D 3.5 TECHNOLOGY REQUIREMENTS IDENTIFICATION

WP 3

30 September 2019

This is the public version of the deliverable. The confidential version contains the detailed reports of all FIEs.

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LIST OF ABBREVIATIONS

Abbreviation	Explanation
CC	Competence Centre
DIH	Digital Innovation Hub
FIE	Flagship Innovation Experiment
IE	Innovation Experiment
RC	Regional Cluster
SAH	SmartAgriHubs
WP	Work Package

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PROJECT SUMMARY

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

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

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

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

EXECUTIVE SUMMARY

The SmartAgriHubs (SAH) project, under the H2020 program and led by Wageningen University and Research, aims at progressing the digital transformation of the European Agri-Food sector. SAH uses a multi-actor ecosystem to build upon the excellence, knowledge and innovation that is present all over Europe in start-ups, SMEs, business and service providers and end-users. Specifically, SAH aims at strengthening and maturing the services of Digital Innovation Hubs (DIHs) and Competence Centres (CCs) throughout Europe. The local character of these services is often important, therefore, the project is organised into 9 regional clusters. The main purpose of DIHs and CCs is to support digital innovations in agri-food, in the form of 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.

This specific deliverable (D3.5 "Technology Requirements Identification") asks these 28 FIEs for their technological and non-technological requirements and the reusability of each. Through a pre-defined template that was made from the collaboration of different Work Packages (WPs) in the project, these requirements are listed, together with their progress (fulfilled or not) and the support that was received or is still requested for solving the challenge. Also the reusability of the solution and the target audience and 'release' date of the solutions were asked.

The resulting reports from the FIEs show the very diverse fields and solutions they are working on, and result in the identification of 112 requirements at this moment in the project already (month 11). The largest part of these requirements are technological (67%), as is to be expected in a project on digitalisation in agriculture. However, a lot of non-technological requirements are also mentioned and these are deemed without exception (very) important for the FIEs developments. Technological requirements have a higher fulfilment rate than the non-technological ones (55% versus 30%), probably because technological problems occur earlier in the development process of a product or service (such as sensor selection and algorithm building) than many non-technological issues (such as price settings and training). It is therefore expected that this percentage will shift during the project, as we will analyse in the next iteration of this deliverable (month 36).

Looking at the support from CCs and DIHs, we can see this is already quite developed. Of all requirements, 61% are supported by CCs (for example through expertise, technical know-how, facilities) and 43% by DIHs (for example through community building, training, skills). DIH support is more focused on the non-technological requirements. Also additional support is requested from DIHs and CCs. A thorough analysis of the requirements will allow DIHs and CCs to further mature their services.

For a lot of requirements and related solutions, the FIEs indicated that they are reusable (89%). In addition, not many differences can be observed between agricultural sectors, and the main reason for this is that the majority of requirements (63%) span or can be used in multiple sectors, even beyond agriculture (like sensors, data platforms, workflows, etc.). This is an important result, as it means that there is a large possible impact of the developments of the FIEs and the reusable parts within it.

A detailed analysis of these reports will help DIHs and CCs to strengthen and mature their services, and will help current and future FIEs in identifying synergies and progressing faster through collaboration and usage of existing solutions. This strengthens on the one hand the

SmartAgriHubs project and its goals and achievements, and on the other hand the European agri-food sector in progressing innovation and digitalization. This in turn allows for a sustainable food delivery, with economical (higher productivity, lower costs), ecological (climate impact, resource usage) and social (work circumstances, employment) benefits going hand in hand.

The future steps are to disseminate the obtained lists to the DIHs (through WP 4) and CCs (through WP 5) in order to inform them and help them gain maturity as well as to WP 1 and all FIEs, to update the innovation portal and learn from each other.

This is the public version of the deliverable. The confidential version contains the detailed reports of all FIEs.

1. INTRODUCTION

The H2020 project "SmartAgriHubs" contain several Work Packages to ensure a good progress and support of the project. Tasks of WP 3, directed by BioSense Institute and ILVO, leader and co-leader respectively, are amongst others to define activity plans for the FIEs, closely follow-up the progress of the FIEs, and identify synergies, reusable components and joint activities among the FIEs, based on common technological and non-technological aspects. These are exactly the objectives that this deliverable is contributing to.

This deliverable D3.5 "Technology Requirement Identification" aims to identify and analyze both the technological and non-technological requirements of the FIEs and the reusability of any of the related components. This is a first iteration of this deliverable due M11, which is part of Task 3.3 "Technology Support and Synergies". A second iteration of this deliverable will be done later on in the project (M36) and will enable comparing the progress of the FIEs as well as identifying requirements that are occurring at different phases of the development process of products and services in agriculture digitalization. These deliverables are closely related to on the one hand the "Execution Plans of the FIEs" (bundled in D3.2 at M6) since the ability to overcome challenges, develop new solutions and thus reach the set goals, deliverables and milestones depends highly on how the technical and non-technical requirements can be fulfilled during the lifetime of the project. On the other hand, these deliverables are also linked with the "Learning Takeaways from FIEs" (D3.3, M18) to gather lessons learnt. That is why the template for this deliverable already touched upon the topic by asking FIEs to think about reusability of the solutions to their technological and non-technological requirements and which audience could benefit from it.

This process of gathering challenges and requirements of FIEs on different levels (technological and non-technological) and especially also asking the FIEs if they have found a solution and who helped them during the process or what help they are lacking, is very significant feedback for the DIH ecosystem (WP 4). Indeed, the evaluation of these aspects allows DIHs to improve their services towards the FIEs and in this way supports the maturity of the DIHs. Also, it is information that can contribute to an evaluation of the DIHs services, and how these evolve during the project. Similarly, the support of CCs (WP 5) can be evaluated this way and improved through the points of action where the FIEs feel they are lacking support. The Innovation Portal developed by WP 1 is in a large part a way to form a network between agricultural sector partners and DIHs and CCs that can support developments in digitalization in agriculture. In that sense, it is important for WP 1 to understand the topics for which sector partners are looking for support so they can make these specific points searchable in the Innovation Portal marketplace. All obtained lists will thus be shared with WP 4 and WP 5 to ensure the FIEs are supported by appropriate DIHs and CCs as well as with WP 1 to be incorporated in the Innovation Portal. This will guarantee a stronger validation of the developed technologies and help them to become more marketable in the agri-food sector.

Last but not least the (non-)technological practices and reusable components identified through this deliverable can be a point of inspiration, collaboration and faster advancement of other FIEs and later on also other IEs characterized by common challenges.

In the next section, the approach and methodology (a predefined template) of information collection for this deliverable is explained, after which the filled in templates of each FIE are shown in the results section. These results are analyzed and information is extracted from it. Finally, conclusions can be made in the form of some take home messages.

2. APPROACH & METHODOLOGY

2.1 METHODOLOGY FOR CREATION TEMPLATE "TECHNOLOGY REQUIREMENTS IDENTIFICATION"

A template to collect the technological requirements and non-technological requirements and to identify the reusable components among them was developed by WP 3 in close collaboration with other work packages:

- Work package 1 (Communication):
  The communication team of the SAH project developed the Innovation Portal, an online environment which will facilitate matchmaking, knowledge exchange, networking and training in the European agri-food sector. The collected requirements and reusable components of this deliverable perfectly fit in this vision of the SAH project and of the Portal. This deliverable will enable WP 1 to get more insight in the input for the search and matchmaking tools.
  WP 1 also advised to survey the FIEs interest to have the reusable technological requirements added in the online IoT catalogue (https://www.iot-catalogue.com/), which is already populated with solutions developed in the IoF2020 project (www.iof2020.eu, H2020 nr. 731884).

- Work package 4 (DIHs):
  The Needs Assessment of WP 4 aims to improve the capabilities of DIHs in the SAH project. Gaps between the services of the DIHs and the needs of the farming sector were already collected in every regional cluster. However, the results of this deliverable will also help the DIHs to look for opportunities to broaden their network, gain maturity and offer more services if required by the FIEs in their region. Mainly the obtained information about the non-technological requirements and accomplishment of those needs will be valuable.
  Suggestions were put forward by WP 4 and the template was modified accordingly. Also, a question about the importance assigned to a certain non-technological requirement was added in the template (on a 5-point scale) as suggested by WP 4.

- Work package 5 (CCs):
  Although some overlap might occur with some of the activities of WP 5, this deliverable has added value and is useful to detect gaps in the resources and evolution of the FIEs. WP5 uses a decision wheel and a survey to gather information from the CCs in order to classify systems and corresponding technologies. The information collected in this deliverable will be sent to WP 5 and can be added in this decision wheel. Especially the questions concerning the fulfillment of the technological requirements and requisite additional support, of e.g. CCs, will highlight potential gaps.
  Changes have been made according to the suggestions of WP 5.

2.2 FINAL TEMPLATE "TECHNOLOGY REQUIREMENTS IDENTIFICATION"

TEMPLATE "D3.5 TECHNOLOGY REQUIREMENTS IDENTIFICATION"

Flagship Innovation Experiment	*Name and number*

Regional Cluster	*Name*
What are the technology requirements?	*Please list your FIE technology requirement(s) e.g. software feature, hardware (general equipment) solution, biotechnologies, facilities & land, standards, resources, risk management, etc.*
What are the non-technological requirements?	*Please list your FIE non-technological requirement(s) e.g. business model, services, mentoring, customer intimacy, skills and education, community building, visioning and strategy development, etc.*
What are the reusable components?	*Please list your FIE reusable component(s) of your technology and non-technological requirements.*

FIE TECHNOLOGY REQUIREMENTS

Technology Requirement_*X* _ *name*	**Keywords:**	*e.g. arable farming, GPS, etc.*

Topic	**Description**	
Technology requirement overview	*Please provide technology requirement overview, e.g. software feature, hardware (general equipment) solution, biotechnologies, facilities & land, standards, resources, risk management, etc.*	
Technology requirement snapshot	*Please provide technology requirement snapshot, photo, graph or any other visual presentation.*	
Technology requirement functions	*Please briefly describe functionalities.*	
Is this requirement already fulfilled in your FIE?	*Yes/No*	
Who is supporting you with this technology requirement?	*Please provide company names (e.g. DIHs, CCs of your FIE, etc.).*	
Do you need more support for this technology requirement?	*Please provide company names (e.g. DIHs, CCs of your FIE, etc.), ideas, etc.*	
Is this technology requirement reusable?	*Yes/No*	
Reusable component impacted sectors	**Farm production & Post-harvesting**	*e.g. Livestock production, Fruits, Vegetables, Arable, Dairy, Aquaculture, Novel foods, Other, N/A, All.*

	Distribution	*e.g. Logistics, Marketing, , Visibility & Traceability, Market trade, Other, N/A, All.*
	Consumers	*e.g. Wholesalers & Retails, Online & Home, N/A, All.*
How is it reusable?	*Please explain how this component can be reused?*	
When will it be reusable?	*Please estimate when component will be available for reuse?*	
Who can benefit from it?	*Please list and describe.*	
Are you interested to have this reusable technology requirement added in the IoT catalogue: https://www.iot-catalogue.com/**?**	*Yes/No*	

** Please copy-paste the table to describe all FIE Technology Requirements.*

FIE NON-TECHNOLOGICAL (NT) REQUIREMENTS

NT Requirement *X* _ *name*	**Keywords:**	*e.g. arable farming, DSS, etc.*
Topic	**Description**	
NT requirement overview	*Please provide non-technological requirement overview, e.g. business model, services, mentoring, customer intimacy, skills and education, community building, visioning and strategy development, etc.* *Please also consider a contract for IPR to be listed here.*	
NT requirement functions	*Please briefly describe functionalities.*	
Is this NT requirement already fulfilled in your FIE?	*Yes/No*	
Who is supporting you with this NT requirement?	*Please provide company names (e.g. DIHs, CCs of your FIE, etc.)?*	
Do you need more support for this NT requirement?	*Please provide company names (e.g. DIHs, CCs of your FIE, etc.), ideas, etc.*	

How important is this NT requirement for your FIE?	*Please give your score on a 5-point scale (5 = very important, 4 = important, 3 = neutral, 2 = slightly important, 1 = not important, but perhaps necessary)*	
Is this NT requirement reusable?	*Yes/No*	
Reusable component impacted sectors	**Farm production & Post-harvesting**	*e.g. Livestock production, Fruits, Vegetables, Arable, Dairy, Aquaculture, Novel foods, Other, N/A, All.*
	Distribution	*e.g. Logistics, Marketing, Visibility & Traceability, Market trade, Other, N/A, All.*
	Consumers	*e.g. Wholesalers & Retails, Online & Home, N/A, All.*
How is it reusable?	*Please explain how this component can be reused?*	
When will it be reusable?	*Please estimate when component will be available for reuse?*	
Who can benefit from it?	*Please list and describe.*	

** Please copy-paste the table to describe all FIE Non-Technological Requirements.*

2.3 METHODOLOGY FOR FILLING IN TEMPLATE "REUSABLE COMPONENTS AND TECHNOLOGY REQUIREMENTS"

In the monthly RC meetings, organized and hosted by WP 3, the template was introduced to the FIE coordinators and the RC leaders and co-leaders. The FIE coordinators were asked to complete the template for their FIE together with the FIE partners. They got approximately 1 month to perform this task. Support was asked to the RC leaders and co-leaders.

WP 3 was in charge of the collection of the completed templates. All collected data were inserted in an Excel spreadsheet in order to make pivot tables, graphs and analyses concerning the number of requirements and reusable components, the fulfillment of the requirements, the required additional support, etc. The obtained results were visualized per region (9 RCs of the project) and per sector (5 main agricultural sectors of the project).

3. RESULTS

3.1 RESULTS OF THE FLAGSHIP INNOVATION EXPERIMENTS

This part has been left out of the public version of the deliverable.

3.2 ANALYSES OF THE RESULTS

All 28 FIEs delivered their reports with the bundle of technological and non-technological requirements that they experienced, are working on or are expecting in the future during the lifetime of their FIE and the development of their FIE solutions, products and services.

In total, 75 technological and 37 non-technological requirements were collected, of which 55% and 30%, resp., were already fulfilled at the moment of collection of this deliverable (Fig. 1). The identified technological requirements are very diverse and vary from hardware and sensors including energy challenges, over data models, algorithms and data processing and storage to datahubs, API management and software and visualization solutions. The non-technological requirements can be categorized as procedures or workflows, trainings, networking, business models and price settings and knowledge and services. Also facilities are mentioned, which can be both a technological and non-technological need. Some requirements also span multiple of these categories as they describe a full solution instead of very specific parts.

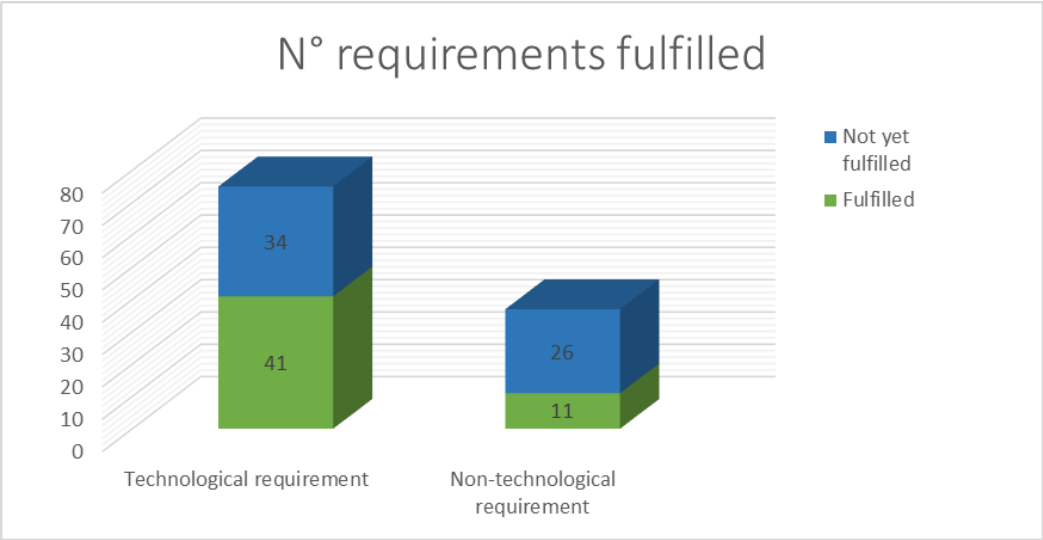


Figure 1: Number of technological and non-technological requirements and their fulfilment rate over all 28 FIEs (flagship innovation experiments).

The technological requirements are mainly situated in the arable sector (26%) although closely followed by technical needs in livestock (22%), vegetable (21%) and fruit (18%) sectors (Fig. 2). The non-technological requirements follow the same line with arable on top (24%) followed by the vegetable (23%), livestock (21%) and fruit (19%) sectors although differences are very small (Fig. 2). Comparing with the number of FIEs operating in each sector, i.e. 10 in livestock, 8 in arable, 5 in vegetables, 4 in fruit and 1 in aquaculture, these results seem very logical. What stands out when analyzing in more detail, is that a lot of FIEs indicated that their requirements cover or can be used for multiple sectors. Only 40 of the 112 requirements were sector-specific, 31 covered between 2 and 4 sectors, while 41 requirements were covering all agricultural sectors or even broader. Examples of these are business models, IoT sensors, workflow diagrams and API connectors. This shows the potential of the FIEs developments for the whole agri-food sector.

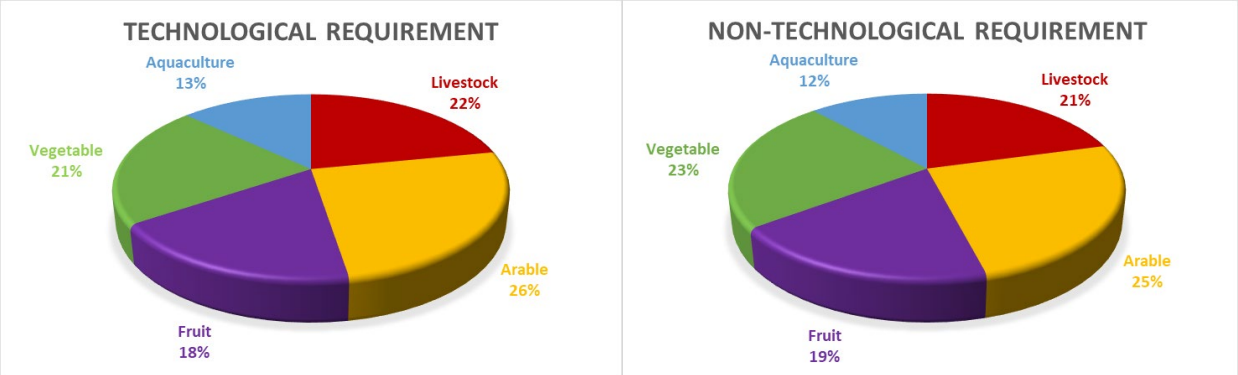
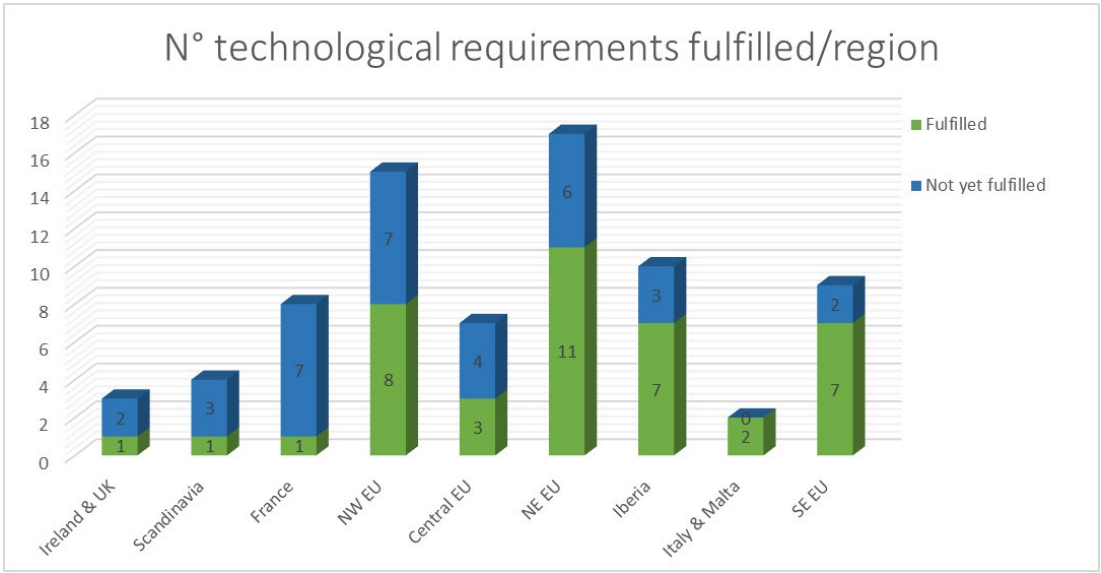


Figure 2: The technological (left) and non-technological requirements (right) spread across different agricultural sectors.

Differences among regions can be observed in the number of requirements although this obviously also depends on the number of FIEs per region (Fig. 3). No non-technological requirements were collected in Italy & Malta. A large variety in the fulfillment per region is detected with a range of 14% fulfillment in France to 100% fulfillment in Italy & Malta for the technological requirements and a range of 0% fulfillment in Scandinavia, Central Europe and North-East Europe to 100% fulfillment in Ireland & UK for the non-technological requirements (Fig. 3). Note that these numbers do not consider that the templates are sometimes filled in in different ways, with some FIEs mentioning very broad requirements, while others split them up into different smaller parts. So these numbers are not a one-to-one representation of the work being done or the size of the challenges encountered.

Especially at the non-technological requirements we see that many are still to be fulfilled (either they are on-going, partially fulfilled or still need to start) (Fig. 3). A possible explanation for this is that technological requirements often occur early in the development process of a product, while other requirements like consumer acceptance, skills and training, strategy, business models, etc. are not always being worked on from the very start. When asked how important the non-technological requirements are for the FIE on a 5-point scale, almost all FIEs indicated that it is very important (score 5). Only a couple of times score 4 was given (important). A positive observation is thus that many of the FIEs are considering these non-technological requirements already at this phase of the project (M11), and it can be expected that their influence will increase further (for example at the time of the next iteration of this deliverable, M36).



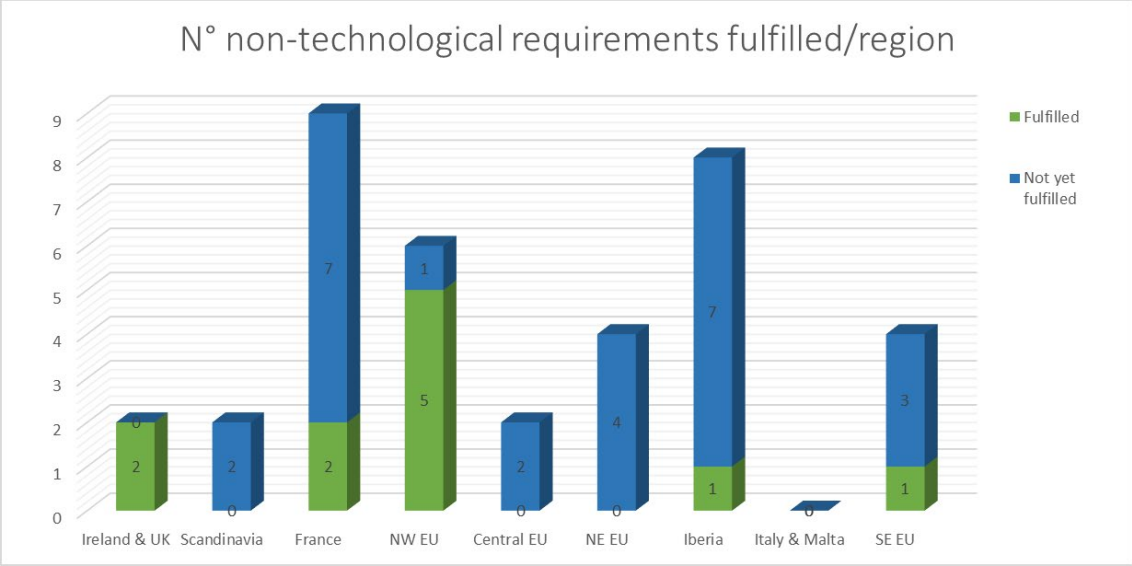


Figure 3: Number of technological (top) and non-technological requirements (bottom) and their fulfilment rate per regional cluster.

Both the technological and non-technological requirements are already well supported in the FIEs. Of the 28 FIEs, in total 20 and 21 indicated they were receiving support already from at least one CC or one DIH, respectively. Support from a CC is present for 60% of the technological requirements and 62% of the non-technological requirements, and this can be from between 1 and 3 CCs at the same time (Table 1). While support from either 1 or 2 DIHs is present for 28% and 73% of the technological and non-technological requirements respectively (Table 1).

This difference in the DIH support is logical, as solving technological challenges is often based on in-depth technical knowledge and experience, which can typically be found in a CC and not necessarily in a DIH. While for the non-technological requirements, such as forming management and training procedures, developing business models and price settings, building a network and finding test facilities are all more competences found in a DIH. The reason that also a lot of CC support is indicated for the non-technological requirements is because a large part of these requirements still have a relation with the technical aspects, such as software development manuals, technical protocols and training, domain knowledge added to algorithms, etc. Also, there is not always a very clear distinction between CC and DIH services which can be related to the same institute.

Besides CC and DIH support, the FIEs are also indicating that they are receiving support from their partners and from SMEs. The FIEs were asked already at the beginning of the project to point at which CCs and DIHs could support their development, and these are already included in the SAH community, either as a partner with funding or without funding or as a DIH or CC in the extended network of the project. These results show however that the support that was planned and put on paper, is actually being used in the development of solution for the FIEs requirements. In the next iteration of the deliverable, it will be interesting to evaluate whether the number of CCs and DIHs involved has increased and the network has broadened to new partnerships as well.

Table 1: Support of CC (competence centers) and DIH (digital innovation hubs) already received for each technological and non-technological requirement.

	Receiving CC support		Receiving DIH support	
	Yes	No	Yes	No
Technological requirements	45	30	21	54
Non-technological requirements	23	14	27	10

When we look at where more support is needed, we see that only for 30% and 22% of the requirements more support is requested for the technological and non-technological needs (Fig. 4). Ten FIEs are requesting further CC support and 12 FIEs are requesting more DIH support. Here we see also a shift towards more CC support needed for the technological requirements and more DIH support requested for the non-technological requirements (Table 2).

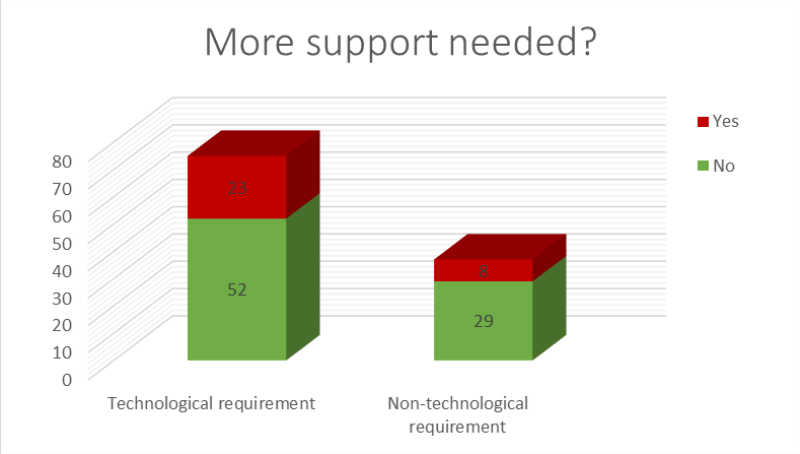


Figure 4: Requests for more support needed for technological and non-technological requirements over all 28 FIEs (flagship innovation experiments).

Table 2: Support requested from CC (competence centers) and DIH (digital innovation hubs) for each technological and non-technological requirement.

	Requesting CC support		Requesting DIH support	
	Yes	No	Yes	No
Technological requirements	12	63	9	66
Non-technological requirements	2	35	7	30

Again differences, though very small, among the regions can be observed with a range of 0% and 100% requested support (Fig. 5). There can be no clear differences inferred between regions about what is available and what is not based on this data alone. DIHs and CCs of a certain region are advised to look closely into the specific requirements that FIEs in their region are mentioning in order to tailor their services.

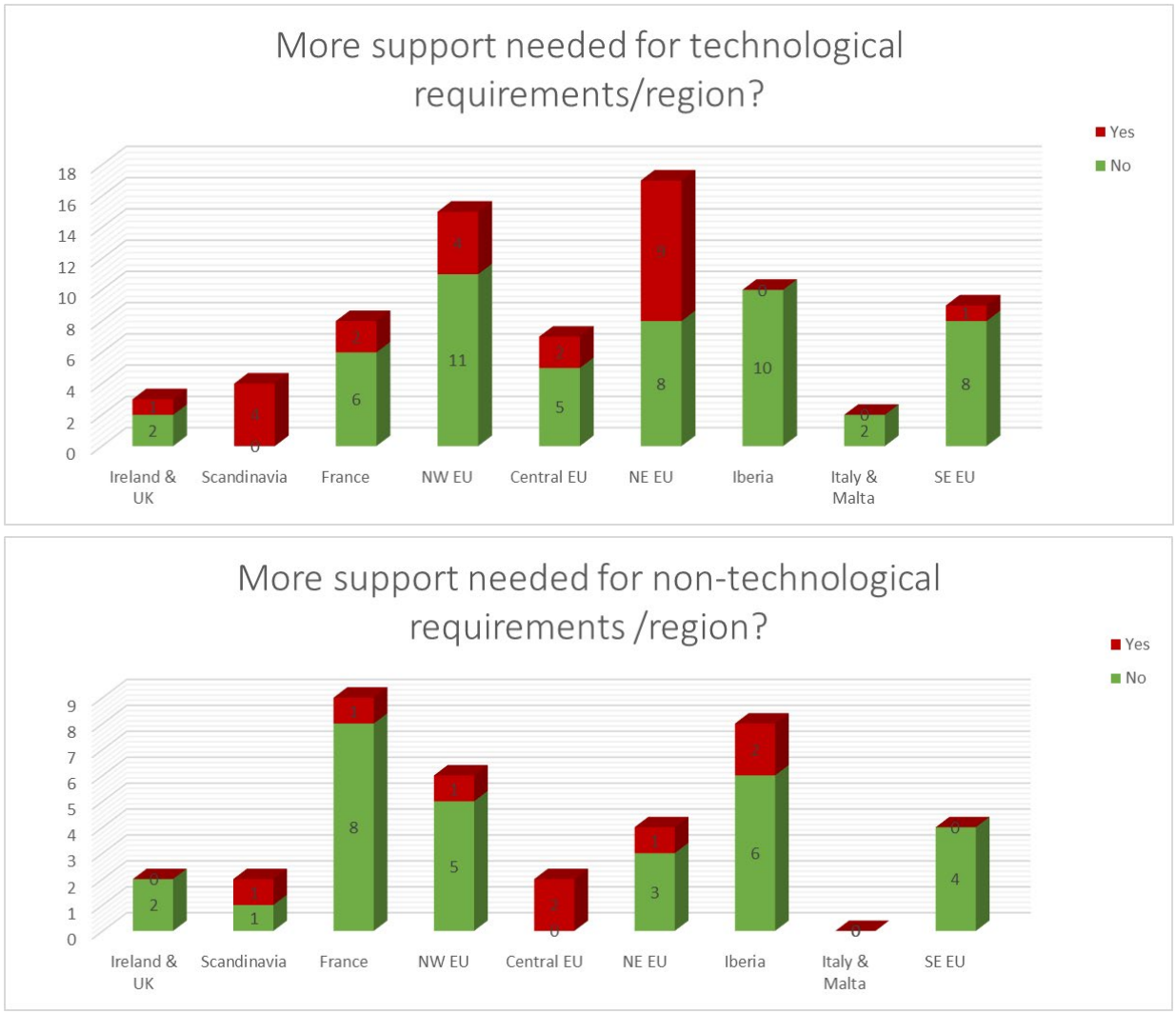


Figure 5: Requests for more support needed for technological (top) and non-technological requirements (bottom) for each regional cluster.

The reusability of both the technological and non-technological requirements is very high (100 out of 112) (Fig. 6) with only a few non-reusable technological requirements in Ireland & UK, France and North-East Europe and some non-reusable non-technological components in France, Central Europe and South-East Europe (Fig. 7). In total, 41 of these components are already available at the moment that this deliverable is written (M11, September 2019), 38 will become available during the SmartAgriHubs project and 21 will be available at the end of the project (M48, November 2022). For half of the technological requirements (52%) there is permission to add them in the online IoT catalogue (www.iot-catalogue.com) and thus make them available for a larger audience.

This reusability is estimated by the FIE partners themselves, off course whether the solution is really reusable as such, is to be validated when it is being used by a number of other systems and users. Very often this will require modifications, but in essence the result that partners are thinking about the possibilities of reusing the solutions and are willing to share it is already a good starting point.

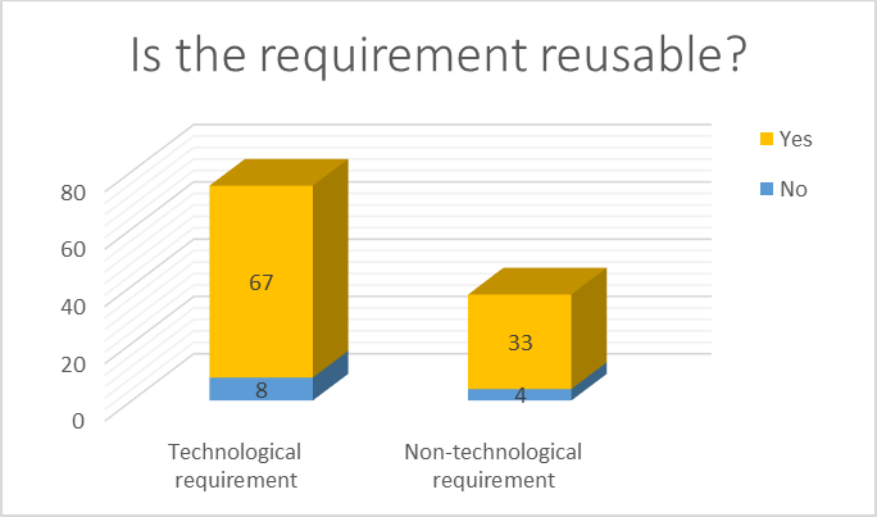
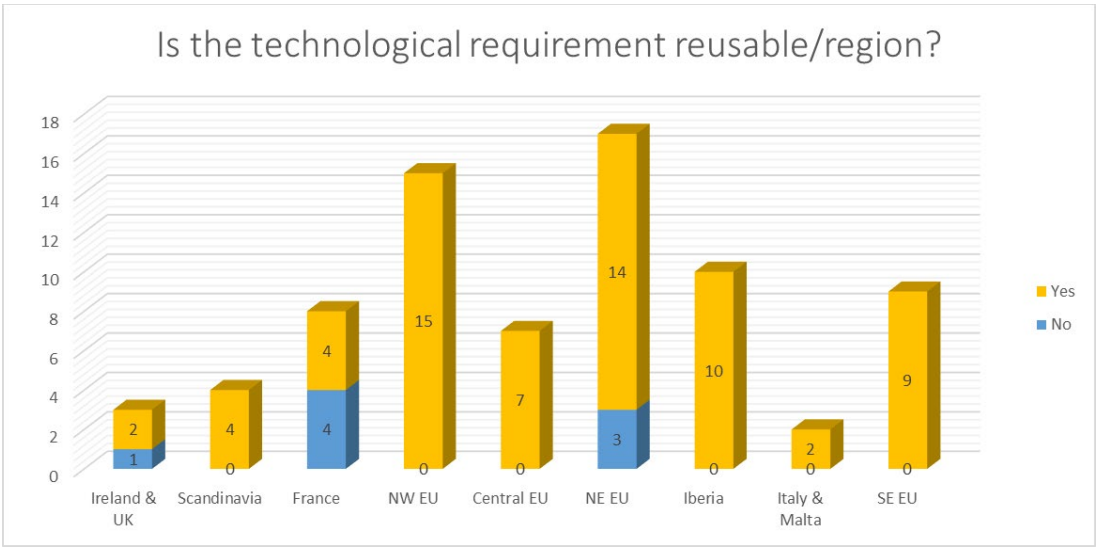


Figure 6: Number of reusable technological and non-technological requirements over all 28 FIEs (flagship innovation experiments).



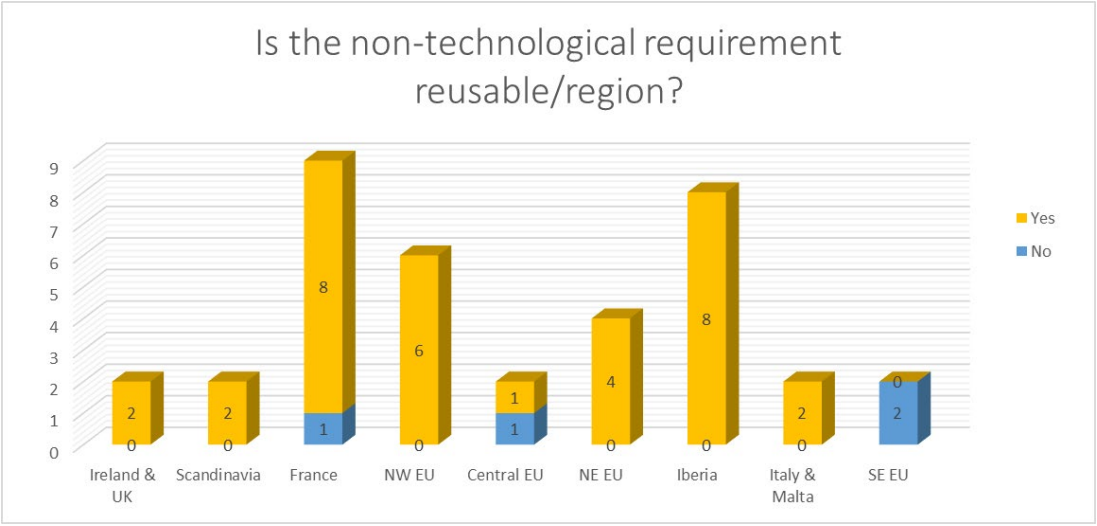


Figure 7: Number of reusable technological (top) and non-technological requirements (bottom) for every regional cluster.

The fact that there are so many reusable components identified is a great result, as all of these developments can thus be used outside the FIEs, either via open source access, paying services or exchange of knowledge and experiences. This is the heart of the SmartAgriHubs

project, which shows that this ecosystem can really progress the Digital Transformation of the European agri-food sector. Crucial is now to foster these innovations and bring them to the attention of the other FIEs, the large SAH ecosystem and beyond. For that reason, this deliverable alone is off course not sufficient. Actions need to be taken to bring the (re-usable) developments and at the same time the requirements still to be fulfilled in the spotlight and build bridges between people needing support for overcoming certain challenges and the people that already have experience or solutions at hand. This will be done through means like the Innovation Portal (WP 1), the IoT Catalogue, the DIH services (WP 4), the CC services (WP 5), the regional cluster meetings (WP 3) and other WP actions and can be further supported via the SAH open call (WP 2).

4. CONCLUSIONS

This deliverable aimed to identify and analyze the technological and non-technological requirements as well as the reusability of them in each FIE. To conclude, the following take home messages can be considered:

- The largest part of the identified requirements are technological (67%), as is to be expected in a project on digitalisation in agriculture. However, a lot of non-technological requirements are also mentioned and these are deemed without exception (very) important for the FIEs developments.
- Technological requirements have a higher fulfilment rate than the non-technological ones (55% versus 30%). Probably this is due to the fact that technological problems occur earlier in the development process of a product or service (like sensor selection and algorithm building) than many non-technological issues (like price settings and training). It is therefore expected that this percentage will shift during the project.
- Overall the FIEs have planned their tasks well and good progress can be derived from the high fulfillment rates observed. A lot of partnerships can also be identified from this deliverable. No doubt additional challenges will occur during the lifetime of the FIEs, that is why this deliverable will have a second iteration in M36 of the project.
- Not many differences can be observed between agricultural sectors, and the main reason for this is that the majority of requirements (63%) span or can be used in multiple sectors, even beyond agriculture (like sensors, data platforms, workflows, etc.). This is an important result, as it means that there is a large possible impact of the developments of the FIEs and the reusable parts within it.
- Of all requirements, 61% are supported by CCs and 43% by DIHs. DIH support is more focused on the non-technological requirements. By analyzing where and how this support is achieved, DIH and CC achievements can be inventoried, as well as give inspiration to less developed DIHs and CCs.
- For part of the 'not yet fulfilled' requirements, the necessary support is already present in the network of the FIEs (through CCs, DIHs, FIE partners or SMEs). For others there is additional support requested however, from DIHs and CCs. A thorough analysis of these requirements will allow DIHs and CCs to further mature their services.
- For a lot of requirements and related solutions, the FIEs indicated that they are reusable (89%). This is an excellent result for the project and the development of the agri-food sector and ecosystem in general, as it is also clear from the analysis that these technological and non-technological solutions are applicable for multiple sectors and regions.
- These results and reusable components can now be used to help populate the Innovation Portal (WP 1) and the IoT Catalogue, mature the DIH services (WP 4) and the CC services (WP 5), and foster collaboration inside the project though the regional cluster meetings (WP 3).
- For a next iteration of the deliverable, focus can be on further monitoring the technological and non-technological requirements, their solutions and their reusability. Synergies between FIEs can be further analyzed by specifically asking the FIEs for the synergies they have detected and the new collaborations they started. In these kinds of deliverables, receiving timely and harmonized reports is always a challenge and will be supported through early announcements of upcoming deliverables and thoroughly explaining the purpose in the RC meetings.

This deliverable allows for the identification of the technological and non-technological aspects that the FIEs are working on and for which they have received or are still requiring support. Besides that, the reusability of these aspects is identified, together with a 'release' date and the target audience. A detailed analysis of these reports will help DIHs and CCs to strengthen and mature their services, and will help current and future FIEs in identifying synergies and progressing faster through collaboration and usage of existing solutions. This strengthens on the one hand the SmartAgriHubs project and its goals and achievements, and on the other hand the European agri-food sector in progressing innovation and digitalization. This in turn allows for a sustainable food delivery, with economical (higher productivity, lower costs), ecological (climate impact, resource usage) and social (work circumstances, employment) benefits going hand in hand.