



**SMART  
AGRI  
HUBS**

# **D4.4. CAPACITY BUILDING PACKAGE OF MATERIALS FOR THE ESTABLISHMENT OF A HUB**

**WP 4**

31 January 2020



[smartagrihubs.eu](http://smartagrihubs.eu)

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## LIST OF ABBREVIATIONS

Abbreviation	Explanation
CC	Competence Centre
D	Deliverable
DIH	Digital Innovation Hub
FIE	Flagship Innovation Experiment
IPR	Intellectual Property Right
IE	Innovation Experiment
ISSM	Innovation Services Maturity Model
RC	Regional Cluster
RDI	Research, development and innovation
RTO	Research and Technology Organisation
SAH	SmartAgriHubs
SME	Small and Medium Enterprise
TRL	Technology Readiness Level
WP	Work Package

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## PROJECT SUMMARY

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

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

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

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

# EXECUTIVE SUMMARY

**For Digital Innovation Hubs to be thriving and self-sustaining entities, accelerating the digitalisation of the European agrifood sector, they need to be capable of delivering an adequate and valuable service portfolio. Workpackage 4 evolves around this capacity building process. This Deliverable 4.4 outlines the initial package of capacity building materials, with an emphasis on the first stages of the DIH lifecycle, i.e. it's establishment phase.**

The SmartAgriHubs Innovation Portal will be filled with capacity building material, guided first of all by the needs of DIHs regarding their required capacities in the "establishment" phase. We distinguish four main (sub)steps in setting up a DIH: Preparation and exploration; Strategy and concept development; Take-off and operationalising the ideas; and Initiation/Start-up. Furthermore, we distinguish four strategic themes that should be addressed and evolved overall: Organisation; Ecosystem; Services; and Financing. Other sources of capacity building directions for DIHs are the needs assessment conducted in 2019, the consequent webinars, and feedback from experts.

Following from this, a first selection of material has already become available on the portal. An overview of these materials, (dd January 2020), is presented in the "Results" section. This is a starting point; over the coming years and based on a dynamic exchange within the project and wider DIH community, our capacity building environment will grow and extend into a complete resources base for DIHs working on the digitalisation of the agrifood sector.

The project will offer a wide array of material, on the project's Innovation Portal, for DIHs to build their capabilities. To prevent DIHs from becoming lost and unsure where to begin due to a bombardment of materials, we propose a structured approach to the capability building process. Firstly, the Innovation Portal will make use of three main building blocks to present to material: the Training section, the Library and an improvement plan as part of the forthcoming DIH Observatory. Five supporting guiding principles for capacity building we propose are: 1. Easy access (e.g. material is digital and free of cost); 2. Goal setting (the DIH's capacity building priorities), 3. Pro-activity (e.g. DIHs are motivated to actively search for material and contribute), 4. Collaboration (e.g. peer-to-peer feedback) and 5. Engagement mechanisms (e.g. reward points are given for contributions).



**Learn the skills you need to succeed**

# INTRODUCTION

The core of Workpackage 4 is to empower Digital Innovation Hubs to become self-sustaining entities in their role as essential components of a digitised European agrifood sector. We aim to do this by supporting hubs to deliver relevant and valuable innovation services in a one-stop-shop concept to the sector. This deliverable is the first of two, outlining the first batch of capacity building materials, followed by a brief description of how we approach DIH capacity building in general.

This Deliverable 4.4 is targeted towards an initial capacity building package of materials for “establishing a hub”, i.e. for DIHs in the phase of launching and initial growth. Deliverable 4.5 (due M40) will deal largely with a capacity building package of materials for “operating a hub”, i.e. for DIHs progressing towards a mature and self-sustaining organisation. It is important to note, however, that a rigid divide will not be applied between these two parts of a DIH lifecycle, as in many cases there will be overlap, or certain aspects within a DIH differ on their lifecycle level, leaving the distinction for a large part theoretical. As a result, attention is given as well for more generic capacity building that may serve in several phases.

## BUILD-UP AND LINK TO OTHER DELIVERABLES

The following chapter first gives a stepwise outline of what it means to establish a DIH. In the consequent Results chapter, an overview of all materials that are provided until the due date of this Deliverable is given, with the establishment of a hub as a starting point. Lastly, we will share our ideas on how to develop the capacity building environment itself, with a few guiding principles for populating the Innovation Portal with (planned) materials in the coming period, as to ensure a structured approach towards creating a thriving capacity building environment and optimal usability for our target group of Digital Innovation Hubs.

Besides the obvious link to D4.5, this deliverable on capacity building extends on the deliverable 4.1 Needs Assessment (July 2019), which served as a basis for our initial materials package. Capacity building is also linked to increasing DIH maturity (Deliverable 4.2, August 2019), which is why, especially in the 2.0 version of deliverable 4.2 (August 2020) on the “go-live” of the SAH maturity assessment tool, we will make the connection between increasing DIH maturity and improving the related service offering through capacity building. Lastly, the DIH Observatory (D4.3, due April of 2020) is strongly linked to our suggested structured approach to DIH capacity building, i.e. a dynamic online capacity building environment, and thus will serve as input for the functionalities listing in D4.3, to be realised in agreement with Workpackage 1 (who are responsible for the Innovation Portal).

NB: Another important deliverable of Workpackage 4 will be the functional outline of the DIH Observatory (Deliverable 4.3) which is materialised in the Innovation Portal by WP1. Some of our building blocks and guiding principles will thus be described in a more functional way in D4.3.

# APPROACH

This chapter deals with the approach we used for initially populating the online capacity building environment with materials. The rationale was supported by these steps:

- Based on previous experience in projects,<sup>1</sup> a first outline of the main steps to establish a hub has been developed to provide a directed overview of materials needed specifically for this purpose.
- Needs related to establishing DIHs were identified based on the needs assessment report developed in WP4; those collected via conversations (including during webinars); and the expert opinion of a few consortium partners.
- An overview was made of generic capacity building needs that have already been identified in the project (i.e. from the needs assessment, webinars, and feedback).
- A web search of available capacity building materials was performed. Ten projects with training material were searched for publicly available training materials (note that deliverables were not considered training materials, as the aim was to find brief and instructional materials that the DIHs could use). Materials that match with the identified needs were mapped and collected.
- Lastly, based on brainstorming activities the WP4 team - whose members have ample experience in supporting DIHs in other domains - mapped various user-friendly tools to engage the audience and encourage DIHs to take an active role in their own capacity building as well as a set of guiding principles to for the capacity building environment (see the section on the Capacity Building Environment).

All the materials themselves (dd January 2020) are mentioned in the Results chapter.

## CAPACITY BUILDING FOR ESTABLISHING A HUB

Based on previous experience in the European XS2 I4MS project,<sup>2</sup> TNO trainings on setting up innovation centres<sup>3</sup>; and insights from the H2020 DIHNET project,<sup>4</sup> several steps can be identified for creating a solid foundation in the DIH establishment phase. This instructional section is meant to provide a concise outline of the elements and steps that initiatives should consider when establishing a hub and builds on these different sources. The steps and

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<sup>1</sup> The XS2I4MS mentoring programme provided support for 29 consortia to conduct feasibility studies to set up DIHs. The steps also build on research on financing the set-up and continuation of Large-scale RDI initiatives from EU-Great! (see M de Heide and M Butter (2016), D5.3 Report assessment match/mismatch and issues with combined funding. EU-GREAT project) Further, insights from trainings in different regions to set up DIHs have been used.

<sup>2</sup> See the I4MS Mentoring Program website for steps to build a business plan (listing the main steps of establishing a hub); XS2I4MS has developed this material as part of the training of 29 consortia to support them in conducting a feasibility study and establishing a hub.

<sup>3</sup> As part of a TNO training programme, Maurits Butter (TNO and project leader of DIHNET) has developed a training on establishing an innovation center. His experience will be shared via a webinar on 31 January 2020.

<sup>4</sup> See discussions in the working group on business models as well as the various experiences shown by interviews with DIHs.

building blocks for establishing of a DIH will also be included as part of the starter’s kit (see the overview of training materials in the “Results” chapter).

## Evolutionary stages throughout the lifecycle of a hub

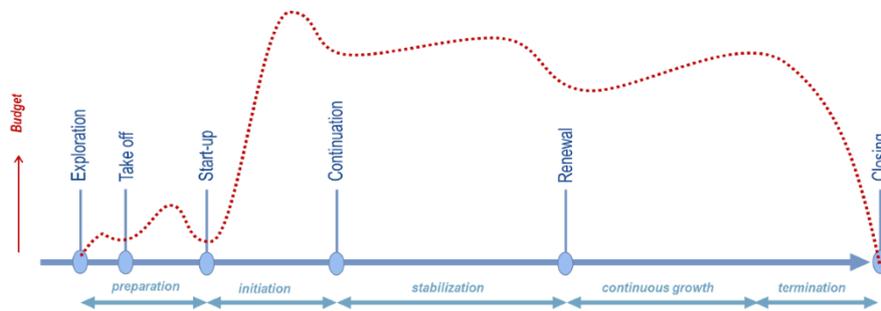


Figure 1: Evolutionary stages of innovation initiatives (source: EU-GREAT! and XS2I4MS)

DIHs, as companies, usually follow evolutionary stages. In general, organisations, including hubs, follow 5 main stages of development (see Figure 1) 1) preparation, 2) initiation, 3) stabilisation (of operations and the organisation of the initiative), 4) continuous growth and 5) renewal of objectives or termination once the objective and mission of the entity has been fulfilled. This deliverable focuses on the first two phases. Of course this approach is not the one truth; a number of other lifecycle organisational models and stages can be found in literature. Just as an illustration, Lester, Parnell and Carraher<sup>5</sup>, for instance propose and test a five-stage model – from existence, to survival, success, renewal, and decline. Looking at the organisational capabilities on the other hand, Helatt and Peteraf<sup>6</sup> have developed the capability lifecycle which provides an overview of possible paths for capability development and addresses the founding, development and maturity stage. According to the authors, after the maturity stage, based on variety of factors, the capability stage can branch out to at *least 6 additional* stages (such as renewal or retirement/death). What aligns all approaches, is the fact that they ascertain that all organisations pass through a number of stages of development that affect not only the size, but also the maturity and activities and strategy of the organisations.

Throughout its lifecycle, a DIH can be expected to continuously develop and evolve, not only in terms attracting new (types of) ‘customers’ and expanding the service portfolio, but also in terms of the type of services offered, the mix of funding sources used to sustain the hub, the organisational and governance terms, and growth of the ecosystem and community of the hub. It is therefore crucial that the DIH development is seen as a continuous evolution and that some main pillars are continuously developed in order to ensure that the hub remains relevant and continues to add value to its customers and ecosystem. Its Purpose,

<sup>5</sup> D. L Lester; J. A Parnell; S. Carraher (2003), “Organizational Life Cycle: A Five-Stage Empirical Scale”, *International Journal of Organizational Analysis*; 2003; 11, 4; ABI/INFORM Global pg. 339

<sup>6</sup> C.E. Helatt and M. A. Peteraf (2003), “The Dynamic Resource-Based View: Capability Lifecycles”, *Strat. Mgmt. J.*, 24: 997-1010 (2003)

Mission and Vision should be periodically reviewed during this dynamic process, as should its strategic goals.

We distinguish four main (sub)steps in setting up a DIH: Preparation and exploration; Strategy and concept development; Take-off and operationalising the ideas; and Initiation/Start-up. It should however be noted, that different number and name of the stages can be found. The HORSE project for instance has developed 5 steps to set up CC (CC initiation, CC charter development, start-up of a new networked CC, CC business plan development, and official start of the CC).<sup>7</sup> XS2I4MS has developed 6 steps to develop a Business Plan for DIHs which could also be seen as development stages. Therefore the steps outlined below should be seen only as guiding and providing an overview of the topics that an initiative should consider in its establishment.

### Steps to set up a DIH

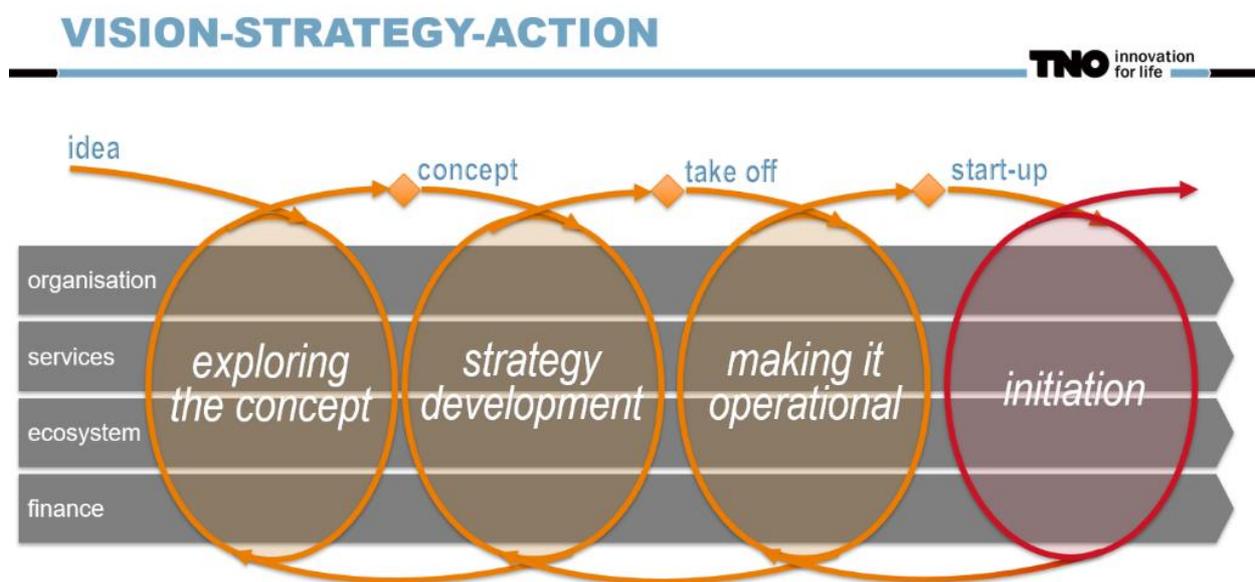


Figure 2: Steps in setting up DIHs (source: Maurits Butter 2019)

The preparation for setting up a DIH is the first of the evolutionary stages of a DIH (see figure above). This preparation stage can be divided into four concrete steps, underlined by specific tasks, and requiring related decisions. It is important to note that a continuous feedback and revisiting of the steps might be needed to adjust the ideas and plans to new insights.

### Exploration and visioning

The establishment of a DIH starts with an idea from one or more partners. Ideally, this idea is explored and further developed into a (first) draft of a vision and mission of the DIH, clarifying its purpose, added value and a (general) market segmentation. A well-developed mission and vision can support the DIH both in developing its strategy, as well as in

<sup>7</sup> B. Semolic (2018), "D7.3 Guidebook for the constitution of new Competence Centres", Horse Project

(later on) sending a strong and consistent message to the broader public of how the DIH would address the ecosystem needs (farmers and other relevant stakeholder) as well as becoming known in the region with their brand. Also, this basic idea should be supplemented with an (at least preliminary) ecosystem analysis, helping the leading partner to map potential consortium partners to support the establishment of the DIH, to identify needs and gaps in the ecosystem, as well as establish links for future collaboration in the ecosystem. The ecosystem analysis at this stage could also help identify the strengths and weaknesses of the regional ecosystem, and possible forthcoming services for the most crucial customer segments of the DIH. At this stage, commitment from main partners to continue with the concept is needed, and management buy-in of the individual partners is critical for committing resources (often in the form of time of employees and connecting existing projects to the DIH idea) to the DIH development. Last, but not least, in this first stage of ideation and exploring the concept, the DIH partners need to explore possible options for basic funding. Funding sources vary - public and in-kind, or through support from farmers' cooperatives and their associations, funding from the partners in the hub (such as CCs) private companies, foundations, and not-only-for-profits, amongst others. This is fundamental, not only because the DIH would need capital before initiating services, but also because a match with (regional) policies or local needs, and the strategies and plans of the partners needs to be established.

Related training material on the SAH Innovation Portal: [Ecosystem analysis \(XS2I4MS\)](#), [Ecosystem landscaping \(Smart Factories in new EU Member States\)](#), [Skills for DIHs \(SAH, G.Gijsbers\)](#), [Setting up DIHs \(M.Butter for SAH \(upcoming 31 January\)\)](#).

## **Strategy and concept development**

Following the vision and ideas formulated in step 1, the basic DIH concept needs to be further developed and translated into more specific services and related business models, i.e. how the DIH will create and capture value with services. For this step, it is also important that the DIH develops its RDI strategy (including first ideas on infrastructure needed and already available). This strategy should be aligned with the vision of the hub, but also with the needs of the farmers, the market and the interests and assets of the consortium. In the end, the RDI strategy should be clearly reflected in the DIH services portfolio and operating business model. Connected to the business model is also the topic of access to funding; the DIH needs to assess whether the market segments are willing (interested in) and able (have capacity to) pay for the services offered, and possible strategies to cover the potential gap between income and expenses have to be explored (considering public and private funding sources). But further, the DIH also needs to determine a strategy on how to access the market (channels of communication, scanning for new DIH partners, and connection to key stakeholders in the community). Last, but not least, in this concepting stage, the DIH should set up the organisational and governance mechanisms within the consortium to establish a dedicated team and champion/leader to assume the leading role. This will ensure that the responsibilities of the consortium partners are clarified and the momentum to further develop the DIH is kept.

Related training material on the SAH Innovation Portal: [Skills for DIHs \(SAH, G.Gijsbers\)](#), [Setting up DIHs \(M.Butter for SAH \(upcoming 31 January\)\)](#), [DIH Strategy Development \(upcoming Febr./March\)](#), [Business Models \(XS2I4MS\)](#), [Webinar on Platform service business models in agriculture](#); [Access to finance \(XS2I4MS\)](#).

## Take-off and operationalising the ideas

When the strategic plans and concepts have been explored and agreed upon, the DIH can start operationalising the plans. This includes making the individual services concrete, including clarification on the access to infrastructure and a plan on how to roll out the (combination of) services, as well as obtaining (or applying for) funding, in general or for specific services. Communication with the community needs to be initiated, promoting the DIH brand and added value. Next to this, the consortium capacities and expertise need to be showcased and developed. This can be seen as a take-off phase in which the DIH gathers speed, experience and tests its services and capacities and their added value. It also includes arranging practicalities regarding the operation of the hub, including materialising the business model(s) and payment structures, and formal governance structure or agreement. At this stage, a complete business plan, including financing plan, will usually be finalised, ready to be shared with investors and the community.

Related training material on the SAH Innovation Portal: [Setting up DIHs \(M.Butter for SAH \(upcoming 31 January\)\)](#), [Building a Business Plan \(XS2I4MS\)](#), [Access to finance \(XS2I4MS\)](#); [IoF2020 Golden Rules on a successful promotion on social media](#), [User Centric services \(upcoming\)](#) etc.

## Initiation/Start-up

The DIH has fully started up its operational services and the consortium is actively engaged. This stage signals the end of the preparation period for the DIH, and the start of a stable operational day-to-day practice on a path towards growth. Yet, flexibility, adjustability and continuous feedback loops need to be established to continuously revise the previous three steps based on the market requirements. For instance, the DIH might start operations with offering only a limited mix of services, which would grow and develop based on the needs of ecosystem.

## Strategic foundation for structuring the DIH establishment

From the above steps, some recurring themes arise that a DIH needs to consider throughout all development steps. Each of these will evolve in terms of development and content and therefore needs to be addressed throughout the four steps of establishing a DIH and should be revisited based on a continuous feedback loop in the DIH development. The four themes are Organisation; Ecosystem; Services; and Financing.

### Organisation

The team that manages the DIH plays a central role in DIH development and establishment. DIHs often address a multitude of topics (technology, business, ecosystem, skills development), complex issues and customer segments. In order to be able to cover this diversity of topics and customers, DIHs often function as a one-stop-shop, **multi-actor entities**. In the first steps, the idea of a DIH is often initiated by a few interested partners who then need to gain support from their own organisations as well as attract and establish links with additional consortium partners to set up and operate the hub. Therefore, in the exploration stage, questions related to organisational structures usually deal with who should (and should not) be included in the DIH consortium, what their respective interests are and what are they

willing to do. In the strategy and operationalising stages, new partners could be added to the initial consortium, making agreements on responsibilities, formation of a core team of dedicated participants, and the governance and management structure. It is also important that the organisation of the DIH ensures sufficient capacity within the hub as well as access to the required expertise, technical and otherwise. The CCs often form a core within the DIH and provide important technical expertise and services. However, governance and funding issues and conflicts (of competing competences, contracts with end users, etc) should be anticipated and dealt with in the organisational stage. With the progress towards a start-up, the legal form of the DIH should also be considered. In this regard, different options exist – from a consortium agreement to a fully established separate entity. The choice of the legal structure would also depend on the national/regional regulations, including labour and tax laws, etc.

## **Ecosystem**

Ecosystem analysis and management refers to the need to map, connect and develop the ecosystem, the community, and the market in which the DIH operates. This element is essential throughout the lifecycle of the DIH, especially as one of the main and often functions (services) of the DIH deals with ecosystem building and learning. In the first step, the ecosystem needs to be mapped and analysed in order to enable the identification of consortium partners (or partnership) for establishing the DIH; understanding the needs as well as the strengths of the local ecosystem; and later on leveraging on their knowledge in the provision of DIH services. Also, different market segments of the DIH need to be explored and consulted to map funding/investment opportunities. Next, links are scanned within the community, with the goal to identify key stakeholders and potential partners with which to develop structured relationships. Connected to the ecosystem analysis, is stakeholder management. A DIH is a multi-actor entity which often aims to orchestrate the regional ecosystem, with Competence Centers at their core, and offer services to various customer types (SMEs, start-ups, Mid-Caps, farmers, tech providers, public organisations). This myriad of stakeholders requires the DIH to carefully considerate and manage expectations, responsibilities and activities, with the ultimate goal to make the ecosystem more vibrant and competitive. At all these levels, the DIH will need the skills to manage these different stakeholder groups, interests, and at times competing interests. Competence Centers may be public or private and have different pricing models, etc.

## **Services**

Services<sup>8</sup> are a crucial part in the establishment of a DIH as they outline how a DIH would create value for the ecosystem (services offered) and capture this value (make business, ensure sustainability). DIHs often employ a portfolio of business models which allow them to develop a mix of services, address various clients (market segments), and involve different DIH partners and market channels. However, their service portfolio will evolve over time. At the start of operations, it is likely that a smaller sample of services will be offered in order to test the response of the market. One can expect that the first services would be

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<sup>8</sup> *The services (i.e. Innovation Services) are explained in detail in Deliverable 4.2 DIH Capability Maturity Model*

connected to the capacities of the establishing partners. As Competence Centers often form the core of a DIH, it is likely that a DIH would start with offering technology related services and rolling out services connected to the business and ecosystem support.

## Financing

Financing relates to how a DIH funds its operations. Financing DIHs usually requires a combination of funding sources (both private and public).<sup>9</sup> Part of the financing of a DIH could be generated via its revenues from offered services. Yet, as not all customers are capable of paying for all services, and as DIHs often perform a societal function, a mix of private and public funding to fill the gap between expenses and revenues may be required. The financing needs and available funding sources for the DIH often depend on the DIHs evolutionary stage. In the ideation stage, the contributions are thus often based on in-kind efforts by the consortium partners, e.g. CCs. The established DIH strategy (business plan and R&D), guides the DIH in finding potential other financial sources. Public funding (from EU or regional authorities) can for instance serve to conduct feasibility studies and develop business plans, while other sources could for instance be needed to sustain the R&D provision (e.g. provided by the CCs). Some partners could also provide additional funding or in-kind contributions. Based on the business plan developed, sufficient private and/or public funding planning should be provided in order to showcase the sustainability and viability of the hub to operate in the short to mid-term. As the hub, in most cases, would not yet be operational in the preparation stage and not yet well known, income from services is limited at the start of operations. At the same time, expenses for technology infrastructure and operational expenses are comparatively high. At the start of the DIH therefore it might need to find multiple sources of funding while taking into account that single investors find it difficult to invest all needed capital or may find the economic risk too high. Contributions from the partners of the hub should also not be underestimated, especially if there are already initiatives that just require transitioning to a DIH function. In general, as the DIH proves its added value and attracts more customers, the income and private funding will usually increase, while the need for public funding decreases. Yet, as a DIH often addresses a market failure and performs a societal mission, it could be expected that at least some basic public funding would remain to be needed to sustain its operations.

## GENERIC MATERIAL

As not all the current SAH DIHs are in the establishment phase, and as there are also many materials available that cannot be directly linked to evolutionary stages, we are in parallel also populating the learning environment with other, more generic, training materials.

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<sup>9</sup> See for example, M de Heide and M Butter (2016), *D5.3 Report assessment match/mismatch and issues with combined funding. EU-GREAT project*, M. Butter et al (2015), *"Assessing support of pilot production in multi-KETs activities D7 Final report of the multi-KETs Pilot lines project, including the tentative policy roadmap"*, mKETs project; M. de Heide (2016), *"The financing of fieldlabs in the Netherlands"*, TNO 2016 R11435

## Combining existing materials with new trainings

A number of projects have already developed an extensive list of trainings on topics ranging from how to establish and develop a hub, to using particular technologies in the agriculture sector. The SAH project will, wherever relevant and possible, leverage and refer to these trainings, as well as the tools developed for CCs under WP5<sup>10</sup> which may be relevant for DIHs, especially in relation to demonstrations and networking tools. WP4 will collaborate with WP5 to identify digital technologies training materials that have been uploaded on the Agricultural Technologies Navigator in the Innovation Portal. These can then be accessed and used by the DIHs, CCs, and other interested users who may or may not be members of the DIHs. When topics are already sufficiently addressed by previous trainings, SAH will aim to provide examples of existing hubs and their approach to a topic (eg on ecosystem analysis, learning, and community building). Best practice sharing, without creating the wheel again, in other words.

Next to this, SAH will also develop its own trainings, on topics that are not yet covered. Examples that are already implemented are a webinar on skills for DIHs (December 2019).

Both sources of information will be used simultaneously. The end result will be a dynamic and increasingly complete set of existing and new trainings that can support both starting-up hubs and existing hubs in their development.

## Overview of main projects providing capacity building trainings for DIHs

As mentioned above, in order to improve efficiency, SAH will combine new trainings with already existing capacity building materials developed by previous projects and from other reputable sources. With this objective in mind, the WP4 team has studied the materials of several relevant projects.

Only some of the materials found have been uploaded to the SAH portal. The selection was based on the identified needs in the SAH community and whether, following our guiding principles, an open access webinar or template is available on the topics. Some topics are addressed by multiple projects (such as ecosystem assessment and stakeholder mapping). In this case, the decision on which training to include in the SAH portal has been based on the judgement of the WP4 team and relevance of the training, the connection to DIHs, and agriculture.

It should be noted that it is almost impossible to make a full inventory of trainings available. I4MS alone has, for instance, identified close to 90 trainings<sup>11</sup> and WP5 has identified, in a review of prior projects for the purpose of CC capacity building, 11 projects<sup>12</sup> with relevance for DIHs and CC (some of which are referred to in this deliverable). For that reason, any interested stakeholder can upload new training materials at the SAH Portal themselves.

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<sup>10</sup> WP5 will develop 5 tools for CCs: *Evaluation Tools; Quick Demo Decision Tool (QDDT); Demonstration Guideline; 'Prepare for Success!' Tool; and a Repository of 'How to?' videos. See Deliverable 5.5 Capacity building package of materials for the establishment of a Hub*

<sup>11</sup> <https://trainings.i4ms.eu/>

<sup>12</sup> See *Smart Agri-Hubs Deliverable 5.5 "Development of materials for trainings and interregional demonstrations of CCs"*

The capacity building materials published or planned by WP4 are described in the following sections.

## PREVIOUSLY IDENTIFIED CAPACITY BUILDING NEEDS

The content related to the capacity building should reflect the overall needs of the ecosystem. Therefore, based on the previous needs assessment, the already held webinars and the experience of the consortium, a list with needs (followed by list of trainings) has been developed. The overview of the needs for capacity building material can be found in Table 1 below. Please note that this list contains needs explicitly mentioned by SAH DIHs and RCs. Following along the lines of D4.4 and D4.5, we distinguish between the evolutionary stage to which the need is related, wherever relevant.

Identified Needs Based on D4.1 Needs Assessment (T4.1)	Need (to establish and/or operate a DIH)
DIHs need more connections with industry (large business and start-ups)	to operate a DIH
Tools used and required to deliver innovation services by DIHs	to establish and operate a DIH
DIHs should be leading awareness actions on using cloud services.	to operate a DIH
Based on SWOT Analysis: It is noticeable that DIHs mention funding as their main need to fulfil their ambitions, followed by support, network, knowledge and digital technologies	to establish a DIH
Improve awareness and the provision of services and support to smaller farms and less innovative sectors	to operate a DIH
Although community building is considered important for most DIHs the ecosystem analysis and lack of connections resulting from the scarcity of surveys, shows that improvement is needed in this respect	to establish and operate a DIH
Provision of Innovation Services – and how to plan and deliver them	to operate a DIH
Identified Need Based on Webinars (T4.1.)	
Change of Business model: It's not a priority for farmers	to operate the DIH
Ecosystem mapping: -It's key to identify all actors in the communities	to establish and operate the DIH
Foster connections DIHs – Farmers/Farming ecosystem.	to establish and operate the DIH
Use Of Data	to operate the DIH
The chaos of all different initiatives, programs, pilots, etc. compile also the new projects	to operate the DIH
Advise on how to involve farmers (initiatives/pilot)	to establish and operate the DIH
Identified Need Based on consortium experience	
Outline the main elements and steps to set up a DIH	to establish a DIH
Explain the difference between the <b>roles</b> played by a CC and DIH	to establish a DIH
Identify the added value for DIHs to participate in SAH	to establish and operate the DIH

Table 1: Identified Need Based on D4.1 Needs Assessment (T4.1)

## RESULTS

The WP4 team has started the planning of new materials and mapping of possible topics for webinars, interviews, etc. This has been complimented with already identified and mapped existing training material. An overview of the identified topics, and planning of the activities and uploads can be found in the tables below. This overview is actually a snapshot of a live document that is continuously updated by the WP4 team as new needs in the community are identified, e.g, through workshops with DIHs<sup>13</sup>. The planning represents a blend of new and already existing materials, as well as various modes of delivery.

The mapped and planned materials will support new DIHs in setting up their organisation as well as already operating DIHs in optimising their operations and services. Some of the trainings identified are of importance in both of these stages. The tables in the following sections provide an overview of which training is considered useful for which stage.

### OVERVIEW OF PROJECTS AS SOURCES FOR CAPACITY BUILDING MATERIALS

An overview of projects with existing materials and trainings explored for SAH DIH capacity building include:<sup>14</sup>

- I4MS Mentoring Programme (part of the XS2I4MS project), providing webinars on 6 key topics, including business models and plans, brokerage, financing, use cases and ecosystem assessment
- Smart Factories in New Member States: providing webinars, templates and manuals to support the development of DIHs and DIH networks
- 4D4F project which aimed to develop a network around dairy farmers and technology providers and
- IoF 2020, providing educational material and webinars on topics related to DIHs and Internet of farm and food
- DIVA project which supports industrial digi-tech value chains with applications to the agro-food, forestry and environment sectors and provides webinars (not recorded until this moment) on specific technologies and their application in the agro-food sector
- The AgriSpin project which has developed 'inspirational booklet' which provides examples of good working practices as well as a "Training Toolkit on Innovation"

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<sup>13</sup> In February 2020 a workshop on capacity building for strategy development is planned with a Dutch DIH, and in March 2020 a workshop will be held with several DIHs at the annual event in Bucharest.

<sup>14</sup> Note that this is not an exhaustive list of projects providing training. The identified projects with available trainings is based on web search and the experience of the WP4 partners on the topic of trainings. Based on the needs assessment, not all projects have been highlighted and from those shared in the SAH portal, not all trainings have been referenced. Only the most relevant information has been published so far.

which provides different tools and training support for advisors and other stakeholders supporting innovators.

- SmartAkis project has examples of 6 Innovation Cases/stories, as well as a platform which includes a technology database, and an assessment tool that could be used to determine valuable farming technologies for particular needs.
- Skills for Future Farmers which provides an online platform for training of farmers in 6 languages (incl. English).
- EIT Food which aims to develop a network supporting a sustainable and trusted food systems and providing various courses on education in the food sector.
- DIHNET which provides information on topics related to specialisation and business models but with a focus on developing a network of networks (meta-level approach).

## EXISTING MATERIALS FOR THE ESTABLISHMENT OF A DIH (SNAPSHOT AS OF JANUARY 2020)

Service/ Topic	Name material	Presentation	Date	Capacities to Establish/Operate a DIH
Community building	XS2I4MS training on Showcasing use cases and how to develop them	Presentation	Existing material	Both
Ecosystem learning	Smart factories project Ecosystem landscaping presentations	Presentation	Existing material	Both
	XS2I4MS ecosystem analysis	Webinar recording	Existing material	Establish DIH
	IoF2020 Golden Rules on a successful promotion on social media	Presentation	Existing material	Both
Specific technologies	Webinar DIVA : 'Robotics for Smart Agriculture and Forestry' (21/11/2019)	Webinar	Existing material	Both
	4D4F webinar - "Tomorrows precision livestock farming today"	Recorded webinar	Existing material	Both
	Smart Farming Platform (technology database and assessment tool)	Online material	Existing material	Both
Incubator/accelerator support	XS2 I4MS webinar on 'Business Models' for hubs	Recorded webinar	Existing material	Establish DIH
	XS2 I4MS webinar on 'Building a Business Plan' for hubs	Recorded webinar	Existing material	Establish DIH

	Webinar on Platform service business models in agriculture	Recorded webinar	Existing material	Both
<b>Access to finance</b>	XS2 I4MS webinar on 'Access to finance' for hubs	Recorded webinar	Existing material	Establish hub
	IoF 2020 Webinar on Price setting for IoT solutions	Recorded webinar	Existing material	Both
	Skills for Future Farmers - online platform for training programs	Online training	Existing material	Both
<b>Horizontal topics</b>	Webinar "From Regional Nodes to Digital Innovation Hubs"	Webinar	21-Nov	Establish hub

Table 2 Existing trainings for the establishment of a DIH (snapshot as of January 2020)

## FUTURE MATERIALS FOR THE ESTABLISHMENT OF A DIH (SNAPSHOT AS OF JANUARY 2020)

Service / Topic	Name material	Presentation	Date	Capacities to Establish/Operate DIHs
<b>Strategy development</b>	DIH Strategy development	Webinar	Feb/Mar	Establish hub
<b>Testing and valid</b>	Design Thinking, Co-creation, Open Innovation		Feb/Mar	Both
<b>Offering housing</b>	Example of the horticulture hub in NI on providing shared space and connection to education (interview)	Peer learning	Feb	Both
<b>Skills</b>	SAH webinar "Skills for DIHs"	Webinar	17/12/2019	Both
	AGRISPIN Training Toolkit on Innovation	Short instructive document	Feb	Both
<b>Data topics</b>	Use of data	Webinar		Both
<b>Horizontal topics</b>	Q&A DIH Best practices – interactive webinar (tbd)	Webinar	Feb	Both
	Starters kit	Short instructive document	Jan/Feb	Establish hub

	Training to improve General DIH maturity	Webinar	Mar/Apr (after the maturity model is published)	Both
	Setting up a DIH	Webinar	31-Jan (tentative)	Establish hub
	DIH Governance structure (legal personality and structure)	Webinar	12-Feb (tentative)	Establish hub

Table 3 Future trainings for the establishment of a DIH (snapshot as of January 2020)

## EXISTING MATERIALS FOR OPERATING A DIH (SNAPSHOT AS OF JANUARY 2020)

Service / Topic	Name material	Presentation	Date	Capacities to Establishing/Operate DIHs
<b>Community building</b>	XS2I4MS training on Brokerage	Recorded webinar	Existing material	Operate hub
	IoF2020 Use-case progress classification	Short instructive document	Existing material	Operate hub
	IoF2020 User Acceptance Questionnaire	Short instructive document	Existing material	Operate hub
	IoF2020 KPI Catalogue	Short instructive document	Existing material	Operate hub
	IoF2020 Webinar on Investment Deals & Pitching	Recorded webinar	Existing Material	Operate hub
<b>Horizontal topics</b>	IoF2020 Webinar on Consumer Behaviour	Recorded webinar	Existing material	Operate hub
	IoF2020 Webinar on European Test Farm Network	Recorded webinar	Existing material	Operate hub

Table 4 Existing trainings for operating a DIH (snapshot as of January 2020)

## FUTURE MATERIALS FOR OPERATING A DIH (SNAPSHOT AS OF JANUARY 2020)

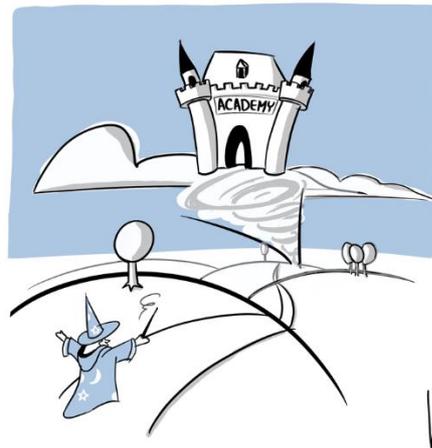
Service / Topic	Name material	Presentation	Date	Capacities to Establish/Operate DIHs
<b>Community building</b>	'Farmer Centric Innovation' webinar	Webinar	February	Operate hub
	Peer assessment among DIHs and their benefits			Operate hub

*Table 5 Future trainings for operating a DIH (snapshot as of January 2020)*

# THE CAPACITY BUILDING ENVIRONMENT

## Capacity building environment building blocks

The online environment on the Innovation Portal currently consists of a Training section and a Library section. A third important element will be added to that, envisioned to be part of the DIH Observatory (Deliverable 4.3): a specific space for capacity building on DIH-level. Here all three concepts will be explained in further depth.



## Training section

The training section is a vibrant public space (open to all registered portal users) where a broad selection of materials (planned webinars, recorded webinars, e-learnings, etc) is constantly on offer and updated. These can be new, or recycled from other projects and initiatives. sources.

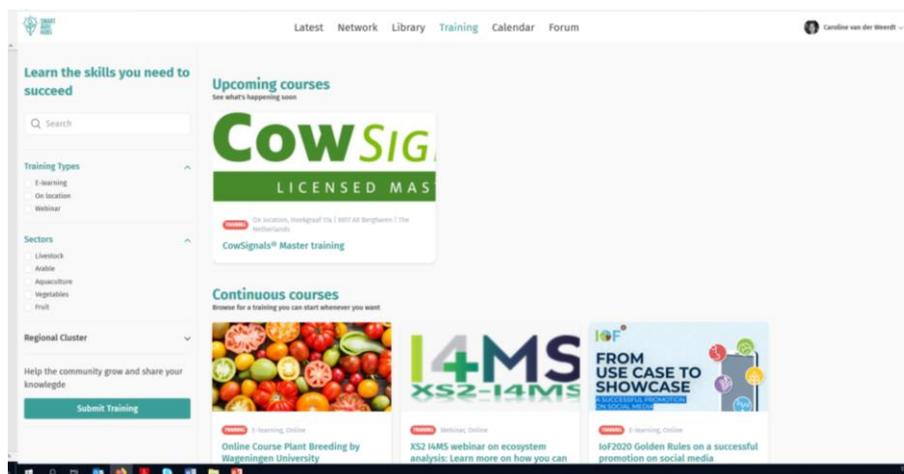


Figure 3 Screenshot of the Innovation Portal Training section (15-1-2020)

## Library section

This section is considered to be a more static section, where for instance larger books and reference works are posted. The specifications for what is meant for the Library and what is meant for the Training section will be explained on the respective pages so that it is clear for everyone working with these environments. All items will in any case be easily found through a comprehensive search mechanism based on tags and keywords. Tags and keywords for digital technical solutions will also be coordinated with WP5 who have developed the Agricultural Technology Navigator, as well as standardised keyword search categories.

## DIH-level capacity building in the Observatory

A more personalised capacity building space makes it possible for DIHs to manage their own learning program regarding the SAH material that will be on offer. The space will be accessible on hub level and, on individual level, those specifically assigned as related to the DIH in the registration process. Functionally speaking, this environment will become part of the Observatory that can be accessed by hubs themselves through their own profile. This environment ideally encompasses these items:

- An overview of trainings that the DIH plans to conduct and those that the DIH already did. For instance, a “drag-and-drop” function from the Calendar or Trainings section to the personal learning space makes a personal selection possible.
- In order to guide the capacity building process, but also for WP4 to keep track of the relevance of the DIH-level trainings overview, a DIH is also motivated to actively state intended improvements in this personal environment (i.e. improvement plan).
- The main results of the maturity assessment are displayed in this environment.
  - A visual may be shown of (potential) DIHs that match on the basis of learning goals and/or maturity assessment results. NB: If learning goals cannot be matched on a structural level (i.e. over multiple DIHs) this is a clear indication for a structural learning need. This forms a cue for the SmartAgriHubs Community to develop corresponding materials.
  - Please note (in relation to maturity assessment): processing the learning materials associated with a specific maturity level, is not sufficient to promote a level in maturity.

Obviously, this is all not straightforwardly realised, as it requires sophisticated measures to track online behaviour for instance. This is a topic that will be covered in the design and definition of the DIH Observatory, in close cooperation with WP 1.

## Guiding principles

Attracting DIHs to the Innovation Portal is crucial, which is why an increasing amount of capacity building materials is becoming available there. It is vital however to support DIHs in their learning process with a structured approach to capacity building, rather than simply bombarding the portal with materials. This structure will take shape with the guiding principles described in this section. These serve as initial considerations as the capacity building process has only just started. Iteratively, in close cooperation with the DIHs and RCs on the

one hand, and related WPs (WP1 and WP5) on the other, the capacity building process will be optimised in the coming years.

We propose five guiding principles for creating an optimal SAH online capacity building environment for DIHs: 1. Easy access, 2. Plan improvements, 3. Pro-activity, 4. Collaboration and 5. Engagement mechanisms.

### **1. Easy access**

Given the central role of the Innovation Portal within SmartAgriHubs, capacity building will, for the large part, take place online; e.g through webinars, single or modular step-by-step trainings, and e-learnings. Online learning<sup>15</sup> lends itself to flexible learning times and is often cost- and resource effective. It does however also require mechanisms for activating the learning community to actually participate in online trainings, which is why we also envision guiding principles to address this aspect. Our capacity building approach will encompass face-to-face learning whenever relevant, for instance train-the-trainer sessions, but as these are planned later in the project as these will be part of D4.5.

A guiding principle for easy access to the materials is also that they are open access and free of cost. We may decide to provide space for advertising paid support, however this is yet to be agreed with the project partners, and if so, these should be additions and not primary capacity building sources.

### **2. Goal setting**

To guide activities and to assure long-term commitment, it is helpful to be guided by a solid plan with capacity building goals, which ensures DIHs focus on relevant capacity building materials and adopt a learning mindset with a clear direction. Hereto a mission is a good starting point. A mission describes what you do, and for whom<sup>16</sup>. DIHs will be motivated on the portal to consider their mission and state it (in their space in the Observatory) to guide their capacity building overall. An example of a mission adopted by DIH is provided below (from the DIH Smart Digital Farming, Flanders):

“With agri-smartness, we integrate applied intelligence and data-driven decision making in precision farming -and livestock breeding without losing synchronicity with our planet.”

This mission serves to gear integrated digital activities in a planet-conscious way, with the accent on livestock. It can thus be connected to and supported by specific learning goals. Some of these goals would be similar for many DIHs, for instance to provide relevant services in an efficient manner and to engage the ecosystem. Other learning goals would be DIH-specific closely connected to the mission and particular local situation of the hub. Main learning goals in the case of DIH Smart Digital Farming for instance could be scaling-up joint R&D

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<sup>15</sup> As also described in D5.5 Development of materials for trainings and inter-regional demonstrations of CCs (§ Knowledge transfer in a digital environment)

<sup>16</sup> [www.effectivegovernance.com.au/vision-mission-and-purpose-statements-what-is-the-difference/](http://www.effectivegovernance.com.au/vision-mission-and-purpose-statements-what-is-the-difference/)

projects (preferably with best practices in livestock farming). Or learning more about safe and secure data sharing.

Another means to define goals for improvement, is the DIH Innovation Services Maturity Model (IS MM) self-assessment, which will help the DIH to specify those aspects and services on which the DIH wants to evolve, e.g. "for service {} I want to move from {level} to {level}"<sup>17</sup>. This self-assessment tool will become available in March of 2020. DIHs self-assessment will also be complemented by a peer-review mechanism, in which DIHs give each other feedback on their assessment and routes towards increased maturity via a DIH-level improvement plan.

### **3. Pro-activity**

For our network of Digital Innovation Hubs to grow and thrive in a demanding and ever-changing world, a receptive and open learning mindset fundamental. DIHs often resemble start-ups in the sense that they need to take agile and bold steps to scale rapidly with minimum resources and in general overcome the fragile phase of establishment and growth into sustainable entities. This takes place in an environment that is complex and dynamic. The environment for DIH capacity building, built into the SmartAgriHubs Innovation Portal, is the central place where DIHs are supported in this process. In other words: the project provides here the conditions to learn; the DIHs ideally adopt a learning mode. This means they should be engaged to give feedback, ask questions, conduct maturity assessments (also over time), and help other DIHs. Moreover, although Workpackage 4 will manage the process of capacity building, it is up to the entire community to ask for, and also contribute relevant materials where they detect white spots or possible improvements. As the domain of (smart) agrifood is in transition, there are so many new developments that cannot be covered in pre-set learnings and trainings. Functionalities in the Observatory and Innovation Portal such as the means to share best practices, should thus help to create this pro-active atmosphere. The following two guiding principles are also related to this.

### **4. Collaboration**

A first priority for collaboration is internal: close collaboration with WP5 on CC capacity building is needed to optimise efforts and to avoid duplication in tools designed for CCs and DIHs. WP4 and WP5 collaboration may include, amongst others: making the CCs within DIHs aware of relevant capacity building tools applicable also to CCs; linking in tools for CCs developed by WP5<sup>18</sup>; and training on the use of Agricultural Technology Navigator to maximise its utility for not only CCs, but also for DIHs and RCs. On a DIH level, we will encourage peer-learning and sharing via discussions after webinars, the annual events and encouraging DIHs to connect to each other.

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<sup>17</sup> More on this can be found in Deliverable 4.2 DIH Capability Maturity Model

<sup>18</sup> <sup>18</sup> B. Semolic (2018), "D7.3 Guidebook for the constitution of new Competence Centres", Horse Project

An important goal for the project is to create a lively learning community. Or, a so-called community of purpose, in which DIHs share and connect to establish the digital transformation and leverage their heterogeneity through experiences. A main element to support such a community is supporting matchmaking, e.g. on learning goals, maturity levels and peers. This requires a sophisticated labelling and tagging system in the portal.

## **5. Engagement mechanisms (e.g. rewards)**

We are fully aware that the need for capacity building, let alone community activity on capacity building, is now often latent in DIHs. Supporting mechanisms for engagement will thus be welcomed in the capacity building environment. One of such ideas could be a system of rewarding, where points can be earned by individual contributions to trainings but even more so, by community contributions.

Example reward points for individual activities or milestones:

- Filling out data
- Stating a purpose
- Stating learning goals
- Maturity assessment
- Viewing a video / participating in a training / etc

Example reward points for community activity:

- Reviewing
- Forwarding / recommending material
- Creating
- Forum activity
- Maturity self-assessment peer review

The way these points are calculated and materialised are still to be established. For instance, we have to ensure that a DIH that has overcome struggles feels just as much accredited as a top-of-class performer. For materialising, we consider options such as the use of stars (e.g. from Stars to Superstars), and actual rewards such as the option to present yourself as a DIH on a prominent place on the portal with an x amount of points.

Other engagement instruments to consider are personal invitations to events, interviews in SAH communications and specific mentioning in dissemination (if appreciated by the DIH).

# CONCLUSIONS

Setting up and developing a DIH is an ambitious and engaging process. Becoming a self-sustaining entity in the long run is even more so. In this first deliverable of two, we have started to outline capacity building materials for supporting DIHs in this process, with a focus on the first evolutionary stages of the DIH lifecycle, ultimately in order to achieve this vision of a strong network of EU DIHs

This is a starting point, and the coming years of the project will evolve around both optimising the online DIH learning environment in the Innovation Portal, and continuing the collection and presentation of free-to-use trainings already available via previous projects and other reputable sources, and offering new ones. The aim in the end is to create a learning environment in which the DIH community itself contributes to (peer) capacity building.

The following items should to be addressed to achieve this goal, and will thus be the focus of the capacity building activities in the coming months:

- Listing requirements, designing and testing the capacity building environment elements on the Innovation Portal and in the DIH Observatory together with WP 1;
- Defining the approach for sharing and cataloguing best practices;
- Developing and/or collecting new materials on: technology-, ecosystem- and business-related services and other identified topics mentioned by DIHs and RCs (e.g. data, consumer trends, climate change, etc). The extent to which technology related services materials can be used from information from the Agricultural Technology Navigator, uploads of videos of technology solutions, etc. will be explored with both WP5 and WP1;
- Strengthen the flow from self-assessment (after the launch of the self-assessment maturity tool in Q1 2020) to generating messages on assessment results and pointing towards possible available trainings and webinars (e.g. through tagging); The extent to which the self-assessment tools for DIH and CCs can be coordinated will be explored by WP4 and WP5.
- Motivate community involvement, e.g. with a reward system.

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# SMART AGRI HUBS

