



D2.4 STOCKTAKE OF POTENTIAL REGIONAL AND NATIONAL PUBLIC/PRIVATE FUNDS FOR AGRI-FOOD DIHS WP 2

31 March 2020

Tool-based stocktaking to facilitate and improve the matchmaking between organizations and specifically SMEs and investors as well as to better communicate the financial needs of an organization/SME in specific lifecycle stages



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LIST OF ABBREVIATIONS

Abbreviation	Explanation
AKIS	Agricultural Knowledge and Innovation System
ATN	Agricultural Technology Navigator
B2B	Business-To-Business
CAP	Common Agricultural Policy
CC(s)	Competence Centre(s)
CF	Cohesion Fund
cPPP	Contractual Public-Private Partnerships
DIH networks	Organisations in the DIH ecosystem: CC, technology providers, farmers, Agri-tech SMEs, Universities, governmental agencies, etc.
DIH(s)	Digital Innovation Hub(s)
DoW	Description of Work, the original project proposal
EAFRD	European Agricultural Fund for Rural Development
EBN	European Business and Innovation Centres Network
EC	European Commission
ECB	European Central Bank
EEN	European Enterprise Network
EFSI	European Fund for Strategic Investment
EIB	European Investment Bank
EIC	European Innovation Council
EIF	European Investment Fund
EIT	European Institute of Innovation & Technology
EMFF	European Maritime and Fisheries Fund
ERANET	European Research Area Network
ERDF	European Regional Development Fund

ERDF	European Regional Development Fund
ESF	European Social Fund
EU	European Union
FIE(s)	Flagship Innovation Experiment(s)
H2020	Horizon 2020
HEU	Horizon Europe, follow-up programme of H2020
IE(s)	Innovation Experiment(s)
IoT	Internet of Things
JTI	Joint Technology Initiatives
Open Call	SAH planned call for proposals for funding additional actions to network expansion
PPP	Public-Private Partnerships
R&D	Research & Development
R&I	Research & Innovation
RC(s)	Regional Cluster(s)
SAFE	Survey on the Access to Finance of Enterprises
SAH	SmartAgriHubs
SC	Societal Challenge in Horizon 2020
SCR	Société de Capital-Risque
SME(s)	Small and Medium-Sized Enterprises
SR(I)A	Strategic Research (and Innovation) Agenda
TFEU	Treaty on the Functioning of the European Union
TIR	Investment Return Rate
TRL(s)	Technology Readiness Level(s)
VC(s)	Venture Capital/Venture Capitalist(s)
WP	Work Package an organizational unit of tasks and activities in the project

LIST OF FIGURES

Figure 1. The five basic concepts that are applied in SmartAgriHubs to build and foster a layered network of DIHs and CCs in regional clusters in Europe.	10
Figure 2. Loans agri-food sector. Non-financial corporations. Outstanding amounts at the end of the period (Millions of Euro). Source: ECB.	19
Figure 3. Proportion of SMEs that indicated access to finance as the most important problem during April to September 2019, EU28 by country. Source: Survey on the access to finance of enterprises (SAFE). Analytical Report 2019	20
Figure 4. Access to finance in the EU by country in 2019. Source: Survey on the access to finance of enterprises (SAFE). Analytical Report 2019	21
Figure 5. Key reasons given by banks for refusing applications (multiple answers allowed). Source: Survey on financial needs and access to finance of EU agricultural enterprises, 2018	22
Figure 6. Key reasons for no application by farmers (multiple answers allowed) Source: Survey on financial needs and access to finance of EU agricultural enterprises, 2018	22
Figure 7. Left: intentions to invest by farm head age. Right: Intention to invest by expected date of retirement from farming. Source: European farmers' intentions to invest in 2014-2020: survey results, 2012	23
Figure 8. Misalignment of public and private innovation support and how SmartAgriHubs wants to overcome this situation by combining public and private capital (Source: TNO)	24
Figure 9. Structure of the upcoming Horizon Europe programme. Source: https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_orientations-he-strategic-plan_122019.pdf	25
Figure 10. 2018 Budget share among the three different CAP pillars	27
Figure 11. The nine objectives for the future of the CAP	28
Figure 12. Overview of distribution of structural and investment funds by Rural Development Programmes	28
Figure 13. Private funding opportunities depending on level of funding and development phase	31

LIST OF TABLES

Table 1. List of topics and technologies that can be used for more advanced search filters in the networking function of SmartAgriHubs Innovation Portal	15
Table 2. Map of funding instruments categorized by main types of funding (public, public-private, private) indicating their target stakeholders, target region and additional information	39

TABLE OF CONTENTS

PROJECT SUMMARY	7
EXECUTIVE SUMMARY	8
1 INTRODUCTION	10
1.1 THE SMARTAGRIHUBS PROJECT	10
1.2 OBJECTIVE OF WP2	11
1.3 OBJECTIVE OF TASK 2.2 AND THIS DELIVERABLE	11
1.4 OUTLINE OF THIS DELIVERABLE	12
2 APPROACH & METHODOLOGY	13
2.1 IDENTIFYING TOOLS FOR MATCHMAKING	13
2.2 CREATING A MAP OF FUNDING INSTRUMENTS	13
3 RESULTS	15
3.1 TOOLS FOR MATCHMAKING	15
3.1.1 SEARCH FILTER FOR THE INNOVATION PORTAL	15
3.1.2 MORE SOPHISTICATED MATCHMAKING INSTRUMENTS	16
3.2 NEEDS FOR ACCESSING FINANCE IN THE EU AGRICULTURAL SECTOR	18
3.3 MAP OF FUNDING INSTRUMENTS	23
3.3.1 EU FUNDING	24
3.3.2 PUBLIC-PRIVATE PARTNERSHIPS	29
3.3.3 PRIVATE FUNDING	30
3.3.4 TO CONCLUDE	35
4 CONCLUSIONS	37
APPENDIX I MAP OF FUNDING INSTRUMENTS	39

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

This deliverable is part of Work Package 2 (WP2), focussing on network expansion by open calls, which will support initiatives that will finally expand, validate and strengthen the network of agri-food DIHs that are directly facilitating the usage of CC services and coaching the realisation of IEs. The main objective of WP2 is to expand the network by open calls, requesting for new initiatives that will:

- Increase the number of Innovation Experiments in order to create new digital innovations and solutions and
- Create or identify new DIHs and CCs to facilitate and support the realisation of IEs.

Moreover, new initiatives should also strengthen the network through more mature DIHs, connections with CCs, improved digital solutions and competent users and, last but not least, a sustainable network of funders that are investing in the digital transformation in the agri-food sector.

The latter objective is the focus of this deliverable, namely, to meet the needs for matchmaking and funding instruments to support network expansion of the SAH ecosystem. These needs were identified and reported in previous deliverables D2.2 and D2.3.

For this purpose, stocktaking of tools for matchmaking and mapping of potential funding instruments was conducted. Special attention is paid to financial needs of organizations – in particular start-ups and SMEs – in specific lifecycle stages.

The stocktake of tools for matchmaking has resulted in:

- Specifications for advanced search mechanisms in the SAH Innovation Portal that can help to match make for specific topics in regions, sectors, technologies; The specifications need to be harmonised with the classification for the Agricultural Technology Navigator that is developed by WP5/WP1.
- Sophisticated tools for match-making, mostly provided by advanced websites – also with advanced search and filtering mechanisms - and apps that support the organization of matchmaking events and B2B networking. Most of these tools target the connection between start-ups and SMEs and potential funders.

A desk study on the needs for access to finance for agricultural companies in the EU was carried out before mapping of funding instruments took place. The study provides some useful insights into differences between regions, type of farms/farmers also in relation to their age. This information can especially be used by potential investors to identify specific risks and opportunities.

The map of funding instruments gives an overview of the different instruments at three levels:

- 1) *EU-funding*, providing several opportunities for financing digital innovations in agri-food at pan-European as well as at regional level and sometimes in combination.
- 2) *Public-Private Partnerships*, which are mostly large programmes focusing on cross-cutting technologies such as robotics, photonics, 5G, etc. None of them are specifically targeting the agri-food sector. However, most of these technologies can be applied to this sector since they are key cross-cutting challenges that agri-food companies have to face in order to keep competitive in a highly evolving society.

- 3) *Private Funding*, such as *business angels*, *venture capital*, and *private-equity* that are targeting different types of companies – in particular start-ups and SMEs in their different stage of development. In several cases, this type of funding is embedded in *start-up networks*, *incubators* and *accelerator programmes* that reduce the risk for investors and increase efficiency. Finally, there are many private banks that particularly focus on the agri-food sector, sometimes also on a very regional level.

For each level of funding, initial lists of concrete financing instruments that can be used for matchmaking are provided in a systematic table in Appendix I. This list will be complemented with additional funding instruments at National and Regional level, being gathered currently in WP3, with the aim of creating a more exhaustive list with a wide regional coverage, and integrating different types of funding opportunities, to help SAH Open Call applicants on defining their strategy of approaching the Open Call.

The framework of the mapping and these initial lists can be used for an advanced database in the SAH Innovation Portal that can significantly improve the matchmaking process for DIHs. Communication on this will be essential for success.

1 INTRODUCTION

1.1 THE SMARTAGRIHUBS PROJECT

The main objective of the SmartAgriHubs project (SAH) is to consolidate and foster a European wide network of Digital Innovation Hubs (DIHs) for Agriculture to enhance the Digital Transformation for Sustainable Farming and Food Production.

SAH is organized in six work packages (WP):

- WP1 Ecosystem Building
- WP2 Network Expansion by Open Calls
- WP3 Monitoring and Evaluation of Innovation Experiments
- WP4 Digital Innovation Hub Capacity Building and Monitoring
- WP5 Competence Centres
- WP6 Project Coordination and Management

This deliverable is part of Work Package 2 (WP2), focussing on network expansion by open calls, which will support initiatives that will finally expand, validate and strengthen the network of agri-food DIHs that are directly facilitating the usage of CC services and coaching the realisation of IEs.

SAH is building on an extensive European network of existing DIHs and Competence Centres (CCs) that are acknowledged by local agricultural and ICT communities. This network is based on several accelerator projects (e.g. SmartAgriFood, FInish, FRACTALS, KATANA) and is further leveraged through the Internet of Food and Farm 2020 (IoF2020).

Figure 1 visualizes the five basic concepts to build and foster this network of DIHs and CCs. DIHs are the key components to support Innovation Experiments (IEs) in their specific region. Next to the role of organiser and initiator of IEs, DIHs act as community builder connecting needs and solutions, identifying CCs and funding opportunities. DIHs are organised in Regional Clusters (RCs) to facilitate identification and addressing of regional challenges and opportunities.

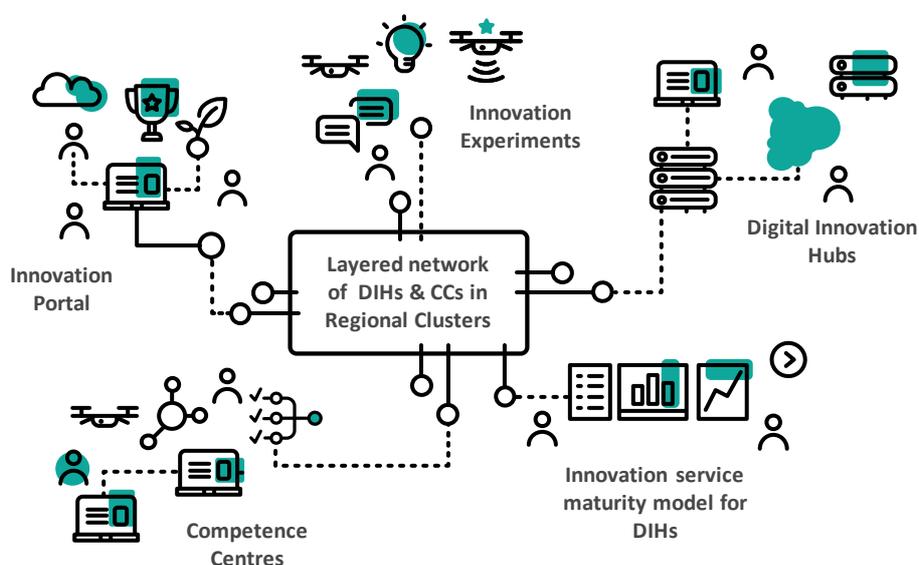


Figure 1. The five basic concepts that are applied in SmartAgriHubs to build and foster a layered network of DIHs and CCs in regional clusters in Europe.

The SAH Innovation Portal acts as a communication tool to exchange ideas and experiences among RCs and DIHs as well as to provide a platform for IEs to discuss on digital innovation. Finally, the innovation service maturity model provided by SAH WP4 offers feedback mechanisms for DIHs to learn about white spots in their service level.

1.2 OBJECTIVE OF WP2

The main objective of WP2 is to expand the network by open calls, requesting for new initiatives that will:

- Increase the number of Innovation Experiments in order to create new digital innovations and solutions and
- Create or identify new DIHs and CCs to facilitate and support the realisation of IEs.

WP2 does so in three tasks. The objective of task 2.1 (T2.1) is to organise regional challenges (meetings, hackathons or other events). These events should identify regional opportunities, needs and white spots with regard to digital innovation in the agri-food sector and finally result in new IEs. T2.1 was organising events and supported RC teams and DIHs in the realisation of their individual workshops/ events. The aim of T2.2 is to identify how these needs and requirements can be adapted to the available (regional) public and private funding in combination to the envisaged SmartAgriHubs Open Calls. Task 2.3 will finally take care for the Open Call management itself.

1.3 OBJECTIVE OF TASK 2.2 AND THIS DELIVERABLE

Task 2.2 'Match-making and DIH network interaction' has been planned to be carried out in two different and consecutive phases:

Phase 1 – Gathering feedback from the needs of DIH networks regarding their needs for matchmaking. This phase consists of scoping the needs of DIH networks in terms of match-making and assessing the capability of DIH networks to access funding of interested third parties (main hindrances and possibilities) and the awareness of DIH networks on available funding mechanisms that could serve for various meanings. The main result of this phase is an analysis of DIH networks main strengths and weaknesses towards matchmaking activities and funding opportunities.

Phase 2 – Support to match-making activities. This phase consists of the support to match-making actions to maximise the accessibility of DIH networks to available opportunities in terms of collaborative networks, and funding opportunities, both private and public funding. For this phase, preliminarily to the match-making activities, partners are compiling internally a map of available public and private funding instruments that will serve as the basis for the elaboration of appropriate network expansion routes through matchmaking

As a result of phase 1, the needs for matchmaking and funding instruments were identified from the current SmartAgriHubs ecosystem of DIHs and Regional Clusters (see deliverable D2.3). At the same time, Task 2.1 has identified thematic priorities for regional, sectoral and economic expansion (see deliverable D2.2).

The objective of this deliverable D2.4 is to meet these needs and priorities by stocktaking tools for matchmaking and map potential funding instruments to facilitate and improve

matchmaking between organizations and specifically SMEs and investors as well as to communicate the financial needs of an organization/SME in specific lifecycle stages.

1.4 OUTLINE OF THIS DELIVERABLE

The remainder of this report is organized as follows. Chapter 2 describes how the stocktake of matchmaking tools and mapping of funding instruments took place. Then, Chapter 3 describes the tools for matchmaking and funding instruments that were found. Finally, Chapter 4 draws some conclusions accompanied by some recommendations for follow-up activities.

2 APPROACH & METHODOLOGY

In this Chapter we will first describe how tools for matchmaking were identified. Second, we will describe how a first version of a map of funding instruments was obtained.

2.1 IDENTIFYING TOOLS FOR MATCHMAKING

Matchmaking for network expansion is considered to consist of basically two succeeding steps:

1. Get to know which actors could potentially collaborate with each other on digital innovation in the agri-food sector
2. Once actors have found each other, they should meet and negotiate with each other how they can take action.

For the first step, we considered the SAH Innovation Portal, and in particular its network features (<https://smartagrihubs.eu/portal/network?>), as an important basis. It serves as a tool for matchmaking as organisations present themselves here. The network includes both organisations that offer digital solutions as well as organisations looking for them and organisations that mediate between them. Currently, it is already possible to apply a search filter for Regional Clusters, Sectors and Organisation Type (DIH, CC, IE, etc.). Based on the output of deliverable D2.2, in particular the thematic priorities that were identified, it is proposed to enrich this feature with two search filters that could support matchmaking. The first is a filter on *technologies* that are applied in projects, offered by tech service providers or being developed by competence centres. A second filter feature should enable to search for organizations by themes or topics. Specifications for these filters will be developed in Section 3.1.1.

For the second step, a more intensive contact is needed to find out if there is a good match between different actors that want to collaborate with each other. As described in preliminary design of the Open Call, in deliverable D2.2, an important role for additional funding parties is expected. Especially for these investing parties, it is important to facilitate an effective and efficient match-making process. This was already foreseen in the project proposal phase and therefore we took specific partners, such as EBN and PNO, on board because they have already a lot of readily available knowledge and experience in this area. Based on this knowledge, a list of more sophisticated instruments for matchmaking will be provided in Section 3.1.2.

2.2 CREATING A MAP OF FUNDING INSTRUMENTS

As already indicated before, finding additional funding will be an essential step for successful expansion of the SmartAgriHubs, facilitated by the Open Call. To further support the matchmaking process, an initial map of funding instruments is developed in this deliverable. To obtain this map, information is gathered from multiple sources and channels:

1. The specific needs in terms of matchmaking and access to public and private funding of the different players in the agricultural sectors and, more specifically, of the key players of the digitalisation of the EU agriculture sector, were gathered through different means (surveys, direct contact in organised events, semi-structured interviews,

etc.). The results of these activities were already reported in previous deliverables D2.3 'Interaction with DIH networks for open call preparation' and D2.2 'Roadmap for regional, sectorial and economical network expansion'.

2. Specific figures on the actual situation for EU enterprises in the EU agricultural sector for accessing financing mechanisms, especially private ones, is gathered through a desk study compiling recent studies carried out by the European Commission, associated entities and collaborators.

The results from these activities have resulted in a simple framework that provides a comprehensive overview of the various types of public and private funding instruments that are most relevant for the digital innovation in the agri-food sector. Based on this framework, a first version of a map of funding instrument was compiled using readily available knowledge from SAH partners, in particular PNO, EBN and Cajamar. Since SMEs are a core target group of the SAH network, particular attention is paid to them. While Section 3.2 will provide more insight into the needs of the agriculture for funding, Section 3.3 will describe the framework of various types of funding in detail while the actual, initial map of funding instruments is provided as a systematic table in Appendix I.

3 RESULTS

This Chapter will first describe the various tools for matchmaking that were developed or identified in Section 3.1. Then, background information on the needs for accessing finance in the agri-food sector is provided in Section 3.2. Finally, the initial map of funding instruments is presented in Section 3.3.

3.1 Tools for matchmaking

3.1.1 Search filter for the Innovation Portal

As a result of the outcome of deliverable D2.2 on identifying thematic priorities for each region, a framework for topics and technologies was developed that can be used as search filter for finding matchmaking partners. This will be an additional filter to the option to search by region and sector already.

Table 1. List of topics and technologies that can be used for more advanced search filters in the networking function of SmartAgriHubs Innovation Portal

Topics	Technologies
1. Product quality (also including chain transparency and track and trace)	I. Sensing techniques (remote, terrestrial)
2. Optimization of farm operations	II. Unmanned vehicles
a. Productivity	III. Cloud and edge computing
b. Plant health	IV. Data analysis (also AI)
c. Labour efficiency	V. Data service and information systems (a.a. dss)
d. Animal health	- Technology unidentified
e. Input efficiency	
3. Environmentally sustainable production	
a. Emission Reduction	
b. Less food/feed waste	
4. New ways of doing business, new relations with customers	
5. Interoperability	
Topic unidentified	

Work Package 5, that is building the network of Competence Centers, is working on a more detailed list of technologies. The classification of technologies of CCs is called Agricultural Technology Navigator (ATN, in the shape of a wheel). In March 2020, at the occasion of the

annual SAH meeting, the first stage will be launched in the SAH Innovation Portal. There will also be open fields where CCs can describe their systems, using keywords. In a second iteration, technologies will be classified based on the inputs from the CCs, so that more precise filtering/matchmaking can occur through the Portal. Results of the iteration will be a rigorous set of agri-tech classifications and will take up to month 36. Therefore, we propose to use the more simple, comprehensive list in Table 1 for the matchmaking phase of the Open Call that is launched before.

The idea now is to enrich the network pages on the SAH Innovation portal (<https://smartagrihubs.eu/portal/network?>) with a search filter on technologies and topics as specified in Table 1. The WP2 team requested WP1 to adopt the present search function on the Network Pages to include the grey text describing the activities of the organisation on the Network pages and not only the subtitles (green text) to the companies' name. We will communicate on the portal to include topics and technology fields from the list created in D2.2 to enrich the grey text for non CCs). This will enlarge the possibility in finding and matching organisations.

As external sources, relating to the technologies already applied in organisations, one could also check the website of Smart AKIS¹ and the IoT catalogue². On the longer term, it could be considered to merge or integrate these into SmartAgriHubs Innovation Portal (to be confirmed with WP1).

3.1.2 More sophisticated matchmaking instruments

Although we live in an interconnected world, many successful business connections still happen face to face, which is one of the reasons why business matchmaking events have increased in popularity in recent years. One underlying difference when comparing networking and matchmaking events is that matchmaking aims to save time for attendees with regards to their search of potential prospects. Also, another important aspect to take into consideration is that matchmaking events are structured on a one-to-one meeting setting, where people are already put into specific contexts and are able to kick-start their conversation swiftly, without having to lose too much time on small talk. Additionally, this form of networking also excludes the awkwardness of approaching and commencing a conversation.

In recent years, we have seen an explosion of different matchmaking platforms, all with their different specificities, but most of them do focus on event matchmaking. Below, a non-exhaustive list of matchmaking instruments used to match interested parties is provided:

1. **b2match (<https://www.b2match.com/>)**

An all-in-one solution to organise impactful business events and effective B2B matchmaking. The B2B matchmaking software allows detailed networking profiles, marketplace entries, flexible matchmaking settings, different meeting format, effective meeting management and messaging.

2. **Brella (<https://www.brella.io/>)**

¹ <https://www.smart-akis.com/>: a free platform providing a number of tools for disseminating and making easier the use of Smart Farming technologies.

² <https://www.iot-catalogue.com/about>: the 'IoT Catalogue' is a repository for knowledge and technology on the Internet of Things.

Platform dedicated to event matchmaking. Users create a detailed profile, specifying relevant interests and intents. Brella suggests potential matches and the user can then book 1:1 meetings with the top matches, selecting a time and sending a meeting request. The platform includes meeting schedule, rescheduling and an in-app chat functionality.

3. eventtia (<https://www.eventtia.com/en/b2b-matchmaking>)

Comprehensive event planning and management toolbox including B2B matchmaking platform and networking. Eventtia offers a complete matchmaking tool to organise networking events. Features include: networking profiles to segment audience and facilitate matchmaking between groups; modular agendas to schedule one-on-one meetings; pre-event online interaction; possibility to personalise time segmentation and meeting duration; assignation of meeting space.

4. B2meet (<https://www.b2meet.com/>)

Tool to support business networking during exhibitions and conferences. It allows users to create their own business matchmaking solution, importing participants from existing systems, setting customised match-making rules and monitoring results. The event attendants can then create profiles with relevant information, search profiles and send meeting requests, confirm or refuse meetings and rate the meetings in the end.

5. Powerlinx (<https://www.powerlinx.com/>)

A B2B matchmaking platform, which focuses on finding business opportunities and partners for companies. Powerlinx delivers partnership recommendations of companies, based on the compatibility among companies.

6. Eventdex Business Matchmaking App (<https://www.eventdex.com/business-matchmaking-app/>)

This app is part of the Eventdex event management platform, which includes solutions to handle events from start to finish. The B2B matchmaking app allows users to schedule 1-on-1 appointments based on preferences and availability, and enables the event admin to automatically schedule meetings between buyers and sellers.

7. Converve (<https://www.converve.com/converve-event-networking-software/>)

A platform for matchmaking participants and content during events. It includes data-driven recommendation tools to enable participants to find the most valuable contacts and content at an event. Attendees can schedule meetings, send messages and customise their personal agendas.

8. EventBrew (<https://www.eventbrew.co/business-matchmaking-app/>)

The Business Matchmaking Software is a solution that matches attendees with prospective leads. It is a simple app that allows users to create a profile and preferences, search potential partners and schedule meetings. The features include scheduling meetings and appointments, create surveys, add comments to appointments, upload pictures, video and marketing material, export/print schedule, integrate with social networking websites and email marketing.

9. TalkB2B (www.talkb2b.net/en/overview-conference-and-event-management-software-talk-B2B)

It is a web and mobile platform designed for trade manifestations, conferences, networks, and other special meetings. The platform provides where participants can create a profile on the Internet, describing its company and the individual services offered or requested. After creating a profile, participants use the advanced search to find possible partners and schedule meetings with them. Before the conference, Talk B2B platform generates a schedule of meetings for each participant, which can later be used during the conference.

These sophisticated matchmaking tools provide users with an easy way to target their potential prospects who respond best to their needs allowing for efficient meetings. While these instruments are very effective in an event setting, matchmaking can also occur through different formats. Nowadays, some network-based organisations such as EBN (www.ebn.eu) utilise their websites in order to conduct matchmaking. Members have their own login details and are required to complete their organisation profile according to the scope of their work, sector of expertise, and services offered. Once registered and their profile is complete, they can interact with other members of the community via a forum or chat function. Also, members have the possibility to share upcoming opportunities (project-based, technical assistance, need of expertise, need for contacts in another EU country) with the community via a sort of marketplace. Depending on the scope of the opportunities, they will receive expressions of interest from interested parties. Finally, it is worth mentioning that many websites today include the use of a simple search filter system, which allows users to quickly target and find what they look for according to key words.

3.2 NEEDS FOR ACCESSING FINANCE IN THE EU AGRICULTURAL SECTOR

According to a study from the European Investment Bank³, many agricultural enterprises are small family farms, with almost 40% reporting an annual turnover of less than EUR 25 000 (with 12.5% below EUR 2 000). Around 94% employ less than 10 people permanently.

A major challenge is the ageing farm manager population: around half of them are over 55. Only some 5.4% of the farm managers are under 35 years old.

Small size and limited profitability suggest high investment needs to increase the efficiency and competitiveness of EU agricultural enterprises. At the same time, reduced size and low profitability may affect the ability of farms to obtain financial resources, with the concrete possibility of a vicious circle to be addressed by public support. Similar concerns arise for ageing farmers. Though young farmers are more likely to invest in modernising their agricultural holding, they have significant difficulties in accessing financial resources.

Access to land seems to be problematic for a relatively small group of enterprises (11%), which hides important differences between the Member States. For example, access to land was a problem for more than one third of farmers in the Czech Republic, Greece, Estonia, Germany and Finland.

³ *Survey on financial needs and access to finance of EU agricultural enterprises. European Investment Bank. 2018. Retrieved from <https://www.fi-compass.eu/publication/brochures/survey-financial-needs-and-access-finance-eu-agricultural-enterprises>.*

According to the latest data published by the ECB, the outstanding capital of loans dedicated to financing the agricultural sector has shown a growing trend in recent years (see Figure 2). This circumstance, together with the fact that public financing has also increased as a result of institutional support for this sector, such as the European Fund for Strategic Investment (EFSI)⁴ and the Horizon 2020 programme⁵ for research and innovation, shows an increase in business activity in agricultural investment.

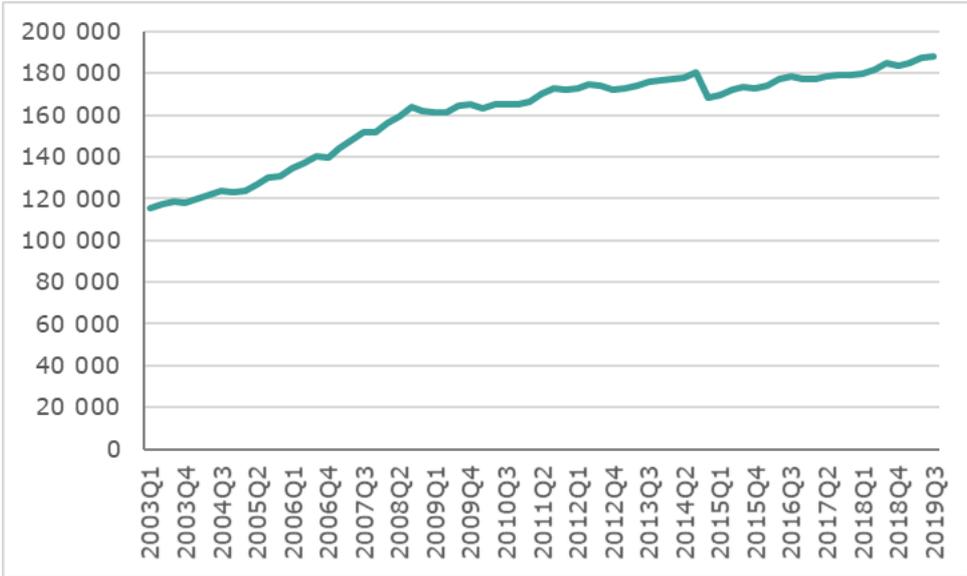


Figure 2. Loans agri-food sector. Non-financial corporations. Outstanding amounts at the end of the period (Millions of Euro). Source: ECB.

The importance of the agricultural sector in the total financing to non-financial corporations is only 4.2%. However, these figures strictly correspond to private financing directly to the agricultural sector, leaving food industry included in manufacturing, being therefore difficult to quantify. In spite of the fact that there is no data available on loans for food industry, there is literature on SMEs access to finance conditions by the European Union.

SMEs are relevant in food industry as shown by the data published by Food and Drink Europe in 2019⁶. According to this Institution, SMEs represent a 99.1 % with more than 290 000 companies. Moreover, SMEs generate 47.5% of the food and industry turnover and value added and provide two thirds of job in the sector.

In the European Union, access to funding is the most important concern for 7% of SMEs in 2019. This figure has been reduced since 2014, when it was still 13%⁷. By country, the perception of limited access for funding in Germany and Austria in the lowest in the European Union. In Greece, Malta and Lithuania it is considered as a pressing problem.

⁴ https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan-europe-juncker-plan/european-fund-strategic-investments-efsi_en

⁵ <https://ec.europa.eu/programmes/horizon2020/en/h2020-section/food-security-sustainable-agriculture-and-forestry-marine-maritime-and-inland-water>

⁶ <https://www.fooddrinkeurope.eu/publication/data-trends-of-the-european-food-and-drink-industry-2019/>

⁷ Survey on the access to finance of enterprises (SAFE). Analytical Report 2019

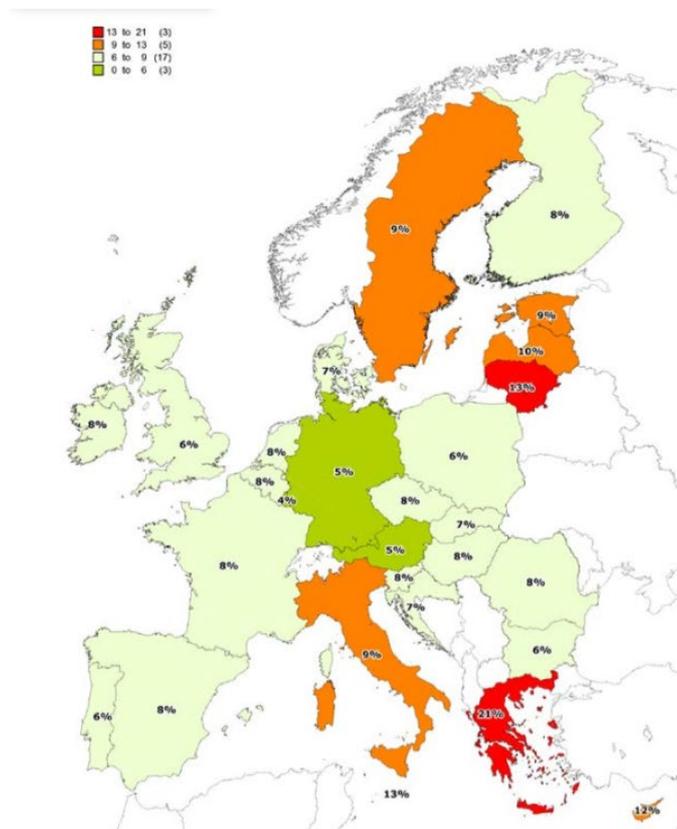


Figure 3. Proportion of SMEs that indicated access to finance as the most important problem during April to September 2019, EU28 by country. Source: Survey on the access to finance of enterprises (SAFE). Analytical Report 2019

As indicated in Figure 4, the most relevant sources of financing for this kind of companies are credit lines for 51%, loans for 46% and leasing for 47%. Between April and September 2019, 24% of SMEs in the European Union actually applied for a bank loan and 7% of the applications were rejected. Of those SMEs that successfully applied, 10% received less than they expected and 1% declined the loan from bank for the elevated cost. According to the survey, 4% did not apply because of fear of rejection.

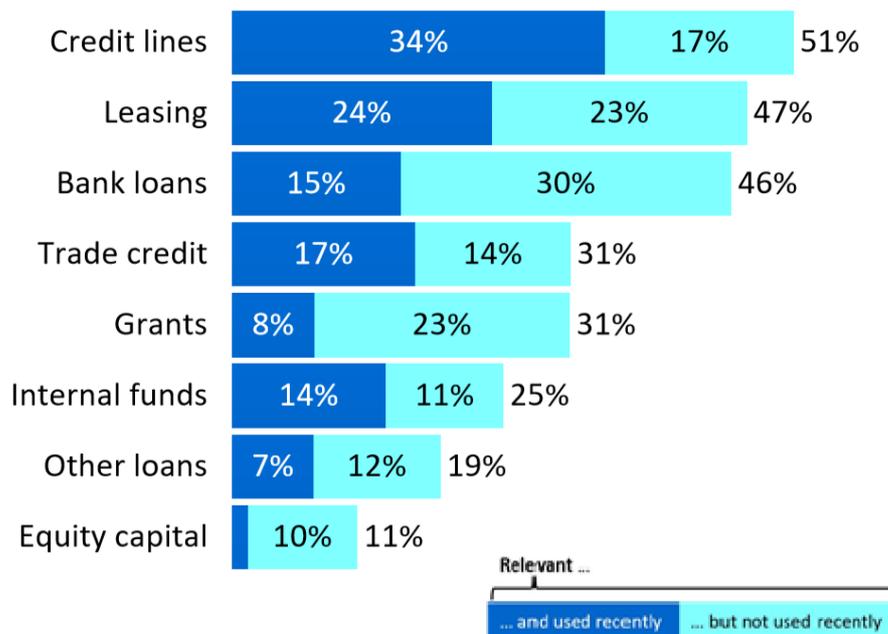


Figure 4. Access to finance in the EU by country in 2019. Source: Survey on the access to finance of enterprises (SAFE). Analytical Report 2019

Concerning agriculture, the survey carried out by the European Commission⁸ shows that nearly 30% of the agricultural enterprises applied for financing in 2017 for investments. 16.7% of those applied for bank finance on different time frame: medium-term loans (6.2%), long-term (5.9%) and short-term (5.3%). The average request was for EUR 35 400 (with an average interest rate of 4.76%) for short-term loans and EUR 118 000 (3.40% average interest rate) for long-term loans.

In the year in which the survey took place, 71.4% of the applications for long-term loans and 76.1% of the short-term loans were approved, while 29.6% of the total applications were rejected. There were 3.3% of farmers who rejected financing due to its high cost.

As indicated in Figure 5, the main reasons provided by the banks for refusing the financing were: a high investment risk, specific limitations on lending to farmers by particular banking policies and a lack of appropriate immovable collateral. A main reason provided by farmers for not applying for financing was sufficient internal or own funds (Figure 6). Around 10% of farms did not apply for fear of possible rejection; a higher share in comparison to SMEs in other sectors. In any case, 12.2% of farms said that access to finance for investment was difficult before 2017 and 10.4% had difficulties in accessing finance for working capital at that time.

In conclusion, farmers are refraining from actively searching for financing, which makes it difficult for them to obtain better conditions or easier access to financing. Besides, the large majority of farms applied only to one bank. This could be explained by the fact that farmers may favour relations with a single bank or that local competition between banks may be limited.

⁸ Survey on financial needs and access to finance of EU agricultural enterprises. European Investment Bank. 2018. Retrieved from <https://www.fi-compass.eu/publication/brochures/survey-financial-needs-and-access-finance-eu-agricultural-enterprises>.

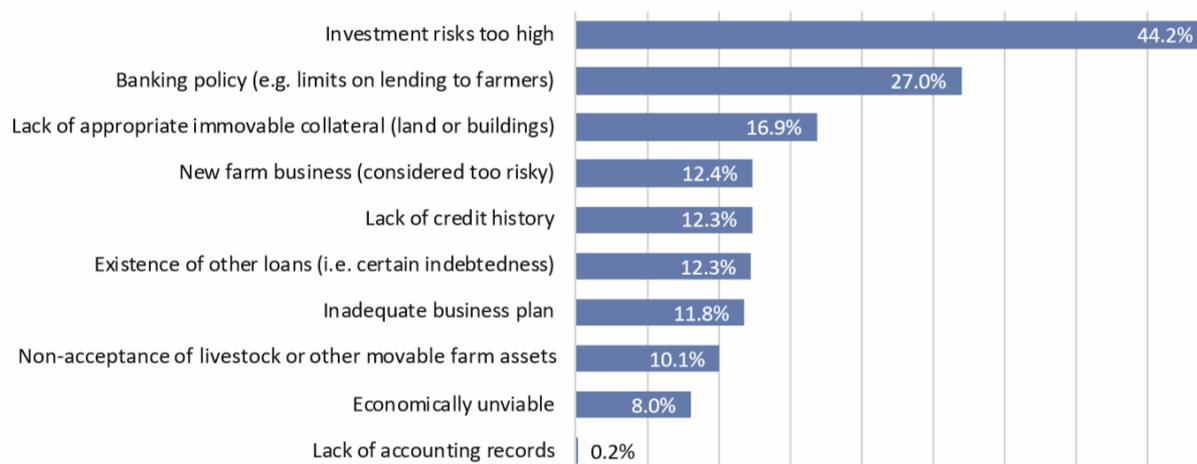


Figure 5. Key reasons given by banks for refusing applications (multiple answers allowed). Source: Survey on financial needs and access to finance of EU agricultural enterprises, 2018

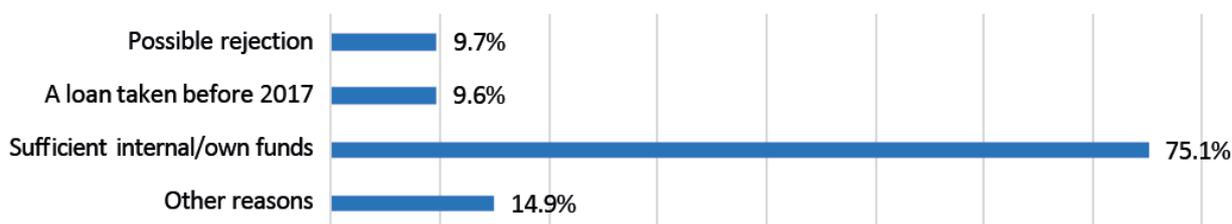


Figure 6. Key reasons for no application by farmers (multiple answers allowed) Source: Survey on financial needs and access to finance of EU agricultural enterprises, 2018

Investments financed in agriculture are mainly for renewal of machinery, equipment or operating facilities (63%), followed by working capital (41%), investments on land (15%) and purchase of land (11%). In most cases consulted in the survey, farmers needed to provide guarantees, especially in applications for long-term loans (50%). Thus, the requirement for guarantees and their amount, sometimes higher than the requested amount, continues to be a difficulty in access to financing.

Therefore, the fact that farmers try to finance with own resources, together with the fear that the loan application will be rejected, and the conditions of private financing lead to the phenomenon that farms try to find funding from other private individuals (e.g. relative and friends) in 14.8% of cases.

There are differences between large and small farms in terms of their funding needs, intention to invest and access to funding. Thus, small farms tend to apply for more financing for working capital and larger farms for renovating machinery, equipment and facilities.

Large farms have a higher intention to invest and easier access to credit than small and medium-sized farms. Their applications to banks are less likely to be rejected and, in addition, this type of farm is the one that most requests bank financing.

Small farms, however, have the most difficulty in accessing bank financing, especially for working capital, and they often refuse medium- to long-term financing because of its high cost. In addition, applications for bank financing are lower due to the higher fear of being rejected or due to the nature of their business case, so they use other sources of private

financing more frequently. They are also the type of farms more rejected by lenders in all product categories.

Nevertheless, according to the literature consulted, the structural characteristics of the farms and the maximisation of profits are not the only determinants in deciding to make an investment, but are also influenced by their values, beliefs, socio-economic status, age and the presence of a successor or plan to stop farming.

The age factor is somewhat ambiguous, having time horizon of agricultural activity having great weight. In fact, farmers that have no successor or plan stop farming are less likely to intend to invest than those with an identified successor whether it's a family member or not. While young farmers or farmers with a clear succession in the activity have more intentions to invest.

The ambiguity of the effect of age on investment has also been reflected in the survey "Survey on financial needs and access to finance of EU agricultural enterprises" published by the European Commission, in which no significant differences were found in funding applications prior to 2017 between those over and under 40 years of age. This shows that young farmers and agri-food companies run by young managers tend to have greater difficulty in accessing credit, with a success rate of 68% compared to 79% of credit accepted by those over 40 (Figure 7).

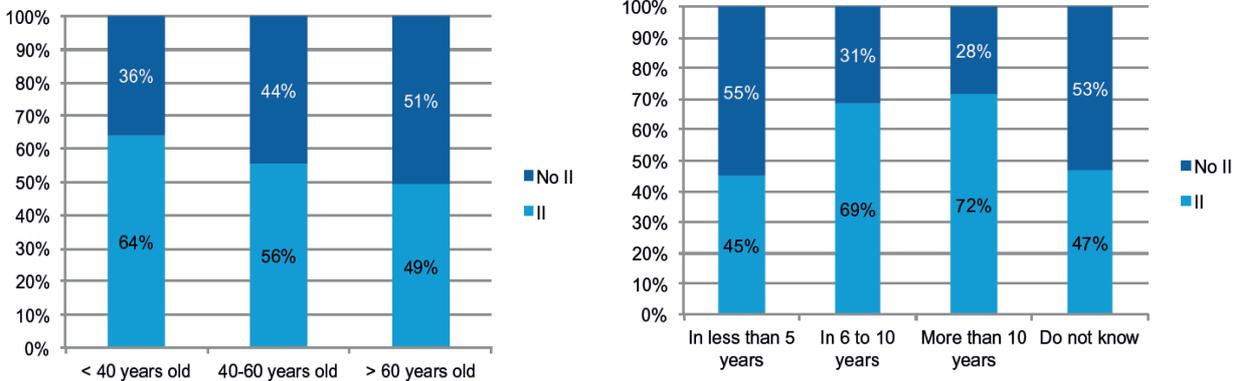


Figure 7. Left: intentions to invest by farm head age. Right: Intention to invest by expected date of retirement from farming. Source: European farmers’ intentions to invest in 2014-2020: survey results, 2012

In that survey, 27% of total applications from farmers under 40 were rejected by the lenders, and main reasons provided by banks for refusal were the risk associated with a new business project, the lack of guarantees and inappropriate business plans. In addition, young investors expressed more discouragement to apply for funding in the banking sector. These two circumstances mean that this type of investor usually turns to family and friends for financing.

We can conclude that there are different scenarios characterising the needs, possibilities and hinders to access funding depending on the differences between regions, type of farms/farmers also in relation to age of the farmers. This information is used as a background to identify specific funding instruments that may be of interest for the agri-food sector and that are further explained in the next section.

3.3 MAP OF FUNDING INSTRUMENTS

It was already written in SmartAgriHubs’ project proposal that one of the problems for large-scale uptake of digital solutions in agriculture is the misalignment between public and private

innovation support. This is often connected to the well-known 'valley of death' in which the availability of – usually public - funding for developing a prototype diminishes, while private funding is still scarce as indicated in Figure 8.

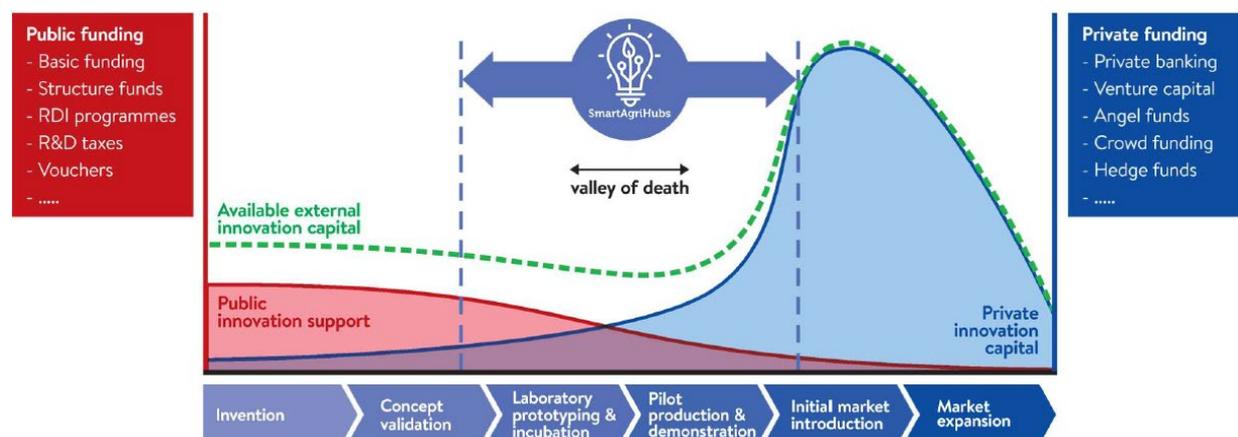


Figure 8. Misalignment of public and private innovation support and how SmartAgriHubs wants to overcome this situation by combining public and private capital (Source: TNO)

This figure also shows that innovations in which there is either only public or private capital involved, the potential of available capital is underspent. This is a problem of all regions in Europe, so a central approach will be very beneficial. SmartAgriHubs wants to span this situation helping start-ups and SMEs through the valley of death also by closing the gap between public and private funding.

For that purpose, this section identifies three types of funding and their specific instruments: EU-funding, public-private partnerships and private funding. Appendix I contains a table with concrete examples of each type of funding, its target stakeholders and details on where to find more information.

3.3.1 EU funding

Horizon 2020 is the current programme of the EU Commission to fund research & innovation projects and actions. Horizon 2020 focuses on three main pillars:

- **Excellent science:** world-class scientific excellence actions to make the research and innovation system more competitive;
- **Industrial leadership:** actions to speed up the development of technologies that will support businesses and innovation, including for small companies;
- **Societal challenges:** to respond to the priorities identified in the Europe 2020 strategy.

The latter pillar, Societal Challenges (SC) is the largest pillar in terms of funding. There are 7 challenges:

- Health, demographic change & wellbeing (SC1);
- Food security, sustainable agriculture and forestry, marine/maritime/inland water research and the bio-economy (SC2);
- Secure, clean & efficient energy (SC3);
- Smart, green & integrated transport (SC4);
- Climate action, environment, resource efficiency & raw materials (SC5);

- Inclusive, innovative & reflective societies (SC6);
- Secure societies (SC7).

The main opportunities for the agri-food sector are in SC2, although opportunities may arise also in SC5.

The Horizon 2020 programme will be completed by the end of 2020, and a new programme from 2021 to 2030 is being set in place with the name of Horizon Europe (HEU). The structure of HEU is still in the phase of design, but in principle the basic structure will remain quite similar to the current H2020 Structure, as shown in Figure 9:



Figure 9. Structure of the upcoming Horizon Europe programme. Source: https://ec.europa.eu/info/sites/info/files/research_and_innovation/strategy_on_research_and_innovation/documents/ec_rtd_orientations-he-strategic-plan_122019.pdf

In this framework, the **European Innovation Council** will support innovations with breakthrough and disruptive nature and scale-up potential that are too risky for private investors, with 70% of the total budget earmarked for SMEs. The European Innovation Council acts as a one-stop-shop, helping innovators create the markets of the future, leveraging private finance to scale-up their companies. There are two complementary instruments foreseen for this programme:

- *Pathfinder instrument* – For innovations covering from early technology to pre-commercial stage. This funding instrument will be based on grants.
- *Accelerator instrument* – For innovations from a pre-commercial stage to market and scale-up. This funding instruments can be based only on grants or can have a blended finance of grants and equity.

Another instrument of interest is the **R&I Missions**, which have the final objective of adapting and enhancing EU's research to better fit society and citizen's needs, with strong visibility and impact. A mission will be a portfolio of actions across disciplines intended to achieve a bold, inspirational and measurable goal within a set timeframe, with impact for society and policy making as well as relevance for a significant part of the European population and wide range of European citizens. In the scope of HEU, specific missions will

be programmed within the five Global Challenges and European Industrial Competitiveness pillars. From the five main Mission Areas, we can highlight two that will be related to the agri-food sector:

- *Adaptation to climate change, including societal transformation.*
- *Soil health and food.*

COSME is the EU programme for the Competitiveness of Enterprises and SMEs, supporting SMEs in the following areas:

- Facilitating access to finance
- Supporting internationalisation and access to markets
- Creating an environment favourable to competitiveness
- Encouraging an entrepreneurial culture

COSME supports the **Enterprise Europe Network (EEN)**, which companies in the agricultural sector can freely approach via their local partner in their region. They offer advice on EU funding opportunities, assistance to find business partners abroad or expand abroad, advice on EU access to finance, support for innovation, and technology transfer, offering a platform for matchmaking and partnering. The EEN is an initiative funded by COSME that works locally, through national branches or associated agencies⁹. One of the objectives of the Enterprise Europe Network is to support European entities to find partners abroad (within and outside the EU). Indeed, the Network manages Europe's largest database of business opportunities and can support in finding targeted business partners via its website¹⁰.

Besides Horizon2020 and Horizon Europe, the EU provides funding for a broad range of projects and programmes covering areas such as: regional & urban development, employment & social inclusion, agriculture & rural development, maritime & fisheries policies, research & innovation, humanitarian aid.

Over 76% of the EU budget is managed in partnership with national and regional authorities through a system of "shared management", largely through 5 big funds - the Structural & Investment Funds. Collectively, these help to implement the Europe 2020 strategy:

- *European Regional Development Fund (ERDF)* – regional and urban development
- *European Social Fund (ESF)* – social inclusion and good governance
- *Cohesion Fund (CF)* – economic convergence by less-developed regions
- *European Agricultural Fund for Rural Development (EAFRD)*
- *European Maritime and Fisheries Fund (EMFF)*

The **Interreg Europe** programme is financed by the European Regional Development Fund (ERDF) and exists to assist public authorities (local, regional and national), managing authorities and intermediate bodies, and agencies, research institutes, thematic and non-profit organisations. Actions developed with financial support from Interreg Europe must fall into one of the following four categories: Research and innovation, SME competitiveness, Low-carbon economy and Environment and resource efficiency.

Also, the **European Investment Fund (EIF)** supports EU's micro, Small and Medium Sized Enterprises (SMEs) by improving their access to funding (it does not lend money directly).

⁹ <https://een.ec.europa.eu/about/branches>

¹⁰ <https://een.ec.europa.eu/partners>

The EIF can support agricultural, food and forestry SMEs through banks and other financial intermediaries such as microfinance institutions, private equity, and venture capital funds.

Since 1962, the **Common Agricultural Policy (CAP)** has been representing the framework to improve agricultural productivity and a safeguard for farmers and rural environments. The CAP takes action within three pillars:

- income support through direct payments to farmers. This ensures income stability, remunerating farmers for environmentally friendly farming and green farming practices (maintaining permanent grassland, crop diversification, etc.) and delivering public goods not normally paid for. Farmers also receive money based on the amount of land they hold – again in return for employing eco-friendly farming methods that preserve biodiversity, soil and water quality and keep emissions low. EU funding also helps farmers train in new techniques and upgrade or restructure their farms.
- market measures to deal with difficult market situations such as a sudden drop in demand due to a health scare, or a fall in prices as a result of a temporary oversupply on the market.
- rural development measures with national and regional programmes to address the specific needs and challenges facing rural areas. It is also applied more broadly to improve life in rural areas, by creating jobs and providing basic services. In addition, under rural development, young farmers can benefit from specific support for setting-up their business as well as from higher support rates for investment they make in the business.

Figure 10 shows the budget allocation to the three pillars of the CAP.

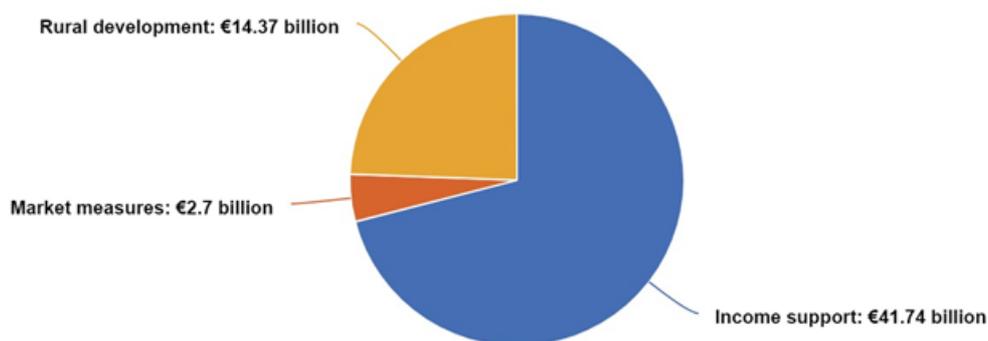


Figure 10. 2018 Budget share among the three different CAP pillars

In June 2018, the European Commission made different proposals for the future of the CAP after 2020, focusing on making it simpler and ensuring best value-for-money. Figure 11 shows the nine objectives of the CAP for the future beyond 2020¹¹.

¹¹ https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap_en.



Figure 11. The nine objectives for the future of the CAP

The CAP defines the conditions that will allow farmers to fulfil their functions in society for the achievement of these nine objectives and the implementation of digital technologies in the farming sector can contribute to most of them.

As a group, the 27 EU Commissioners have the ultimate political responsibility for ensuring that EU funds are spent properly. But because most of the funding is managed within the beneficiary countries, responsibility for conducting checks and annual audits lies with national governments. Figure 12 shows an overview of the distribution of structural and investment funds by Rural Development Programmes.

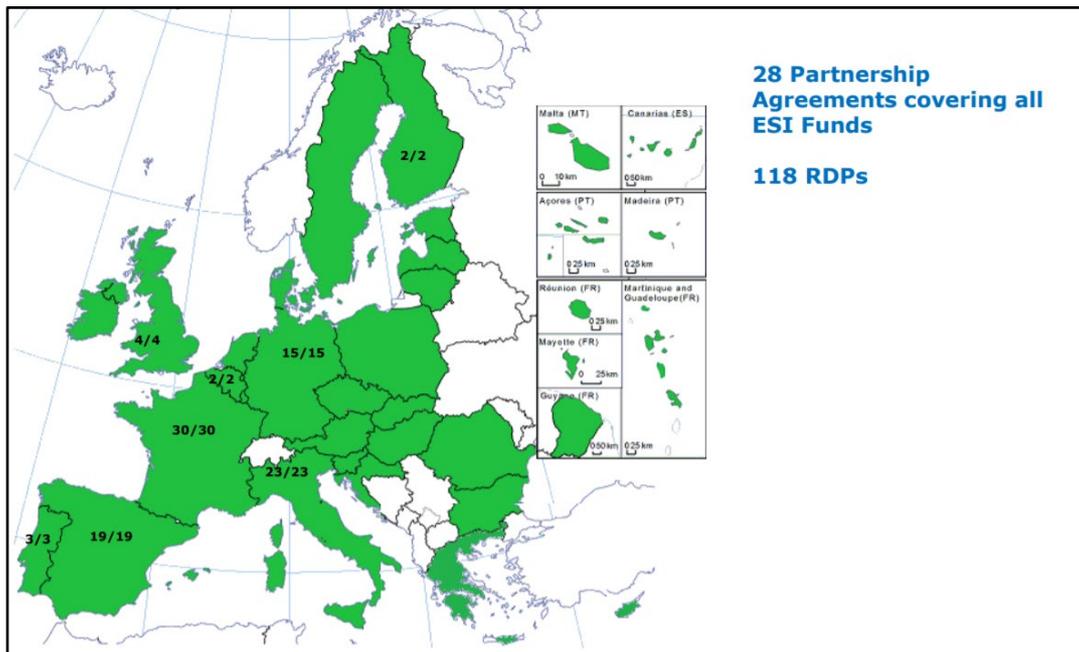


Figure 12. Overview of distribution of structural and investment funds by Rural Development Programmes

European Partnerships

Article 185 of the Treaty on the Functioning of the European Union (TFEU) covers public-public partnerships, with participation of the EU in research and development programmes jointly undertaken by several EU countries. This includes participating in the structures created to execute national programmes.

Under Horizon2020, the following European partnerships are established:

- **EUROSTARS** - The Eurostars Joint Programme provides financial support to market-oriented research projects initiated and driven by small and medium enterprises involved in research and development. It is being undertaken by 33 countries in the framework of the Eureka network.
- Partnership for Research and Innovation in the Mediterranean Area (**PRIMA**) - PRIMA fosters joint research and innovation activities among Mediterranean countries, aiming at developing innovative and sustainable solutions in agriculture, food production and water provision, encouraging application by communities, enterprises and citizens.
- **ERA-NET** is a funding instrument designed to support public-public partnerships in their preparation, establishment of networking structures, design and implementation, and coordination of joint activities. The instruments mainly 'top-up' funding for single joint calls and transnational actions within high European added-value and Horizon 2020 relevance. The specific **ERA-NET ICT-AGRI** is supporting the development and implementation of new technologies for a competitive, sustainable and environmentally friendly agriculture. The overall goals of ICT-AGRI were supporting the coordination of the European research on ICT and robotics, developing a common European Research and Innovation Agenda (SRIA, also SRA) and following up with calls based on funds from the participating countries' national research programmes.

In the upcoming HEU, a new approach to European Partnerships will be followed with the objective of setting a new generation of more ambitious and objective-driven partnerships in support of agreed EU policy objectives. The new partnerships will be:

- *Co-programmed*. Based on contractual agreements and memoranda of understanding and implemented independently by the partners and by HEU.
- *Co-funded*. Based on a joint programme agreed and implemented by partners, with the commitment of those for financial and in-kind contributions.
- *Institutionalised*. Based on long-term dimension and the need for high integration. Partnerships will be based on Articles 185/187 of Treaty on the Functioning of the European Union (TFEU) and EIT-Regulation supported by HEU.

One of the areas for possible Institutionalised European partnerships will be on 'Key digital and enabling technologies'.

3.3.2 Public-private partnerships

Article 187 of the TFEU covers public-private partnerships, typically involving the EU, industrial association(s) and other partners. These partnerships are managed by legal entities called joint undertakings which are responsible for implementing the research agenda in the area they cover.

In the scope of Horizon2020, there are ten contractual public-private partnerships (cPPPs) between the EU and business representatives which have strategic importance for European industry. cPPPs are aligned with the societal challenges of H2020, including climate change, support energy and resource efficiency, and to boost digital innovation and security. They also have an impact on the global technical lead of European based industry, economic growth and creation of new high-skilled jobs in Europe, as well as financing for public infrastructure in rural areas. PPPs are often used as a form of project finance. This financial structure is particularly suitable for projects that require large upfront investments, where the private sector is willing and able to take on certain project specific risks, such as demand or technology risk¹².

There are ten cPPPs:

- Factories of the Future (FoF);
- Energy-efficient Buildings (EeB);
- European Green Vehicles Initiative (EGVI);
- Sustainable Process Industry (SPIRE);
- Photonics;
- Robotics;
- High Performance Computing (HPC);
- Advanced 5G networks for the Future Internet (5G);
- Cybersecurity;
- Big Data Value.

Although none of them are specifically targeting the agri-food sector, most of them can be applied to this sector since they are key cross-cutting challenges that agri-food companies have to face in order to keep competitive in a highly evolving society.

Besides this, we can mention also the Joint Technology Initiatives (JTI) which are joint initiatives between the EU and private industrial consortiums that provide funding for R&D actions in specific industrial sectors. Currently, the following initiatives are in place:

- Innovative Medicines Initiative 2 (IMI2);
- Clean Sky (Aeronautics) 2 (CS2);
- Fuel Cell and Hydrogen 2 (FCH2);
- Bio-based Industries (BBI);
- Electronic components & systems (ECSEL);
- Shift2Rail and SESAR Joint Undertaking.

Only Bio-based Industries has some call that can directly be related to the agri-food sector, basically focused on the development of sustainable and bio-based initiatives.

3.3.3 Private funding

Each company or entity must be sustainable through its own operations. However, for the break-even point to occur, the capital injection into the company is necessary to sustain the

¹² *Financing rural, agricultural and forestry infrastructure. EIB, 2019.*

first operations. Throughout the life of a company, this requires different investments for its growth. Depending on the stage, the type of investment is referred to differently and has characteristics. The type of investment is usually linked to the profit of the company and is depending on the stage of development (Figure 13).

To start the activity, a company usually relies on a capital from its entrepreneurs and founders. Money is also sometimes borrowed from the FFF: "family, friends and fools". This type of capital can be called start or seed capital. It is normal that during the first year of life the company does not generate any profit, only losses. This stage is called the 'valley of death' and is where 90% of companies typically die. Only 5% of companies reach two years. Sometimes a Business Angel can be involved that financially supports the idea and in others it is usually national or regional funding. After break-even, the turning point where income spending exceeds expenses, a capital injection is often needed and it is a good time for a Business Angel to reclaim its investment. This new investment is called private equity or Venture Capital. Venture Capital type is also categorized, and is often referred to as Series A, B, C, etc. Each new round of financing for the company is moved to the next letter. Series A is characterized by the first time the company has been offered to external investors, such as a capital-heavy Business Angel or some private investment group.

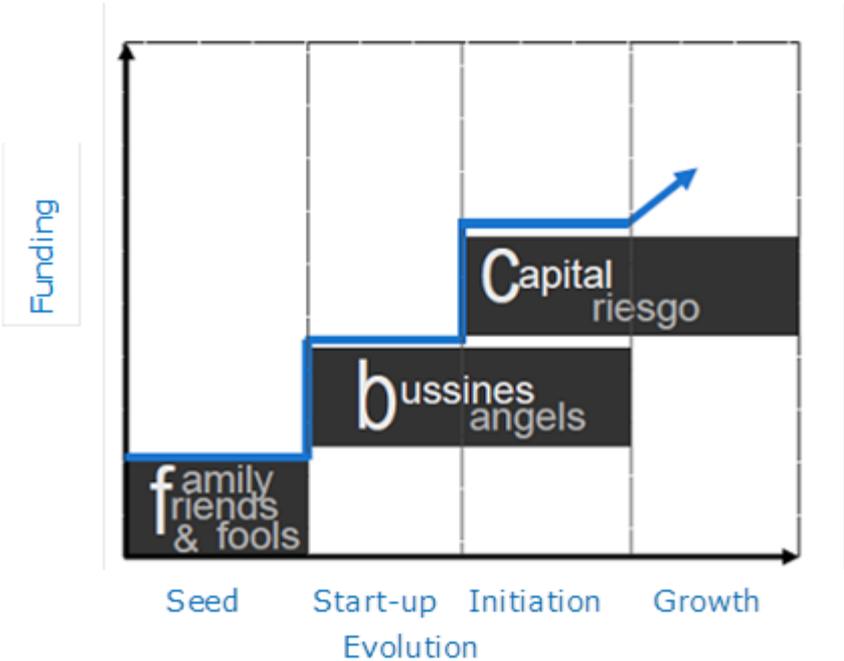


Figure 13. Private funding opportunities depending on level of funding and development phase

Business angels

A business angel or angel investor is an individual who invests personal capital in start-up companies. They invest in return for an equity stake. In other words, when they invest, they obtain a percentage ownership of the start-up business. Business angels expect their investment to give them a good return. Some will take an active role in the start-up business. While some business angels are active board members, others act as advisers and keep out of day-to-day control. Many become sleeping partners. In other words, they provide the capital and but have nothing to do with the running of the company.

They usually invest their own funds in the project, not like Venture Capital companies. And they select their investment projects by valuing the business plan presented to them by

entrepreneurs according to their personal investment criteria, so they make their own investment decisions. They invest in companies with which they have no relationship of kinship or friendship. They invest according to the feasibility of the project expecting great future gain, although they face extremely high risk and therefore require a very high return on investment. The main objective is the return on investment.

Venture Capital

Venture Capital is money given to start-up companies and small businesses expected to be successful. The funding for this financing usually comes from wealthy investors, investment banks, and any other financial institutions. The investment doesn't have to be just financial but can also be offered via technical or managerial expertise.

Investors providing funds are taking a risk that the new company delivers and does not deteriorate. However, the trade-off is potentially above-average returns if the company delivers on its potential. For newer companies or those with a short operating history—two years or less—venture capital funding is both popular and sometimes necessary for raising capital, particularly if they don't have access to capital markets, bank loans, or other debt instruments. One downside for the fledgling company is that the investors often get equity in the company and, therefore, a voice in company's decisions.

Venture Capital is one of the main forms of financing for early stage start-ups in their growth phase and who have already used other sources of financing such as FFF (Friends, Family & Fools) and seed capital. As said earlier, VC funds or Venture Capital Companies (SCRs) invest a certain amount in start-ups in exchange for a percentage of their profit.

VC firms are usually made up of several general and limited partners who invest the funds that the firm has. These funds are usually provided by other investors (institutional and others) seeking a high return, as well as pension funds, public money, etc. The general and limited partners are responsible for making an adequate investment of these funds and for providing a return to the actors who provide the funds. Through these investments, VC firms seek to participate in the future income of start-ups (normally controlling between 25 and 30% of them), in addition to taking over voting rights and/or a position on the board of directors of their own. One of the main characteristics of this type of financing is in the risk associated with investment in start-ups that are in their early stages, with great growth potential but also with an uncertain future. This risk also assumes that the reward can be very important. Venture Capital's funding business model is to invest a certain amount of money in several start-ups to diversify risks and in the hope that in that group of companies will achieve success, offering a high return either to through its sale to another company or with its IPO (initial public offering).

Private Equity

Private equity, at its most basic, is equity - shares representing ownership of, or an interest in, an entity - that is not publicly listed or traded. Private equity is a source of investment capital that comes from high net-worth individuals and firms. These investors buy shares of private companies or gain control of public companies with the intention of taking them private and ultimately delisting them from public stock exchanges. Large institutional investors dominate the private equity world, including pension funds and large private equity firms funded by a group of accredited investors.

This definition is very similar to Venture Capital and VC is normally considered as a sub-element of Private Equity. However, there are a number of differences between the two concepts.

- *Types of companies:* while the VC tends to focus on technology companies, Private Equity funds invest in all types of companies and industries
- *Amount invested:* Private Equity funds have to invest larger amounts of money than the VC, with figures normally exceeding 100 million euros
- *Percentage acquired:* Private Equity usually buy 100% from a company or majority percentages, while VC funds between 20 and 30%
- *Risk:* Because the amounts invested are much higher than in the case of Venture Capital, Private Equity institutions typically perform a smaller number of trades each year that have a lower associated risk than Venture Capital. VC funds tend to make several investments to diversify risks.

These are the four main structural differences between Private Equity and Venture Capital. As a result, it is also important to note that Private Equity funds expect a return on their investment of 40% (TIR), higher than in the case of Venture Capital (20%).

European Start-up Ecosystem

A start-up ecosystem is established with the integration of individuals, start-ups in their various stages of development and of course, the different types of business support organisations all interacting together thereby creating an environment that fosters innovation and the creation of start-up companies. Organisations within this ecosystem can be divided into different categories: universities, support organisations such as incubators and accelerators, funding organisations and start-up networks. Accelerators and incubators will be described in more detail below. All these entities are part of a dynamic European ecosystem that works toward a common goal, which is to allow EU start-ups to scale on a global level. Additionally, it is important to underline one important aspect with regards to the European start-up ecosystem, is that it is characterised by many national and regional start-ups organisations and associations all working towards supporting entrepreneurs with their day to day activities.

Accelerators

Accelerators are organizations that offer a range of support services and funding opportunities for start-ups. They tend to work by enrolling start-ups in months-long programs that offer mentorship, office space and supply chain resources. More importantly, business accelerator programs offer access to capital and investment in return for start-up equity. Start-ups essentially 'graduate' from their accelerator program after three or four months — which means that development projects are time-sensitive and very intensive. Acceleration methodology involves successive experiments in the shortest possible time and with the minimum possible resources, following the Lean Start-up methodology, so that in each iteration of these experiments progress is achieved in the process of technical and commercial validation of the solutions proposed.

Because accelerators stringently select participating businesses, investors don't need to waste loads of time sifting through duds in order to track down and evaluate fantastic new start-ups. Instead, angels can simply invest in accelerators that take on shares in start-ups themselves. Accelerators also structure these investments as real options which means that

early stage investors have the right to make future investments if they choose to. That being said, it is not an obligation to invest more.

On the flip side, accelerators are a proverbial treasure-trove of resources for start-up owners. Bearing in mind that these organizations are run by experts who make a living out of helping fledgling businesses to overcome basic hurdles, there's no better way to guarantee entrepreneurial success than to cohabit space with those experts. Start-up owners also benefit from mingling with business peers and generate friendly competition in order to bolster development. The only potential drawback of joining a business accelerator is that start-up owners are generally handing over equity in their companies.

Incubators

An incubator is essentially an organization that provides start-ups with a shared operation space. Incubators also provide young businesses with networking opportunities, mentoring resources and access to shared equipment. Furthermore, they give advice and facilitate the process of accessing to public aids for the promotion of innovation and entrepreneurial activity. Both at European level, as well as at national and regional level.

Incubation services for companies aim to ensure the survival of innovative projects in their most vulnerable period, birth and first steps. Incubation services can be supplemented with accommodation services to give the most coverage possible to these companies in their market arrival phase: offices, co-working areas, meeting rooms and common services that allow minimize upfront expenses.

Cajamar Innova is an incubator facilitating the development and validation of projects in their facilities and those of their network of collaborators, and identifying possible market niches and putting start-ups in touch with their community (<https://www.fundacioncajamar.es/es/comun/cajamar-innova/>).

This concept of a creative haven for start-ups has been around for a pretty long time but rose to prominence in the 1980s after a large number of colleges and universities began to launch school-affiliated incubators to bolster entrepreneurship and employability.

Because of that academic affiliation, many start-up incubators are run as non-profits. They generally won't ask for equity in a company in return for access to funding or resources in the way that accelerators do. As a result, start-ups generally receive far less access to capital by joining an incubator than they could expect to receive from an accelerator. But incubators can contribute with economic resources to finance investment projects or the working needs of companies, such as through the generation and transfer of knowledge, from their experts or experimental centres as it is the case of Cajamar.

Incubators are also better than accelerators at fostering slow growth, because incubators do not generally put a time stamp on their support programs. Where accelerators sponsor intensive, boot camp style programs that last only a few months, start-ups can spend years working from within an incubator to establish growth.

Private Banks

Creation of a specific funding line to provide part of the resources necessary for investment in the establishment of the company, in the acquisition of patents and licenses, the implementation of industrial projects or research and/or commercial actions.

The main features of these financial products are usually the following:

- *Maximum term*: Up to 6 years in case of personal warranty and up to 15 years in case of mortgage guarantee.
- *Payment method*: Optional fixed capital and interest fees, constant capital inflows, and past due or anticipated interest.
- *Periodicity of payments*: monthly, quarterly, semi-annual or annual.
- *Warranties*: Personal, mortgage or mixed.
- *Limit*: up to 80% of the investment.
- *Interest rates*: optionally, fixed or variable, in any case, negotiated through the central offices.

It is important to highlight that there could be flexibility in the guarantees and the method of payment. Normally, there is an interest bonus in the first phases and the lack period is a slow process for achieving results. In terms of warranty, sometimes it is the project itself according to importance.

Another option is to participate in the share capital of some of the companies, whenever technological interest of the project requires it.

Moreover, it is also possible to finance innovation projects and fixed assets themselves for the start-up of industries, factories, etc.

Banks specialized in the agri-food sector can provide technical criteria with their agri-food experts to advise and value the importance of technological investment to be made.

3.3.4 To conclude

This chapter gave an overview of the different instruments at three levels: 1) EU-funding, 2) public-private partnerships and 3) private funding.

1. EU-funding provides several opportunities for financing digital innovations in agri-food as well at pan-European as at regional level and sometime in combination.
2. Most of the public-private partnerships are large programmes focusing on cross-cutting technologies such as robotics, photonics, 5G, etc. None of them are specifically targeting the agri-food sector. However, most of these technologies can be applied to this sector since they are key cross-cutting challenges that agri-food companies have to face in order to keep competitive in a highly evolving society.
3. Several types of private funding can be identified such as business angels, venture capital, and private-equity that are targeting different types of companies – in particular, start-ups and SMEs in their different stage of development. In several cases, this type of funding is embedded in start-up networks, incubators and accelerator programmes that reduce the risk for investors and increase efficiency. Finally, there are many private banks that particularly focus on the agri-food sector, sometimes also on a very regional level

This description of the different public, public-private and private funding mechanisms should serve as a guideline for potential open call applicants on complementary funding sources. However, the suitability of the different types of funding for particular opportunities will need to be evaluated case by case and will depend on several factors, such as the type of activities to be funded, the type of organisation/s to be funded, the region, the particular sector, and other specific requirements that could be set by the funding organism. Now, in Appendix I,

a table is provided with concrete examples of each type of funding, its target stakeholders and details on where to find more information.

This information will be complemented with additional funding instruments at National and Regional level, being gathered currently in WP3, with the aim of creating a more exhaustive list with a wide regional coverage, and integrating different types of funding opportunities, to help SAH Open Call applicants on defining their strategy of approaching the Open Call.

4 CONCLUSIONS

The objective of this deliverable was to meet needs for matchmaking by stocktaking tools for matchmaking and map potential funding instruments to facilitate and improve matchmaking between organizations and specifically SMEs and investors. The actual assessment of needs for matchmaking was done in deliverable D2.3. Here we give special attention to financial needs of organizations – in particular start-ups and SMEs – in specific lifecycle stages.

The stocktake of tools for matchmaking has resulted in:

- Specifications for advanced search mechanisms in the SAH Innovation Portal that can help to match make for specific topics in regions, sectors, technologies; The specifications need to be harmonised with the classification for the Agricultural Technology Navigator that is developed by WP5/WP1.
- Sophisticated tools for match-making, mostly provided by advanced websites – also with advanced search and filtering mechanisms - and apps that support the organization of matchmaking events and B2B networking. Most of these tools are very similar and they target the connection between start-ups and SMEs and potential funders.

Before the map of funding instruments was provided, some background on the needs for access to finance for agricultural companies in the EU was described. This provided some useful insights into differences between regions, type of farms/farmers also in relation to their age. This information can especially be used by potential investors to identify specific risks and opportunities.

The map of funding instruments gave an overview of the different instruments at three levels: 1) EU-funding, 2) public-private partnerships and 3) private funding.

EU-funding provides several opportunities for financing digital innovations in agri-food as well as pan-European as at regional level and sometime in combination.

Most of the *public-private partnerships* are large programmes focusing on cross-cutting technologies such as robotics, photonics, 5G, etc. None of them are specifically targeting the agri-food sector. However, most of these technologies can be applied to this sector since they are key cross-cutting challenges that agri-food companies have to face in order to keep competitive in a highly evolving society.

Several types of *private funding* can be identified such as *business angels*, *venture capital*, and *private-equity* that are targeting different types of companies – in particular start-ups and SMEs in their different stage of development. In several cases this type of funding is embedded in *start-up networks*, *incubators* and *accelerator programmes* that reduce the risk for investors and increase efficiency. Finally, there are many private banks that particularly focus on the agri-food sector, sometimes also on a very regional level.

For each level of funding, stocktaking took place resulting in initial lists of concrete financing instruments that can be used for matchmaking. This list will be complemented with additional funding instruments at National and Regional level, being gathered currently in WP3, with the aim of creating a more exhaustive list with a wide regional coverage, and integrating different types of funding opportunities, to help SAH Open Call applicants on defining their strategy of approaching the Open Call.

The framework of the mapping and these initial lists can be used for an advanced database in the SAH Innovation Portal that can significantly improve the matchmaking process for DIHs. Communication on this will be essential for success.

APPENDIX I MAP OF FUNDING INSTRUMENTS

A template for the compilation of funding instruments is presented in Table 2, where a few preliminary examples of different funding mechanisms (public, public-private and private) are categorized. The main information is presented, such as the target stakeholder groups or the region of application or the main objective of the funding instrument. Examples of the different categories have been included, with the main objective to serve as a guideline for the gathering of information related to different types of funding mechanisms.

This information will be complemented with additional funding instruments at National and Regional level, being gathered currently in WP3, with the aim of creating a more exhaustive list with a wide regional coverage, and integrating different types of funding opportunities, to help SAH Open Call applicants on defining their strategy of approaching the Open Call.

Table 2. Map of funding instruments categorized by main types of funding (public, public-private, private) indicating their target stakeholders, target region and additional information

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
PUBLIC INSTRUMENTS							
Horizon 2020 Collaborative projects	x	x	x	X	EU	https://ec.europa.eu/programmes/horizon2020/en	Collaborative R&D project to tackle EU global challenges.
European Innovation Council	x	x			EU	https://ec.europa.eu/research/eic/index.cfm	Support innovations with scale/up potential that are too risky for private investors.
R&I Missions			x	x	EU		Adapting and enhancing EU's research to fit society's needs.

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
COSME	x	x			EU	https://ec.europa.eu/growth/smes/cosme/en	Improve European SMEs competitiveness
European Regional Development Fund (ERDF)	x	x	x	X	EU and Member States	https://ec.europa.eu/regional_policy/en/funding/erdf/	Regional and urban development.
European Social Fund (ESF)			x	X	EU and Member States	https://ec.europa.eu/esf/home.jsp	Social inclusion and good governance.
Cohesion Fund (CF)	x	x	x	x	EU Specific Member States	https://ec.europa.eu/regional_policy/en/funding/cohesion-fund/	Economic convergence of less-developed regions.
European Agricultural Fund for Rural Development (EAFRD)	x	x	x	x	EU + regions	https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/rural-development_en	Agricultural and rural development. Improve competitiveness of EU agricultural sector.
European Maritime and Fisheries Fund (EMFF)	x	x	x	x	EU and Member States	https://ec.europa.eu/fisheries/cfp/emff_en	Improve competitiveness of maritime and fishery sectors.

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Interreg Europe	x	x	x	x	EU/cross-country regions	https://www.interreg-europe.eu/	Assist public authorities in setting up actions for regional development
European Investment Fund	x	x			EU	https://www.eif.org/	Support SMEs in accessing funding (bridge financing)
EUROSTARS	x	x	x	x	EU	https://www.eurostars-eureka.eu/	Market-oriented R&D projects led by SMEs
PRIMA	x	x	x	x	EU, specifically Mediterranean Regions	http://prima-med.org/	Joint R&D activities among Mediterranean countries
ICT-AGRI ERANET			x	x	Cross-EU Member States	https://www.ictagrifood.eu/	Support partnerships in designing and implementing joint activities

PUBLIC-PRIVATE PARTNERSHIPS

Contractual Public-Private Partnerships

Factories of the Future (FoF)	x		x		EU	https://www.effra.eu/factories-future	
Energy-efficient Buildings (EeB)	x		x		EU	http://e2b.ectp.org/	
European Green Vehicles Initiative (EGVI)	x		x		EU	https://egvi.eu/	

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Sustainable Process Industry (SPIRE)	x		x		EU	https://www.spire2030.eu/	
Photonics	x		x		EU	https://www.photonics21.org/about-us/photonics-ppp/	
Robotics	x		x		EU	https://www.eu-robotics.net/sparc/	
High Performance Computing (HPC)	x		x		EU	https://www.etp4hpc.eu/cppp.html	
Advanced 5G networks for the Future Internet (5G)	x		x		EU	https://5g-ppp.eu/	
Cybersecurity	x		x		EU	https://ecs-org.eu/cppp	
Big Data Value	x		x		EU	http://www.bdva.eu/PPP	
Joint Technology Initiatives							
Innovative Medicines Initiative 2 (IMI2)	x		x		EU	https://www.imi.europa.eu/about-imi	

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Clean Sky (Aeronautics) 2 (CS2)	x		x		EU	https://www.cleansky.eu/	
Fuel Cell and Hydrogen 2 (FCH2)	x		x		EU	https://www.fch.europa.eu/	
Bio-based Industries (BBI)	x		x		EU	https://www.bbi-europe.eu/	
Electronic components & systems (ECSEL)	x		x		EU	https://www.ecsel.eu/	
Shift2Rail and SESAR Joint Undertaking	x		x		EU	https://shift2rail.org/	
PRIVATE FUNDING							
Business Angels							
European Trade Association for Business Angels (EBAN)	x		x	x		http://www.eban.org/	
Agriculture Angel Investors	x	x	x	x	International	https://angel.co/agriculture/investors	

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Business Angels Network van Oost NL	x		x	x	Netherlands	https://oostnl.nl/nl/business-angels	
Angel Investment Network	x		x	x	United Kingdom	https://www.angelinvestmentnetwork.co.uk/find-investors/industry-agriculture-5	
Venture Capital							
AgFounder	x	x	x	x	World	https://agfunder.com/	Firm focused on foodtech and agtech with an ecosystem of 75,000+ members and subscribers globally, and proprietary technology to support the investment team.
Clave Capital	x		x	x	International	http://clave.capital/	
Syngenta	x	x	x	x	International	https://www.syngentaventures.com/	
Inventages	x		x	x	International	http://www.inventages.com/	
Anterra Capital	x	x	x	x	International	https://www.anterracapital.com/	
Avrio Capital	x	x	x	x	International	https://www.avrioubdebt.com/en	
Private Equity							

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
European Start-up Ecosystem							
Kickstart						https://kickstart-innovation.com	
European startup network (ESN)					EU	https://europeanstartupnetwork.eu/	Sourcing tech start-ups from all over Europe (interesting for DIH wanting to use tech start-ups for innovation experiments)
Startup Europe Regions Network					EU	http://startupregions.eu/	EC funded initiative Again could be interesting to source tech start-ups from regional ecosystems
Startup Europe Partnership (SEP)					EU	https://startupeuropartnership.eu/	Network with corporate and investors angle ... interesting for matchmaking purposes
The RisingFoodStars Association (eit Food)					EU	https://www.eitfood.eu/entrepreneurship/projects/risingfoodstars	Umbrella organisation representing high potential start-ups in the agri food sector
Austrian startups					Austria	https://www.austrianstartups.com/	Platform for Austrian related innovation start-ups
Start-ups.be						https://startups.be/about	Belgian tech entrepreneurs

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Bundesverband Deutsche Startups eV					Germany	https://deutschestartups.org/	German platform for start-ups
Italia start-up					Italy	https://www.italiastartup.it/chi-siamo/	Italian platform for start - ups
Startup Asociación Española					Spain	https://asociacionstartups.es/	Spanish association for start-ups
Startupbritain					United Kingdom	http://startupbritain.org/	British start-ups platform
Startup Estonia					Estonia	https://startupestonia.ee/	Estonian initiative / platform for start-ups (around 650 active start-ups)
Etventure						https://www.etventure.com/	EY initiative aimed at supporting the digital transformation of projects ... Could be interesting for corporates angle
Startuphub					Portugal	http://startuphub.pt/	Tool for matchmaking purposes. Interesting for the Portuguese region
Startup Lithuania					Lithuania	https://www.startuplithuania.com/	Main platform to source Lithuanian start-ups
European cluster					EU	https://www.clustercollaboration.eu/vibrant-platform-	Use the filer to find all EU clusters with agri food angle

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
collaboration platform						service-cluster-organisations	
Startup.network					EU	https://startup.network/	Network that can support in finding investments etc ... Could be interesting for open call
F6s Portal					International but also EU focused	https://www.f6s.com/	Interesting for matchmaking purposes or to find corporates / investors etc
BETA-i					EU	https://beta-i.com/	Beta-i is an organization created to boost entrepreneurship, and established businesses grow, by offering 360° innovation services with 6 main areas: Acceleration, Events, Corporate (Innovation & Open Innovation), Education, Investment and Hub
Reimagine Food Prometheus					EU	https://www.reimagine-food.com/	
Happy Farm					Ukraine	http://happyfarm.com.ua/	The main purpose of this accelerator program is to search for and commercialize new technologies and developments in the IT sector.
Incubators							

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Cajamar Innova					Spain	https://www.fundacioncajamar.es/es/comun/cajamar-innova/	It supports early-stage projects focus on water technology in Spain
AgTech					France	https://www.euratechnologies.com/incubateur-agtech-euratechnologies/	French incubator focused on agri tech
BIC Euronova					Spain	http://www.bic.es/	Incubator based in Spain with an agri tech focus
Tagus Valley					Portugal	https://www.tagusvalley.pt/	Incubator based in Portugal
Incubateur Descartes					France	http://incubateur-descartes.com/	French incubator based in Paris
Technoport Luxembourg					Luxembourg	http://www.technoport.lu/online/www/function/homepage/ENG/index.html	Luxembourgish incubator focusing on high tech start-ups
Accelerators							
Shakeupfactory					France	http://shakeupfactory.co/	Start-up accelerator programme
Start Life					Netherlands	https://start-life.nl/	Food & Agtech start-up accelerator programme of the Wageningen University

Instrument	Target stakeholders				Region	Entry point/contact	Objective/comment
	Tech suppliers	Farmers	CCs	DIHs			
Imec Istart					Belgium	https://www.imec-int.com/en/istart	Tech start-up accelerator programme
Startupbootcamp Food Tech					Italy	https://www.startupbootcamp.org/accelerator/foodtech-rome/	High growth tech start-ups operating in the food tech industry
Kickstart Accelerator					Switzerland	https://kickstart-innovation.com/	Scale – up programme
Seedrocket					Spain	https://www.seedrocket.com/	Boosting scale – up with high growth potential
Banks							
Cajamar					Spain?		
Rabobank					Various countries		
Credito Agricola					Portugal	https://www.creditoagricola.pt/	
Credit Agricole					France	https://www.credit-agricole.fr/	
Other							
Crowd funding	x	x					Multi-actor private investment with early return