

D 2.4

Pathways validation and experimentation in DIH Networks – First Iteration

Action acronym	ConnectedFactories 2
Action Full Title	Global-leading smart manufacturing through digital platforms, cross-cutting features and skilled workforce
Grant Agreement Number	873086
Instrument	CSA: Coordination and Support Action
Deliverable Number	D2.4
Deliverable Title	Pathways validation and experimentation in DIH Networks – First Iteration
Lead Beneficiary	INNO
Work package	2
Work package leader	FPM
Dissemination level ¹	Public
Type ²	R
Due date according to DoA	M15
Actual submission date	08 March 2021
Main editors and contributors:	INNO, VTT, INESC TEC, IMR

¹ PU: Public, CO: Confidential, only for members of the consortium (including the Commission Services)

² RE: Report, OT: Other; ORDP: Open Research Data Pilot



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Abbreviations and acronyms

TERMS, ABBREVIATIONS AND ACRONYMS	
DIH	Digital Innovation Hub
EDIH	European Digital Innovation Hub
DEI	Digitalising European Industry
SME	Small & Medium Enterprises



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1 Executive Summary

This document reports the strategy and action plan to bring the ConnectedFactories 2 Pathways methodology to European SMEs through the network of Digital Innovation Hubs (DIHs), that are currently established or being developed in the scope of some European Projects. The target is to validate and assess the Pathways with a large number of manufacturing SMEs from many different regions of Europe. At the same time, the hubs and networks shall become *evangelizers* of the Pathways.

To achieve this, a set of *train the trainer* workshops is proposed, to prepare the DIHs to use the tools and methodologies established by the ConnectedFactories 2 CSA to assess the technologies and solutions available to progress in the Digitalisation Pathways, and to be able to enrich the collection of use cases that serve as example for other SMEs.

The ICT Innovation for Manufacturing SMEs (I4MS - <https://i4ms.eu>) DIH networks are the first ones to be addressed, as there are important synergies and alignments with the Pathways, both targeting at the acceleration of digital transformation in manufacturing. Moreover, several partners of the ConnectedFactories 2 CSA are involved in I4MS initiatives and we could leverage on this synergy. Follow-up workshops will allow to gather the feedback from the DIHs to fine tune both the Pathways and the engagement strategy proposed in this document. These follow-up workshops can also be taken as *train the trainer* for a second wave of initiatives, that will see how other DIHs are already using the Pathways methodology.



2 Introduction

This document describes the strategy and action plan that the ConnectedFactories 2 CSA is setting up to engage the Digital Innovation Hub (DIH) networks in the experimentation and the validation of the Pathways. The remaining of this document is organised as follows:

Section 3 provides the objectives and the main directives of this strategy. This will be developed in 4 subsections, where each one will touch a different topic.

In section 4, an overview of the main DIH networks that will be targeted is depicted. The initiatives have been differentiated depending on the European topic ID. The section lists first the most relevant I4MS projects and later other interesting initiatives that may be included in the future. In addition, a mapping of the initiatives with the Pathways will be carried out.

In section 5 the main guidelines for the preparation, execution and follow-up of the Train the Trainer workshop are provided.

Section 6 reflects several of the actions taken by ConnectedFactories 2 CSA partners.

Finally, in section 7 some conclusions and final remarks to the document are presented.



3 Reaching SMEs through DIHs

3.1 Digital Innovation Hubs as Pathways Evangelists

The EU proposed Digital Innovation Hubs as a key priority in the Digitising European Industry (DEI) Initiative³, adopted in April 2016. In particular, the Commission has been supporting digital transformation experiments and networking of DIHs through Horizon 2020 projects. These projects beyond their SME-driven experiments conducted along the project's lifetime, usually foresee cascade funding mechanisms through open calls by **engaging SMEs in innovative experiments with DIHs** in a cross-border context. In Horizon Europe and in the Digital Europe Program (DEP) the DIH networks will also play a strong role. In particular, the European Digital Innovation Hubs (EDIHs) in the DEP will provide access to technical expertise and experimentation as well as the possibility to “test before invest”. The EDIHs will help companies improve business/production processes, products, or services using digital technologies. They also provide innovation services, training, and skills development that are needed for a successful digital transformation.

Digital Innovation Hubs support and assist SMEs and start-ups and aim to become key actors in bringing digitisation within the reach of all industry sectors. The DEI community strongly supports the proposed European network of Digital Innovation Hubs as a means of supporting businesses, and **especially SMEs** and non-technology intensive industry, in seizing the opportunities of digital transformation.

One of the key messages that the Commission has established for the DIHs is that they must be **evangelists⁴ for digitisation** within their constituencies. They must be highly client-focused while having collaboration and networking as a defining characteristic. They must instil entrepreneurial thinking and embed a digital culture in companies while being firmly rooted in practical business solutions. They must have a strong physical presence while also operating effectively in the digital space. And they must have flexible business models that are able to adapt and evolve over time as circumstances and funding regimes change.

In this context, the ConnectedFactories 2 CSA is working to **engage the DIHs to become evangelists of the Pathways**, to integrate them into their own tools to help them in this huge task that is digitalising the European SME industries. At the same time, the feedback from DIHs will help to fine tune the Pathways to align them better with the needs and requirements of the SMEs.

3.2 The Pathways in DIHs

The Pathways to the digitalisation of manufacturing are a simple but powerful representation of how the digitalisation can bring value in the different manufacturing areas, such as factory automation, value networks of product-service development. The Pathways also guide the manufacturing industries in their transition towards data based and circular business. In addition, the most significant key enablers and cross-cutting factors (such as engineering skills and tools, interoperability, security, etc.) that empower the

³ Digitalising European Industry Strategy: <https://ec.europa.eu/digital-single-market/en/digitising-european-industry>

⁴ Roundtable on DEI, WG1 Digital Innovation Hubs, 2017:

https://ec.europa.eu/futurium/en/system/files/ged/dei_working_group1_report_june2017_0.pdf



progress along Pathways are also addressed. The Pathways framework is available in the structured wiki of the EFFRA Innovation Portal⁵.

The main objective of the Pathways is to facilitate the migration from legacy situation to innovative approaches by showing what are the technologies available for the different steps and also by showing examples of how this migration has been achieved by others. This objective is aligned with the purpose of DIHs, and it can become an important asset for them.

In addition, the Pathways facilitate and stimulate the companies to have internal discussions and help them to identify the main areas of development: where they can evolve, how to approach the digitalisation process, where to invest, what are the tools and technologies and key enablers needed to reach the desired level within the Pathways. On the other hand, Pathways can help the DIH itself to analyse their portfolio of experiments and use cases to find gaps and to identify actions and technologies that have to be improved or tested to provide a more complete vision of the migration process.

At the same time, by mapping SME use cases on Pathways, the DIHs will gain a wider visibility for the hub and for the use case owner, as the EFFRA Innovation Portal is an open access site with significant coverage.

3.3 Strategic Guidelines

The ambition is to turn the relevant DIHs into a Pathway evangelist and engage them in the dissemination, validation and refinement of the Pathways. To achieve this, the following strategic lines have been defined:

- 1. Train the DIHs as evangelists for the Pathways:** Provide the DIHs with the knowledge required to understand and explain the concept of the Pathways, and to use the mapping tool (the EFFRA portal).
- 2. Highlight the benefits of the Pathways for the DIHs:** Show the opportunities that the Pathways can bring the DIHs, not only to assess the digital maturity of the SMEs they collaborate with, but also to highlight the areas in which the DIHs are specialised, and to identify the gaps and the areas in which their affiliated SMEs should advance.
- 3. Focus on DIH Networks:** Several initiatives and projects are developing networks of DIHs to foster the collaboration among them, and to provide them with support and tools. ConnectedFactories 2 will identify relevant DIH networks, in order to support a maximum number of DIHs focusing on manufacturing digitalisation and circular economy.
- 4. Enlarge the use case collection, especially from SMEs:** The DIHs will provide access to a huge network of SMEs from all over Europe. This will allow us to collect a representative sample of use cases and validate the work done in the CSA.
- 5. Ensure the use of the Pathways beyond the ConnectedFactories 2 CSA:** Involving the DIH we will ensure that the Pathways are used to promote the digitalisation even after the CSA. This is also supported by EFFRA that hosts the Innovation Portal even after project end.

⁵ <https://portal.effra.eu/wiki>



3.4 DIH Engagement Process

In order to involve the DIH networks on the validation and experimentation of the Pathways, a linear process has been defined, although it can be adapted to the different needs.

STEP 1 – IDENTIFICATION OF INITIATIVES

Among all the initiatives that have created networks of DIHs, the focus will be on the manufacturing DIH Networks, although in the future the scope can be extended to other topics. The different initiatives will be analysed and those that are more aligned with the concept of the Pathways will be addressed in first place.

STEP 2 – TRAIN THE TRAINERS WORKSHOP

After contacting the selected initiatives, ConnectedFactories 2 CSA will invite the selected DIHs into a Train to Trainers workshop. The objective is to provide them with the knowledge and the tools to use and participate actively in the validation of the Pathways.

STEP 3 – VALIDATION IN THE DIH

The ConnectedFactories 2 CSA will encourage the DIHs to start validating the Pathways with their experiments and use cases, collecting the feedback from the SMEs involved. Access to the Innovation Portal will be provided so they can map those use cases and initiatives.

STEP 4 – FOLLOW-UP WORKSHOP

Follow-up workshops will be organised to collect the feedback from all selected DIHs, what will help to refine and fine tune the different concepts of the Pathways and the tools provided (the EFFRA portal), and to make them more accessible to the SMEs. This follow-up workshop can also become a Train the Trainer Workshop for new DIHs.

STEP 5 – EXPANSION ENGAGE BROADER NETWORK OF DIHS (EDIHS, CE)

With the objective of enlarging the reach of the Pathways in Europe new initiatives will be included in other *train the trainer* workshops. In this aspect, ConnectedFactories 2 partners will continuously monitor the DIH landscape to spot new and interesting initiatives that can be involved to broaden and reach new regions.



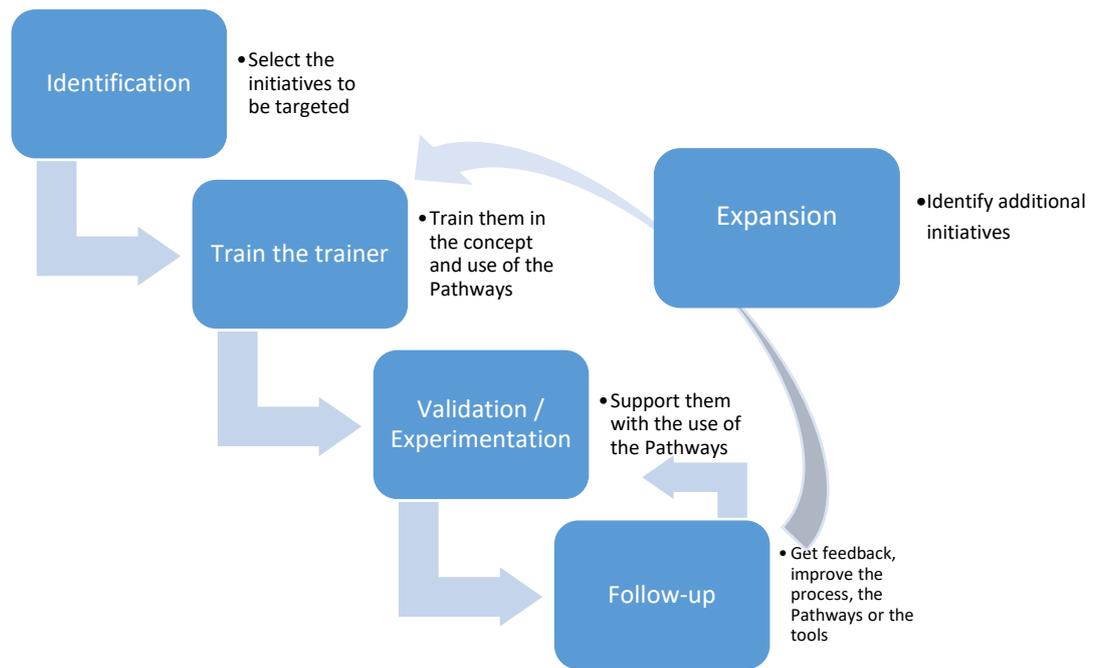


Figure 1 - DIH Engagement Process

3.5 European Digital Innovation Hubs

The European Commission has proposed the creation of the first-ever Digital Europe Programme, which would invest €9.2 billion to align the next long-term EU budget 2021-2027 with increasing digital challenges. In this frame, European Digital Innovation Hubs (EDIHs) function as one-stop shops that help companies dynamically respond to these challenges and become more competitive.

European Digital Innovation Hubs will have both local and European functions. EU funding will be made available for hubs that are already (or will be) supported by their Member States (or regions), in order to increase the impact of public funding. The Digital Europe Programme will increase the capacities of the selected hubs to cover activities with a clear European added value, based on networking the hubs and promoting the transfer of expertise. Member States have an essential role in the selection process of the EDIHs; the initial network of EDIHs will be established from a list of hubs designated by the Member States.

After the EDIHs will be selected and operational, they will form a powerful European network to accelerate digitalisation. The EDIHs that operate in manufacturing sector may become an additional channel to disseminate Pathways and reach out to even more SMEs.

Currently, the process to designate the EDIHs is not yet finished, although the objective of the commission is to enable the selected EDIHs to start their operations after summer in 2021. Therefore, it is expected to finalise the project by Q1 2021.



4 Manufacturing DIH Networks

This chapter provides an overview of the initiatives and projects representing manufacturing DIH Networks in Europe, and evaluate the alignment between their activities and the Pathways for Digital Transformation.

In a first stage, the ICT Innovation for Manufacturing SMEs (I4MS) projects will be targeted, as these hubs are particularly focusing on digitalisation of small manufacturing companies. The involvement of some of the partners of the ConnectedFactories 2 in those projects is significant, what makes them easier to reach.

Moreover, other relevant hubs, such as European Digital Innovations Hubs for manufacturing, initiatives related with SAE and hubs dedicated to circularity should also be addressed. This selection will be made on basis of its DIH networks potential, also assessing its alignment with Pathways and its contribution towards the digitisation of SMEs. The participation of any ConnectedFactories 2 partner in the projects will also be taken as a selection criterion.

4.1 I4MS (phase 4) - DT-ICT-03-2020

4.1.1 DIH-World

DIH-World, starting 1st July 2020 aims to **accelerate the uptake of advanced digital technologies by European manufacturing SMEs in all sectors** by supporting them in building sustainable competitive advantages and reaching global markets. Also pretends to **accelerate the maturity of DIHs and the development of their collaboration capabilities** and provide them access to harmonised **tools**, well proven technologies, effective **methodologies**, sound knowledge, smart investment sources, rich **training** assets and overall a **vibrant innovation environment**.

These well-established project objectives, aligned with the Pathways, and the high contribution to it of one of the CF2 partners, motivate its selection at this first stage.



Figure 2 DIH-World Network

4.1.2 AI REGIO

AI REGIO “Regions and Digital Innovation Hubs alliance for AI-driven digital transformation of European Manufacturing SMEs”, starting 1st October 2020, aims at filling 3 major gaps currently preventing AI-driven DIHs from implementing fully effective digital transformation Pathways for their Manufacturing SMEs.





Figure 3: AI REGIO map of DIHs.

This DIH network has been selected as a priority for the interests of ConnectedFactories 2 due to the significant involvement of a CSA partner. Furthermore, its main objective is clearly aligned with the Pathways.

The AI REGIO project will build a one-stop-shop platform that enables access to resources for AI-based solutions in efficient and sustainable manufacturing, with particular emphasis on resources that can lower the AI adoption barriers for SMEs.

4.1.3 Change2Twin

Change2Twin is a European project which supports manufacturing SMEs in their digitalisation process by providing Digital Twin solutions. The concept of Digital Twin is one of the big game-changers in manufacturing and allows companies to significantly increase their global competitiveness.

Change2Twin will adopt the best practices developed so far in I4MS: helping manufacturing SMEs in their digitalisation efforts; focusing on local support provided by DIHs; and keeping cascade grants as accessible as possible.

Change2Twin has certified **38 Digital Innovation Hubs from 15 countries**.



Figure 4: Change2Twin map of DIHs.

4.1.4 DIGITbrain

The EU Research and Innovation Programme, Horizon 2020, funds DIGITbrain Project. It started on 1st July 2020 and aims to enable small and medium-sized European manufacturing companies to benefit from AI-based Manufacturing-as-a-Service (MaaS).



DIGITbrain is deeply rooted in the innovation ecosystem of the I4MS project CloudiFacturing and the industrial platforms FIWARE and IDS, and it will build on these results, by means of extending the CloudiFacturing solution with an augmented digital-twin concept called “Digital Product Brain” (DPB) and a smart business model called “Manufacturing as a Service” (MaaS).

In order to maximise the impact of the experiments, each of them will be accompanied by a Digital Innovation Hub (DIH) which will provide help from proposal writing to technical and business support for each use case. The DIHs will become the main facilitators of MaaS.

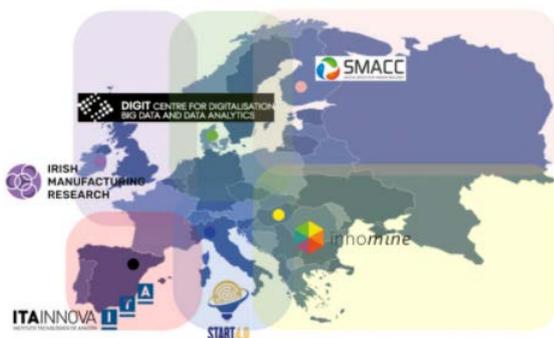


Figure 5: DIGITBrain map of DIHs.



4.1.5 Vojext

VOJEXT, starting 1st July 2020, will demonstrate its value through five different experimental pilots in five different sectors (plastic textile, electronics, automotive, construction and creative architecture for urban regeneration).

VOJEXT covers traditional and non-traditional areas for AI-robotics and cognitive ICT developments. The project will foster scientific and business driven innovation under the umbrella of the Digital Innovation Hubs in Spain, Germany, Poland and France that specialise in robotics, artificial intelligence, automation and manufacturing; which will be linked to other seven DIHs in Hungary, Romania, Lithuania, Italy and United Kingdom through the advisory board.



4.1.6 I4MS4Ts

The Coordination and support action I4MS4Ts (I4MS Tools and Technologies for Transformation), starting in 1st June 2020, contributes to I4MS ecosystem structuration and visibility.

It collaborates with Innovation Actions, Digital Innovation Hubs and other related networks (SAE, EFFRA, EIT Manufacturing, Blueprint for Sectoral Cooperation on Skills: etc.) to solve the challenges faced by tech suppliers and public bodies (innovation support/economic development agencies) when trying to accelerate digital take up by manufacturing SMEs and midcaps in Europe. While sustaining and enhancing the work done in previous I4MS Phases, I4MS4Ts will contribute to a more efficient, collaborative and clustered ecosystem structure and will make use of best practises from early adopters to reach the late majority of manufacturing SMEs.

4.2 Smart Anything Everywhere (SAE) - DT-ICT-01-2019

4.2.1 Smart4Europe2

The Coordination and Support Action Smart4Europe2 started in January 2020 and aims to support SMEs and mid-caps in their digital transformation as well as building a pan-European network of Digital Innovation Hubs. The SAE Initiative is not specifically focussed on manufacturing, but most SAE projects (Innovation Actions) include manufacturing as a target sector. Smart4Europe2 provides the enabling tools and services for the SAE Initiative, fosters collaboration between its projects and related other initiatives within the same focus area such as I4MS and ConnectedFactories 2. Moreover, the CSA provides services and trainings to start-ups, SMEs and mid-caps to support their digital transformation journey. Here, mutual benefits could be exploited between Smart4Europe2 (the coordinator is part of the ConnectedFactories 2 consortium) and ConnectedFactories 2 in upskilling the companies with knowledge developed within the pathways to digitization in manufacturing and the associated use-cases.



4.2.2 BOWI

Boosting Widening Digital Innovation Hubs (BOWI) aims to **support DIHs, SMEs, and Midcaps by facilitating the access and uptake of SAE and I4MS technologies**. The BOWI Network of Mature Hubs will consist of the mature hubs already part of the consortium and hubs well-established and highly experienced in I4MS and SAE technologies. Through an open call aims to add 9 developing hubs to activate cross-border technology transfer programmes together with mature DIHs.



The **overall BOWI aim is to build a digital innovation hub (DIH) network** based on experience and practice sharing. This network will support the collaboration between developing hubs (protohubs) in regions where SAE and I4MS technologies are underrepresented, and well-established hubs with experience in these technologies. For this reason, is a good candidate for the second selection stage.

4.2.3 DIH4CPS

The initiative for Fostering DIHs for Embedding Interoperability in Cyber-Physical Systems of European SMEs (DIH4CPS) will help European enterprises overcome these innovation hurdles and establish Europe as a world leading innovator of the Fourth Industrial Revolution. It started 1st January 2020 and will create an embracing, interdisciplinary network of DIHs and solution providers, focused on cyber-physical and embedded systems, interweaving knowledge and technologies from different domains, and connecting regional clusters with the pan-European expert pool of DIHs.



The DIH4CPS consortium consists of **13 DIHs from 9 countries** in all regions of Europe which all have a strong regional foundation and are role models for the transfer of research results into the industrial practice of regional SMEs and MidCaps.

4.2.4 DigiFed

The Digital Innovation Hubs (DIH) federation for large scale adoption of digital technologies by European SMEs Innovation Action (IA) – DigiFed aims to foster digitalization of the European industrial landscape in the field of Cyber-Physical and Embedded Systems, particularly targeting SMEs. DigiFed is also focused on the development and consolidation of a Europe-wide DIH-network into a common ecosystem. To this purpose, it aims at understanding the operational, structural, and financial factors of success of different DIHs throughout the European landscape, including unveiling the role of the local DIH-ecosystem in their success and the impact of the services they provide to support SMEs. Moreover, DigiFed aims at identifying and establishing synergies between DIHs, such that they can improve and expand their services.



The DigiFed consortium consists of 13 partners from 9 countries, of which 9 partners are also DIHs in 7 European regions, with vast experience supporting SMEs, start-ups and technology transfer. The DigiFed IA started the 1st of January 2020.



4.3 Other projects and initiatives in DIH for Manufacturing

4.3.1 DIH4Industry

To enlarge the outreach of MIDIH H2020 Project, and to create a broader network of industrial Digital Innovation Hubs, DIH4Industry was created, a digital European Marketplace platform of knowledge, components and services provided by MIDIH for active and upcoming Digital Innovation Hubs (DIHs) in the Digital Industry area. DIH4Industry aims to be a matchmaking platform for European DIHs that allows solutions and services, supplied by different projects/initiatives, to be shared in the context of manufacturing to support European SMEs in their digital transformation.

Due to the significant participation of a ConnectedFactories 2 partner and to its action field, has been decided that this project is deservedly assessable on the second selection phase.



Figure 6 DIH4Industry Map of DIHs

4.3.2 DIHNet – (DT-ICT-06-2018) & DIH4AI – (ICT-49-2020)

The DIHNET.EU project enables the coordination of European, national and regional initiatives directly supporting the digital transformation and Digital Innovation Hubs (DIHs). The project aims to create a sustainable pan-European network of networks, with a focus on regional DIHs. This will boost DIHs collaboration and will offer services and tools to DIHs



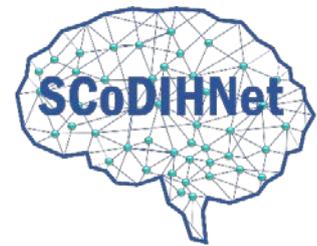
4.3.2.1 DIH4AI

The DIH4AI project aims at **building a network of AI-on-demand innovation and collaboration platforms**, supporting joint development and provision of ecosystem-business-technology-transformation services through a sustainable network of regional DIHs specialised in AI and targeting local SMEs and local tech governmental agencies. The DIH4AI regional platforms are by design interoperable with the pan-EU AI4EU platform thanks to an interoperability framework operating at Portal, Data and Cloud levels, allowing SME-DIH-EU virtuous bi-directional collaborations at the level of shared AI resources, AI-oriented standard data models and ontologies, AI ready FAIR datasets, AI-driven user interaction and services (SAAS) and AI-compatible advanced computation facilities (PAAS and IAAS).



4.3.3 SCODIHNET

The SCoDIHNet initiative is contributing to the European Industry Digitalisation helping companies to improve their processes, products and services through the use of connectivity technologies. This initiative is co-supported by AIOTI (www.aioti.eu) and the 5GIA (www.5g-ia.eu) and is supporting Digital Innovation Hubs that are providing services on 5G, IoT, Cybersecurity and artificial intelligence. 5G, IoT are key technologies to develop digitalisation of European industry together with AI and cybersecurity in order to ensure flexibility, adaptability and end-to-end security.



Today, the SCoDIHNet initiative encompasses 78 members from 24 European countries.

4.3.4 EUHubs4Data - DT-ICT-05-2020

The European federation of Data Driven Innovation Hubs (EUH4D) aims to consolidate as the European reference for data driven innovation and experimentation, fostering collaboration between data driven initiatives in Europe, federating solutions in a global common catalogue of data services, and sharing data in a cross-border and cross-sector basis. It provides an integrated ecosystem aimed to stimulate greater participation of European SMEs and start-ups in the data economy.



With the objective of serving as reference to the establishment of the Common European Data Spaces, the federation is initially composed of 12 DIHs, covering 10 countries and 12 different regions, and plans to increase the geographical coverage by incorporating other relevant initiatives in the upcoming months.

4.3.5 DIH² - DT-ICT-02-2018

DIH² is now a network of 25 DIHs with a target to reach over 170 DIHs. DIH² believes in the power of robotics to transform the agility of manufacturing in Small and Medium-sized Enterprises (SMEs) and to drive economic growth across the European Union. Starting 1st January 2019, the sole aim of the network is to **spark incremental** (cut 50% cost of advance robotics solutions, double the growth of robotics market) and **disruptive** (maximum productivity & optimum agility) **innovations in over 300,000 Manufacturing SMEs and Mid-Caps**. It will support SMEs in their Agile Production challenge (50% increase in productivity) and unleash their digitalisation potential by enabling robot solutions that are more cost effective at lower lot sizes.



Figure 7: DIH² map of DIHs.

DIH² will transform this network into a self-sustainable non-profit association with members all over Europe. DIH² will demonstrate that public funded research can help SMEs & Mid-Caps achieve digital excellence and global competitiveness through adopting advanced robotics solutions in Agile Production.



4.3.6 S-TEC ⁶ and the Application Centre Industrie 4.0^{7 8}

The Application Centre Industrie 4.0 is an innovation environment that belongs to Fraunhofer IPA. It is used to conduct research on Industrie 4.0 applications, as well as to further develop them to meet requirements. The main objectives of the Application Centre Industrie 4.0 are summarized in the attached figure.

Companies may use the centre as a testing environment for their own projects, or for joint research and development projects. Today’s demonstrators are already showing how cyber-physical systems can be implemented in manufacturing. Generative manufacturing technologies and real-time simulations are also demonstrated.



Figure 8: Application Centre Industrie 4.0 - Objectives

Recently the work of the Application Centre Industrie 4.0 has been reorganized and the activities smoothly transited to the Stuttgart Technology and Innovation Campus S-TEC. S-TEC was co-founded by Fraunhofer, the University of Stuttgart and the state government of Baden-Württemberg with a view to advancing future-oriented research topics and bringing them quickly to the market. Lighthouse research, industry-on-campus projects and start-ups, as well as training courses and further education programs take place on the campus. S-TEC networks companies with Stuttgart’s highly-diverse research landscape across the following five areas:



Figure 9: S-TEC centers

- 1. Service Centre Mass Personalization:** Holistic personalized product and service innovations.
- 2. Centre for Additive Manufacturing:** Development of additive processes and total process chains for the production of the future.
- 3. Centre for Cyber Cognitive Intelligence:** Research and development of intelligent methods and tools with the latest findings in Artificial Intelligence and Industry 4.0
- 4. Centre for Cyber Physical Systems:** Design and development of architecture, infrastructure and toolchain for Cyber Physical (Production) Systems.
- 5. Centre for Digitized Battery Cell Production:** Development and establishment of highly flexible series production processes for different battery technologies.

⁶ [S-TEC - We power innovation. \(s-tec.de\)](http://s-tec.de)

⁷ [Application Center Industrie 4.0](#)

⁸ [Digital Innovation Hubs - Smart Specialisation Platform \(europa.eu\)](http://europa.eu)



4.3.7 Future Work Lab

Opened on February 2, 2017, the Future Work Lab (FWL) is Germany’s largest facility exploring the impact of Industrie 4.0 on industrial manufacturing. Occupying 1,000 m², it offers a first-hand taste of the industry workplaces of the future. The Demonstrator World showcases more than 50 demonstrators, covering the full range of future industrial work environments and bringing them to life. This gives the companies the chance to see in a showcase how aspects of digitalization can enhance future workplaces.



Figure 10: The Future Work Lab - Demonstrator World

The Future Work Lab hosts regular webinars and “Open Lab Days”. In April 2021, the project will be part of the Hannover Messe digital edition and will host its first “International Open Lab Day” on April 14. With FutureWork360, four thematic virtual tours have been realized in three different languages for global accessibility.



Figure 11: The Future Work Lab – Open Lab Days

The focus of the current work of the FWL is to make AI usable for the factory of tomorrow and to create use cases

4.4 Mapping of the initiatives with the Pathways

All the above-mentioned initiatives are being analysed and interviews with the project leaders are being conducted in order to have an overview that will help to group and prioritise the initiatives according to the most relevant pathways for each of them. Figure 12 provides a tentative mapping of the initiatives and the Pathways, which is being continuously updated as the initiative leaders are interviewed.



	Hyper-connected Factories pathway	Autonomous Smart Factories pathway	Collaborative Product-Service Factories pathway	Cybersecurity pathway	Circular Economy pathway	Data-Spaces pathway
DT-ICT-03-2020						
DIH-World		X		X		X
AI REGIO	X	X		X		X
Change2Twin	X		X			X
DIGITbrain				X	X	X
Vojext	X	X	X			
I4MS4Ts	X	X	X	X	X	X
DT-ICT-01-2019						
Smart4Europe2	X	X	X	X	X	X
BOWI	X					X
DigiFed	X	X	X			X
DIH4CPS		X	X			
Other Initiatives						
DIH4Industry	X	X				X
DIHNET - DIH4AI	X	X				X
SCoDIHNet	X			X		X
EUH4D				X		X
DIH^2	X	X				

Figure 12- Tentative Mapping of the Manufacturing DIH Network Initiatives with the different Pathways



5 Train the trainers workshops

To address the first of the strategic guidelines, which is training the DIHs in the Pathways, a series of “train the trainer” workshops will be organised. The workshops will provide the DIHs the knowledge required to spread the word and to integrate the Pathways in their portfolio of tools that helps the SMEs to progress in their Digital Transformation. This section provides an overview of the main guidelines for the preparation and execution of these workshops.

5.1 Objectives of the workshop

The train the trainer workshops aim to:

1. Introduce the ConnectedFactories 2 CSA and the Pathways to the DIHs
2. Engage DIHs to use and disseminate the Pathways to digitalisation of manufacturing
3. Foster the collection of use cases by the DIHs and to map them into the EFFRA Innovation Portal
4. Obtain feedback on the Pathways and the cross-cutting factors

5.2 Structure of the workshop

Workshops will be structured with special focus on participation and interaction of the participants. The duration of the workshops will be around three hours and will include the following activities:

- Brief presentation of the ConnectedFactories 2 CSA
- Presentation of the Pathways for Digitalisation of Manufacturing. This presentation will be adapted to the audience, focusing on the Pathways that may be of special interest to the attendants. The speaker(s) will highlight the benefits of using the Pathways as tool to assess the digital maturity of the SMEs and to identify the processes that could be improved.
- Presentation of the EFFRA Innovation Portal as a tool both to find use cases that can be used as examples on how to move forward on the Pathways, and to map pilots, trials and use cases, providing visibility both to the companies involved and the DIHs. It can also help the DIHs to identify their areas of specialisation within the Pathways, or gaps that should be addressed in future use cases with SMEs.
- Interactive session: A participative approach will foster discussion on ConnectedFactories 2 results and outcomes, collect feedback and input, and refine and find gaps in one of the following topics: (1) End user needs, trends and challenges, (2) cross-cutting factors, e.g. standardisation, business models, skills, cybersecurity, etc., (3) individual Pathways to digitalisation of manufacturing including sustainable value networks and circular economy, and data spaces, and (4) successful use-cases of digitalisation. Depending on participating DIH and associated companies more issues might be addressed.
- Wrap-up: Presentation and discussion of the preliminary results as well as the follow-up and engagement strategy.

The main part of the workshop should be the interactive sessions. To foster participation during these sessions, different tools and techniques may be used, e.g., dot voting, business model/problem canvas, Thinking Hats, questionnaires, rotating teams, etc. The utilisation of different techniques and tools changes



whether workshops are performed face-to-face or online. Nevertheless, different tools can be utilised to facilitate effective online attendance and to ensure that great results will be achieved.

5.3 Feedback and reporting

Workshops will be monitored, and results will be compiled into a workshop report. For this, a common template will be generated. Each report will consider a comprehensive analysis of the results obtained, including the main points of discussion and observation of the participants, especially regarding the identification of gaps in the existing Pathways and even new possible Pathways.

5.4 Workshop's success measuring

As mentioned before, the main aim of this workshop initiative is to introduce and disseminate the ConnectedFactories 2 CSA and Pathways to the DIHs in order to turn them into *Pathways evangelists* that helps us to reach more SMES, to collect and map additional use cases in the EFFRA Innovation Portal, and receive valuable feedback from these SMEs through the DIHs.

The first wave of this *train the trainer* workshops will target a few DIH Networks with a **scope of over 100 DIHs in more than 20 countries**. The measure of the success will be the number of DIHs engaged and the number of participants in each workshop. The intention is to **engage at least 50% of the DIHs** represented in these networks. Consequently, the KPI to be developed needs to measure the performance of the workshops and indicate the number of DIH that attends each workshop.

Beside the number of attendees and hubs, it will also be interesting to follow the number of cases identified, and how many of them address SME needs.



6 Examples of Specific actions and plans per partner

6.1 VTT - Finland

In Finland, the transition to circular and data-based business in manufacturing occurs in diverse national networks and communities. The collaboration with different stakeholder groups was launched at December 2020 within the national workshop entitled “Circular economy and digital manufacturing – Building Sustainability and Circularity for Manufacturing Industry”. The aim of the workshop was to collect feedback to the CE and Data Spaces Pathways developed in ConnectedFactories 2 and engage the stakeholders to further development. In particular, the national Sustainable Industry X hub, which is the European Digital Innovation Hub candidates in manufacturing, will offer services that help the manufacturing companies to realise transition to digital and circular business. In order to have up-to-date understanding of the development needs of manufacturing VTT conducted a SMEs survey at the end of year 2020. According to the survey results, the manufacturing industry has been suffering from insufficient availability of skilled labour for a long time. This already the companies’ reluctance to make investments. The result of survey emphasises that the SMEs in the manufacturing industry lacks resources and expertise needed for long-term strategic planning and visions of future business opportunities.

As a next step, the intention is to strengthen the collaboration with the DIH network in order to enhance the development of strategic business competences of manufacturing SMEs. Especially, the topics related to twin transition (sustainability, circularity or carbon neutrality enabled by digitalisation) are identified as a crucial topic for further collaboration. Twin transition in industry is also the driver of the Finnish Artificial Intelligence 4.0 program⁹ that, among other things, will outline the organisation of the Finnish EDIH and DIH network and its task. ConnectedFactories 2 Pathways may be shared and spread in the network of the EDIHs once the hubs become fully operational. The Finnish Artificial Intelligence 4.0 has a strong focus on data economy and will support action that help small companies in the adoption of data-based business models. There is a huge potential for Finnish technology industry companies, but obvious development needs as well.

Currently, VTT also coordinates several H2020 DIH project networks such as DIH² and BetterFactory focusing on robotics in manufacturing. VTT will encourage these DIH networks to test and adopt the ConnectedFactories 2 Pathways.

6.2 INESC TEC - Portugal

In December 2020, the Ministry of Economy of the Portuguese Government launched the Digital Innovation Hubs Call (“Polos de Inovação Digital” in Portuguese)¹⁰. A total of 31 applications completed both stages of the process (January and February 2021, respectively), which is now under evaluation. These consortia have in common the fact that they intend to be a one-stop-shop for digital transformation and to boost the application of digital technologies in companies, mostly to SMEs.

⁹ https://tem.fi/-/tekoaly-4.0-ohjelma-vauhdittaa-liiketoiminnan-digitalisaatiota?languageId=en_US

¹⁰ <https://www.iapmei.pt/PRODUTOS-E-SERVICOS/Empreendedorismo-Inovacao/Inovacao-e-Competitividade/Programas-e-iniciativas/Rede-de-Polos-de-Inovacao-Digital.aspx>



Several consortia aim to apply Artificial Intelligence, High Performance Computing, or Cybersecurity, or a combination of these main areas, as their core business. Some of the DIH applicants are sector-oriented, while others are transversal. Almost all of these stated they want to apply to the European DIH call. The Portuguese Government will choose 10 to such call and the results are likely to be public during March 2021.

Specifically related to Industry 4.0 and to ConnectedFactories 2 pathways, there is PRODUTECH DIH applicant, in which INESC TEC is an active and key consortium member. In addition, PRODUTECH is an officially recognized innovation cluster since 2009 from which INESC TEC is a founding member, and it already acts as a *de-facto* DIH.

INESC TEC plays a key supporting role to this collaboration network and engages with PRODUTECH to get feedback from its fellow members and to disseminate information to them. This is done either by organizing specific meetings and workshops with them, or by participating in events organized by the managing structure. For the forthcoming pathways validation, INESC TEC intends to proceed the same way with PRODUTECH as well as with other DIHs relevant to this area.

6.3 IMR - Ireland

Irish Manufacturing Research Ltd. (IMR) is a small, agile, independent research technology organisation at the heart of a regional ecosystem of partners, including more than 150 companies, and intrinsic part of the Irish manufacturing innovation cluster.

Specific actions to engage DIHs to validate the Pathways: Organisational Level

The organisation utilises digital marketing channels to provide information on digitisation technologies and opportunities for SME's to engage with. One of the areas of digitisation where IMR focuses is the application of the Industrial Internet of Things in the context of Industry 4.0. IMR looks to provide leadership across 3 key themes within this digitisation theme;

1. Technology understanding and identification.
2. Skills needed to support digitisation strategies.
3. Organisational capabilities and structures.

Technology understanding and identification

IMR have completed a series of webinar's targeted at SME's to provide context to technology allowing them to understand where technologies can be applied. A series of subjects have been presented including 'An introduction to IIoT', 'An I4.0 pilot factory', 'AI applications in manufacturing' and 'Blockchain technology in manufacturing'. These act as a reference to SME's on how to approach technology selection which enables IMR to provide support in further investigative work and the creation of research objectives. The initial series of talks has resulted in more specific subjects being presented throughout 2021. For example, in March IMR will be presenting talks on 'Digital Twins and their application to manufacturing' and 'An architectural framework to support I4.0'. A series of white papers are also planned to document in more detail different aspects of digitisation. These will include subjects on power management of IIoT edge devices, OPC UA, Use case IIoT deployments and 5G MPN's and their industrial applications.

Skills needed to support digitisation



The development of workforce skills is seen as a critical area to address which has been highlighted through IMR's dissemination and webinar activities. This has led IMR to focus on the development of a series of nationally recognised CPD certified courses to assist SME's in the development of their key digitisation personnel. This strategy was developed in response to feedback from the webinar series of activities completed to date. Examples of the courses developed include virtually delivered hands on classes in IIoT and Machine Learning. Both of which are supported by the nationally focused 'Engineers Ireland'. It is anticipated that further work will be undertaken throughout 2021 to offer similar short and comprehensive courses to enable SME's to develop the skills needed to harness the opportunities digitisation presents.

In parallel to this IMR is deploying technologies in live environments to present easy to adopt technologies in a way SME's can leverage. In 2020 this included the deployment of LoRa based sensor systems to enable SME's to monitor manufacturing environments and the development of data architectures and infrastructure models which are included in digital frameworks being developed and deployed in IMR. These teachable points of view were started in 2020 and will continue into 2021 through the development of a 'pilot factory concept' to support IMR's DIH strategy.

Organisational capabilities and structures

IMR has developed an 'Industrial data analytics framework' which helps organisations focus on identifying possible digital initiatives with high impact on their KPI's. This framework presents a gap analysis and supports companies to strategise on aligning digital technologies with their goals.

Specific actions to engage DIHs to validate the Pathways: Strategic level

IMR cooperates closely with EU Actions transferring research & innovative solutions into the wider manufacturing community.

- [CSA-Industry4.E](#): IMR successfully coordinate this ECSEL Industry4.E lighthouse Initiative project aimed at establishing a more connected community of relevant research development innovation across various funding programmes (i.e. ECSEL and H2020) to enable them to connect with each other and the end-user/stakeholder community.
- [CIRCULÉIRE](#) – **The National Platform for Circular Manufacturing**: IMR are the secretariat of the National Platform a national-level cross-sectoral public-private partnership, and its' vision is to accelerate the transition towards a zero-carbon circular economy in Ireland by embedding innovation in manufacturers and their supply-chains. Launching in January 2020, this three year initiative has a ring-fenced **innovation fund dedicated to large scale systems-level innovation and demonstration projects**. It is the ambition of this initiative to use the manufacturing sector as a role model for the circular transition across the entire Irish economy.

IMR are **Ireland's ONLY Regional Manufacturing DIH** delivering results with industry. Highlights of our I4MS pedigree:

- [BEinCPPS](#) I4MS phase 2: IMR received cascade funding from Business Experiments in Cyber Physical Production Systems (BEinCPPS) project to design and deliver a **"Digital Innovation Hub Feasibility Study"** in 2017



- [MIDIH](#) I4MS phase 3: IMR lead the MIDIH task “**Evolution of Phase 2 Regional Manufacturing DIHs**” which involves Business Coaching of the DIHs and includes new business models for DIHs of different types in different regions across the EU.
- [DIH²](#) is a network of 26 DIHs, with a target to reach over 170 DIHs. IMR will be involved in the **Business Coaching of the DIHs**. The aim of the network is to spark incremental and **disruptive innovations in over 300,000 SMEs** and Mid-Caps. IMR lead the Irish effort and truly understand the level of passion required to get industry to engage with cascade funds and R&D.

6.4 Innovalia - Spain

Innovalia has always fostered and supported DIHs in the manufacturing sectors, and has led several initiatives to develop and capacitate multisectoral DIH networks, where mentoring and training the DIHs has been one of the main activities, as well as providing them with tools to potentiate the digitalisation regional SMEs. Currently Innovalia is involved in several initiatives, such as DIH-World or DIH4AI, to help the Digital Innovation Hubs to expand their activities and reach more SMEs in their area of action.

Also, Innovalia has been involved since the creation of the International Data Spaces Association, in the dissemination and definition of the concept of the Data Spaces, the Digital Sovereignty and the data economy. In fact, Innovalia is the coordinator of the IDSA Hub Spain, which is the regional representation of the IDSA in Spain.

Innovalia has already started to discuss with the DIH-World initiative in the best way to spread the ConnectedFactories 2 Pathways in the DIH-World Network, and also plans to integrate the Data Spaces Pathways in the tools and activities that will be promoted from IDSA Hub Spain targeting the Spanish DIHs.

6.5 Fraunhofer IPA - Germany

Fraunhofer IPA (FHG IPA) is one of the Fraunhofer-Gesellschaft’s largest institutes that addresses a number of leading and future topics as e.g. battery production, adding value through bio-intelligence, digital transformation, frugal manufacturing systems, artificial intelligence for production and resilient value creation. Thus, in technological issues, the focus of research and development work at FHG IPA is mainly related to the manufacturing industry with 15 specialist departments covering the entire field of manufacturing engineering across various manufacturing sectors: automotive, machinery & equipment, electronics & microsystems, energy, medical engineering & biotechnology and the process industry. FHG IPA is directly involved or has initiated several DIH respectively.

FHG IPA experts have already established a contact to the Centre for Cyber Physical Systems of the S-TEC and have had the first exchange regarding the lighthouse research activities and current projects with industry. Interesting topic is the Training and Education program of the S-TEC. In this context, the first exchange between the Center and ConnectedFactories 2 could be successfully established and the possibility of dissemination have been discussed. Thus, the main aim is to use the provided dissemination channels of the centre to inform the German industrial community about ConnectedFactories developments, especially with the focus on the pathway development activities. Further exchange meetings have been already set up with the technical experts to exchange on such cross-cutting topics as “Interoperability and Standards” as well as



“Cybersecurity”. This contribution can improve the development of the new pathways planned for the current phase of the project.

Further activities were undertaken in relation to the completed work in the Application Centre Industrie 4.0. The centre has already finished several showcase projects in the area of Smart manufacturing and Industry 4.0. The results provide a valuable input to the cross-cutting factors “Interoperability and standards”, “Human in manufacturing” and “Cybersecurity”.

Further work has been done with regard to the ConnectedFactories 2 cross-cutting factors “Interoperability” and “Human in manufacturing”. For this purpose, the contact to the Future Work Lab has been established. During the first exchange a range of showcases could be identified that may specifically contribute with the current pathway development process. Further meetings have been already planned for the next period of time.

6.6 Fondazione Politecnico di Milano - Italy

The Industria 4.0 national plan

The Italian Piano Industria 4.0 (Industry4.0 plan) is a 4 years plan (2017 – 2020) with the objective of fostering the digital and technological development of the national industry, to increase competitiveness in the European and international scenario. The starting point of the strategy is to avoid sectorial and vertical initiatives but to create synergies among different stakeholders, by developing horizontal solutions.

To share awareness and competences about Industry4.0, but also to help enterprises to orientate among existing solutions or to develop new ones, research centres such as universities or innovation hubs play a fundamental role.

Hence, investments for Industry4.0 are addressed not only to private SMEs but funds have been allocated also with the aim of increasing research and creating hubs able to support enterprises towards the digital transformation. Namely, it has been encouraged the development of **Competence Centers** and **Digital Innovation Hubs**.

Competence Centers are centers working in collaboration with universities with the objective of: sharing and consolidating I4.0 awareness; developing I4.0 innovative solutions; exploiting new technologies making them accessible to public via live demos, webinars, workshops...

Digital Innovations Hubs are more numerous and widespread along the national territory, in order to get contact and support local regional realities. They represent a bridge between research and industry and whose goal is to share the I4.0 culture and provide a support in planning and investing in digital technology.

The network of DIHs and CCs

Currently in Italy there exists 8 Competence Centers and more than 20 DIHs. Politecnico di Milano, situated in Lombardia, has a strong relationship with MADE Competence Center (of which is the supervisor) and DIH Lombardia.

The MADE Competence Center



The MADE Competence Center, situated in Politecnico di Milano campus, consists of a 2000 mq demo-center together with rooms dedicated to co-working, meetings, training and education. With the aim of supporting enterprises in the journey towards digital transformation, main services provided are:

- **Showing and informing** about I4.0 technologies
- **Teaching and training**
- **Implementation** of innovative solution

The DIH Lombardia

DIH Lombardia (the Digital Innovation Hub of Confindustria) represents a bridge between research centers (such the MADE CC) and enterprises (mainly Small and Medium) located in Lombardia. It is the gateway for industries towards Industry4.0 world, promoting the innovation demand and creating synergies among different partners.

Thanks to the application of “TestIndustria 4.0”, that is a self-assessment tool developed by Politecnico di Milano, DIH Lombardia provides to enterprises a first overview of their digital maturity in order to identify areas to be improved. This is a fundamental starting point to define together the digital transformation roadmap and to help the company in the choice and planning of investments.

AFIL (Intelligent Factory Association Lombardy) is an Italian private association, recognized by Lombardy Region as the regional technological cluster for Advanced Manufacturing. It operates as the private part of a public-private partnership with Regione Lombardia with the aim of promoting research and innovation and enabling technologies for the manufacturing sector.

Namely, the objective is twofold: encouraging cooperation (connecting research institutions and association with enterprise stakeholders) and support to definition of research strategies as a point of contact in the regional scenario.

It is member of EDIH Lombardia (led by MADE Competence Center) together with Politecnico di Milano, other Lombardy universities and several public and private companies.

FPM is in contact with all the CCs and with most of the DIHs in Industria 4.0. Such initiatives are already aware of the three CF1 pathways, but we need to refresh them with the most recent industrial cases in Lombardia, both in EU and in Local R&I projects. Regarding the new pathways of Cybersecurity, Data Spaces and Circular Economy, we already contacted possible “trainer” roles in the “train the trainer” program. Cyber is one of the Technological Island of MADE CC (Prof. Stefano Zanero); Data Spaces is one of the preferred themes of DIH Lombardia which is an AI DIH (Dr. Giuseppe Linati) while Circular Economy was the subject of a Regional roadmapping exercise¹¹ coordinated by AFIL (Ing. Giacomo Copani).

6.7 Tecnalìa – Basque Contry

Tecnalìa is member of the BDIH (Basque Digital Innovation Hub). It is divided in several technological nodes addressing most of the key enablers and Cross Cutting Factors addressed in CF2. Amongst others:

¹¹ <https://www.afil.it/approvata-da-regione-lombardia-la-roadmap-di-ricerca-innovazione-sulleconomia-circolare/>



- Cybersecurity
- Data driven solutions
- Intelligent and connected machines
- ...

In the following figures Figure 13 and Figure 14, you can find the BDIH structure representation and the different nodes description. TECNALIA is coordinating the Flexible and collaborative robotics node.

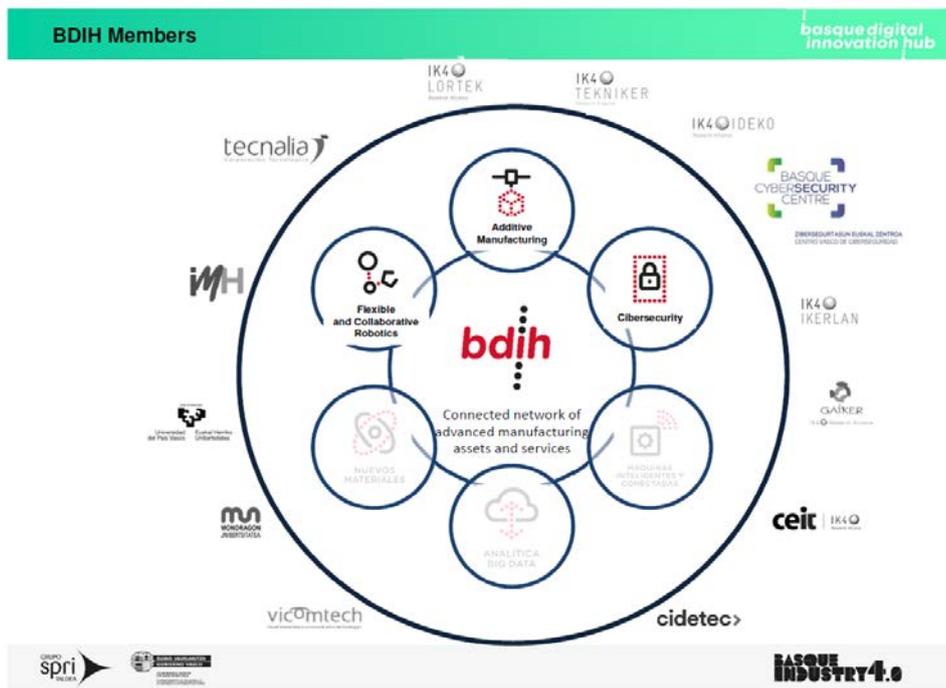


Figure 13: BDIH structure



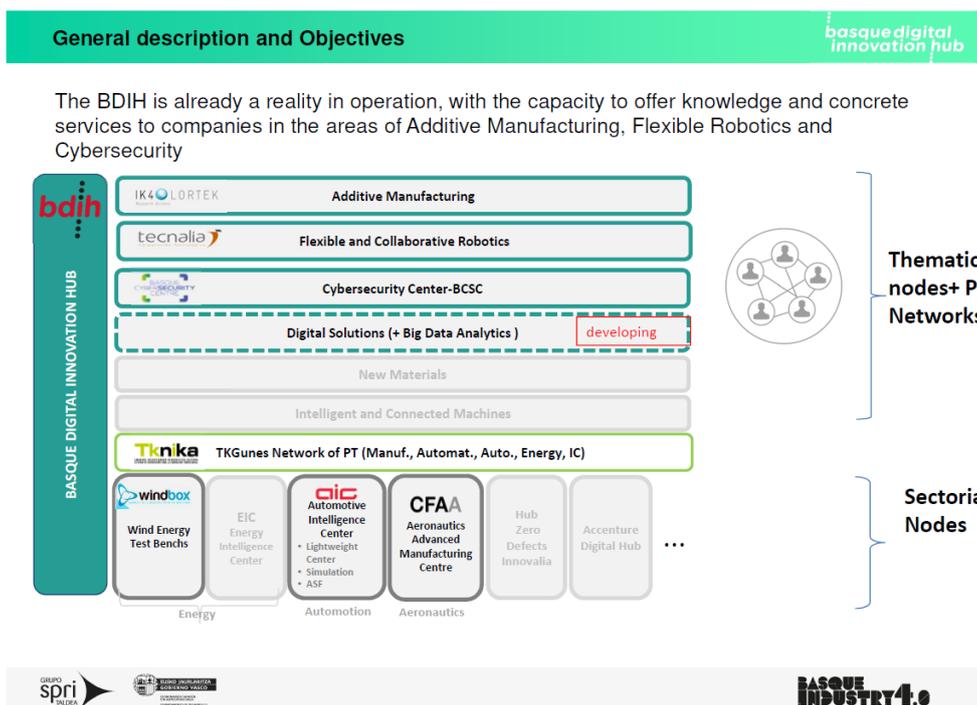


Figure 14:BDIH nodes

6.8 University of Nottingham – United Kingdom

Current validation of the ConnectedFactories2 pathways by the University of Nottingham have up to this point largely focused on SME contacts via our EU Regional Development Fund Projects (e.g. Aerospace Unleashing Potential) but moving forwards we will expand our approach into the UK-based Digital Innovation Hubs.

As a founding institution and board member of the Manufacturing Technology Centre (part of the High-Value Manufacturing Catapult), the University has a long-standing collaboration with this digital innovation hub. Additionally, the University has current and previous collaborations with the Advanced Manufacturing Research Centre, Digital Catapult, and Satellite Applications Catapult – all current or future DIHs. We will use our partnerships with these DIHs to continue to disseminate and validate the pathways to UK SMEs, with a particular focus on the aerospace and space sectors and the Autonomous and Smart Factories Pathway.

As members of the DIGITBrain DIH Network, the University of Nottingham will help SMEs in accessing and implementing Digital Twins, with a particular focus from the University on the usability and human factors aspects. Implementation of Digital Twins via a Manufacturing-as-a-Service approach is a key enabler of Autonomous and Smart Factories, so the network will be used to help validate and position Digital Twin MAAS on the pathway.

6.9 Steinbeis2i - Germany

Steinbeis2i is deeply rooted in the DIH ecosystem and Digitizing European Industry Initiative. S2i is coordinating Smart4Europe2 (the SAE CSA) and is partner in DigiFed (SAE IA) and AI REGIO (I4MS IA) playing an important role in building the pan-European network of DIHs as well as reaching out to and supporting



SMEs in their digital transformation. Steinbeis2i is part of a regional DIH as well as EDIH proposal. Moreover, S2i is a contact point for SMEs in the region of Baden-Württemberg.

Within ConnectedFactories 1 and 2 S2i has led the WP on conceptualising the national/regional workshops, holding such workshops and gathering the relevant data and results in reports. DIH representatives as well as SMEs have been invited to such workshops, to learn about the digitization pathways and how to implement them to enhance their digital transformation. DIHs of the SAE ecosystem have been made aware of the pathways and further activities are planned to provide them with information (train the trainer) to pass such knowledge to their ecosystems. S2i has been promoting the pathways at various events (including I4.0 Open Labs Days and Open Innovation Congress) in Baden Württemberg and will further engage the regional ecosystem in the adaption and application of the different pathways. To make the information on pathways as digestible and available as possible, S2i, together with EFFRA, has been developing so called 'animated pictures' (videos), which have been promoted broadly. The pathway videos have also been distributed via the SAE channels to broadly reach DIHs and SMEs across Europe.

6.10 TNO - Netherlands

The Netherlands

TNO has been involved in discussion regarding Digital Innovation Hubs on EU level (via different CSAs, IAs, service contracts) and on national level via discussions and participation in various field-labs (practical environments which further support the link between research, education, policy and industry and provide an environment for companies and research institutes to develop, test and implement innovative solutions). TNO is also a consortium partner in some of the candidate European Digital Innovation Hubs nominated by the Netherlands.

On EU level, TNO is participating in a number of EU projects which aim to support collaboration among DIHs and networks of DIHs. TNO is leading the DIHNET project, which aims to develop a network of networks and support collaboration among DIHs. To this end, various activities have been organized to further work on the understanding of activities and development of DIH and the future EDIHs and the overall EU DIH network, business models, and supporting information exchange and collaboration. Some examples include: starting an informal, open precursor network of potential EDIHs was started in October 2020, DIHNET acted as co-organizer of the first EDIH conference in January 2021, an annual champion challenge for DIHs across Europe, DIHNET community supporting over 1000 members, offering dedicated spaces for discussion, information (including a DIH of the month, monthly news from related initiatives, WGs) and different materials and webinars throughout the last 3 years.

TNO is also a partner in the BOWI project, working on topics related to establishing inter-regional collaboration corridors and sustainability of the network, as well as contributing to mentoring of hubs and SME experiments. In related projects such as RODIN, DIH4AI, Change2Twin, TNO is also, among others, contributing to topics related to sustainability of such DIH networks – often initiated by Innovation Actions or other EU projects-, as well as how the connection with the DIHs can be used to support the overall digital transition of SMEs.



6.11 LMS - Greece

LMS is leading the establishment and operation of a European Digital Innovation Hub in Greece with the headquarter and demo center located in Patras/Greece. ManuHub@WG assists the Greek industry and especially SMEs and midcaps in their digital transformation “journey” towards realizing and introducing advanced digital technologies. ManuHub@WG helps companies to adopt Industry4.0 technologies (artificial intelligence, robotics, additive manufacturing, cyber-physical-systems, augmented and virtual reality, Internet of Things, 5G, advanced manufacturing processes for advanced materials) in their production processes and to develop technologically new or significantly improved products.

LMS plans to utilize ConnectedFactories I and II pathways for self-assessing companies’ digital maturity level also by the time the network of the EDIHs becomes fully operational it may distribute the content of the pathways and make it usable for several EDIHs that aim at supporting manufacturing companies.

LMS cooperates closely with other EU actors transferring research & innovative solutions into the wider manufacturing community.

- **TRINITY (<https://trinityrobotics.eu/>):** The main objective of TRINITY is to create a network of multidisciplinary and synergistic local digital innovation hubs (DIHs) composed of research centers, companies, and university groups that cover a wide range of topics that can contribute to agile production: advanced robotics as the driving force and digital tools, data privacy and cyber security technologies to support the introduction of advanced robotic systems in the production processes.
- **RIMA (<https://rimanetwork.eu/>):** RIMA (Robotics for Inspection and Maintenance) is a 4-year project aiming to tackle this gap by establishing a network of 13 Digital Innovation Hubs (DIH) and industry associations to support the uptake of robotics – and help small and medium-sized companies (SMEs) to develop novel solutions for different industry sectors.



7 Conclusions and Future Outlook

This document presents the overall strategy for fostering the Pathway validation and experimentation in DIH networks, that has the key objective of turning DIHs into Pathways evangelists, providing this capillarisation that will help to reach and impact SMEs all over Europe. It also presents the individual actions that have been taken by the partners of ConnectedFactories 2 in relation with the DIH engagement to spread the word and also in the pathway validation and experimentation.

Transmitting this knowledge about the Pathways across the manufacturing DIHs will be an effective way to engage SMEs. Furthermore, this will enable ConnectedFactories 2 CSA to collect use cases and enrich the SMEs community with tools to accelerate digital transition.

In the next edition of this deliverable (D2.8 M34) the results of the actions will be reported, and the revisions of this strategy will also be presented.



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