DigiFed

Digital Innovation Hubs Federation
For Large Scale adoption of
digital technologies by European SMEs

D1.5 - Report on assessment criteria to guide the selection of partner DIHs and list of selected partner DIHs

June 2021

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 864266.

Technical References

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Short Description / Executive Summary
The following document presents the development of Deliverable 1.5 (D1.5) under Work Package 1 (WP1) of the DigiFed Innovation Action. Deviations due to covid-19 from the original strategy for this task are comprehensively assessed and justified, and mitigation measures as well as an updated strategy for Task 1.3 are presented. Correspondingly, D1.5 focuses on describing the process utilized for the development of a list of DIHs that have been selected for active engagement in other work packages of DigiFed, particularly WP4. DIHs in this list are selected according to the following methodology: exploiting existing successful collaboration between the DigiFed-partners and the corresponding DIHs; exploiting and utilizing the SAE initiative as an access point to DIHs that are part of that ecosystem; exploit previously established connections in several ecosystem building activities to directly target potential DIHs. This initial list of DIHs is accompanied by a set of criteria that are proposed to guide the engagement process in the corresponding WP. This set of criteria will not only further refine the initial list of DIHs but both structures constitute the basis of the engagement strategy with DIHs. This strategy is focus on collecting relevant information from the European DIH-ecosystem, including type of services provides, target group, sustainability strategy, among others. It is envisioned that this approach will produce relevant results that will facilitate the establishment of joint services between DIHs as well as useful recommendations for the fostering of collaboration between DIHs across Europe.

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List of abbreviations

AE	Application Experiment
B2B	Business to Business
CPS	Cyber Physical System
CFS	Certificate on the financial statement
CO	Confidential
DC	Digital Challenge
DIH – EDIH	Digital Innovation Hub – European DIH
DMP	Data Management Plan
DoA	Description of Action
EC	European Commission
EU	European Union
F2F	Face to Face
GA	Grant Agreement
GDPR	General Data Protection Regulation
GE	Generic Experiment
GEC	Generic Experiment Community
HW	Hardware
IA	Innovation Action
M	Month
PC	Project Coordinator
PM	Person Month
PMB	Project Management Board
PU	Public
RIS3	Regional Research and Innovation Strategies for Smart Specialisation
RP	Reporting Period
SME	Small and Medium Enterprises
SW	Software
WP	Work Package

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1. Introduction

Within the SAE initiative[1] DigiFed is dedicated to support and foster the digitalization of European industries and services in the field by Cyber Physical Systems (CPS) & Embedded Systems, improving competitiveness and enabling the reach of new markets so that companies, SMEs but also midcaps, can benefit from knowledge sharing regardless of their location. DigiFed gathers 12 partners with expertise in digital technologies and innovation management from different countries, established ecosystems, and with the objective of expanding and connecting with other networks to create an *EU-wide Federation of Digital Innovation Hubs*.

This is achieved by two means: On the one hand, financial support is provided to start-up/SMEs/midcaps to develop new innovative CPS solutions and engage to explore specific technological topics under the so called *DigiFed-Innovation Pathways*.

On the other hand, by developing and consolidating a DigiFed-ecosystem of DIHs to understand the main challenges and success factors of DIHs across Europe and foster the development of joint measures, such as services, and structures to support start-up/SMEs/midcaps under novel configurations.

In the case of the latter, it is fundamental to develop and establish delivery partnerships with DIHs in complementary regions to holistically mobilise and serve innovators across Europe. Such partnerships will enable DigiFed to showcase its support and foster instruments, explain the structures implemented to make them operational, and export to DIHs that might have interest to adapt and implement them in their ecosystem. Due to the nature of these instruments, it is also essential to establish bilateral and multilateral collaboration between selected DIHs and individual DigiFed-DIHs, in addition to DigiFed as a whole, to concretize their implementation as well as to guarantee the post-project sustainability of such structures.

This involves firstly defining suitable criteria for selection of complementary DIHs and secondly, the development of an engagement strategy with them. This deliverable focus on the development of such criteria and strategy, as well as the description of how these results will be utilized by other work packages in DigiFed.

The remaining of this report is organized in the following way: Subsection 1.1 describes and positions the DigiFed support instruments or *innovation pathways*. Section 2 describes the methodology, criteria, and strategy to reach complementary DIHs, including mitigation measures to the covid-19 pandemic. Section 3 shows the list of DIHs that have been considered to pursue collaboration and engagement, and the concrete actions to engage with them. Finally, Section 4 presents overall conclusions and follow-up actions to Task 1.3.

1.1 The DigiFed-Innovation Pathways

The *Innovation Pathways* are the main tool by which DigiFed provides direct support to SMEs in the development of innovative CPS-solutions. In addition, they constitute a means to assess the success and impact of implementing pan-European support instruments as well as the challenges and requirements imposed over DIHs for their correct implementation. Three main innovation pathways are implemented by the DigiFed IA (Figure 1):

Application Experiments[2] (AEs): financial grants as well as technical and business support for the development of smart applications in Europe are offered. Demonstrative projects are EU cross-borders and split into three possibilities:

- Single AE: the applying company requests technical expertise from a DigiFed Technology partner to generate a new smart product or service.
- Twin AE: two applying companies from different European, or EU-associated, countries generate a new and innovative CPS application or solution
- Twin AE with low-digitalized company: two applying companies from different European, or EU-associated, countries develop a new and innovative CPS application or solution with at least one partner in the consortium being of low-digital maturity. This configuration also considers the contribution of a DigiFed Technology partner providing technical support and advise.

[1] https://smartanythingeverywhere.eu/
[2] https://digifed.org/open-calls/application-experiment/

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Generic Experiments[3]: DigiFed Generic Experiments Communities (GEC) are designed to test new collaborations between research centres and a group of SMEs & Mid-Caps as well as develop new co-financing mechanisms between European and regional funding to foster European industry digitalization. GECs aim to build communities of SMEs & Mid-Caps around a specific technical topic (GEC Topic) proposed by a DigiFed research centre (the GEC Owner), involving groups of about 10 European companies together with the experts from the research centre. DigiFed has launched 4 different GE communities between 2020 – 2021.

Digital Challenges[4]: DigiFed will experiment new co-funding mechanisms directly involving the demand side. Digital Challenges (DC) are a match funding opportunity where advanced digital technology SMEs are selected through an open call to solve industry challenges set by corporate businesses. The purpose of the DC is to highlight attractive market needs to be addressed through CPS for which new solutions are required. DigiFed will be working with large European organisations, DC Owners, who will serve as early adopters of the accelerated innovations and provide additional support to the programme in the form of co-funding, access to innovation support and pilot sites. DigiFed has launched one DC in 2020 and two more are planned for 2021.

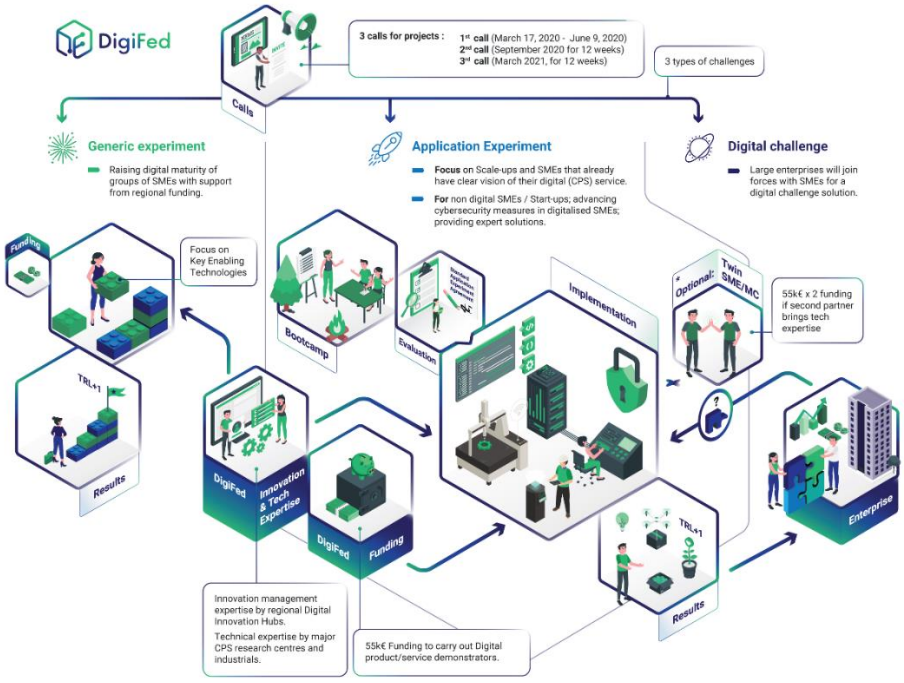

Figure 1. Description of the innovation pathways in the DigiFed project

[3] **https://digifed.org/open-calls/generic-experiment/**
[4] **https://digifed.org/open-calls/digital-challenges/**

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2. Methodology, Selection Criteria, and Mitigation

This deliverable emerges from the objectives and activities performed under Task 1.3, within Work Package 1.

Originally, the goal of this task was to **establish delivery partnerships with other DIHs** in complementary regions to holistically mobilise and serve innovators across Europe. This involved **(1)** identifying potentially complementary DIHs within regions in Europe not yet covered by the DigiFed-DIHs. These complementary DIHs had the necessary expertise and networks to facilitate DigiFed reaching out startups/scaleups/midcaps in their corresponding regions. **(2)** these DIHs were meant to provide support for the delivery of the DigiFed training and pre-selection bootcamps. This process included the transference of financial resources to the selected DIHs for the delivery of the bootcamp activities. **(3)** the development of a *train-the trainer programme for the bootcamps*, which was to be delivered to the selected DIHs.

Due to the restrictions imposed by the pandemic of covid-19, these goals were no longer viable. On-site training to DIHs as well as bootcamps to SMEs were not possible anymore. Consequently, the original strategy was adapted to mitigate the effects of the pandemic, while achieving the overall objectives of DigiFed.

Each DigiFed-partner, and particularly DigiFed-DIHs, focused on bringing the necessary information to the SMEs/start-ups/midcaps virtually. This included the distribution of information regarding the DigiFed-funding opportunities, i.e. the innovation pathways. Topic-wise online sessions performed by the different technology providers were also performed (see D1.3 Bootcamp training). These events were organized in the different regions by the corresponding DigiFed-partners. Several DigiFed-partners performed virtual web seminars and sessions actively making use their local network, e.g. the Enterprise Europe Network[5] (EEN), to promote calls, disseminate call-related information, and means of engagement with DigiFed and its ecosystem. Moreover, individual coaching of potential applicants was performed by all partners which were directly approached, e.g. via the project website, partner's websites or dissemination activities.

In addition, the engagement strategy with external DIHs was reformulated. As before, to meet the objectives of the project while adapting to the current challenges of the pandemic, the adapted strategy directly interlinks with WP4, particularly obtaining feedback from T4.1 *(Sharing of experience and good practices of DigiFed DIHs)* and giving input to T4.2 *(Expansion of the DigiFed ecosystem towards a Europe-wide DigiFed DIH-network)*, T4.3 (*Identification of synergies to enhance regional-European cooperation in DIH support: case studies and recommendations)*, and T4.4 (*DigiFed sustainability model for network cooperation and DIH services)*. To achieve proper engagement with the extended DIH-ecosystem the **exploration and engagement methodology** was adapted to the following:

(1) **Exploit existing DIH-collaborations**: External DIHs with a history of successful collaboration with one or more DigiFed-partners are to be prioritized. This will enable the development of a solid foundation for the development of new DIH-collaborative structures and services
(2) **Exploit SAE-ecosystem**: The SAE initiative constitutes a gateway and a formal access channel to a broader community of DIHs in the field of CPS as well as other areas. Hence, DIHs within SAE are to be prioritized. Similarly, DIHs within other projects from the DEI strategy, e.g. I4MS, will also be contacted. Such channels have been previously utilized with great success to enhance the distribution and reach of the DigiFed-innovation pathways to relevant stakeholders
(3) **Capitalization of ecosystem building activities**: Match-making activities and ecosystem building events offer a great opportunity to present the DigiFed-innovation pathways as well as its DIH engagement objectives. In this case, DIHs that proactively show willingness and interest in building concrete collaboration, particularly through the development of joint DIH-services, e.g. adopting and implementing adapted versions of the innovation pathways proposed by DigiFed, are also to be prioritized.

This way, the *initial set of selected DIHs* is constituted by DIHs with whom the DigiFed consortium has already established connections and collaborates, as well as DIHs that have not yet been directly engaged with. Moreover, the set is constituted by a diverse group of DIHs in different stages of their development and geographical location, with potential for the development of complementary services that can translate into higher impact for their corresponding SMEs and affiliates.

An additional set of features will be utilized to further **prioritize engagement with DIHs**. These criteria will be implemented in WP 4 and will also provide useful information for the development of recommendations, joint-

[5] **https://een.ec.europa.eu/**

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services, and DIH-DIH collaboration in general. In particular, the following information will be requested from the *Initial set of selected DIHs*. Those who respond to this request for information will constitute the *Set of DIHs and features and will be considered in the following networking and engagement activities of DigiFed, particularly under WP4*:

- **SME contacts and affiliates**: To understand how potential DIHs embed into their local environment, it is relevant to understand how its base of SME contacts and affiliated is constituted. This includes how many SMEs are provided with services and what is their profile. Such information helps in assessing the potential impact in the development of joint DIH-services
- **Type of services**: Understanding the services and focus of DIHs is essential to assess complementarities, elaborate possible ways of collaborating, and better fulfil the necessities of SMEs. In particular, D1.1 *(DigiFed DIH knowledge base)* will be utilized as a starting point and a reference to collect and present the services of potential DIHs
- **Technology scope/area**: Experience from the first, second and third open calls has shown that complementarity between SMEs is key to foster successful industrial collaboration. In this sense, it is vital to understand the scope of DIHs, such that SMEs and members of corresponding DIHs may easily find industrial partners and explore alternatives for the development of complementary innovative solutions
- **Geographical location**: DIHs in so-called "*underrepresented regions*" are attractive and a priority within the engagement strategy
- **Consolidation status**: Information regarding how long the DIH has been active will be useful to achieve meaningful transfer of experiences from well-established and operationally solid DIHs to new upcoming DIHs. Moreover, this will provide the opportunity for emerging DIHs to implement and adapt successful instruments from consolidated DIHs and for the latter to explore new collaboration opportunities
- **Sustainability approach:** How does the corresponding DIH envisions its long-term operation? Which would be key features and services that enable its function from an economical perspective? This information is fundamental for the development of long-term collaboration between DIHs
- **Success cases:** Which are the most outstanding success cases of the corresponding DIH? Which lessons have been learnt from those success cases?
- **Presence in the Digital Innovation Hubs Catalogue**[6]

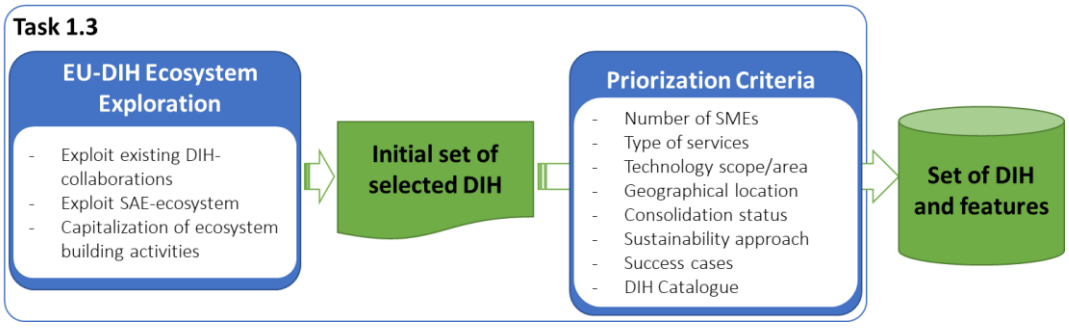

Figure 2. Methodology and priority criteria to select DIHs for engagement

The *Set of DIHs and features*, will collect and consolidate knowledge about services, successes, and challenges of DIHs, including the impact by their base of customers as well as their financial sustainability (Figure 2**Erreur ! Source du renvoi introuvable.**). This list will be built and utilized by WP4 to consolidate the engagement with DIHs outside DigiFed. This initial engagement with the DIHs within the *Set of DIH and features* will take place in a *Network Expansion Event* (WP4), where the previous criteria will be discussed at length, complementarities between DIH-services will be identified, and the ecosystem will be consolidated.

[6] **https://s3platform.jrc.ec.europa.eu/digital-innovation-hubs-tool**

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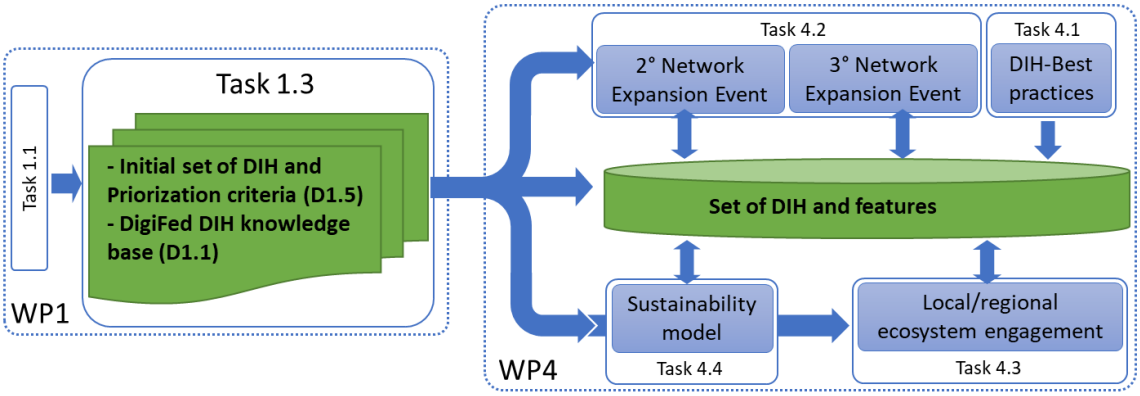

Figure 3. Workflow and interdependencies between T1.3 and other tasks and work packages

This new engagement strategy, while complying with the restrictions imposed by covid-19, actively exploits the DigiFed-DIH ecosystem to meet the needs of the project as a whole and focuses on addressing and servicing SMEs. Moreover, Task 1.3 connects organically with Tasks 1.1 *(DigiFed Offer*), 1.2 *(Engagement of digital challenge owners)*, 1.4 *(Engagement of SMEs and Midcaps)*, and actively making use of the corresponding outputs and deliverables for the successful development of the later stages of WP4, particularly Tasks 4.2, 4.3, and 4.4. Figure 3 shows how the different tasks and work packages connect under the reformulated strategy. Finally, the proposed list and selection criteria will be instrumental in the development of recommendations for the fostering of engagement between DIHs, the development of joint DIH-services, the increased cross-border impact of DIHs, as well as support to SMEs/midcaps and European industries in general.

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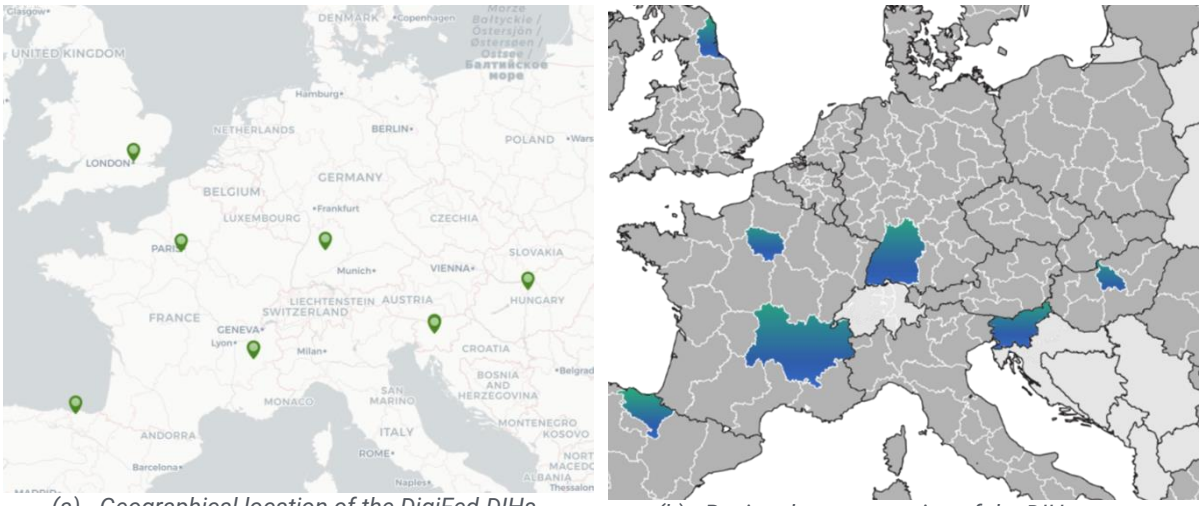
3. Engagement of Complementary DIHs

The restrictions imposed by the pandemy of covid-19 made the development of an adapted strategy necessary to identify and engage with complementary DIHs from the European landscape. As mentioned, this strategy had two main pillars: Firstly, the DigiFed-DIHs and -partners serve as a gateway to identify and connect with complementary DIHs from their local environment as well as the European landscape. In this context, the SAE initiative has been instrumental in providing access to wider environment of potential DIHs. Secondly, active reach out and engagement with complementary DIHs outside the DigiFed-ecosystem through the participation and organization of ecosystem and DIH-network expansion events, focused on understanding the main challenges of DIHs, refinement of their services, assessment of their impact, and development of sustainability models, emong others. In this context, the DIH-Catalogue is instrumental in complementing our database.

In the following, the different DIH-ecosystems of the DigiFed-DIHs are specified, as well as DIHs engaged so far. The aggregated list of all DIHs, i.e. *Initial set of DIHs*, can be found in Table 1.

3.1 The DigiFed-DIHs and -Regions

DIHs are a central part of the DigiFed IA. As mentioned, they are instrumental and gateways to connect with the industrial and economical ecosystem of each region they represent in the project. This includes the connection and distribution of information to SMEs/midcaps/start-ups, as well as key stakeholders from the European landscape.



(a) Geographical location of the DigiFed-DIHs (b) Regional representation of the DIHs

Figure 4. DIHs within the DigiFed IA

The different DigiFed-DIHs and their corresponding regions are: MINASMART providing engagement with the region of Auvergne-Rhone-Alpes, SEZ engaging with Baden-Württemberg, Basque Digital Innovation Hub (BDIH) engaging with Basque Country, BME-EET engaging with Central Hungary, DIGIHALL engaging with Île-de-France, DIH DIGICAT engaging with Northeast England, and DIHS engaging with Slovenia (Figure 4).

This coverage provides DigiFed a somewhat representative overview of the different realities of the local economic and industrial ecosystems of the European continent including additional DIHs and stakeholders, particularly in the previous regions. This will enable DigiFed to compile a comprehensive understanding of the main challenges and pitfalls faced by its DIHs, as well as to understand the impact of the DIH-services provided in each region. Such information is essential, on the one hand, to understand how to better tailor the DigiFed-support instruments during the duration of project, but also to understand and refine future services provided by the different DigiFed-DIH. Moreover, this information will provide the basis to understand the interest and viability of developing joint cross-border complementary DIH-services between the partners of the project, as well as its external ecosystem.

Each DigiFed-DIH provided a list of DIHs within their corresponding ecosystem, with whom they have a successful collaboration track record, and that constitute suitable DIH-partners to consolidate the DigiFed-ecosystem, both at a regional and at a Europe-wide level.

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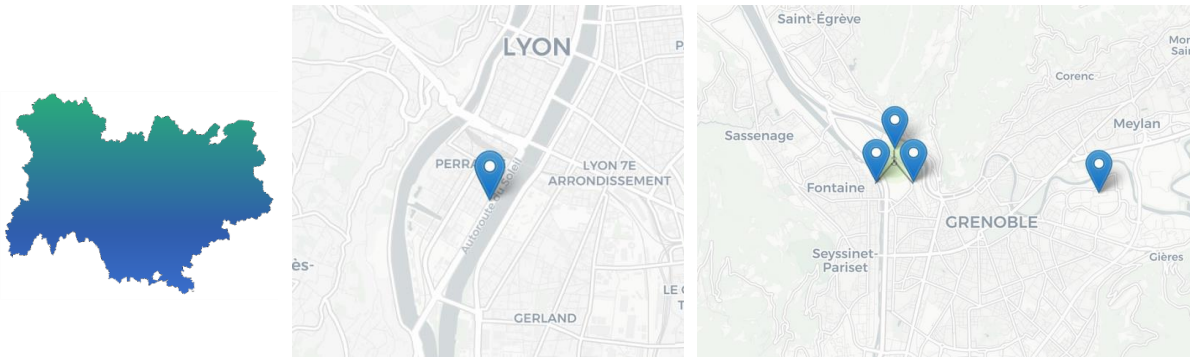
3.1.1 Auvergne-Rhône-Alpes Ecosystem

The region of Auvergne- Rhône-Alpes is one of the most active French regions in RTD and innovation and comprises a large number of high-tech clusters. Different DigiFed-partners have well-established connections with DIHs in this region. Moreover, the DigiFed-DIH presence in this region is given by MINASMART. MINASMART, in collaboration with the European network Silicon Europe Alliance[7], intends to provide access to all economy stakeholders willing to benefit from the advantages of digital technologies in their businesses. MINASMART is represented in DigiFed by their DIH coordinator MNL and CEA. Figure 5 shows the network of DIHs to which DigiFed as access in the region. Each pointer represents a DIH accessible by the DigiFed-DIHs in the region of Auvergne- Rhône-Alpes. Specifically, *Cybersecurity Institut* at Lyon (Figure 5.a), and *IRT Nanoelec*, *CAP'TRONIC*, *AURA entreprise*, and *ICT4Manuf* in Grenoble (Figure 5.b).



(a) DIHs in Lyon *(b) DIHs in Grenoble*

Figure 5. Relevant DIHs in the Auvergne-Rhône-Alpes region

3.1.2 Baden-Württemberg Ecosystem

The **Baden-Württemberg region** is a focal point of German and European innovation, hosting one of the highest densities of start-ups in Europe, and several technology and transfer centres on digitisation and Industry 4.0. Moreover, regional, and German support initiatives have consolidated the establishment and operation of several DIHs in different fields. SEZ represents DigiFed in this region and it is deeply rooted in this regional ecosystem. As partner in the EEN, SEZ is well connected to all major actors of European technology transfer, innovation, and SME support. The DIHs in this region that will be access through SEZ can be observed in Figure 6.

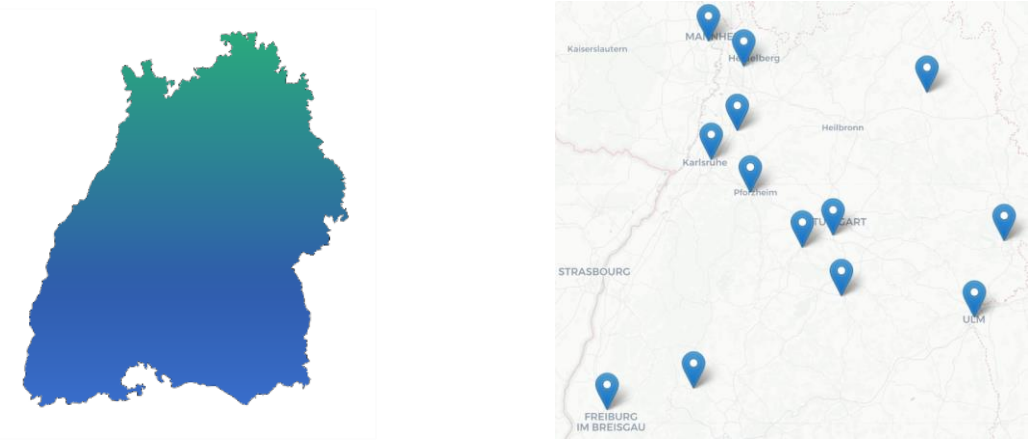


Figure 6. DIH-ecosystem in the Baden-Württemberg region

3.1.3 Basque Country Region Ecosystem

The **Basque Country region** is one of the main innovation engines of the Iberic peninsula and concentrates a large number start-ups and innovator. Moreover, numerous regional and national initiatives to develop and consolidate DIHs in different fields have been implemented and are scheduled.

[7] **www.silicon-europe.eu/home**

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The Basque Digital Innovation Hub (BDIH) is a non-profit initiative that responds to the Basque Smart Specialization Strategy RIS3 (Regional Research and Innovation Strategies for Smart Specialisation) in advanced manufacturing, named Basque Industry 4.0[8], to support the business fabric in the experimentation of digital innovations (Figure 7). The aim of the hub is to provide easy and cost-efficient access to European industrial fabric, especially SMEs in the Basque region, to innovative and excellent scientific technological capabilities required to meet the challenges of industry 4.0 in the Advanced Manufacturing environment. The BDIH is one of the three strategic initiatives developed under the framework of Basque Industry 4.0 Strategy.

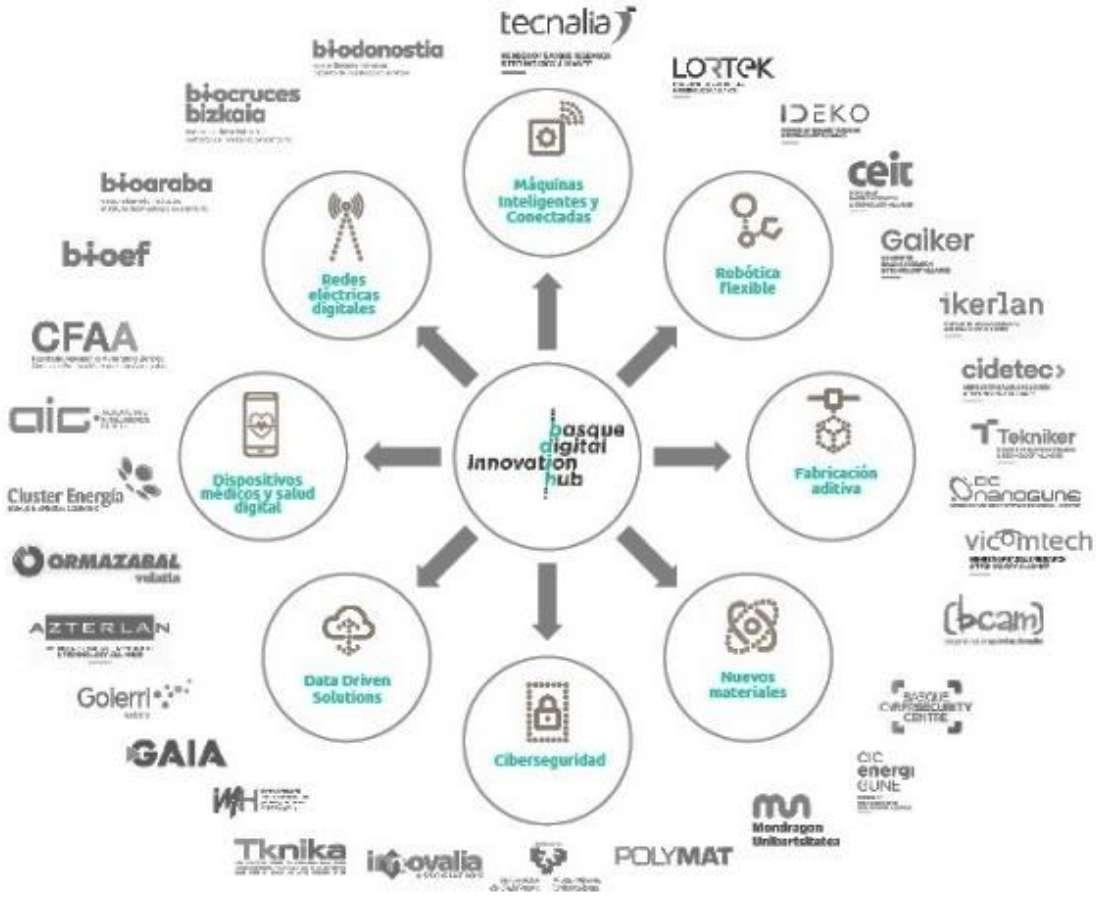

Figure 7. BDIH ecosystem in the Basque Country

The BDIH is represented in DigiFed by project-partner IK4-IKERLAN. In this context, DigiFed is in a privileged position to access, extend and consolidate its ecosystem in the corresponding region, not only by servicing local companies but also engaging with additional DIHs. Thus IK4-IKERLAN will spearheaded and provide valuable information on the success factors and challenges faced by DIHs as well as key DIH-services and impact on the SME landscape in this region.

3.1.4 Central Hungary Region Ecosystem

The **region of Central Hungary** has several structures and initiatives for the advancement and implementation of CPS and Industry 4.0. Here the regional RIS3 strategy focuses on several relevant target areas such as ICT, med-tech, and environmental technologies. BME is deeply rooted in both the national and regional ecosystem, e.g. leading the Hungarian Industry 4.0 technology platform and benefitting from close contacts to regional and national decisionmakers. Moreover, BME is part of the BME-EET DIH, which is a non-profit international DIH located in the Central Hungary region, specifically in Budapest, and member of the SAE community and the National Industry 4.0 Platform. This DIH constitutes a valuable gateway to the eastern part of Europe, facilitating the understanding of

[8] **www.basqueindustry.eus**

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the main challenges facing SMEs in their adoption of advanced digital technologies in the region. The DIHs proposed by BME-EET for collaboration can be observed in Figure 8.

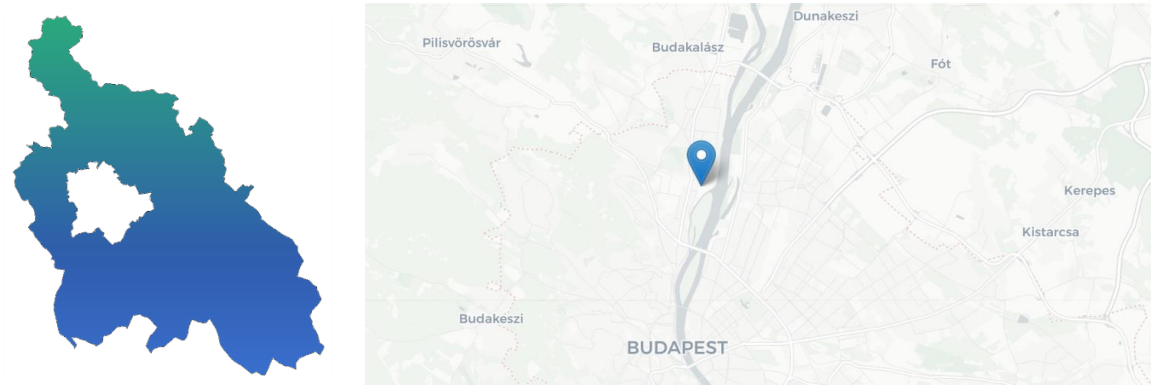

Figure 8. Innomine DIH in the Central Hungary region

3.1.5 Ile-de-France region Ecosystem

The **Ile-de-France region** is one of Europe's neural points innovation, digitalization, and entrepreneurship. DIGIHALL is the official DIH for the Ile-de-France region. The DIH seeks to federate the Region's innovation ecosystem, answering the needs of industry more efficiently and contributing to the creation of a European innovation market. DIGIHALL is led and represented in DigiFed by CEA LIST and the SYSTEMATIC industry cluster. Different target stakeholders of DIGIHALL include academia and education providers, venture capital, incubators, and testbeds/affiliated programmes aimed at accelerating the pace of technology adoption and value creation. The DIH is supported by the Regional Government of Ile-de-France and enshrined in its Smart Industry strategy.

The proposed DigiFed-DIH ecosystem in this region can be observed in Figure 9 and it is spearheaded by DIGIHALL.

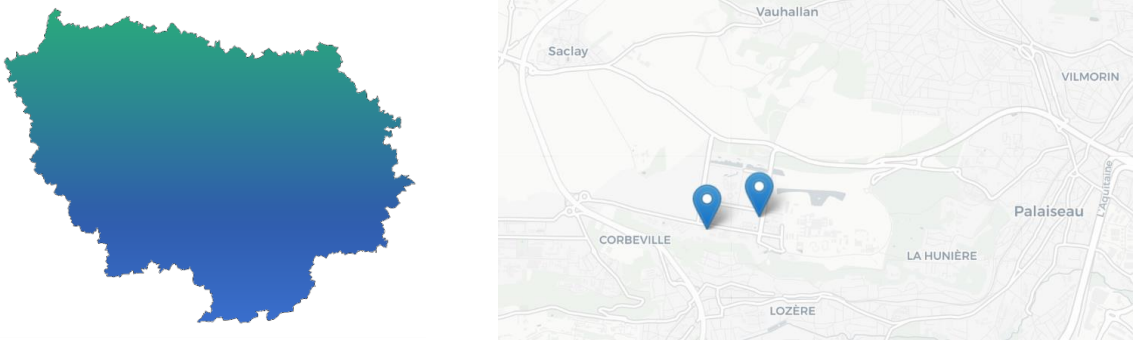

Figure 9. Selected DIHs in the Ile-de-France region are concentrated in Palaiseau

3.1.6 Northeast of England Region Ecosystem

DIH DIGICAT is the DigiFed-DIH located in the **Northeast of England region**. DIH DIGICAT is represented in DigiFed by Digital Catapult and constitutes a vital door to an essential part of the European continent. In this context, the DIH helps to understand the challenges of the regional SMEs and whether their pursuit of European business collaboration can be supported by structures and instruments as those proposed by the DigiFed-innovation pathways. The reach of Digital Catapult extends throughout the United Kingdom. In the Northeast of England region its headquarters are established in Sunderland (Figure 10).

Digital Catapult Centres which form the DIH help innovators bring digital services and products to market. These centres actively collaborate with key stakeholders, local business, academia, the public sector, as well as Digital Catapult Centres across the UK. Jointly, these centres address the needs and opportunities of the regional market regarding digitalization of their industry and businesses. These partnerships are integral to foster and support clusters in pushing the regional and national agenda in digital transformation.

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Figure 10. Digital Catapult headquarters in the Northeast England. Its main partner in the region is Sunderland Software City

3.1.7 Slovenia Region Ecosystem

ULJ is the DigiFed-partner in the **Slovenia region** and also a strategic-partner of the Digital Innovation Hub Slovenia (DIHS). The DIHS is a national one-stop-shop to provide, connect and support knowledge, business and technology expertise, technologies, experimental and pilot environments, best practices, methodologies and other activities necessary to fully enable Slovene Industry in building digital competencies, innovation models and processes, support their digital transformation and raise their competitive advantages based on digital. DIHS is a private non-formal institute that operates with the help of founding members: Chamber of Commerce and Industry of Slovenia, University of Ljubljana, FabLab Network, University of Maribor, Tecos, Technology Park Ljubljana, International Institute of Business Analysis Slovenia, Smart Factories Cluster and Wood Industry Cluster. DIHS covers three essential important pillars of digital transformation: education, industry (SMEs) and municipalities, and is unique in its comprehensive lifelong learning approach. The proposed DigiFed-ecosystem in the Slovenia region is observed in Figure 11.

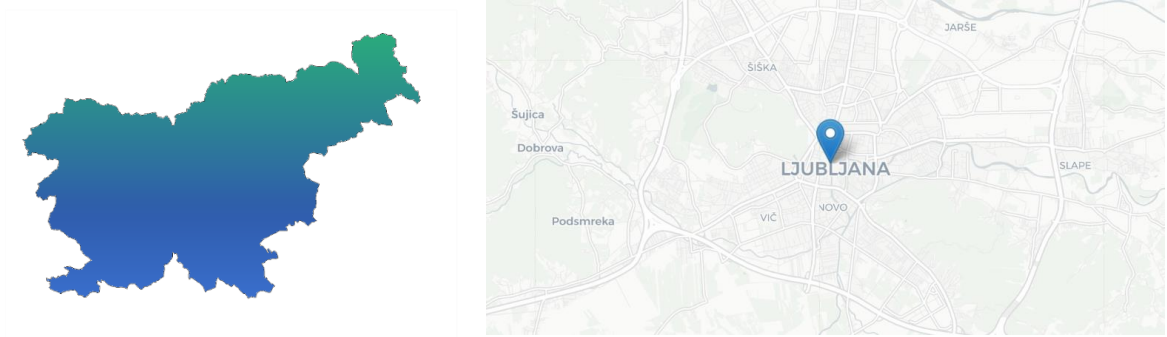

Figure 11. Selected DIH in the Slovenia region

3.2 SAE-DIH Ecosystem

In April 2016 the European Commission presented the Digitising European Industry Strategy[9] (DEI). The over-all objective of this strategy is to ensure that any industry in Europe – big or small, wherever situated and in whichever sector – can fully benefit from digital innovations to upgrade its products, improve its processes and adapt its business models to the digital age.

Within the DEI strategy, the goal of the Smart Anything Everywhere Initiative[10] (SAE) is to foster SMEs/start-ups/midcaps to enhance their products, services, and business processes by developing and implementing innovative digital technologies. The cornerstone of this process is the development of Application Experiments,

[9] **https://ec.europa.eu/digital-single-market/en/digitising-european-industry**
[10] **https://smartanythingeverywhere.eu/**

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which are implemented in different formats by every IA under SAE. Moreover, DIHs have an active role the development and execution of Application Experiments by connecting companies, suppliers, and users. Such configuration creates a win-win situation for all involves parties, and in particular, benefits DIHs by growing their ecosystems and extending their range of services. This way, the goal of SAE regarding DIHs is to help them establish fully functional ecosystems that can provide services beyond technical advice such as business consulting and training.

The first phase (Figure 12) started in 2015 with four IAs and focused on **creating a well-functioning ecosystem**. The second phase started in 2017 with 4 new IAs and a CSA to support the existing and new DIHs into forming a coherent pan-European network. In this line, this phase focused on **expanding the ecosystem and its European dimension**. The third phase aims at **consolidating collaboration and widening the pan-European network of DIHs**.

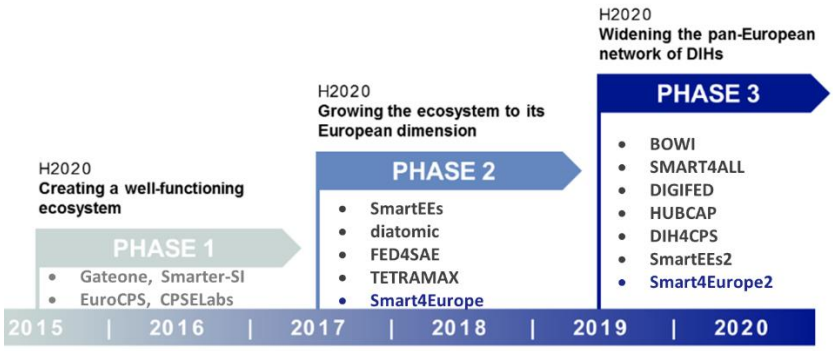

Figure 12. Evolution of the SAE initiative

Throughout its three phases (Figure 13), the SAE initiative has been dedicated to the creation of well-functioning ecosystems around regional DIHs in different technology areas:

(c) Cyber-physical and embedded systems
(d) Customized low energy computing powering CPS and the IoT
(e) Advanced micro-electronics components and Smart System Integration
(f) Organic and large area electronics/ Flexible and Wearable Electronics

In addition, an explicit effort has been made at *Widening Digital Innovation Hubs* such that networks and specifically hubs in so-called underrepresented regions may directly benefit and develop the previously mentioned areas by strongly collaborating with IAs in SAE and I4MS[11], e.g. through joint highly innovative cross-border experiments.

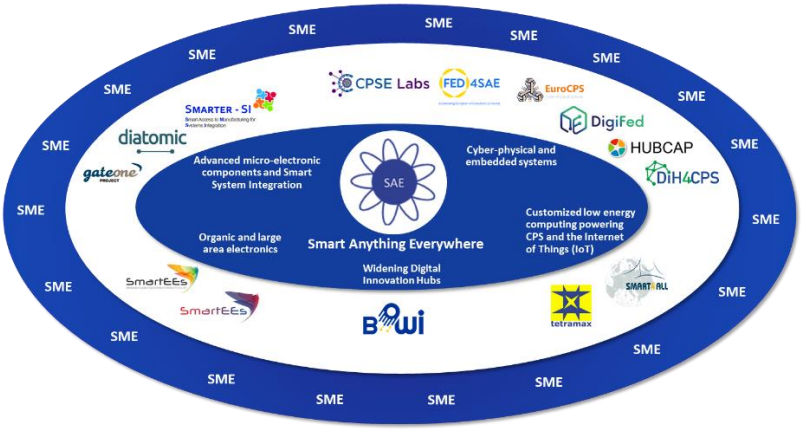

Figure 13. IAs and technology areas of SAE throughout its three phases

This way, the SAE Initiative constitutes the main gateway for DigiFed to access an extended ecosystem in a formal and systematic way, particularly in the case of engagement with DIHs that are part of the initiative and the DEI strategy in general. In particular, SAE has been used as an intermediary to connect and engage with the different

[11] **https://i4ms.eu/**

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DIHs under their corresponding IA-consortia. Moreover, although DigiFed has become active during the third phase of SAE, the Initiative has also been instrumental in connecting DigiFed to DIHs and structures already established by IAs from previous phases.

Figure 14. SAE DIH-ecosystem during its third phase[12]

An important aspect to be noticed is that the SAE-ecosystem of DIHs during its third phase (Figure 14) provides the opportunity to engage with so-called "*underrepresented regions*", particularly from the south and eastern parts of Europe. This has provided the opportunity to further distribute the DigiFed-innovation pathways to companies in those regions, as well as to engage with the corresponding DIHs to further complement the knowledgebase under construction. In this context, complementary work and concrete collaboration with the BOWI project will be a post-task action to be undertaken particularly in WP4.

3.3 Targeted Network Expansion Efforts

Capitalization of the expansion and ecosystem activities in which DigiFed has taken part or organized has been an essential component in the definition of potential DIHs for further engagement.

In particular, this set is constituted by DIHs that have pursuit active engagement with DigiFed and its partners at network building activities (or afterwards). This set of DIHs is also complemented by different DIHs outside the direct DIH-regions, with whom the different project partners have previously achieved collaboration. Moreover, relevant DIHs, EDIHs applicants, and other structures in strategic regions have also been preliminary contacted and included in the list. Finally, DIHs to be contacted directly are also included on this set.

These DIHs present an excellent opportunity to control, contrast, and compare best practices, lessons learnt, and sustainability strategies from different regions across Europe (WP4). The coverage of the potential DIHs and their corresponding regions can be observed in Figure 15.

[12] DigiFed-DIHs have not been included in the map.

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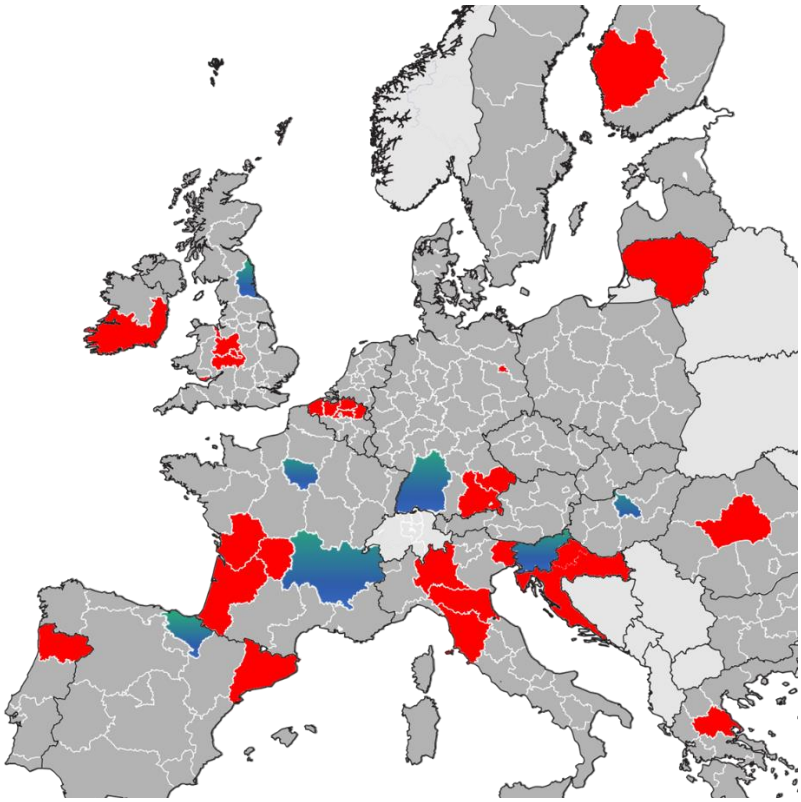
(a) Geographical location of DIHs to be directly contacted and engaged in ecosystem building activities



(b) Regions represented by DIHs engaged in ecosystem activities, and selected for direct engagement

Figure 15. Set of DIHs and other structures directly targeted for engagement

Figure 15.b show the different regions that are considered in addition to the original seven DigiFed-regions. This will facilitate the comparison of different DIH-service strategies as well as sustainability models. Moreover, it will enable the participants to build communication and collaboration channels with counterparts of interest that may translate into concrete engagement, i.e. development of joint services, joint-dissemination strategies, brokerage and match-making programs, sharing of geographically dispersed testing facilities, etc.

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3.4 DigiFed-Ecosystem and Initial List of DIHs

The **Initial set of selected DIHs** is presented in Table 1, where the name, region, and area of focus are specified. In additionl, Table 1 also specifies the appearance of the DIH in the DIH Catalogue (CTLG), the communication channel to establish connection with the DIHs, i.e. through a DigiFed-partners, the SAE-network or through direct/targeted engagement. This list gathers 87 DIH and will later be refined and DIHs will be prioritized according to the criteria proposed in **Erreur ! Source du renvoi introuvable.**Figure 2. Considering references previously obtained from different JRC reports, it is expected to achieve support from at least two DIHs to map their own local/regional environment under Task 4.3 (*Identification of synergies to enhance regional-European cooperation in DIH support: case studies and recommendations*), and active engagement in the response of the criteria provided, including active participation of the following two network expansion activities under Task 4.2 (*Expansion of the DigiFed ecosystem towards a Europe-wide DigiFed DIH-network*) of at least 10 DIHs.

DIH	Region	Area	Channel	DIH CTLG
4P DIH	Slovenia	Technology I4, HW SW	DigiFed-Partner	Yes
Aarhus Universitet	Aarhus (region)	Digitalisation, Big Data, Data Analytics	SAE	Yes
ACCIÓ - Agency for Business Competitiveness	Catalonia	Business development, international trade	Targeted engagement	No
Advanced Manufacturing Research Centre of Wales (AMRC Cymru)	Wales	Automation, design for X, digitalisation, product and process verification	Targeted engagement	No
AFIL - Associazione Fabbrica Intelligente Lombardia	Lombardy	Manufacturing innovation	Targeted engagement	Yes
AIN - Asociación de la Industria Navarra	Navarra	Advanced materials, sensors, intelligent systems	Targeted engagement	Yes (IRIS)
Applied Artificial Intelligence	Baden-Württemberg	Artificial Intelligence	DigiFed-Partner	No
ART-ER	Emilia-Romagna	Sustainable growth	Targeted engagement	Yes
ARTES 4.0 Toscana	Tuscany	Robotics, enabling digital technologies	Targeted engagement	No
AURA entreprise	Auvergne-Rhône-Alpes	Support to SMEs	DigiFed-Partner	No
Azores DIH (through INESC TEC)	Azores	Artificial Intelligence, Cybersecurity and High-Performance Computing	Targeted engagement	Yes
BIBA - Bremer Institut Fuer Produktion Und Logistik GmbH	Bremen	Intelligent Production and Logistics Systems & ITC applications	SAE	Yes
Brainport Industries	North Brabant	High tech equipment	Targeted engagement	Yes
Brandenburgische Technische Universitat Cottbus-Senftenberg	Brandenburg	Smart Regions and Heritage Energy Efficiency and Sustainability Biotechnology, Environment and Health Cognitive and Dependable Cyber Physical Systems	SAE	Yes
CAP'TRONIC	Auvergne-Rhône-Alpes	Digital	DigiFed-Partner	No
Central Research Lab	London	Smart machines, manufacturing	DigiFed-Partner	No
Centre for Process Innovation Limited LBG	North East England	Biotechnology, Pharmaceutical, Photonics, Electronics, Digital	SAE	Yes
COMET - Cluster Meccanica Friuli Venezia Giulia	Friuli-Venecia Julia	Metal mechanics	Targeted engagement	No

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DIH	Region	Area	Channel	DIH CTLG
Digital Hub kurpfalz@bw	Baden-Württemberg	Digitalization	DigiFed-Partner	No
Digital Hub Nordschwarzwald	Baden-Württemberg	Digital transformation	DigiFed-Partner	No
Digital Hub Region Bruchsal (HubWerk01)	Baden-Württemberg	Digital transformation	DigiFed-Partner	No
Digital Impulse Hub	Catalonia	Digitalization aware rising, new technologies updates, training	Targeted engagement	Yes
Digital Innovation Hub Lombardia	Lombardy	Energy, construction, manufacturing innovation	Targeted engagement	Yes
Digital manufacturing Innovation Hub Wales - DMIW	Bridgend	Digital Innovation and the exploitation of industrial digital technologies Hub	Targeted engagement	No
Digital Mountains St. Georgen	Baden-Württemberg	Digital transformation	DigiFed-Partner	No
Digitalisierungszentrum Ostwürttemberg (DigiZ)	Baden-Württemberg	Industrial Applications, IT Security, Artificial Intelligence	DigiFed-Partner	No
Digitalisierungszentrum Ulm | Alb-Donau | Biberach	Baden-Württemberg	Digital transformation	DigiFed-Partner	No
DIH PISMO	Sisak Moslavina	Metallurgy	Targeted engagement	No
DIH TERA	Osijek-Baranja	Business and financial, technology	Targeted engagement	Yes
DIHNAMIC Nouvelle-Aquitane	Nouvelle-Aquitane	Transport and logistics, manufacturing innovation	Targeted engagement	Yes
DInO (EDIH Candidate)	Bayern		Targeted engagement	No
DNS – Digital Hub Neckar-Alb und Sigmaringen	Baden-Württemberg	Digital Innovation and Transformation	DigiFed-Partner	No
EIT Digital	Brandenburg	Enhance Digital & Entrepreneurial Skills	Targeted engagement	No
Flanders MAKE	Flanders	Manufacturing innovation	Targeted engagement	Yes
Fondazione Bruno Kessler	Sudtirol	Artificial Intelligence	SAE	Yes
Foundation Cluster Information and Communication Technologies	Balograde	Information Communication and Technology	SAE	No
Future Industries	Baden-Württemberg	Smart Products, Mobility, KI und Industrie 4.0	DigiFed-Partner	No
FZI Research Center for Information Technology	Baden-Württemberg	information technology, engineering, and economics	Targeted engagement	Yes
ICT4Manuf	Auvergne-Rhône-Alpes	CPS	DigiFed-Partner	Yes
Idryma Technologias Kai Erevnas	Crete	Lasers and Photonics, Microelectronics, Advanced Materials/Nanotechnology, Molecular Biology and Genetics, Biotechnology, Computer Science, Bioinformatics, Precision Medicine, Systems Biology, Robotics, Telecommunications, Applied and Computational Mathematics, Chemical Engineering Sciences, Energy, Environment	SAE	Yes

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DIH	Region	Area	Channel	DIH CTLG
INESC TEC	Porto	Computer Science Industrial and Systems Engineering Networked Intelligent Systems Power and Energy	Targeted engagement	Yes
Innomine	Central Hungary	Business innovation, Fundraising, I4.0	DigiFed-Partner	Yes
Innovalia ZDM Digital Innovation Hub	Basque Country	Industry 4.0	Targeted engagement	Yes
Institute of Entrepreneurship Development	Thessaly	Digital	Targeted engagement	Yes
Instytut Chemii Bioorganicznej Polskiej Akademii Nauk	Greater Poland Voivodeship	Bioorganic Chemistry	SAE	Yes
IRT Nanoelec	Auvergne-Rhône-Alpes	Micro & Nanoelectronics	DigiFed-Partner	Yes
IS4PROD	Limerik	Intelligent Systems, Renewable Energy	Targeted engagement	Yes
Krakowski Park Technologiczny Sp Zoo	Lesser Poland	Business Development, Investment	SAE	Yes
Latvijas Informacijas Tehnologiju Klasteris	Riga	IS development and application services for export	SAE	Yes
Leibniz Institut Fuer Agrartechnik Und Biooekonomie E.V.	Brandenburg	Bioprocess engineering Technology evaluation and material cycles Technology of preparation, storage and preservation Technology in crop production Technology in animal husbandry	SAE	Yes
Luxembourg Institute of Science and Technology	Red Lands	Research and Technology Organisation, materials, environment and IT	SAE	Yes
Marseco Doo Tetovo	Tetovo	Information & Communication Technology	SAE	No
Munich Innovation Hub for Applied AI	Bayern	AI	Targeted engagement	No
Norges Teknisk-Naturvitenskapelige Universitet Ntnu	Trondheim	Health, oceans, energy	SAE	Yes
Politechnika Poznanska	Greater Poland Voivodeship	Bioinformatics and Genomics, Bioorganic Chemistry	SAE	Yes
Politecnico di Milano	Lombardy	Physical sciences and engineering	Targeted engagement	Yes
Polytronics Digital Innovation Hub	Auvergne-Rhône-Alpes	Plastics and composites	Targeted engagement	Yes
PRODUTECH	North Region	Concept validation and prototyping, R&D, testing and validation, access to funding and financing	Targeted engagement	Yes
Radboud University	Gelderland	Computer and information sciences	Targeted engagement	No
Rheinisch-Westfaelische Technische Hochschule Aachen	Rheinland Westfalien	Information and communication technology	SAE	Yes
Smart manufacturing DIH	Pirkanmaa	Smart machines, manufacturing	Targeted engagement	Yes
South East European University Tetovo	Tetovo	Environment and Health	SAE	Yes

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DIH	Region	Area	Channel	DIH CTLG
Sunderland Software City	North East England	Digitization	DigiFed-Partner	Yes
Sunrise Valley DIH	Vilnius	Digitization	Targeted engagement	Yes
SYSTEMATIC	Ile de France	Deep Tech	DigiFed-Partner	Yes
Tallinna Tehnikaulikool	Tallinn	Smart and energy-efficient environments, IT, SMEs	SAE	No
Tampere University of Applied Sciences	Pirkanmaa	technology, wellbeing services, business administration, and culture	Targeted engagement	No
TECNALIA	Basque country	Advanced Manufacturing, Digital Transformation	Targeted engagement	No
The Manufacturing Technology Centre	National	Aerospace, Advanced manufacturing, Construction, Defence	Targeted engagement	Yes
The High Value Manufacturing Catapult	West Midlands	Advanced manufacturing	DigiFed-Partner	Yes
TransilvaniaDIH	Transilvania	HW and SW	Targeted engagement	Yes
Uninova - Instituto de Desenvolvimento de Novas Tecnologias	Lisbon	Microelectronics Optoelectronics and Processes; Technology and Systems.	SAE	Yes
Universitat Politecnica De Valencia	Comunidad Valenciana	Electronics, Animal technologies, mechanics, water technologies	SAE	Yes
Universitatea Lucian Blaga Din Sibiu	Sibiu	Manufacturing, informatics	SAE	Yes
Universite Lumiere Lyon 2	Auvergne-Rhône-Alpes	Information and communication sciences	SAE	No
University of Maribor	Styria	technology innovation	Targeted engagement	No
University of Newcastle Upon Tyne	North East England	Digitization, IT	SAE	No
Univerzitet U Novom Sadu Fakultet Tehnickih Nauka	Novi Sad	Engineering, mathematics and natural sciences	SAE	Yes
Virtual Vehicle Research Gmbh	Steiermark	Automated vehicles	SAE	Yes
Zapadoceska Univerzita V Plzni	Bohemia	Applied sciences, electric engineering, new technologies	SAE	No
Zentrum Digitalisierung Landkreis Böblingen (ZD.BB)	Baden-Württemberg	Digitization	DigiFed-Partner	Yes

Table 1. Initial list of selected DIHs

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4. Conclusion

This deliverable describes the methodology and selection criteria to engange with the DIH-ecosystem beyond DigiFed. Modifications and adaptions to the original approach and engagement-objectives imposed by the covid-19 pandemic are explained and justified.

The current strategy aims at fulfiling the overall objectives of DigiFed and supporting other tasks and WPs centered on ecosystem building with DIHs. For this, firstly it focuses on exploiting the current DigiFed-DIH ecosystem, the DIH-ecosystem of SAE, and actively exploiting the results from previous participation on different ecosystem building activities as a means to target specific DIHs of interest and capitalize exiting collaborations. These activities have produced an *Initial set of selected DIH* to be contacted and engaged with composed of 87 DIHs. From this list we expect to achieve support from at least two DIHs to map their own regional/local environment (T4.3) and active participation of at least 10 DIHs in the remaining networking activities (T4.2).

As a consequence, this set of DIHs is constituted by DIHs with whom DigiFed has already established connections and collaborates, as well as DIHs that have not yet been directly engaged with. Moreover, these DIHs have different profiles, consolidation status, and complementarities.

A second step involved the development of a set of criteria to guide the actual engagement with the selected DIHs. Both, the criteria and the initial list constitute an input to Task 4.2, 4.3 and 4.4 in WP4 to feed its network expansion activities. This way, the engagement with the DIHs and the consolidation of the set of DIHs and features will be perform under WP4.

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