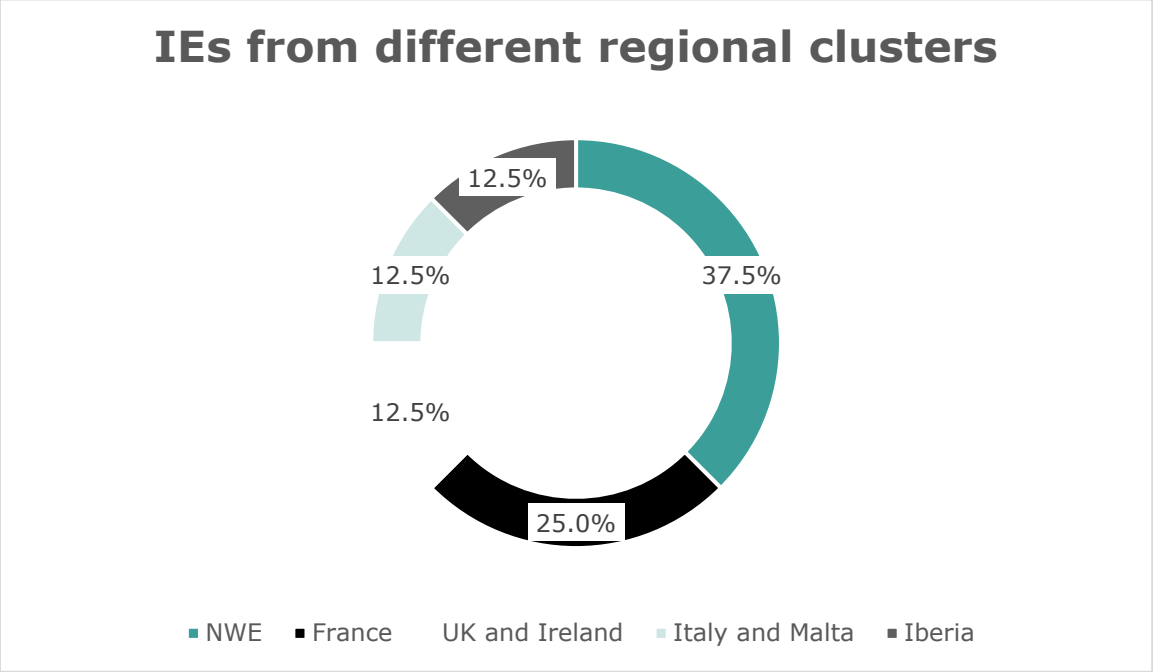

Figure 9 – Regional clusters share in OC RESPOND2 - SMEs

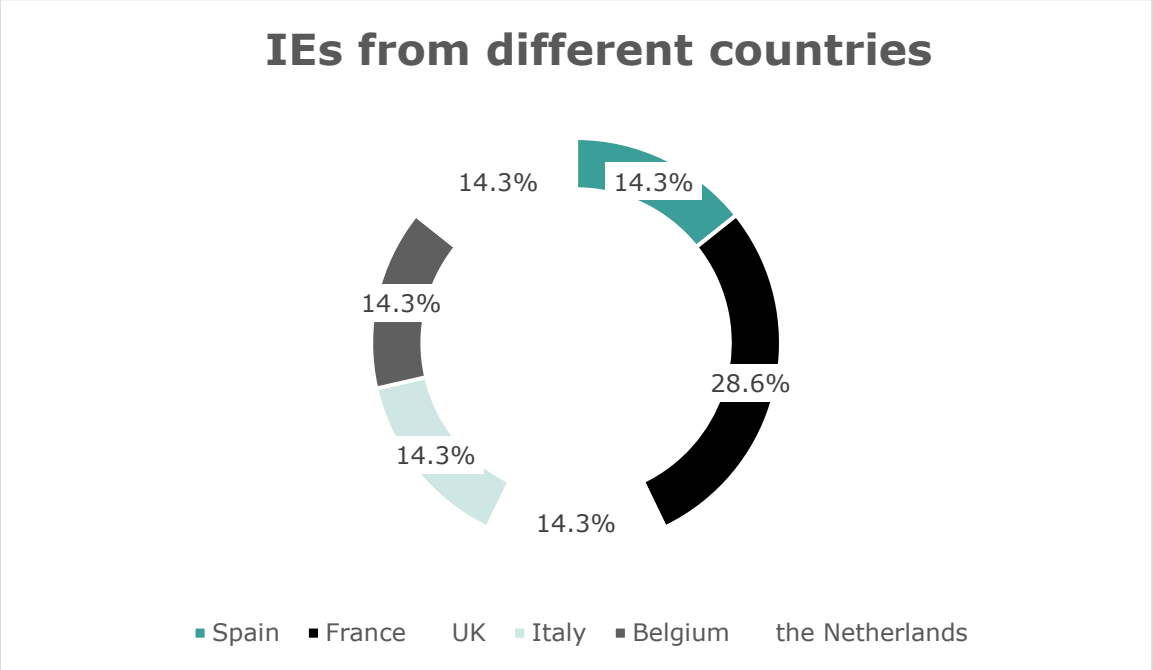

Figure 10 - Countries share in OC RESPOND2 – SMEs

It can be noticed that within this OC, IEs are mostly evenly distributed within different sectors. However, most of them had experiments in the field of dairy, fruits and animal production (17.4%). Vegetables and arable sector have the same number of experiments (13.0%) as well as novel foods, organic food and aquaculture which had the least number of experiments (8.7%). Figure 11 represents this analysis:

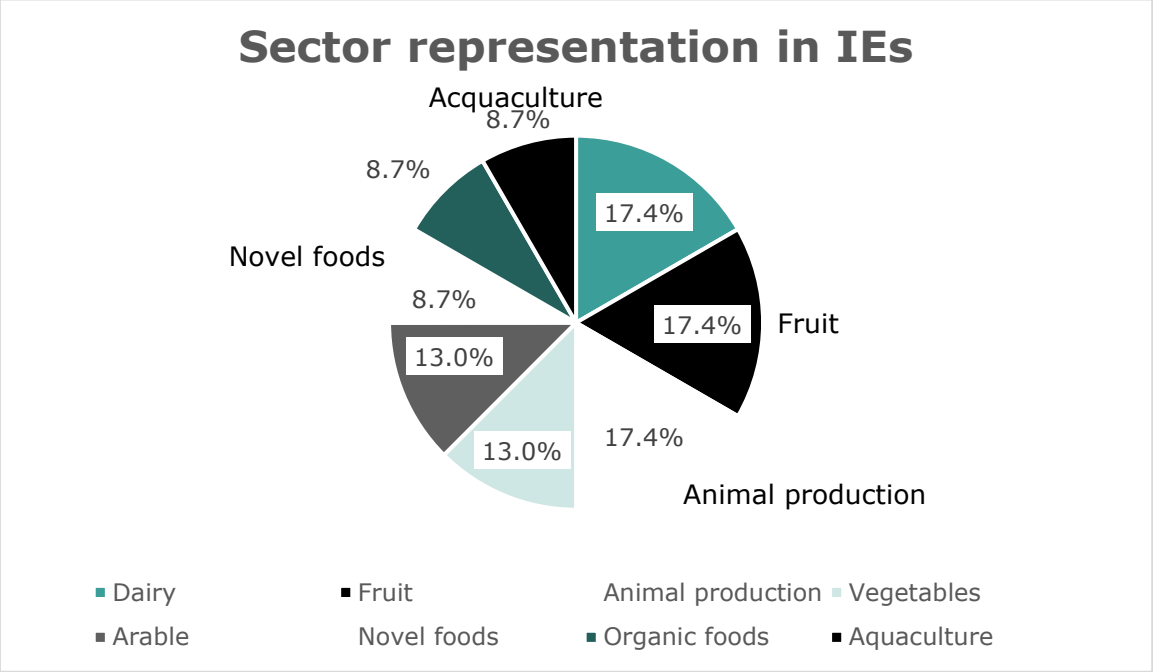

Figure 11 - Sector representation in IEs in OC RESPOND2 - SMEs

When it comes to the project duration, the shortest one lasted for four months, while the longest IE lasted for eight months. On average, the duration was less than six months. Five projects started on the 01.07.2020, two on the 01.08.2020 and the last started on 01.09.2020. Half of the projects ended by 31.12.2020 and the last two ended on the 31.03.2021.

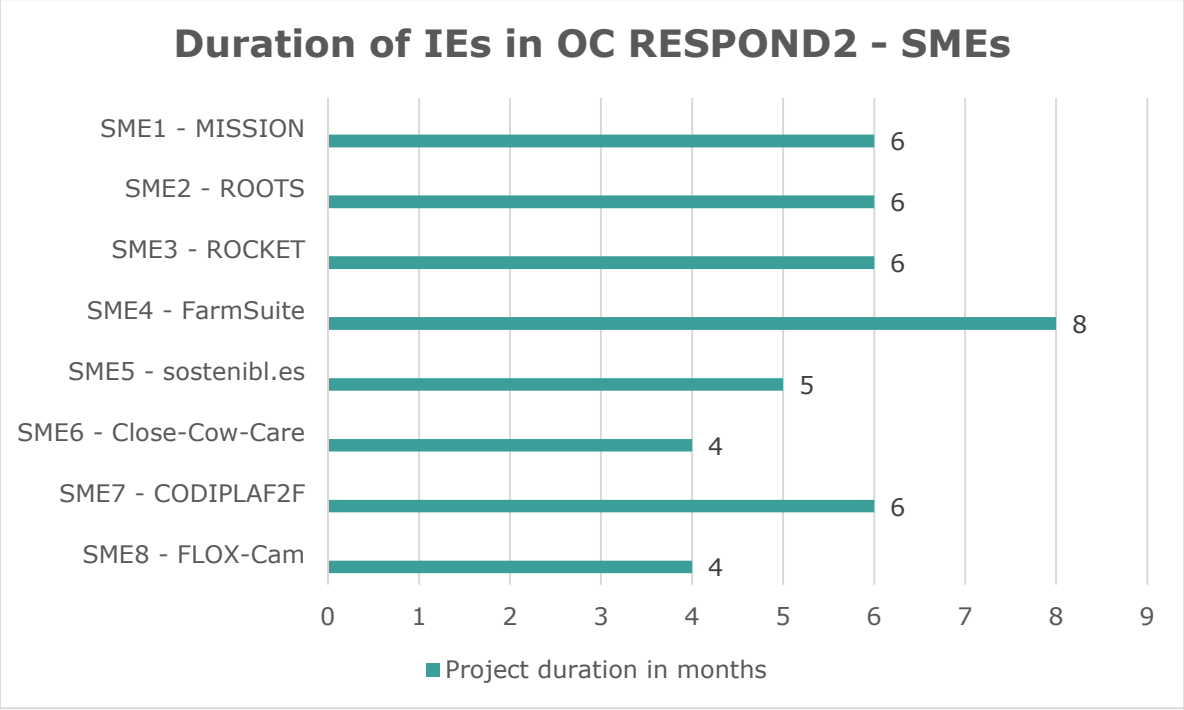

Figure 12 - Project duration of IEs in OC RESPOND2 – SMEs

The common **target groups** of all OCs within this call were farmers and producers. SMEs and retailers were also frequently identified as target groups. Other than these groups, commonly targeted were farmers associations, consumers, hubs and cities. Some of the IEs had specific target groups e.g., agricultural recruiters, beekeepers, veterinarians,

winegrowers, gardeners, pensioners, unemployed people, students, agricultural workers or other experts: accountant, employers' group, cooperatives, training Centres.

The-end products and solutions of all the projects were software-related, using different technologies e.g., blockchain and IoT. In most cases, the products were already existing but within OC RESPOND2 SMEs, new characteristic were introduced to the existing solution that are supposed to mitigate the consequences of COVID-19. 3/4 of the products were platforms and other solutions are user-interface and AI-based solutions, as presented in Figure 13:

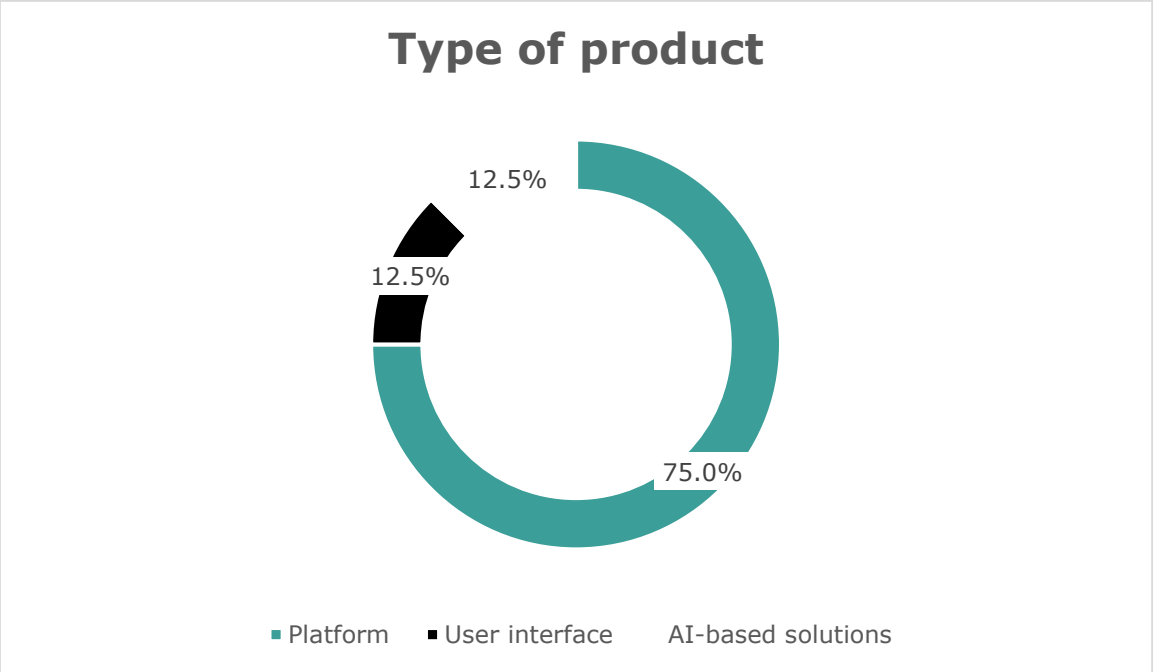

Figure 13 - Type of product solutions in OC RESPOND2 – SMEs

The projects within this OC did not have many subcontracted parties. On the contrary, only three projects have included them – one project had two subcontracted parties and other two had only one.

Regarding the number of involved SMEs – 50% of projects had one SME involved, 25% had two SMEs involved, 12.5% worked with three SMEs and 12.5% worked with six. When it comes to other organisations that were included in the projects, 12.5% included start-ups and 25% included three other organisations. The statistics is the same for all of them regarding cooperation with DIHs and CCs, no one included them in the IE, but that does not mean that they were not included once the experiment realisation started.

This report also addresses the number of **key individuals** as well as the gender analysis. The number of key individuals varied as shown in Figure 14:

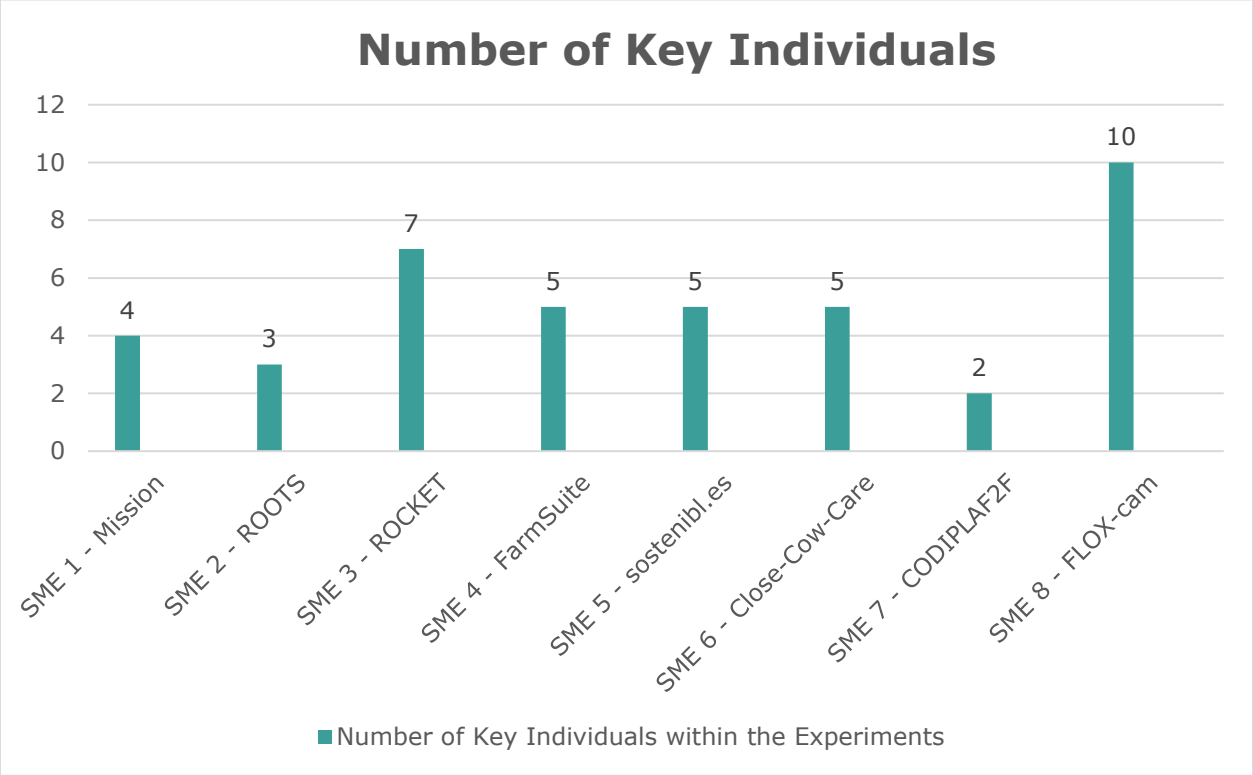

Figure 14 - Number of Key Individuals in OC RESPOND2 – SMEs

Other than just the number of people involved in the IEs, having in mind the importance of gender balance within the teams, we also analysed those statistics as well as gender representation among the coordinators. As it turned out, the teams and coordinators were mostly male-dominant with ¾ of the team members were male. The results can be seen below:

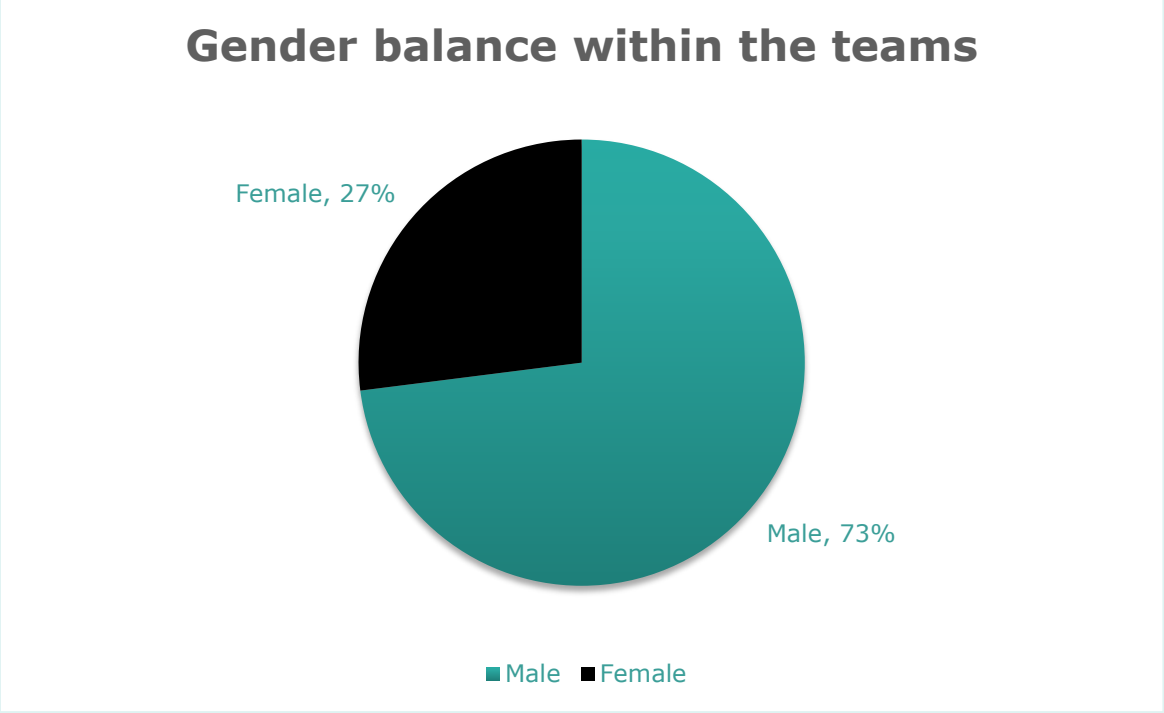

Figure 15 - Gender balance of teams in OC RESPOND2 – SMEs

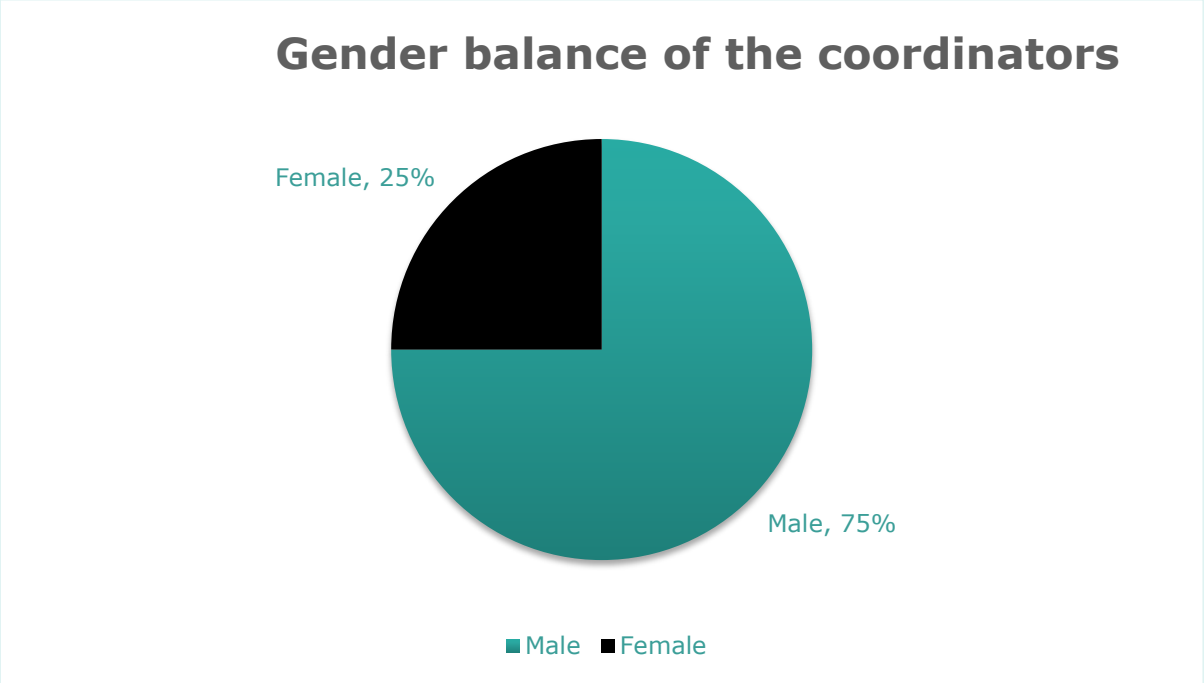

Figure 16 - Gender balance of the coordinators in OC RESPOND2 – SMEs

3.2 OC EXPAND

Statistics show that most of the IEs within OC EXPAND come from RC NWE (60%), NEE (20%) and Iberia (20%). Since during this OC five projects were contracted, RCs SEE, Italy and Malta, Scandinavia, UK and Ireland, CE and France were not represented within this OC. More specifically, the projects were almost evenly widespread regarding countries - Lithuania (20%), Germany (20%), Spain (20%) while only Belgium had a higher share of 40%. These statistics are represented below:

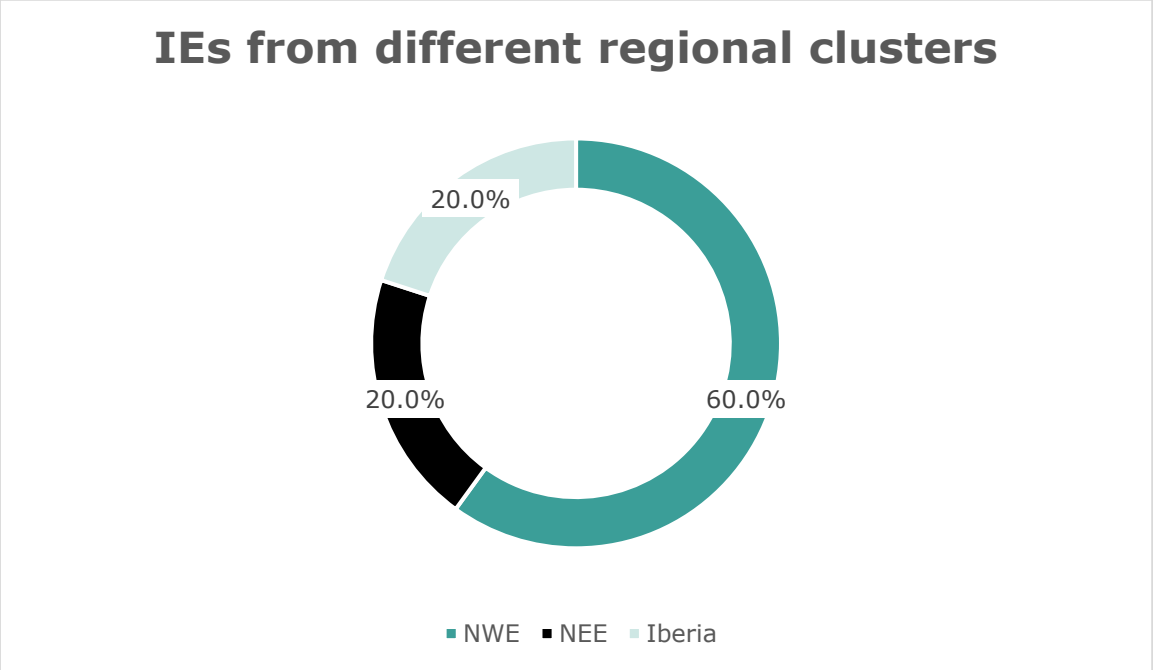

Figure 17 - Regional cluster share in OC EXPAND

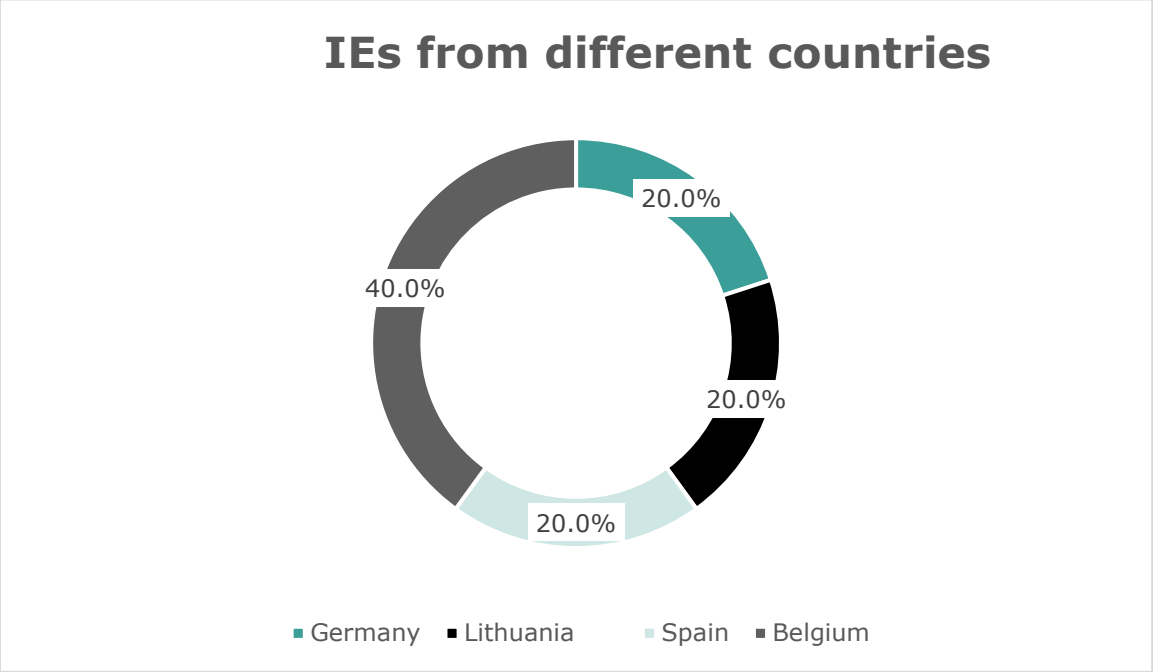

Figure 18 - Countries share in OC EXPAND

However, the IEs have identified several other organisations from different countries that they intend to collaborate with. On average, three other countries were identified. Among them were Finland, Croatia, France, Portugal, the Mediterranean area, the Netherlands, Poland, Austria, Italy and others where projects started in 2021 and all of them are ongoing. The first started on 01.02.2021 and the last started 01.07.2021. The shortest project will last for eight months while the longest one will last for 18 months and therefore that project is supposed to end the last – 31.07.2022.

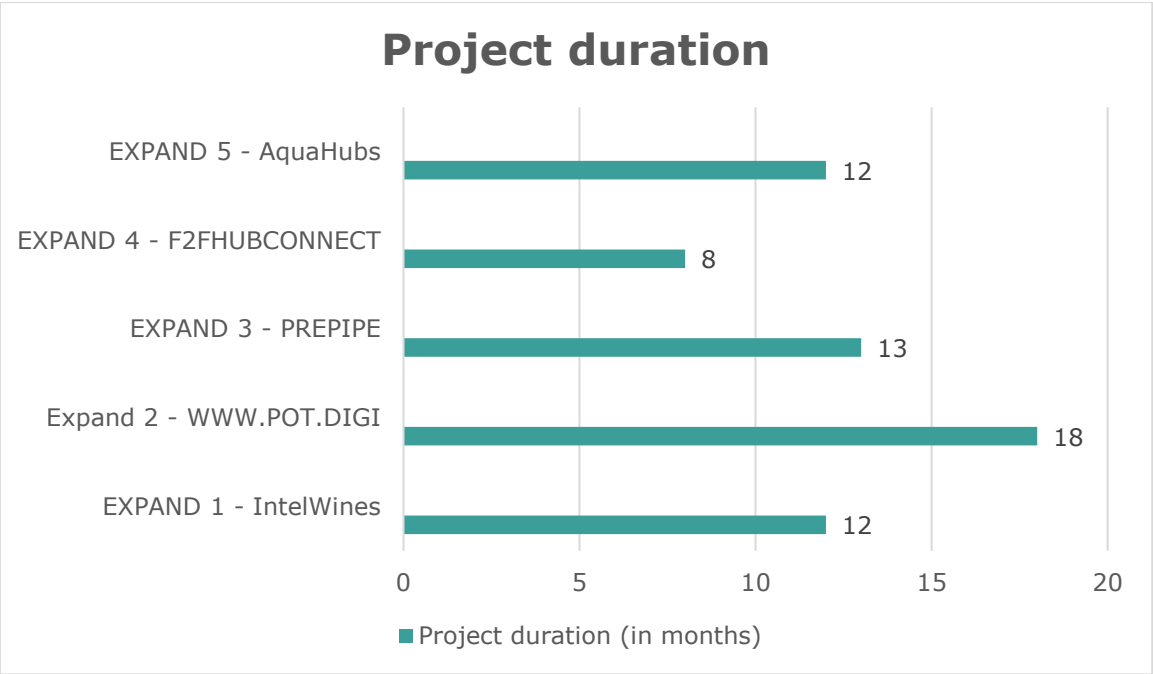

Figure 19 - Project duration in OC EXPAND

Most of the projects are multisectoral, but the sectors that are often mentioned are arable (in three out of five projects), aquaculture, animal production, dairy, vegetables, fruit and novel foods (two out of five projects). One project is focused on a specific sector – winery.

The average number of IE within one project is three. More specifics are presented on Figure 20:

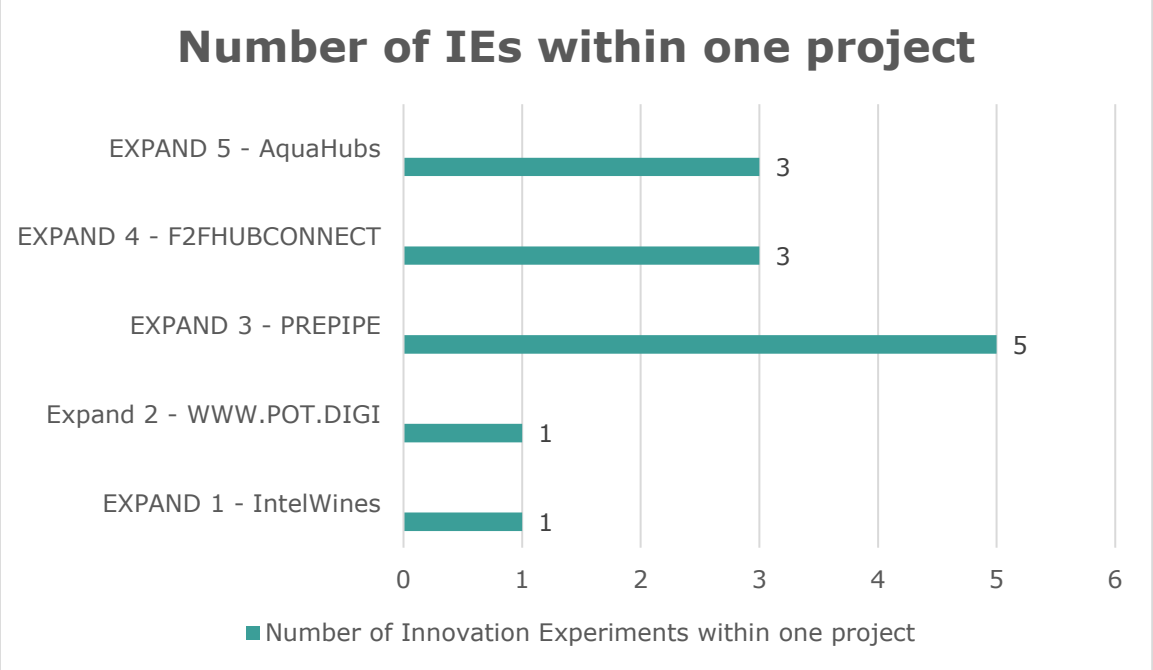

Figure 20 - Number of IEs in OC EXPAND

Considering the fact that some projects had multiple IEs, **TRL**s are not clear for all of the experiments, but it can be concluded that the average starting TRL is 4 whereas the target TRL is 7.

The **topics** of the IEs were all regarding innovation in agriculture, but some of the projects were more specific and have set their work in the field of precision agriculture, logistics and food traceability, fishery and aquaculture.

Different project topics means different **target groups**. Other than innovation development companies, which were a target group for two out of five projects, all of the others had different target groups, e.g. wine making companies, IT companies, logistics companies or SMEs, farmers, machine construction companies, processing industry, retailers, customers, B2B customers (such as large canteens - schools, retirement houses, hospitals), end-users, DIHs and CCs, policy makers, local and national operating association, resellers, whole sellers, consumers, implementing bodies, aquaculture farmers and professional fishermen.

All of the final solutions were software-related but some of them (40%) have also included a hardware component as the final product. The most common solution was a platform (60%), however AI, data capture camera system, IoT sensors, e-DIH development, NIR spectrometry, machine learning and data analysis technique were also included. Interestingly, some of them included soft skills as a final product, more concretely, increasing DIH capacities was the aim of that specific project.

Reusability: The developed technologies and systems must be reusable to scale up to other industries and companies as fast as possible. All the projects intend to disseminate the developments and discussions made during the projects. Platform development is one of the most important replicant results which would be reached through the EXPAND OC. Since a high number of projects was dealing with platform development, it should be acknowledged that it is a feasible replicability strategy. Many of them have previously developed an ecosystem where they can disseminate their developments to other regions and projects,

using either a common, centralized platform or a deployable clone of the platform. One of the reusability strategies includes the development and launch of the Minimum Viable Product that can further be reused in other projects and experiments. One the other hand, some of them developed strategies for the exploitation of the results, e.g., software will be developed as a service and will be owned by and open to all farmers. With constant collaboration on new features, cross-fertilization across regions can continue.

With some more specific projects, e.g., in the wine sector, complete system for the traceability of the products has been developed, from the vineyards to the glass consumed by the end customers, including vinification, maturing, storage in barrels, bottling, labelling, palletization and the different distribution channels. The whole environment has been designed to allow replicability by others in the same sector.

When it comes to the aquaculture sector, the project has developed a set of strategies that will ensure reusability:

- A programme on knowledge exchange and capacity building;
- A set of tools for each relevant stakeholder of the aquaculture and fishery industries (Innovation development SMEs, End-users, DIHs and CCs, Policy making/implementing bodies);
- Policy recommendations;
- A framework on aqua-tech needs assessment.

This is the public version of the deliverable. The confidential version contains Funding sources.

All the projects were organized by DIHs which offered different **services**. Most of them offered general DIH services, such as capacity building, communication and dissemination tools, access to online platforms, access to relevant information, resources, tools and equipment, establishing business plans for the hubs B2B activities and providing marketing support. Additionally, some of them offered access to available funding opportunities, digital support, IE assessment and validation. Some offered more specific services such as assistance to implement full traceability of the products (incl. QR codes) with the possibility to hash them on a public blockchain ledger for full public traceability, training on labelling, food security, coordination of logistic food supply between hubs where needed and support for WMS integration. DIHs offered different number of services, as presented in Figure 22:

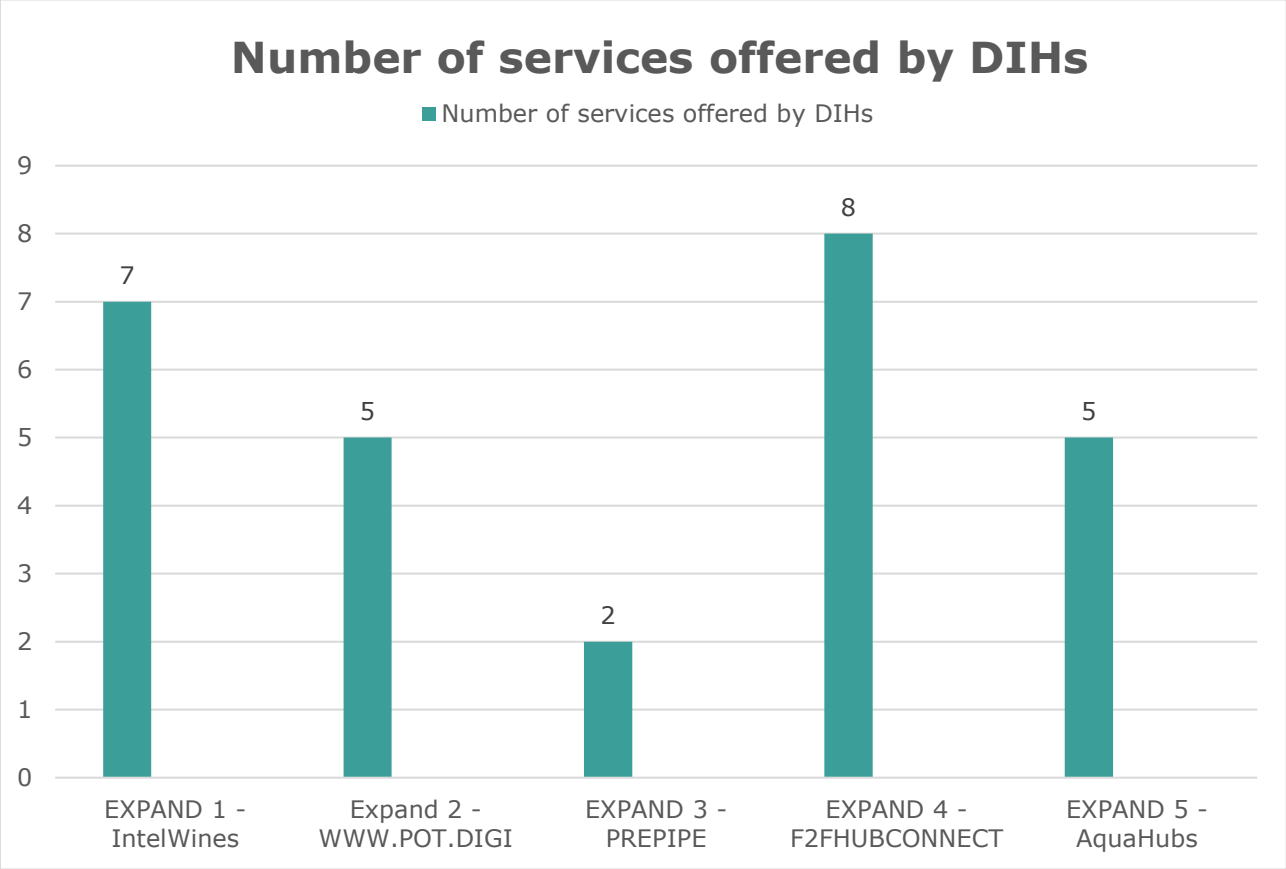

Figure 21 - Number of services offered by DIHs

All DIHs did the obligatory DIH maturity self-assessment test. Based on that test 60% of the DIHs were evaluated as high whereas other 40% were in the intermediate range.

The total number of **Key Partners** in OC EXPAND is 27. Out of those 27, there are four identified categories of partners: DIHs, CCs, SMEs and other partners (mainly Institutes, R&D organisations, associations, etc.)

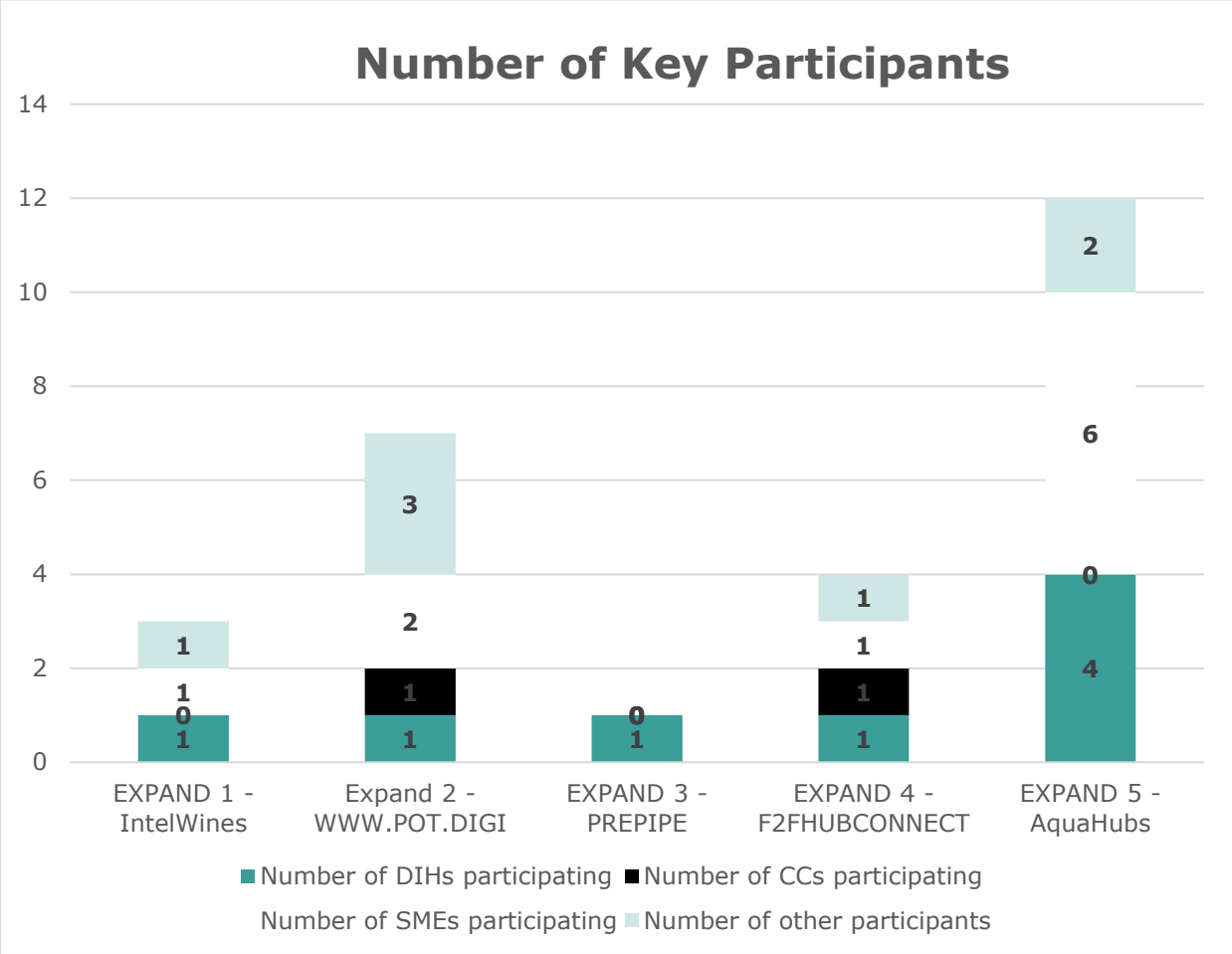

Figure 22 - Number of Key Participants in OC EXPAND

The total number of **key individuals** in this OC is 29. However, the project teams were not very well gender-balanced – 69% were male individuals and 31% were female. On the contrary, when it comes to the gender of the coordinator, the statistics is different – 60% were female coordinators whereas 40% where male. These facts are presented below:

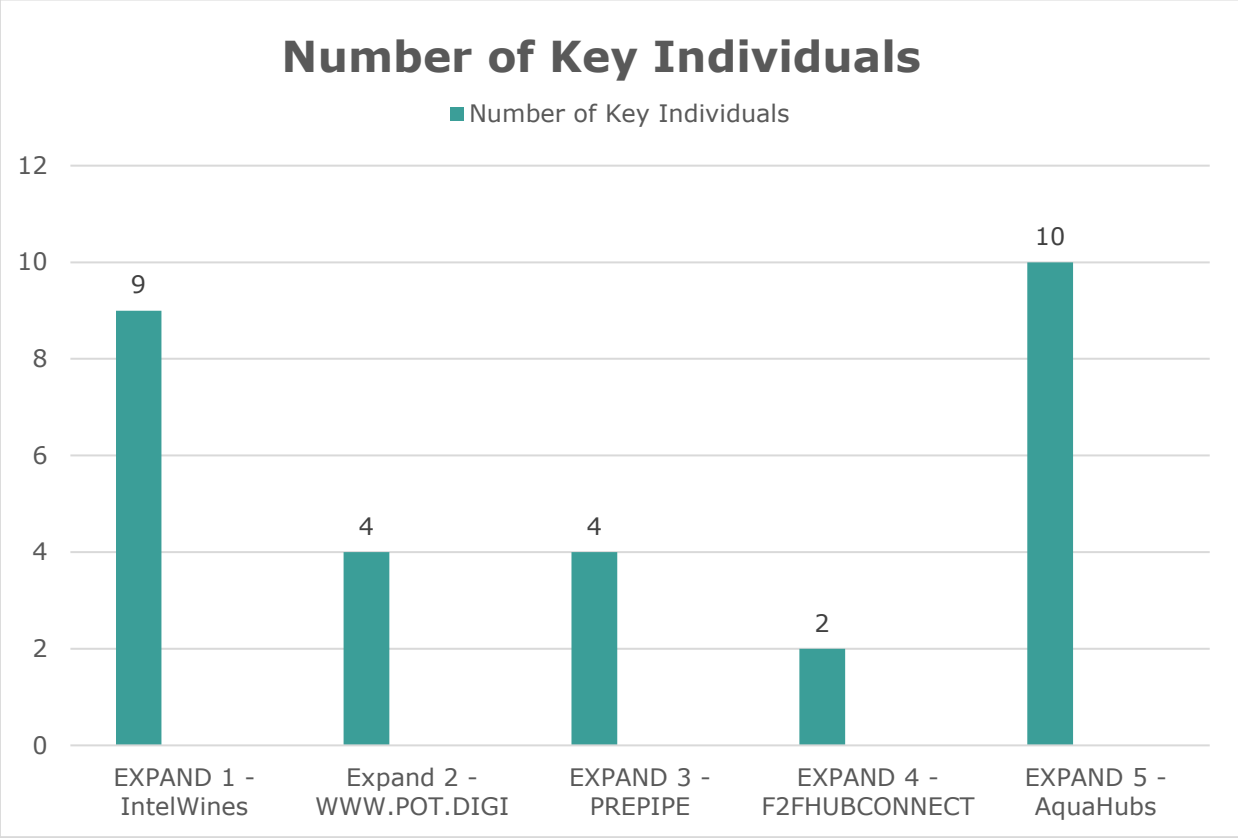

Figure 23 - Number of Key Individuals within OC EXPAND

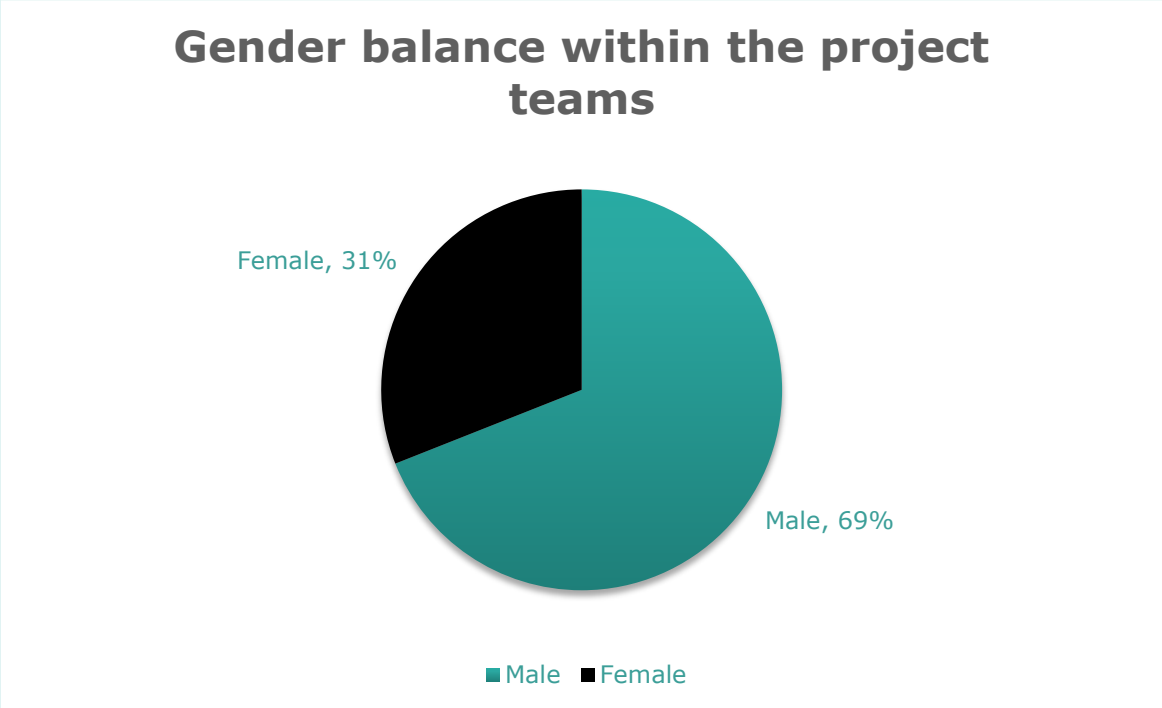

Figure 24 - Gender balance within the project teams within OC EXPAND

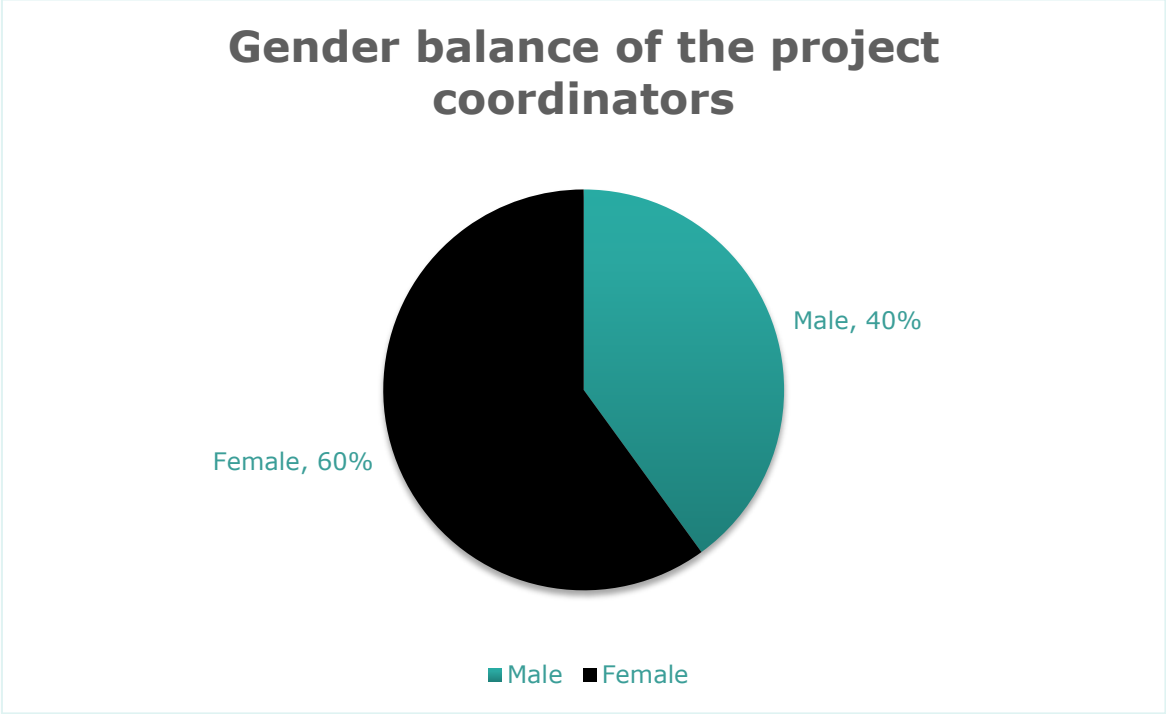

Figure 25 - Gender balance of the project coordinators within OC EXPAND

3.3 OC RESTART

Statistics show that four RCs were involved within this OC: NWE (40%), RC UK & Ireland (20%), RC Iberia (20%) and RC CE (20%). Out of all five projects signed RC NEE, Italy and Malta, France, Scandinavia and SEE were not present within this OC. All countries were represented equally – Germany (20%), Austria (20%), UK (20%), Spain (20%) and the Netherlands (20%), as presented below.

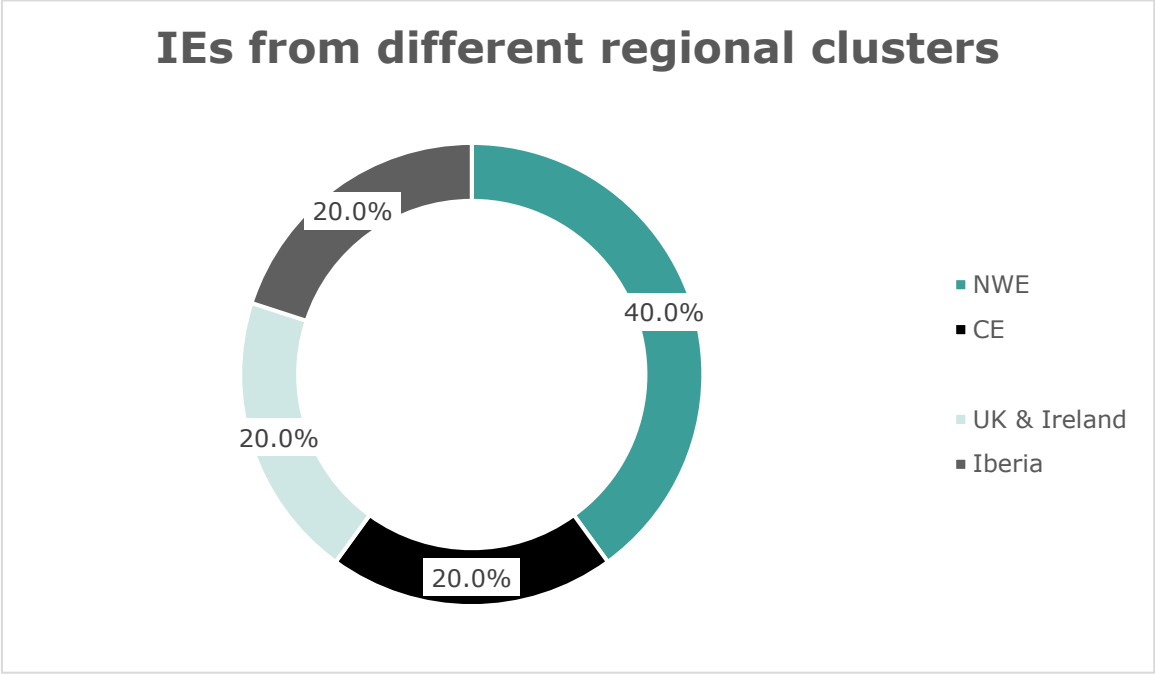

Figure 26 - Regional cluster share in OC RESTART

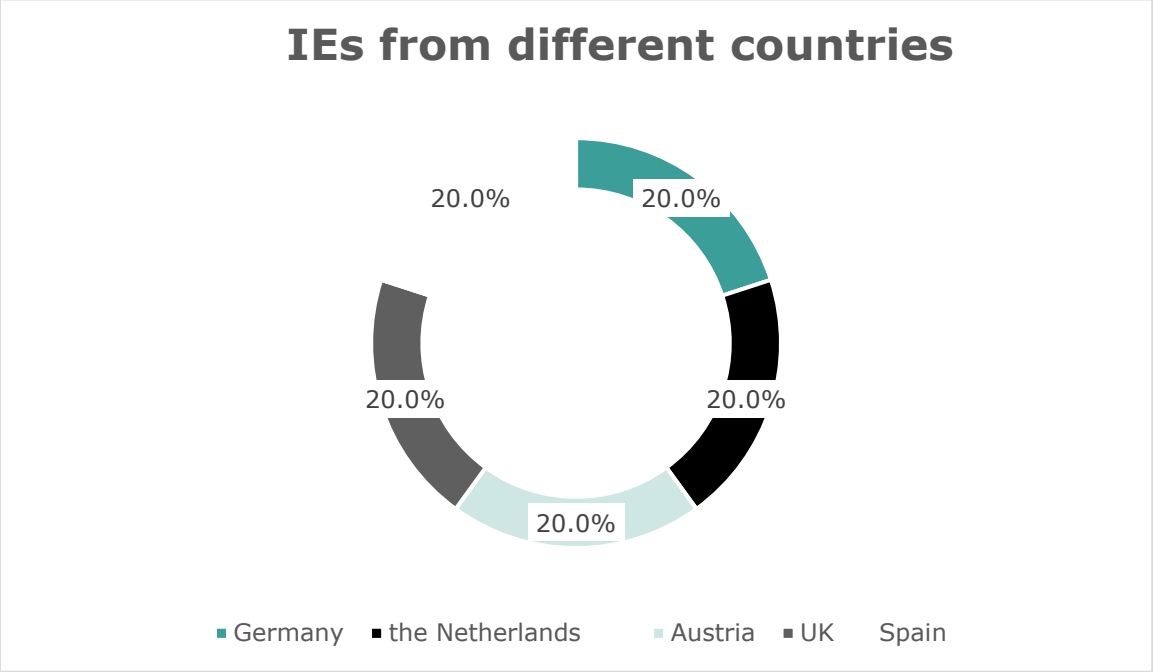

Figure 27 - Countries share in OC RESTART

Two out of five projects were multisectoral and included animal production, dairy, vegetables, fruits, arable, novel foods and aquaculture. The other three differed – one is regarding automation in agri-food sector, the second one is dealing with the economical side of the agri-food sector whereas the third one is focusing on AgTech for different foods, and specifically arable.

The first project started on 01.02.2021 while the last one started 01.07.2021. Two of them have ended 30.06.2021 while the last one will end on 30.03.2022. The shortest project lasted for five months, whereas the longest lasts 12 months, as presented in Figure 29:

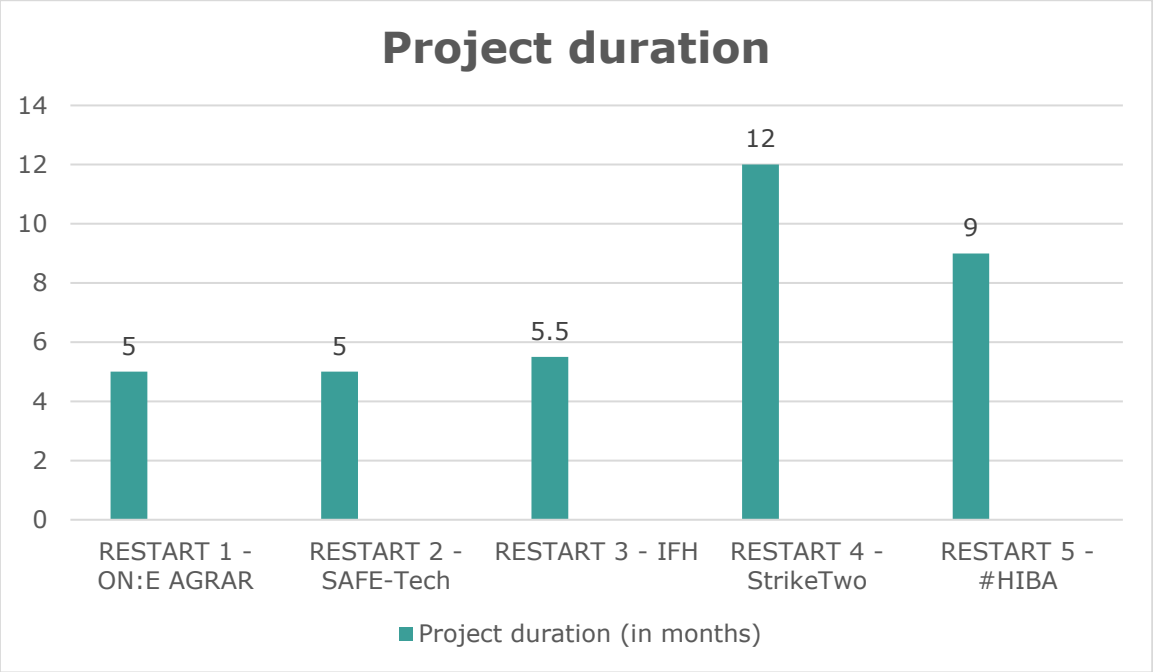

Figure 28 - Project duration within OC RESTART

The projects didn't deliver very detailed information on the challenge specifics. Considering the uncertainties caused by the global COVID-19 pandemic during 2021, all the challenges were done online. 40% of them identified as hackathons, 40% are accelerator programs and 20% identified as innovation activities. Only 60% reported on the duration of the events – one day (20%), two days (20%) and four days (20%). Only one project reported that the minimum envisaged number of teams is six, while the others did not report on this category.

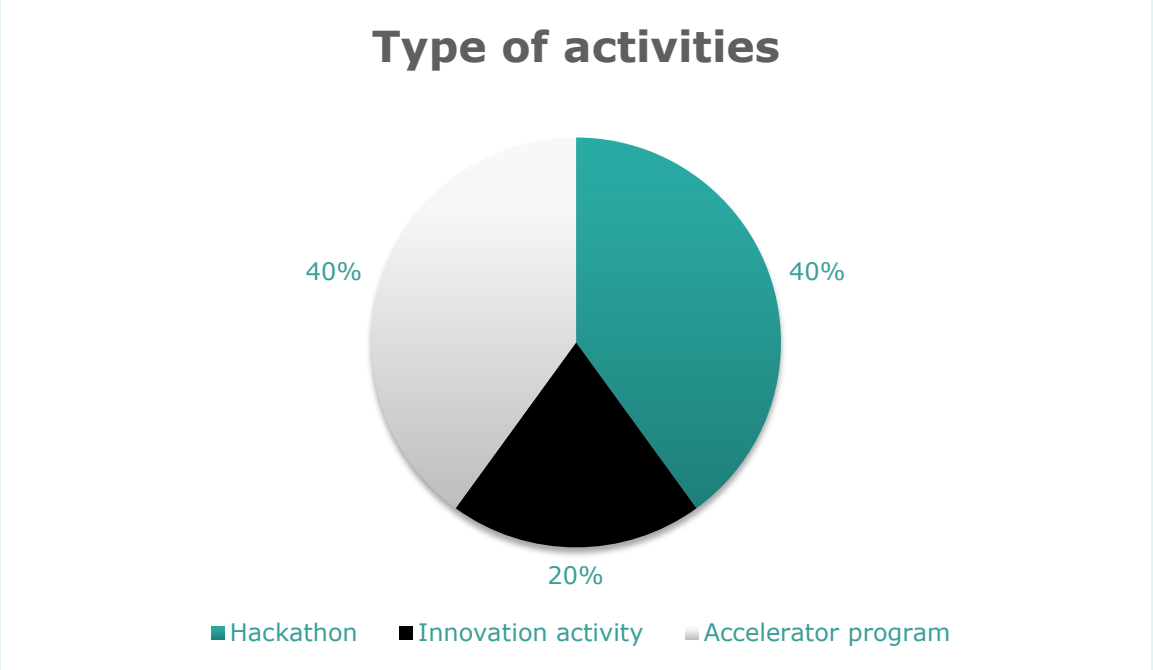

Figure 29 - Type of activities within OC RESTART

All the envisaged **solutions** are software-base and one project (RESTART 2 – Safe-Tech) included a hardware component, too. When it comes to the specific products, there are no strict limits, e.g., platforms, drones, machinery, robotics, satellites, anything related to automation of farm devices, blockchain, applications using AI, etc could be developed as a final product.

One project (RESTART 3 – IFH) has identified **challenges** and the need for digital innovation to solve those specific challenges, not restricting with the type of end-product. These are identified challenges:

1. Scarcity of skilled harvesting workers for speciality crops
2. Direct marketing for farmers via commodity exchanges or online platforms
3. Food traceability for supermarkets and restaurants via digital tool for consumers
4. Standard, affordable precision farming toolkit for small arable farms <1.000 EUR

Different challenges mean different **target groups**. Vast majority (80%) has identified SMEs as target groups and many other stakeholders as well, e.g. agricultural start-ups, agri-tech developers, AGTech companies, retailers, AI-based crop yield predictors, farmers, entrepreneurs.

All projects within this OC included in their EPs some kind of a strategy on how to involve **end-users** (or winning teams) after the events. However, not all projects delivered a detailed strategy. Some of them explained that those activities will be done through newsletters, influencer marketing, DIH networks innovation and seeking financial support to create smart companies, SMEs, associations, networks and private and public organisations. Others reported that they will obtain feedback and follow up with teams on next steps. There were some EPs that have explained every step of the intended support. For example, one project identified the following steps: execution, collaboration and commitment. To solidify the post-

event commitment, the organisers have planned to initiate the project kick-off meetings with all stakeholders in order to provide a successful collaboration of the willing. Another project committed to continue their support for 12 months following the event, to help ensure that the winning projects realise new products and services in the market. The support would be tailored to each winning team and can include: access to the organisation's facilities and research assets, mentoring support (technical and commercial), support with funding/investment applications, legal and procurement support, introductions to businesses and industry, introductions to investors as appropriate, showcasing, PR and awareness raising, etc.

Reusability: As reusability is very important to the SAHs project, all projects within OC RESTART have identified their strategies regarding reusability.

All of them include PR, social media channels and communications with their own networks as well as SAH network. Additionally, to support the dissemination and sharing of results, some projects will prepare a case study of the technologies developed, as well as action learning points on the overall hackathon process to be shared with Digital Innovation Hubs and Competence Centres across the Smart Agri Hubs network. The goal of that action is to help to develop best practice protocols for such activities. A webinar may also be hosted to share the experience and support the winning team to connect with the DIH and CC network.

The projects that have developed platforms found this as an ideal opportunity to bring together regional DIH initiatives, innovations and stakeholders on a long-term basis. Start-ups, SMEs and investors would gain benefits from the event platform, where a continuous cooperation process can be initiated. This way interested companies are brought together through matching with suitable innovations, beyond a single event and can thus benefit from a registration in the long term.

To ensure long-term sustainability, some of the projects plan to provide results from the hackathon as open-source material, through their websites. As mentioned above, some of the hackathon winners will receive support in order to upgrade their ideas to pilot projects. Apart from the mentoring program, one project has stated to collect information to release the "Best Practices Manual & Accelarathon solutions". This manual can be used by end-users and other relevant stakeholders interested in the final solutions and results.

All the projects have been organised by DIHs. 80% of the DIHs provided a **self-assessment maturity test** and the results are the following: three projects were in the category of high overall DIH maturity (60%) and one project was in the low category (20%). The total number of **key participants** was 29 and in addition to that, five more stakeholders are identified (but are not key participants) as well as one additional start-up. Key participants and stakeholders per projects are presented in Figure 31:

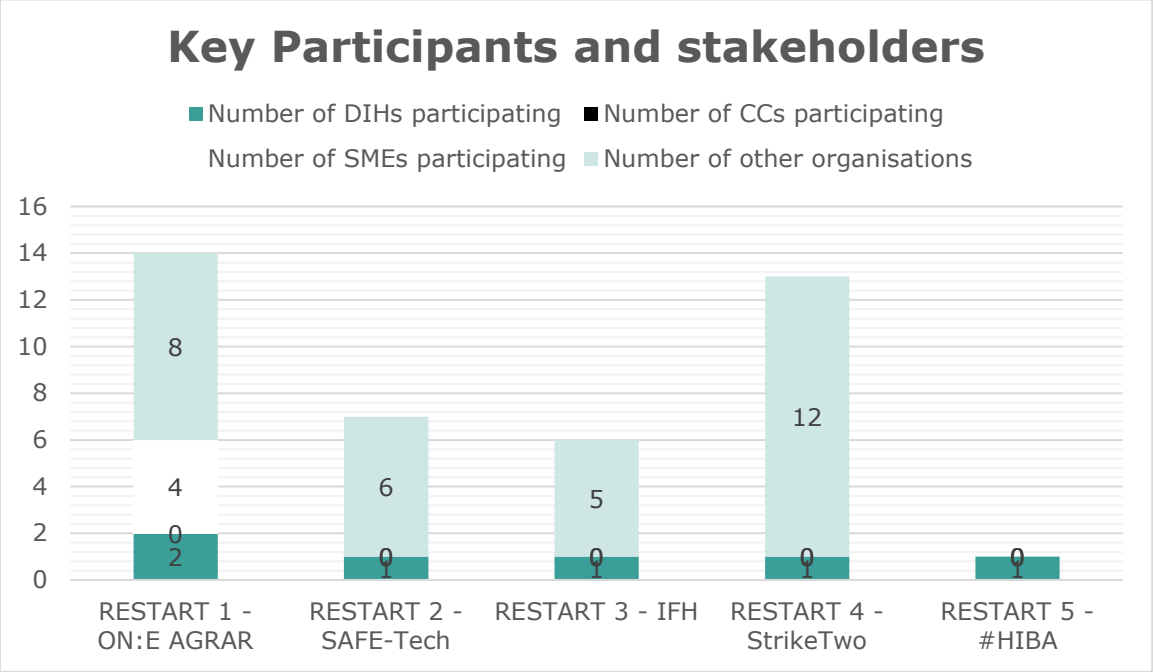

Figure 30 - Number of Key Participants and stakeholders in OC RESTART

Total number of **key individuals** involved in the project teams is 25. When it comes to gender balance of the project teams, 64% of key individuals were male while 36% were female. The situation is the same as in OC EXPAND when it comes to the gender balance of the coordinators, 60% are female and 40% are male. The statistics are presented below.

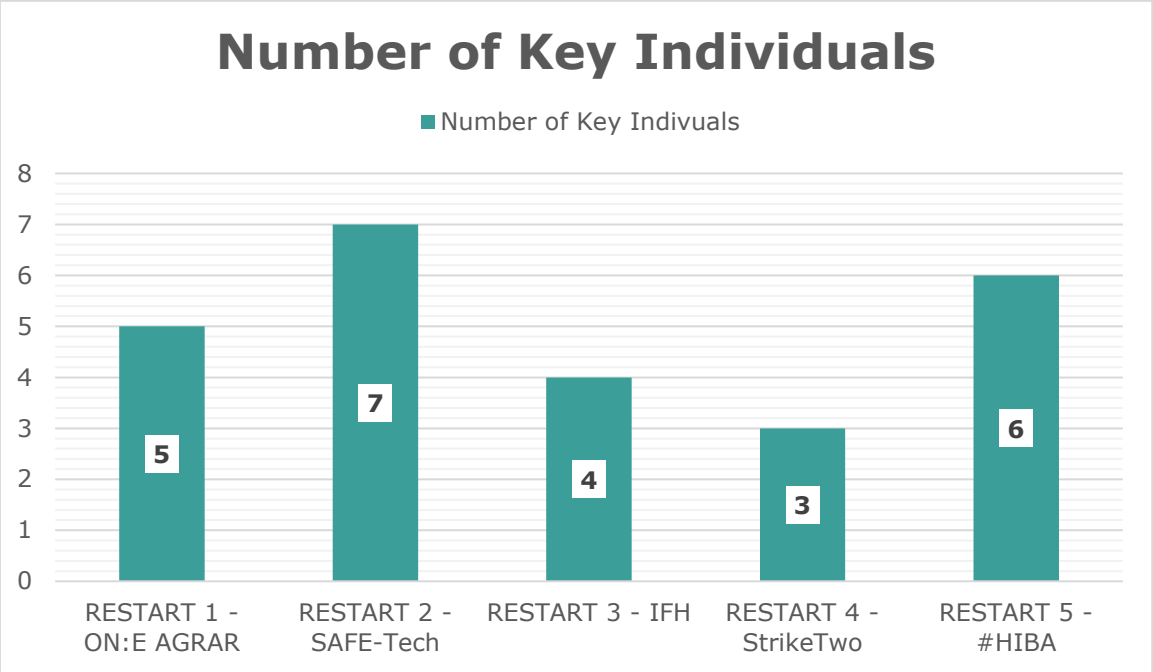

Figure 31 - Number of Key Individuals within OC RESTART

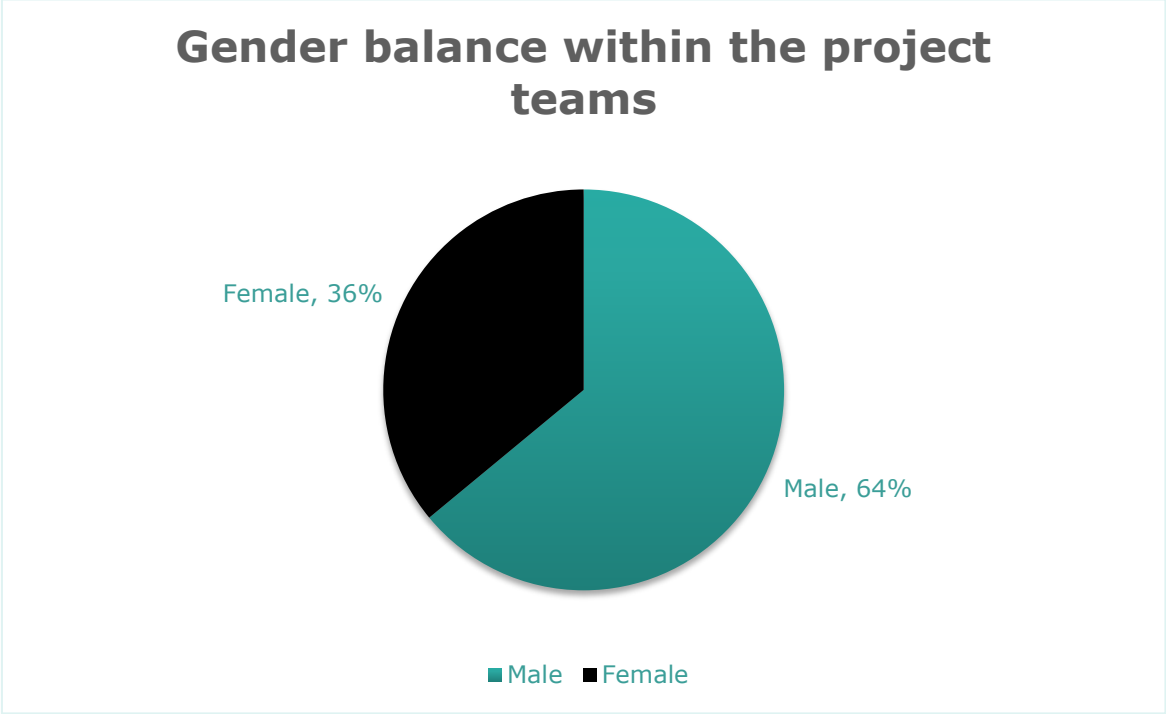

Figure 32 - Gender balance within the project teams within OC RESTART

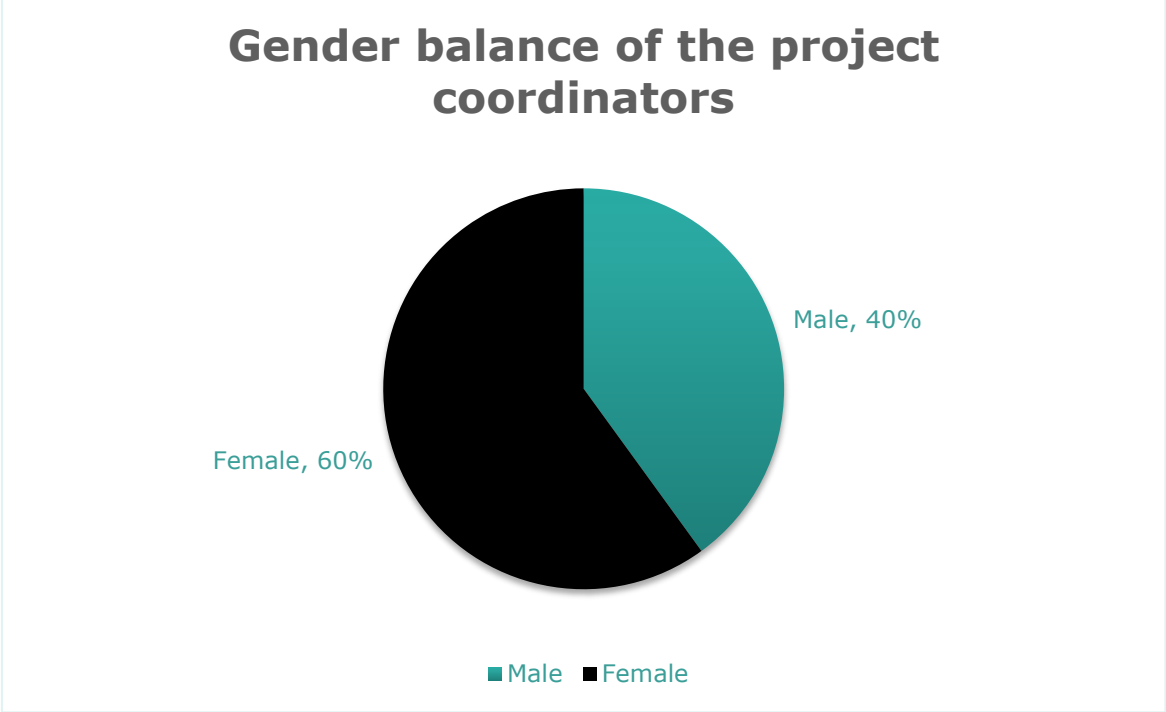

Figure 33 - Gender balance of the project coordinators within OC RESTART

3.4 OC PREPARE

Statistics show that RC SEE was the most presented RC within this OC (36%). Other than this one, four other RCs are also present in this OC: RC Iberia (29%), RC NWE (21%), RC Italy & Malta (7%) and RC UK & Ireland (7%). Regional Clusters CE, NEE, France and

Scandinavia were not represented within these OC. Different countries are almost equally represented – Spain (14.2%), Portugal (14.2%), Germany (14.2%), Bosnia and Herzegovina (7.1%), Cyprus (7.1%), Greece (7.1%), Belgium (7.1%) Slovenia (7.1%), UK (7.1%), Romania (7.1%) and Italy (7.1%). The highest number of countries are participating within this OC – eleven countries are represented, as can be seen in Figure below.

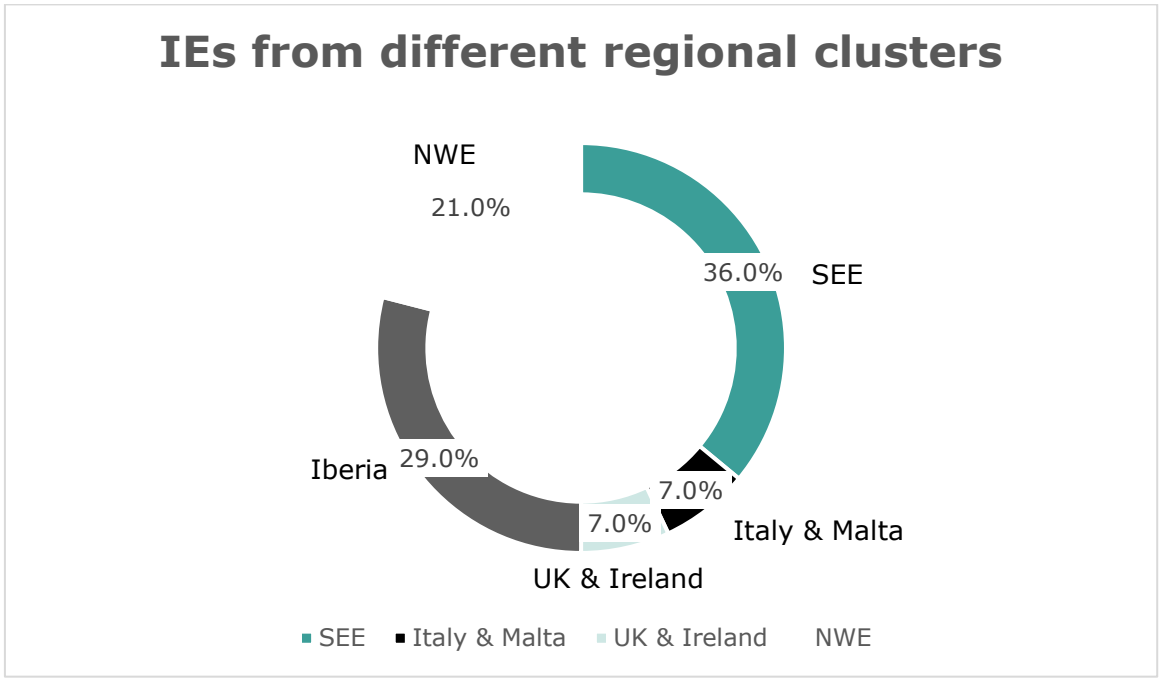

Figure 34 - Regional cluster share within OC PREPARE

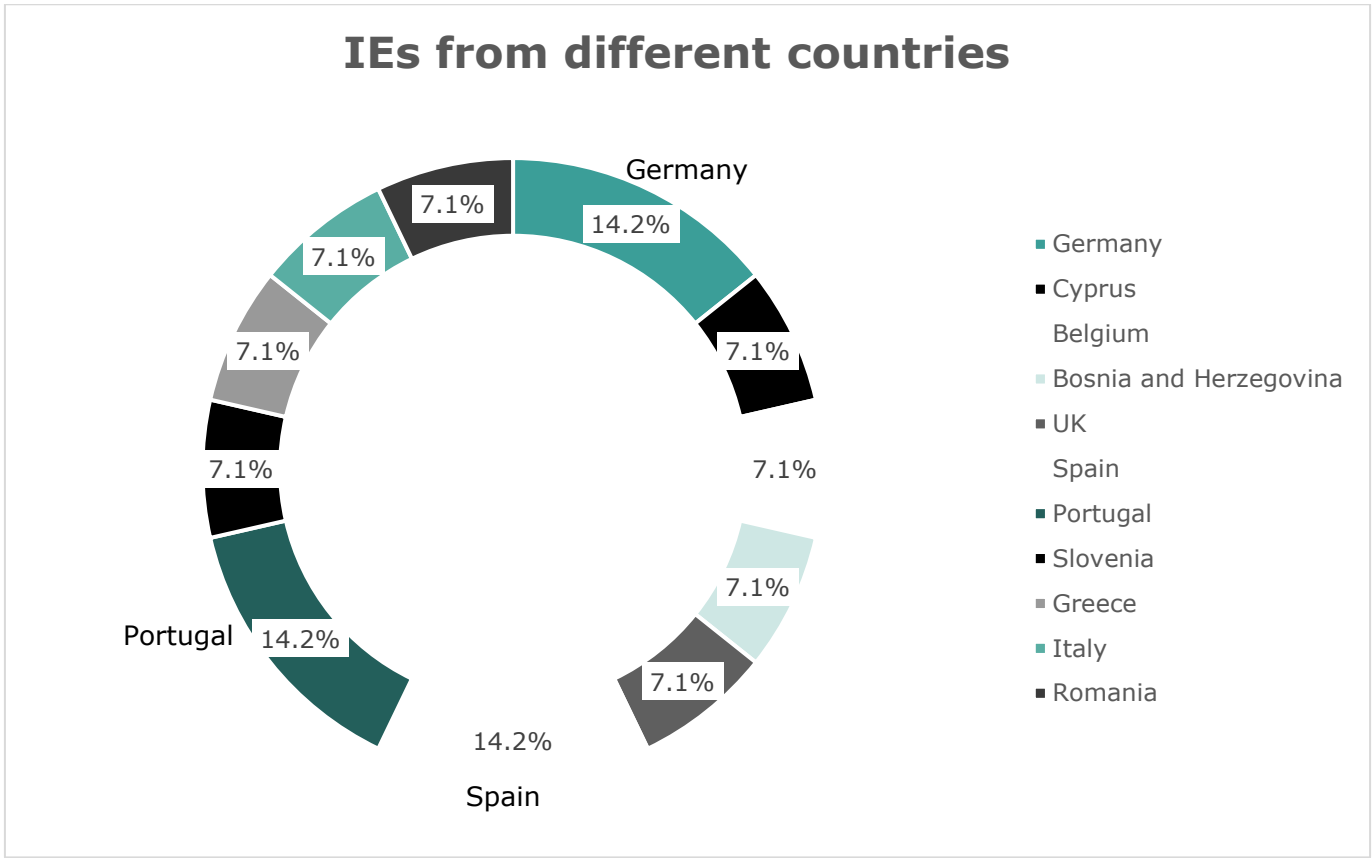

Figure 35 - Countries share within OC PREPARE

When it comes to specific **sectors** the proposals, the majority of them are related to either multisectoral or related to one specific sector. 43% of the projects are related to either fruits or vegetables, or both and animal production is represented with 14%. Other projects mainly concern specific sectors, some of them being the wine sector, precision agriculture, viticulture, food logistics and management, soil management, food supply chain, etc.

The shortest project will last three months whereas the longest project will last nine months, and the average project duration is six months. The first project started 25.06.2021. and all of them will end by 31.12.2021., except one project - PREPARE 13 (DIMAP), which is an exception - this project ends 31.05.2022.

The majority of the **solutions** are software-based (79%) while 14% are hardware-based solutions and 7% included both types of technologies.

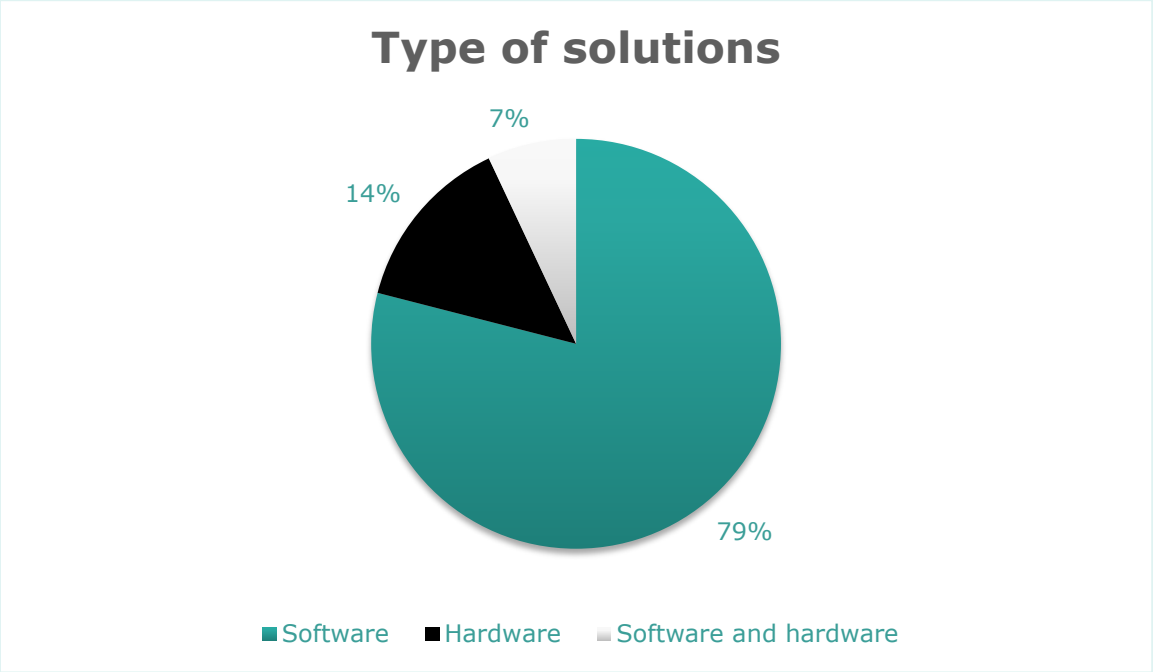

Figure 36 - Types of solutions within OC PREPARE

The majority of **final products** are not completely predefined, and they show high diversity – platforms or similar digital tools are the most common ones (43%), AI and drones are represented with 21%, IoT with 14%. Regarding other product solutions, the most common ones are DSS, sensors, robotics, remote sensing, … However, some of the solutions were quite specific, e.g. digital solutions for the protection of sheep herds from wolf attacks, a digital tool for weeds control and pesticide management, crop yield monitoring by satellite or aerial imaginary or ventilators using IoT and infrared cameras.

The most common **target group** are farmers (64%) and some of the projects have specific farmers in mind, e.g. livestock farmers or farmers involved with horses. Other target groups show diversity, and they include SMEs, fruit and vegetables producers, local communities, researchers, students, food supply actors, consumers, public institutions (hospitals, schools), restaurants, hotels, canteens, technology developers, retailers, sustainability organisations, government, wine producers and consumers, …

All of the IEs had one experiment planned out, except PREPARE 7 (TIE) which had 2 different experiments within one project.

The total number of **key participants** is 64 and Figure 38. represents how are the participants placed within these 14 projects. In the case of other participants, other stakeholders were often identified, but not contacted while preparing the proposal, therefore they were not accounted as key participants. The most common other participants are research organisations, cities or villages, institutes, associations or other types of supporting organisations.

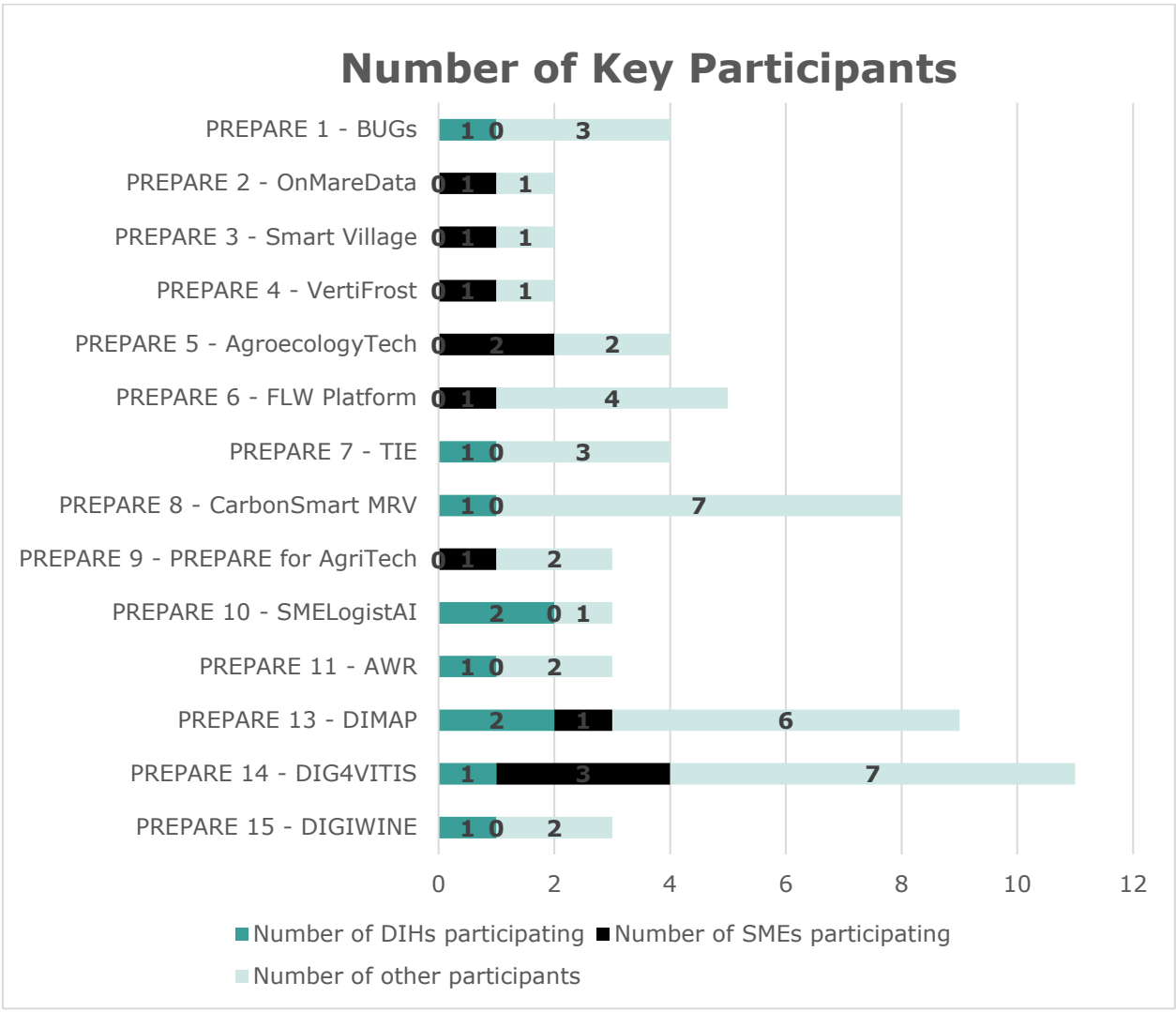

Figure 37 - Number of Key Participants within OC PREPARE

The total number of **key individuals** within the project teams is 80. The teams did not show a proper gender balance, as 35% were female and 65% were male. The situation is quite similar when it comes to the coordinators, 36% were female and 64% male, as presented on the figures below:

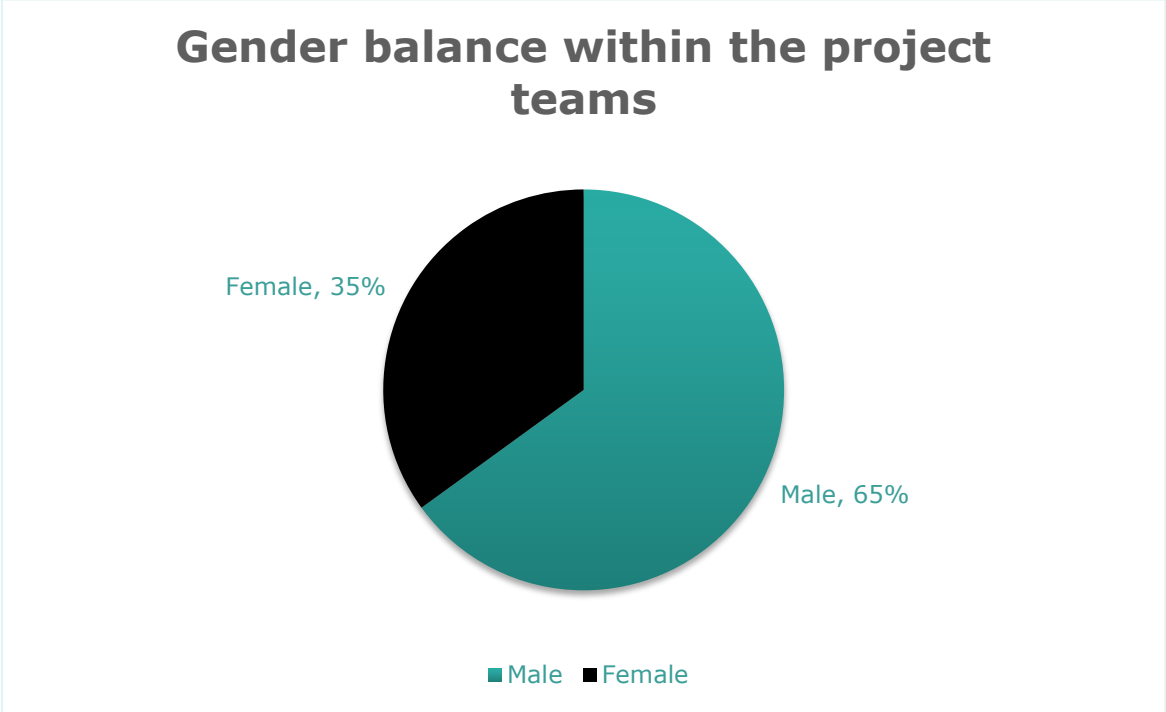

Figure 38 - Gender balance within the project teams within OC PREPARE

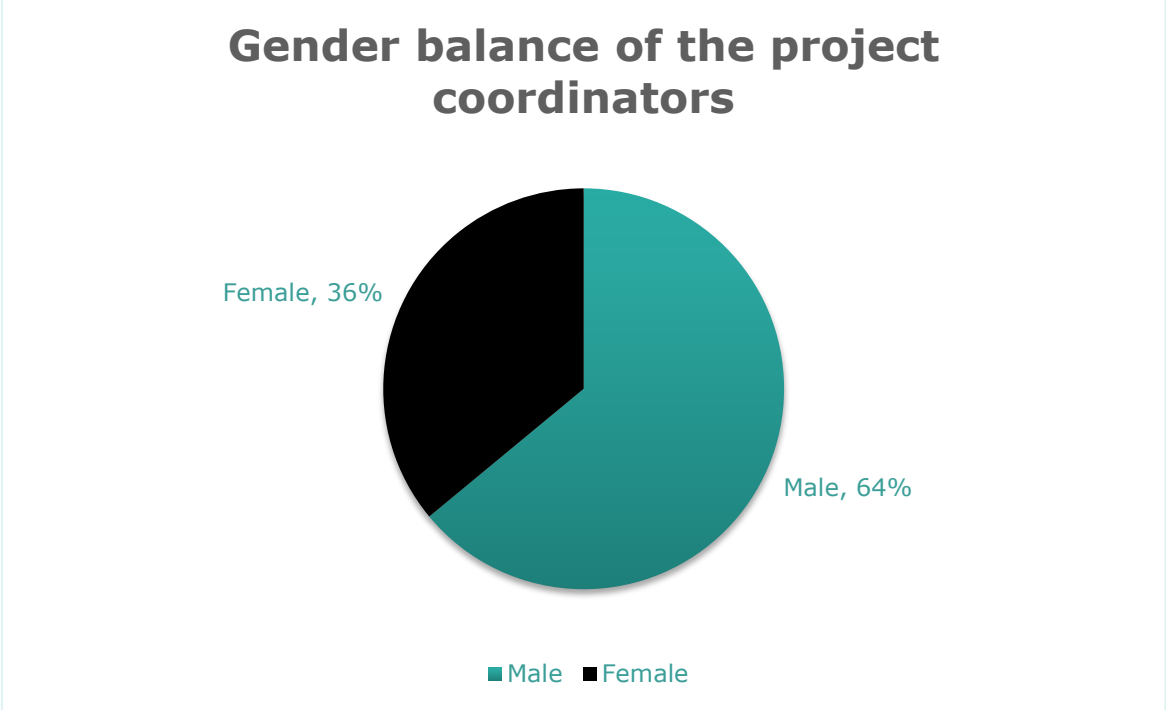

Figure 39 - Gender balance of the project coordinators within OC PREPARE

3.5 COMPARATIVE ANALYSIS OF THE OPEN CALLS

Statistics show that on the project level, RC NWE is the only RC presented in every OC. Furthermore 26.7% of all projects are from RC NWE. The second most widespread RC is Iberia (22.2%), followed by RC SEE (15.5%). However, the majority of the SEE projects are within OC PREPARE. Which means that those are shorter projects with smaller budgets. RC France and RC UK & Ireland are represented with 8.9% while RC Italy and Malta and RC NEE are represented with 6.7%, followed by RC CE (4.4%). Interestingly, RC Scandinavia was not represented in neither of the Open Calls. These statistics are presented in Figure 41:

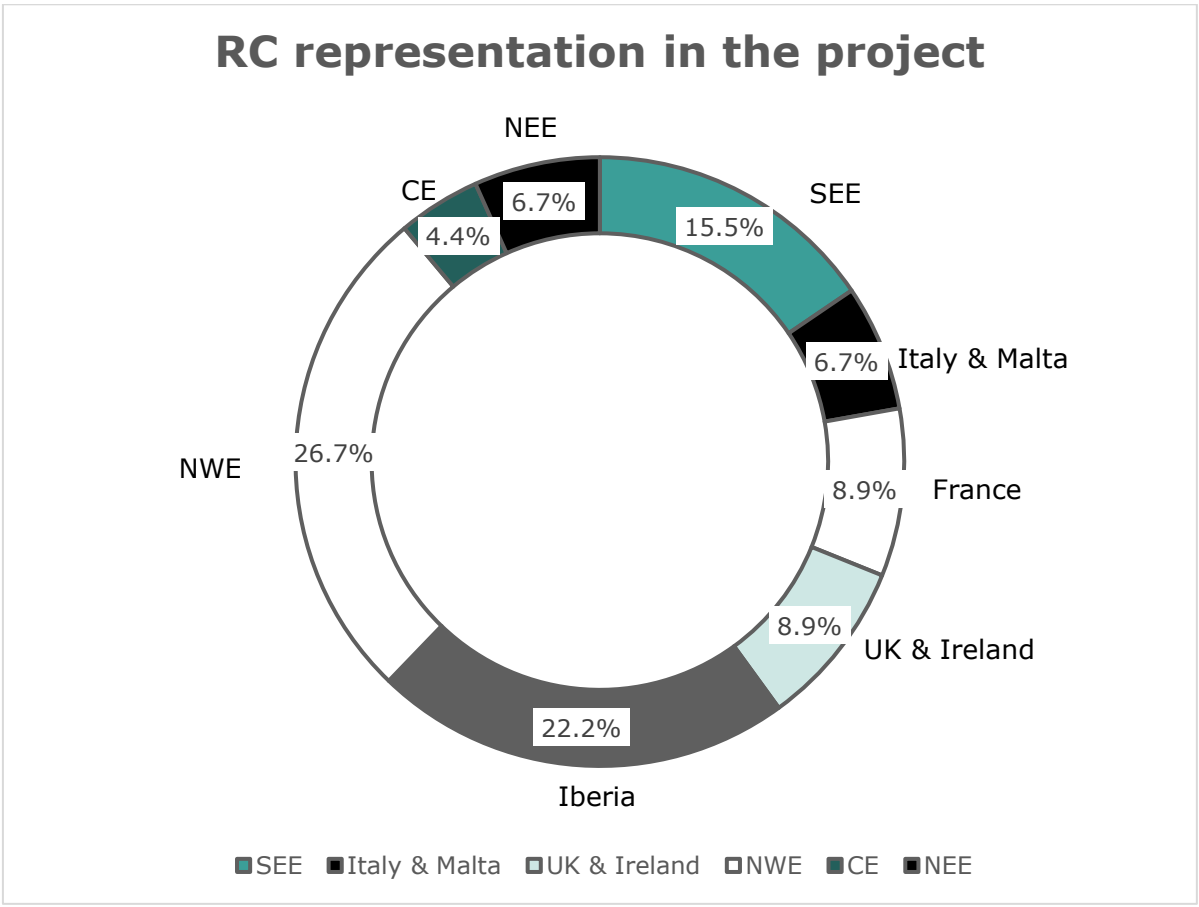

Figure 40 - RC representation in the project

When it comes to **sector** representation, the only general conclusion is that the majority of the projects were multisectoral, meaning that they were developing solutions that could be used in different sectors within the agri-food sector. The ones that were multisectoral were referring to these general sectors: dairy, fruits, animal production, vegetables, arable, novel foods, organic food or aquaculture. On the other hand, some were more specific – either dealing with the problems their country is facing or upgrading the field of their previous work. Some of those sectors were: winery, automation in agri-food sector, AgTech for different foods, precision agriculture, viticulture, food logistics and management, soil management, food supply chain, etc.

The most common **types of products** were by far software-based products. This characteristic was specially presented in the shorter lasting projects, since that usually meant that they had smaller budgets. Therefore, it seems that those projects didn't have the resources (time and money) to develop hardware solutions. The most common pathway of these products are an upgrade of the existing products with new options.

The **end solutions** differed, with platforms being the most common solution on the project level. Other than platforms, other common solutions are technologies using AI or IoT, drones, sensors, satellites, remote sensing, blockchain, decision support systems, etc. There are also a couple specifically predefined solutions e.g. NIR spectrometry, machine learning and data analysis technique or data capture camera system.

The most common **target groups** were farmers and producers, followed by SMEs. Other than those, projects have identified various stakeholders as target groups: wine making companies, IT companies, logistics companies, machine construction companies, processing industry, retailers, customers, B2B customers (large canteens - schools, retirement houses, hospitals), end-users, DIHs and CCs, policy makers, local and national operating association, resellers, whole sellers, consumers, implementing bodies, aquaculture farmers and professional fishermen, agricultural start-ups, agri-tech developers, AgTech companies, entrepreneurs.

When it comes to the total number of **project participants**, the highest number of project participants was within OC PREPARE (80) and the lowest number of the participants was within OC RESTART (25). This completely makes sense, since those are projects with the largest number of signed projects and least number of signed projects, respectively. The total number of all key partners in the project teams is 239. The gender balance analysis shows that the teams do not have a proper gender balance. When observing this characteristic, RESPOND1-DIHs had the best score – 53% of male participants and 47% female. However, on the project level the participants are not well gender balanced – 64% are male and 36% are female participants, as presented on the Figure below:

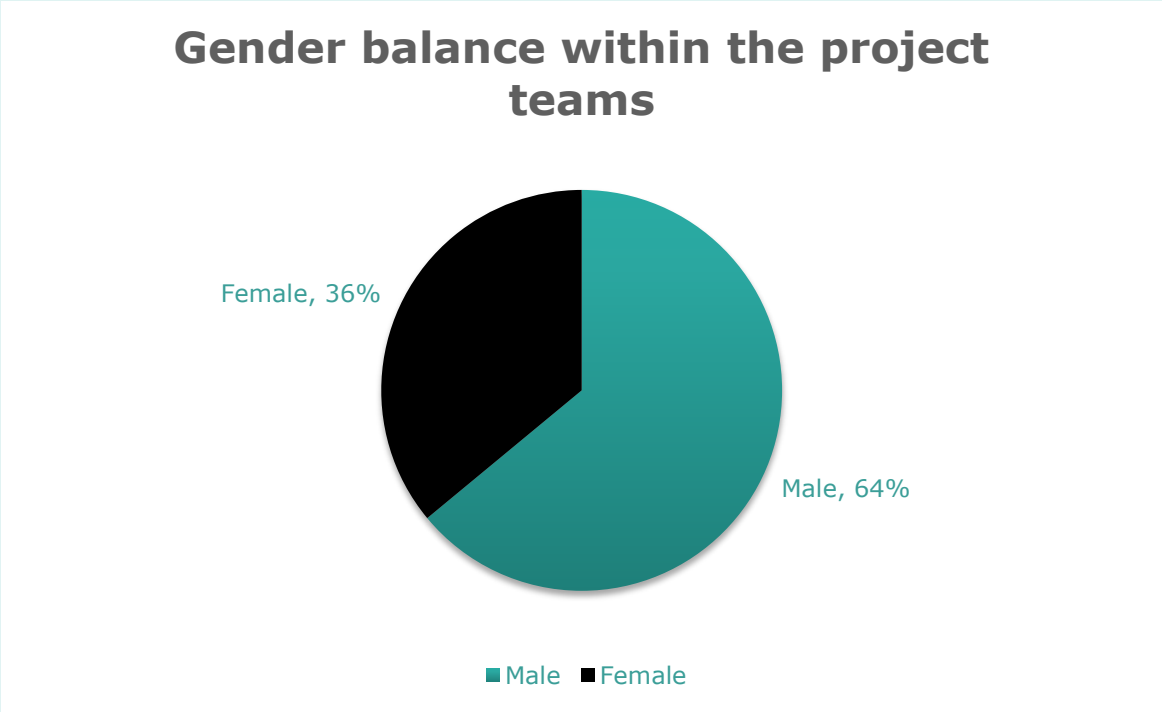

Figure 41 - Gender balance within the project teams on the project level

On the other hand, the situation is different when it comes to the project coordinators. Some projects were female dominated (RESPOND1 – DIHs, EXPAND, RESTART) and others were male-dominated (RESPOND2 – SMEs and PREPARE). On the project level, the coordinators were almost completely gender balanced – 47% female and 53% were male coordinators.

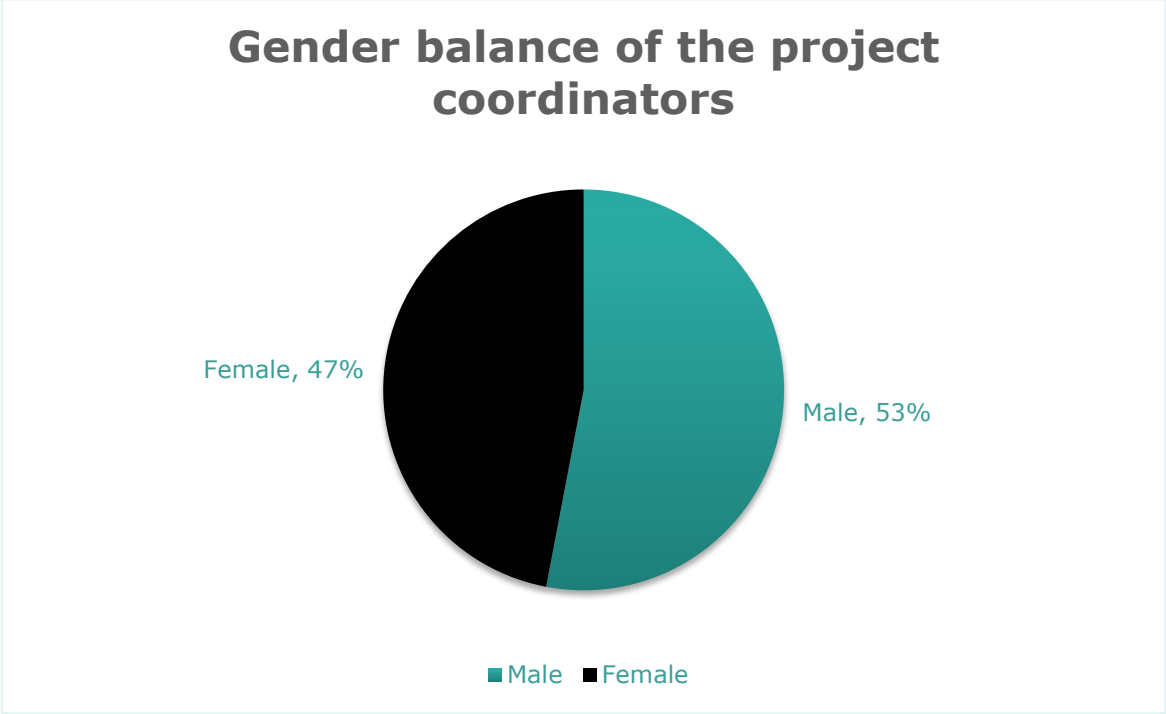

Figure 42 - Gender balance of the project coordinators on the project level

4. CONCLUSIONS

D3.2-2 Innovation Experiments Execution Plan is the result of the cooperation between all WPs involved in the project and the inputs provided by IEs. The execution plans represent a concrete base for SAHs - the starting point and foundation of the work that will be performed by the IEs, and a proof of their agreed-upon plans.

IE EPs are living documents, where in order to reach more significant results for the project, sometimes plans and activities have to be modified. In case of changes, they must be accepted beforehand by the relevant WPs and the project management.

Throughout the IE EPs collection process, IEs coordinators have shown eagerness to cooperate and professionalism, nonetheless we have faced postponement challenges, that were caused due to a workload, amount of required data and partners' daily tasks and obligations. General impression is that the IE EPs varied in structure and some of them were written with detail and high-quality inputs while others lacked that precision.

The main conclusions after the analysis are that the RCs are not evenly represented in the OCs – RC NWE being the most represented whereas RC Scandinavia did not have a single project within these five OCs. The solutions are widely spread across the agri-food sector, each of them solving different obstacles through innovative approaches in this field. The most common solutions were software-based platform while the most common target groups were farmers, producers and SMEs. The gender balance analysis showed that on the project level the project teams were mainly male dominated. However, this fact does not apply to the project coordinators, where the difference between male and female representers is less present.

During the monitoring process WP3 has the opportunity to look at tech project with much more details and learn about realistic challenges that the European agri-food industry is facing. Without an exception, thanks to close collaboration with all partners involved, we managed to overcome all the obstacles. One of our recommendations to all IEs relates to the development of a more detailed plan on how they will follow up with their activities or winners of challenges, once their project within SAHs is finalised. In this way a lot more can be learned about the strengths and weaknesses of all the projects, therefore we would also have a better insight into their future plans and sustainable results of SAHs projects.

Since there are still many ongoing IEs and more OC projects to come, the future steps include monitoring the predefined actions, as well as supporting these IE in overcoming obstacles and achieving their full potential.

5. ANNEX 1: OPEN CALLS EXECUTION PLANS

This is the public version of the deliverable. The confidential version contains Annex 1: OPEN CALLS EXECUTION PLANS