



(E)DIH Service Portfolio, Customer Journey and Pipelines - M9

D3.1

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Abbreviations and Acronyms:	
AI	Artificial Intelligence
AR	Augmented Reality
BP	Blocking Points
CJ	Customer Journey
D BEST	Data Business Ecosystem Skills Technology
DIH	Digital Innovation Hub
DR BEST	Data Remote Business Ecosystem Skills Technology
DT	Digital Transformation
EC	European Commission
EDIH	European Digital Innovation Hub
ETL	Extract Transform Load
EU	European Union
FSTP	Financial Support for Third Parties
GDPR	General Data Protection Regulation
ICT	Information and Communication Technologies
IDS(A)	International Data Space (Association)
IP	Intellectual Property
IoT	Internet of Things
LE	Legal Entity
MVP	Minimum Valuable Product
PoC	Proof of Concept
SME	Small Medium Enterprise
UI	User Interface
VR	Virtual Reality
WP	Work Package

1. Executive summary

AI REDGIO 5.0 WP3 - “(E)DIHs Network for AI-at-the-Edge Industry 5.0”, started at month 3 and will finish within the end of the project at month 36. WP3 aims at:

- i. Creating an ecosystem of (E)DIHs active in AI-at-the-edge for Manufacturing Industry 5.0;
- ii. Defining I5.0 inspired methods and tools for Service Portfolio analysis and Customer Journeys (CJs) as well as collaboration corridors among (E)DIHs to fill the service offering gaps evidenced by CJs;
- iii. Materialising a network of AI-at-the-edge Experimental Facilities where to perform experiments WP6;
- iv. Extending and integrating the existing DIHIWARE platform for Industry 5.0 (E)DIH networks.

To address all these objectives, five specific tasks (T3.1 – T3.5) have been designed to better organize the activities listed above but, at the same time, to keep them linked together, since WP3’s objectives are strongly dependent on one another and it is fundamental to develop them simultaneously, granting consistency.

The current deliverable D3.1 – “(E)DIH Service Portfolio, Customer Journey and Pipelines – M9” is the first report of WP3 which is focused on T3.1 and T3.2 achievements (corresponding to the first two bullets) and it is also linked with other activities of WP3 and WP2 tasks, such as the collaboration corridors and EDIH handbook, respectively.

D3.1 is the result of almost 7 months of collaborative activities where the 19 AI REDGIO 5.0 DIHs have been deeply involved, applying and validating the METHODIH methodology (a methodology created to support DIHs, addressing points i. and ii., developed by POLIMI) and collaboratively and participatively compiling their Service Portfolio and Digital Transformation Service Pipelines with the support of METHODIH methods and tools.

D3.1 encompasses two key components: an explanation of the methodology used (including the steps to reach its most updated version), and a concise overview of the AI REDGIO 5.0 ecosystem. This overview is presented by highlighting the outcomes derived from numerous interactions held with 19 DIHs (Digital Innovation Hubs).

A basic version of METHODIH was sketched in previous H2020 I4MS projects. Through time and different projects, the methodology evolved and adapted, to be finally validated in the previous AI REGIO project in its most updated version. Currently, during AI-REDGIO 5.0, the EDIH network of the project run an ulterior validation of the available methods and tools, improving them, adapting them to SMEs and the AI technologies, and spotting features not yet covered to customize them according to AI REDGIO 5.0 requirements. The EDIH network applied the methodology by configuring its Service Portfolio and analysing the customer base of the DIHs through their customer journeys and service pipeline’s configurations. A general overview of the project ecosystem in terms of services and customers is provided in a dedicated section of the report.

The scope of Service Portfolio analysis is to identify competencies and expertise of the DIHs and to pinpoint new services to be implemented within the duration of the project. More than two-thirds of the services provided are related to Data, Ecosystem, and Technology activities. For instance, Contract Research, Decision Making, and Community Building are the three most common types of services provided by the

community of the 19 DIHs. To elaborate, some Digital Innovation Hubs are more Technology-oriented and present a portfolio of technology services that goes from “feasibility assessment” and “provision of infrastructure” to “technical support” and “final validation/certification”. Also, a considerable number of hubs are specialised in Data management and Ecosystem Services. To compensate for the weakness in Skills Management competencies, a higher focus on Skills services would be directed by some DIHs throughout the “to-be” scenario to be covered over the course of the project.

In the Customer Journey analysis, it came out that Digital Innovation Hubs do not support only Technology users (such as SMEs), but the customer base also includes different typologies of customers. From the outcomes analysis it was observed that the small and medium technology-user enterprise was a consumer for 19 out of the 19 DIHs of the network, that is, all of them had a tech user at least once as a customer. Also, the technology provider is part of the customer base for the most part of the hubs, in this case, for 10 out of 19 DIHs of the network.

2. Introduction

The main purpose of deliverable D3.1 – “(E)DIH Service Portfolio, Customer Journey, and Pipelines – M9” is to report the activities performed in tasks T3.1 and T3.2.

The first one, T3.1 “**(E)DIH Service Portfolio and Observatory**”, aims at identifying the services that a DIH should offer in the field of AI, by proposing a common framework, based on a 3 level taxonomy to facilitate the exchange of services between one DIH and the others. In order to provide it, the classification according to a suitable number of categories has been inherited by MIDIH¹ and DIHINET², and then has been tweaked while applied in different projects. The (E)DIH service portfolio model includes four BEST pillars: Business, Ecosystem, Skills, and Technology (test before invest). For example, the previous project AI REGIO proposed the extension of the framework with D (Data), to emphasize the concept of Data Sharing Spaces with respect to Technology and has instantiated the framework for AI applications.

The AI REGIO 5.0 T3.1’s main purpose is to apply/validate the methodology by its 19 EDIHs and enrich it with missing categories if necessary. In this first iteration, the established categories were respected without new additions or changes in the service portfolio structure. In future iterations, T3.1 is intended to further extend the service portfolio analysis spectrum by adding Industry 5.0 aspects and in particular how humans could interact with AI from a perspective of Twin Transition, resilience, and environmental sustainability. Such Industry 5.0 flavours will permeate the D BEST service portfolio analysis, by increasing SMEs 5.0 awareness and twin transition.

Services already provided by DIHs (labelled as AS-IS services) are described according to the taxonomy and, at the same time, new ones (labelled as TO-BE services) are identified to be implemented during the project.

The second Task, T3.2 “(E)DIH Customer Journeys, Pipelines for Human Resilient Sustainable Manufacturing”, has a twofold objective:

- Firstly, it seeks to pinpoint the prospective customers for an AI-focused Digital Innovation Hub (DIH). This entails a detailed examination of their unique needs, challenges, barriers, and the timeframes involved.
- Secondly, the task aims to configure the associated customer journeys. These journeys represent the sequential phases a company faces when harnessing the support of a DIH to facilitate the adoption of AI technologies. In addition, T3.2 deals also with service pipelines, where the service portfolio is matched with the customer base to identify, for each customer, the set of services provided to it, chronologically ordered, and equipped with a timeline. Different typologies of customers can be modelled (technology providers, students, public authorities) but the present report will be focused on Technology users (i.e manufacturing SMEs) and Technology Providers (i.e Open Call winners).

The activities outlined earlier configure the main pillars of the METHODIH methodology, designed to bolster and streamline the service exchange and delivery capabilities of Digital Innovation Hubs (DIHs). This methodology hinges on the utilization of tools and methods that empower DIHs to effectively respond to customer demands. It achieves this by offering a meticulously structured, sequenced, and time-bound array of services, that can be collaboratively constructed in coordination with other DIHs through a different framework of workshops and interactive sessions.

¹ <https://www.midih.eu/> I4MS Phase III project on Industry 4.0

² <https://dihnet.eu/>

The current deliverable (which will be followed by a second one at the end of the two tasks, at month 27) provides the theoretical concept behind the methodology, the description of changes and of refinements applied, but also the first results coming from its validation by DIHs. The next deliverable, showing the results of the second iteration of the tasks, will complement the current one containing the updated version of the Service Portfolios, after new services will be implemented, and the detailed description of success stories, that is, of service pipelines built to describe activities run with each customer. The service pipelines will be prepared for different typology of manufacturing SMEs involved in the adoption of AI-at-the-edge. Best Practices and Success Stories will also be instantiated on the Manufacturing SMEs involved in the consortium and on those selected in the Open Calls.

The EDIH network of AI-REDGIO 5.0 is composed of 19 organizations in total, composed of DIHs and EDIHS. The activities in the task presented in this report were conducted by 14 DIHs, so our analysis will consider the results of 14 DIHs in the network. This report will present pools of aggregated data to summarize the main indicators related to activities performed as well as case by case information. The aim is to represent in the most exhaustive way the entire ecosystem, by providing examples as well as an overview of the network situation. The 19 EDIHs of the network cover different European regions and the purpose of the deliverable is to provide an overview of the entire ecosystem showing how the impact of the project covers an important part of the European region. As well, through the open calls, this impact is supposed to spread even more. The full set of documents, one for each DIH, is stored in the common repository of AI REDGIO 5.0 project and available on request for consultation.

The locations and geographical regions represented by the DIHs of the network are listed below:

Table 1 List of AI REDGIO 5.0 EDIHs and related region of reference

DIH short name	DIH long name	Region of reference
1. AFIL	ASSOCIAZIONE FABBRICA INTELLIGENTE LOMBARDIA	Lombardy (North Italy)
2. KC STV	Competence Centre for Advanced Control Technologies	Ljubljana-Slovenia
3. JSI	Jožef Stefan Institute	Ljubljana-Slovenia
4. UL	University of Ljubljana	Ljubljana-Slovenia
5. OOST NL	Think East Netherlands	Apeldoorn-Netherlands
6. UTW	University of Twente	Overijssel- Netherlands
7. POLY	Polymeris	Rhone-Alpes-France
8. HIT	Hub Innovazione Trentino	Trento-Italy
9. ART-ER	ART-ER-SOCIETA CONSORTILE PER AZIONI	Emilia-Romagna (North Italy)
10. MAKE	Flanders Make	Heverlee - Belgium
11. GAIN	The Galician Innovation Agency	Galicia - Spain
12. MADEcc	MADE Competence Center Industry 4.0	Milano-Italy
13. TUIASI	Technical University Gheorghe Asachi Iasi	Iasi- Romania

14. CVUT	Czech Technical University in Prague	Prague - Czech
15. MADE	Manufacturing Academy of Denmark	Copenhagen- Denmark
16. PBN	Pannon Business Network	Zanati - Hungary
17. DMIW	Digital Manufacturing Innovation Hub Wales	Bridgend - Wales
18. SCCH	Software Competence Center Hagenberg GmbH	Hagenberg - Austria
19. IMECH	Intellimech, Consorzio per la Meccatronica	Lombardy (North Italy)

2.1. Impact and target audience

The deliverable is a public report addressing mainly the DIH for the Manufacturing community, the candidate (E)DIHs, the European Commission, and other actors interested in having more information on the project activities (such as a description of the (E)DIHs network of the project, in terms of services and customer base, getting familiar with the METHODIH methodology concepts and having a complete overview of what has been done so far in tasks T3.1 and T3.2).

The document has a wide target audience since it can be of relevance to everyone who is interested in METHODIH main concepts (three-level taxonomy for service portfolios, the customer types and the rules to build the service pipeline).

Hence, D3.1 represents the first structured documentation for METHODIH, as it has been conceived in AI REDGIO 5.0. In addition, it contains guidelines to let Digital Innovation Hubs adopt it, complemented by the results deriving from our first approach of validation inside the AI REDGIO 5.0 ecosystem.

The methodology described in the D3.1 has been conceived with the main purpose of being a framework for all Europe DIHs (not only for AI REDGIO 5.0 ecosystem). This will allow an easier dissemination inside other communities as to share the results achieved in AI REDGIO 5.0, but also to make it adoptable by a larger number of Hubs providing them a set of common tools and techniques.

D3.1 is not a technical report requiring specific competencies to be understood, and it is written to be easily understood by a wider audience having an interest in the topics of Digital Innovation Hubs.

2.2. Dependencies in AI REDGIO 5.0

D3.1 and in general activities run in T3.1 and T3.2, present several dependencies inside AI REDGIO 5.0.

First, the Service Portfolio analysis in AI REDGIO 5.0 DIHs community is at the base of WP3 in many of their tasks and activities. Besides the key content for its second version (D3.2), D3.1 will be fundamental for the deliverables prepared for T3.3, a task focused on creating Collaboration Corridors for AI-at-the-Edge Industry 5.0, where services flagged as “Collaborative TO-BE” will be implemented. Having a full picture of the ecosystem of hubs, identifying the typology of services mainly provided by each one and their competencies and requirements is fundamental to outline the feasibility of new services development. In addition, in the perspective of a collaborative implementation, it is quite important that all DIHs are provided with the same taxonomy of services to match their needs and expectations, expressed in a common language, in this case, the D-BEST taxonomy.

T3.4 “Network of AI REDGIO 5.0 Experimental Facilities” focused on the management of the DF network on the project, will utilize the DR-BEST taxonomy to organize the service offering of the different DFs of the

network. DR-BEST, is strictly related to the DBEST taxonomy utilized in METHODIH and presented in this report.

T3.5 “DIHIWARE Platform & DIH4Industry AI-at-the-Edge Marketplace”, focused on the deployment of AI REDGIO 5.0 portal, is structuring the online classification of services according to the 3 levels taxonomy provided in METHODIH. For sure, the preliminary information displayed in the portal will be based on data collected by T3.1 and T3.2 of the EDIH network.

In addition to WP3, which is closely tied to the outcomes of the initial two tasks and, consequently, to D3.1, other work packages can benefit from reviewing the present deliverable.

WP2 and WP6 are also related with the implementation of METHODIH methodology by the EDIH network. Specifically, D2.2 “Platforms and experiments AI Scenarios” and D2.3 “User Requirements Specification for edge- AI Industry 5.0” leverage in the D-BEST services required by SMEs to develop the different project experiments.

2.3. Document Structure

The document is structured in 6 sections, where the first two sections contain the executive summary, Introduction to the document, its structure and impact/dependencies, already presented.

- **Section 3** presents METHODIH methodology and its main pillars: Service Portfolio analysis, Customer Journeys and Digital Transformation Service Pipelines. A detailed description is provided to present Section 3 in the shape of a structured documentation for the methodology, useful for understanding its main features and applications. It also contains the description of interactions had with AI REDGIO 5.0 DIHs ecosystem, mainly in terms of online webinars/workshops and online interactive sessions, presenting also the most relevant results achieved during the first iteration of the tasks.
- **Sections 4** offers a comprehensive view of the AI REDGIO 5.0 DIHs ecosystem through an overview of the AI REGIO ecosystem, encompassing almost a hundred services, with a specific emphasis on those slated for implementation during the project. Additionally, it provides an initial categorization of DIHs based on their unique strengths and expertise, along with an overview of portfolio coverage. To enhance readability and minimize redundancy in listing data from all 14 DIHs individually, the section features charts and graphs summarizing the information.
- **Section 5** also offers a comprehensive view of the AI REDGIO 5.0 DIHs ecosystem but in this case from the perspective of the pipelines for Digital Transformation Services. For each identified Customer Journey, this section presents the most pertinent pipelines, highlighting both commonalities among DIHs and distinctions arising from their unique approaches and service offerings to their customer bases.
- **Section 6** contains the conclusions and outlook in the WP3 perspective as well as the whole AI REDGIO 5.0 project.

3. AI REDGIO 5.0 METHODIH METHODOLOGY

METHODIH methodology has evolved over time through different projects. Its initial version can be found in the MIDIH project¹, where a preliminary analysis of tools and methods to support DIHs for Smart Manufacturing was conducted. Later, the METHODIH methodology was also adopted in the AI-REGIO project, where its most updated version was consolidated and adopted also in AI REDGIO 5.0. Briefly, the METHODIH methodology is an acronym derived from METHOdology for DIHs, specialised in AI for Manufacturing Industry, structured in four pillars that will be described in detail in this section of the report.

The set of tools and techniques elaborated in these previous projects has been tweaked, developed, improved, and validated in collaboration with the AI REDGIO 5.0 ecosystem of 19 Digital Innovation Hubs, aiming at enhancing their service proposition both addressed to their customer base and to other DIHs in the network.

The methodology provides a common framework and a set of guidelines to describe and manage the four main pillars of the DIH's offer.

- **Service Portfolio Analysis:** A structured approach is proposed for DIHs to define their as-is and to-be service portfolio. Services are classified into 5 main top-level categories or service classes (**D-BEST: Data, Business, Ecosystem, Skills, Technology**), while a 3 level taxonomy with examples is provided to support DIHs in the definition and description of their as-is and to-be services. The first and wider level of the taxonomy is the service class. The second level is the service type, and the last and more detailed level is the service instance.

The objective is twofold: on one side, DIHs are equipped with a standard Service Portfolio that allows them to interact with other European organizations, “speaking the same language”; on the other, it represents a stimulus to define new services to get a complete range of services to be offered to the constituency. In the following figure, the first and second levels of the taxonomy are shown:

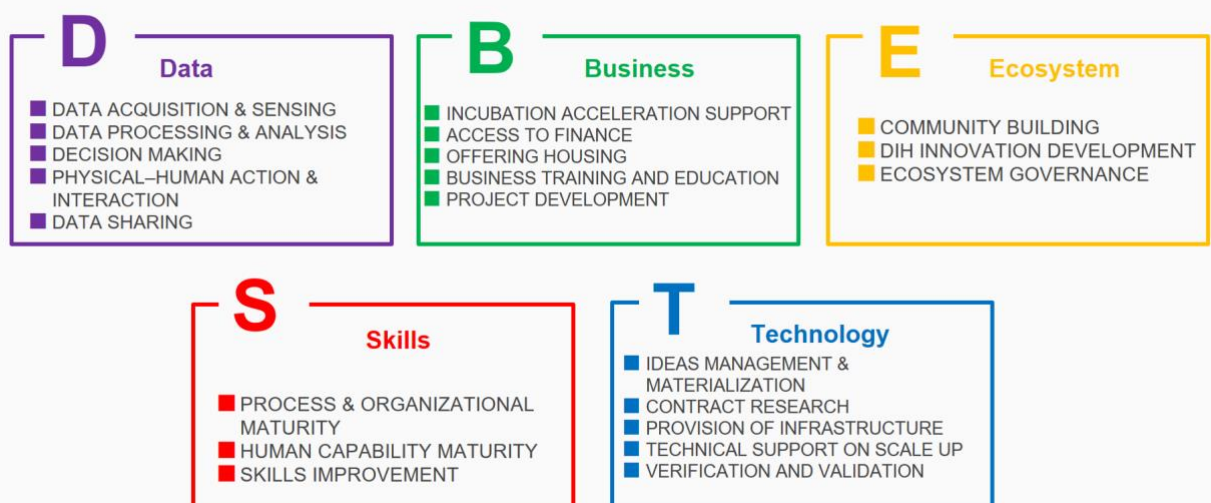


Figure 1 The D BEST classes (first level) and types (second level) of services

¹ <https://www.midih.eu/>

- **Customer Journeys (CJ) and Blocking Points (BP).** A Customer analysis is proposed to understand usual needs, expectations, and interaction workflows by the various ecosystem stakeholders. Customizable templates for six different customer types (**Technology Provider, Technology User, Student, Policy Maker, Start-up, and Experimenter**) are provided. Customer Journeys are defined as step-by-step Digital Transformation evolutionary pathways that typically model the customer interaction with a DIH. A third step in this analysis is the identification of Blocking Points, i.e. of factors preventing customers from evolving their Digital Transformation from one level to the subsequent one.

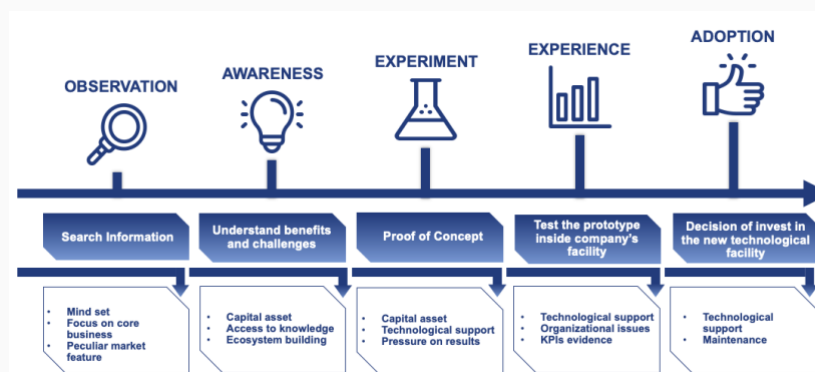


Figure 2 Example of blocking points for Technology User Journey

- **Digital Transformation Pipeline.** The third step of the methodology consists of populating the Customer Journeys with as-is and to-be Services to overcome the Blocking Points identified. The result is a bi-dimensional matrix where the different steps of the Customer Journeys are implemented by services, supporting the evolutionary pathways from one level to the subsequent one.
- **Business and Governance model.** The last step of the methodology is the definition of a business model that considers the complexity of a DIH customer base, which typically is a multi-stakeholder system, and the cross-regional activities that the hub will perform both inside the project and autonomously. The business and governance models pillar have been developed in previous projects, but in AI-REDGIO 5.0, the focus will be on the first three steps.

3.1. D-BEST Service Portfolio (a description of the framework)

The D BEST Service Portfolio is a 3-level taxonomy catalogue, presenting the list of services that a DIH provide to its customers.

“3-level taxonomy” means that services are organized according to three levels of categorization: for each class of services (Data, Business, Ecosystem, Skills, Technology), sub-classes labeled as “types” have been defined and the types include the proper services which have been labeled as “service instances”.

The D BEST Service catalogue contains around 56 different service instances: 12 are services related to Data management, 14 to Business activities, 12 to Ecosystem management and communication, 9 to Skill assessment and training, 9 to Technology facilities.

A detailed description of each service complements the catalogue, to help DIH matching their offer with the D BEST taxonomy.

In the following figure, the 3-level taxonomy is presented for the Ecosystem class.

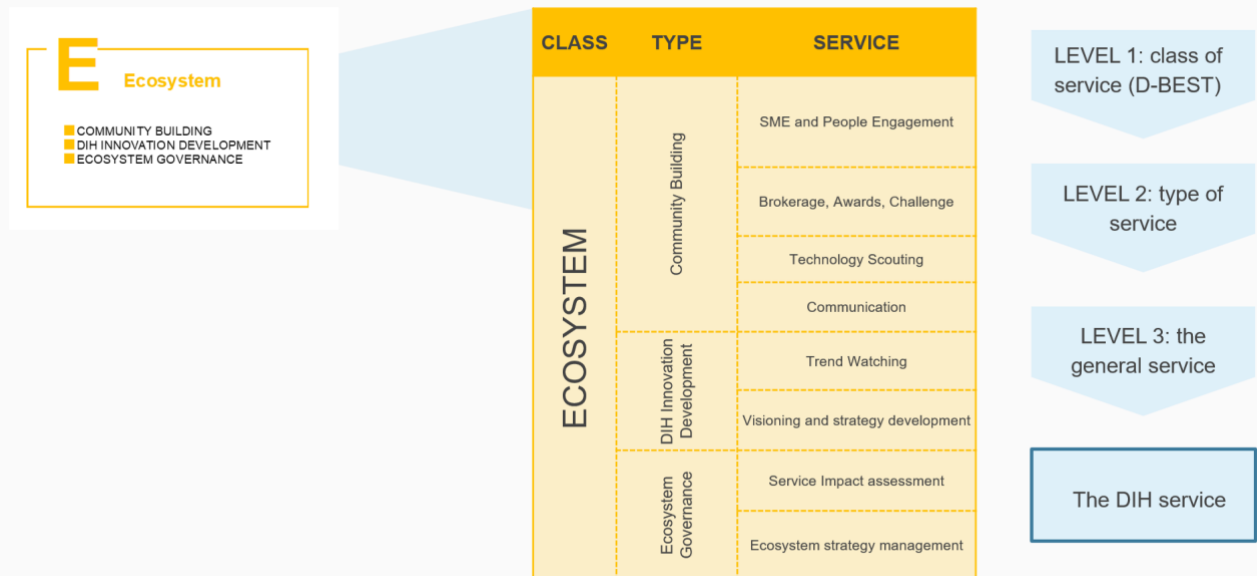


Figure 3 The D BEST 3 level taxonomy: service classes (first level), types (second level) and service instances (third level)

3.1.1. Data Services

Services belonging to this class are those related to data management and data spaces.

A DIH may provide an end-to-end support during the entire data lifecycle (from Data Acquisition to Data exploitation) or can be specialized in a specific activity or sector. According to the DIH's competencies, services may be provided at different levels: for instance, the hub can play the role of intermediary driving the customer toward a third party (a technology provider for example), it can provide skills and competencies or be itself the technology provider.

Five different sub-classes have been identified, to describe the entire data lifecycle:

- **Data acquisition and sensing**, which focuses on the first stages of a data lifecycle, mainly including activities such as data acquisition (also using sensors), data protection, and ETL implementation;
- **Data processing and analysis**, which includes data storage and preliminary data analysis;
- **Decision-making** driven and/or supported by data, that requires the implementation of machine learning models, simulation tools, Big Data analysis (often complemented by a Big Data architecture configuration);
- **Physical-human action and interaction**, from the more basic data visualization, UI and navigation, to the more complex Collaborative Intelligence (where humans and machines are allowed to work together);
- **Data sharing**, starting from data anonymization and governance rules' definition for GDPR compliance to Data Spaces implementation.

3.1.2. Business Services

Services belonging to this class are those related to business activities, including planning and business model definition, funds resources, and project development.

For small companies (such as for SMEs that don't have dedicated resources but also for start-ups not yet integrated into the ecosystem) it is often difficult to orientate among a large number of projects and funded initiatives and, indeed, the support of prepared DIHs is required.

Five different sub-classes have been identified:

- **Incubation acceleration support**, to drive customers to access basic and specialised facilities (from meeting rooms and co-working areas to laboratories and high technological infrastructures) and to support them in business development;
- **Access to finance**, to connect the customer with different funding sources (EU, national, regional, or private) aiming at achieving an effective mix of funds;
- **Offering housing**, to offer innovation spaces to their ecosystem members to interact and share ideas;
- **Business training and education**, providing formal courses, workshops and seminars about business topics.¹

Project development, identifying opportunities through strategic analysis of the ecosystem and trend watching (see next class Ecosystem), developing new proposals, and creating consortia.

3.1.3. Ecosystem Services

Services belonging to this class are those related to the creation and management of an ecosystem, fundamental to exploit synergies among DIHs, but also to increase and better support the customer base.

Three different sub-classes have been identified:

- **Community building**, by mapping and engaging people and SMEs to create consortia, but also involving other DIHs;
- **DIH innovation development**, including trend watching, to monitor the market and to be updated about the transformation of sectors of interest and the latest news. These activities are strongly related to Business class since they are the enablers to ideate and develop new projects.
- **Ecosystem governance**, both via a structured set of governance rules and via a set of KPIs to monitor performance.

3.1.4. Skill Services

Services belonging to this class are those related to training and competencies assessments.

The training activities can be of any kind and deal with several different subjects. Again, according to the DIH's level of competencies, courses may be delivered directly, or the hub may be the point of contact with third parties, playing the role of the broker.

Three different sub-classes have been identified:

- **Process and organizational maturity**, providing self or guided assessments to measure the company digitization level, and readiness for Industry 4.0 and AI adoption. Typically, such assessments are followed by a collaborative stage involving experts where the roadmap toward transformation is defined.

¹ This type of service is in a borderline position since it could have been included in the Skill class, but as it is now, the Business class contains the full range of services related to business.

- **Human capabilities maturity**, measuring the level of digital/technological skills at the worker level. As it happens at the company level, the individual competence assessment is followed by a strategy definition to fill the gaps.
- **Skills improvement**, providing and/or suggesting the specific educational programmes, putting at disposal and/or identifying training repositories. Courses may be addressed to people starting from scratch or to workers who want to consolidate a competence, to trainers who want to be constantly updated regarding new digital and AI solutions.

In the same category, **standardization and certification** tasks are included since the provision of standards and tools for standard certifications is considered a sort of teaching activity.

3.1.5. Technology Services

Services belonging to this class are those provided to the customer to “test-before-invest”; that is, to validate the solution before marketing it, to guarantee its robustness before investing large amounts of money. Support may be provided starting from the early stages, evaluating feasibility and readiness, to the development stage, by putting at disposal hardware to software solutions, till last stages of certification and regulation compliancy.

Five different types of services have been identified, that reflect the main steps of a technological solution’s development:

- **Ideas management and materialization**, related to the first stages of the implementation/ adoption of a digital solution. It includes consultancy about new ideas, feasibility analysis, and readiness assessment of the specific technology to be implemented.
- **Contract research**, both by considering collaborative R&D projects (where the customer can develop the new solution with the support of other partners) and by supporting the customer in preparing a Proof of Concept (PoC) of the solution, evaluating the feasibility.
- **Provision of infrastructure**, providing to the customer a set of tools, platforms, and lab facilities where the solution can be developed and/or tested.
- **Technical support on scale-up**, supporting the customer to move from an embryonic start-up idea to a saleable solution equipped with a business model.
- **Verification and validation**, by certifying the product or making sure that it passes all functional, performance, quality assurance tests and by organizing public demonstrations in front of possible clients.

3.2. Customer Journeys and Service Matrix

As pointed out earlier, in AI REDGIO 5.0, two typologies of customer journeys will be the focus of the analysis. To be specific, this report will spot the light on customer journeys for **technology users** and **technology providers**, which are inheritance from MIDIH. However, this report will provide the theoretical background of other types of customer journeys to enable the reader to visualize the full picture of the market and its diverse demands.

Each journey is a 5-steps path, including the main phases of the customer Digital Transformation and the related blocking points. Blocking points represent barriers that a customer typically faces and must overcome during its transformation journey, and it is here where usually the DIH intervenes in providing support.

Differently from the 5-steps of the path, blocking points are not fixed but may be related to the local scenario where the DIH operates. In the following paragraph, it will be possible to find just a short description of the five steps for each customer journey.

The result from the combination of Service Portfolio and Customer Journeys is the **Digital Transformation Service Matrix**. It is a 5x5 matrix defined by the classes of services as rows (Data, Business, Ecosystem, Skill and Technology) and the steps of the customer journey as columns. Hence, at least one matrix for each Customer Journey is expected.

To fill the matrix, the DIH is required to insert the services of its Portfolio (both AS-IS and TO-BE), provided to the specific customer.

The objective of the matrix is to identify at which stage of the customer journey the service is provided (there may be services spanning more than one column).

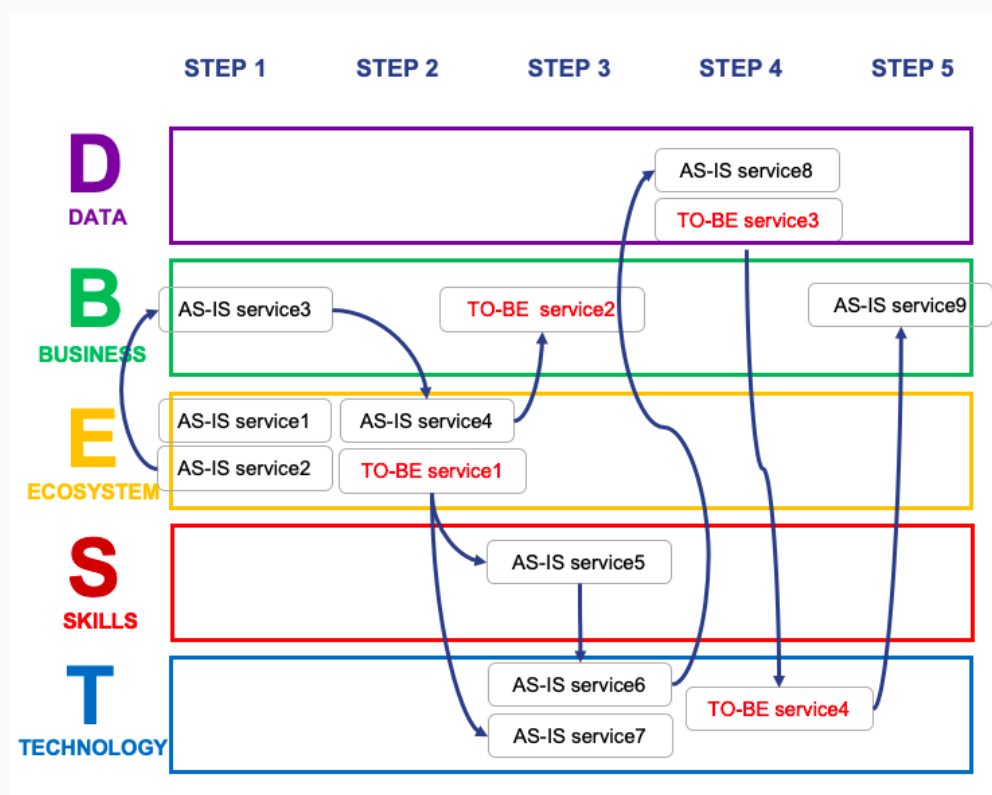


Figure 4 A generic Digital Transformation Service Matrix

3.2.1. Technology User CJ and Service Matrix

Technology Users constitute an important share of DIHs' customer base. They are mainly manufacturing companies in diverse industries (machinery, metal, textile, food, aerospace, automotive...) sharing the final goal of undertaking the Digital Transformation journey to increase their competitiveness leveraging also on Artificial Intelligence technologies.

The five steps are:

- **Observation** (searching of information),
- **Awareness** (understanding benefits and challenges),
- **Experiment** (Proof of concept and new skills),
- **Experience** (testing the prototype and analysing results),
- **Adoption** (deciding to invest in new technological facilities).

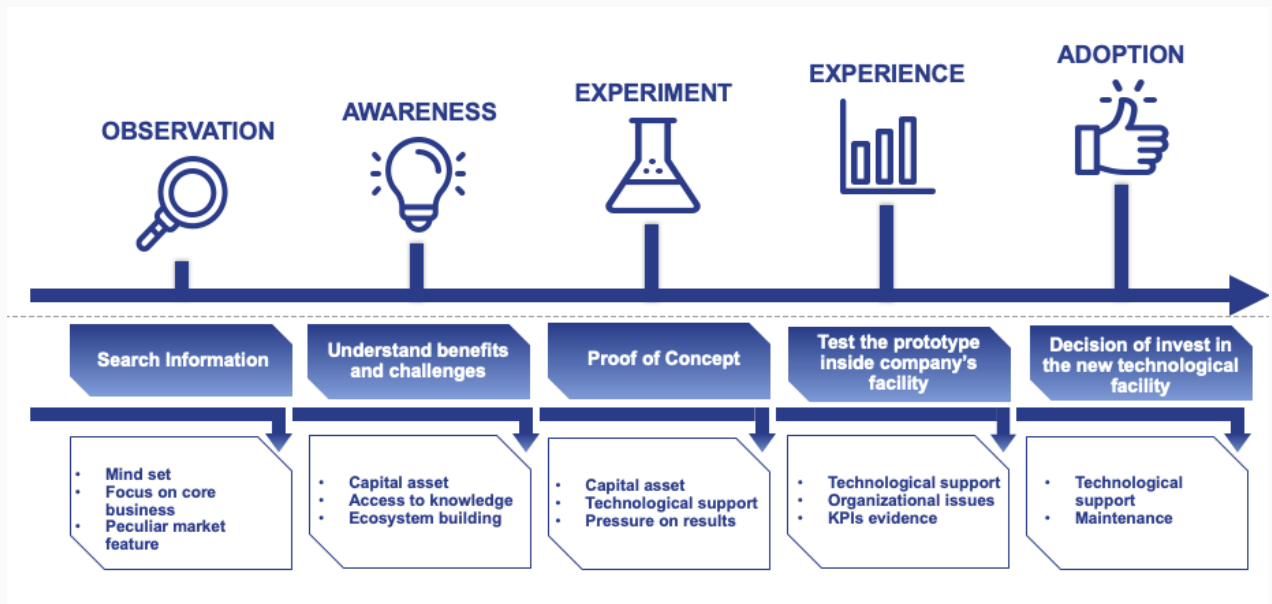


Figure 5 Customer Journey and Blocking Points for Technology User

3.2.2. Technology Provider CJ and Service Matrix

Title Technology Providers, or developers, are companies that develop technologies offered to manufacturing industries (machinery, metal, textile, food, aerospace, automotive...). They are more on the “offer-side” and their final aim within the addressed customer journey is to be ready to launch the technology on the market.

The five steps are:

- **Ideation** (consolidating the business idea),
- **Design and Engineering** (developing the solution),
- **Minimum Valuable Product** (testing the solution verifying its potential),
- **Verification and Validation** (finding early adopters and financial resources),
- **Go to Market** (launching the solution on the market).

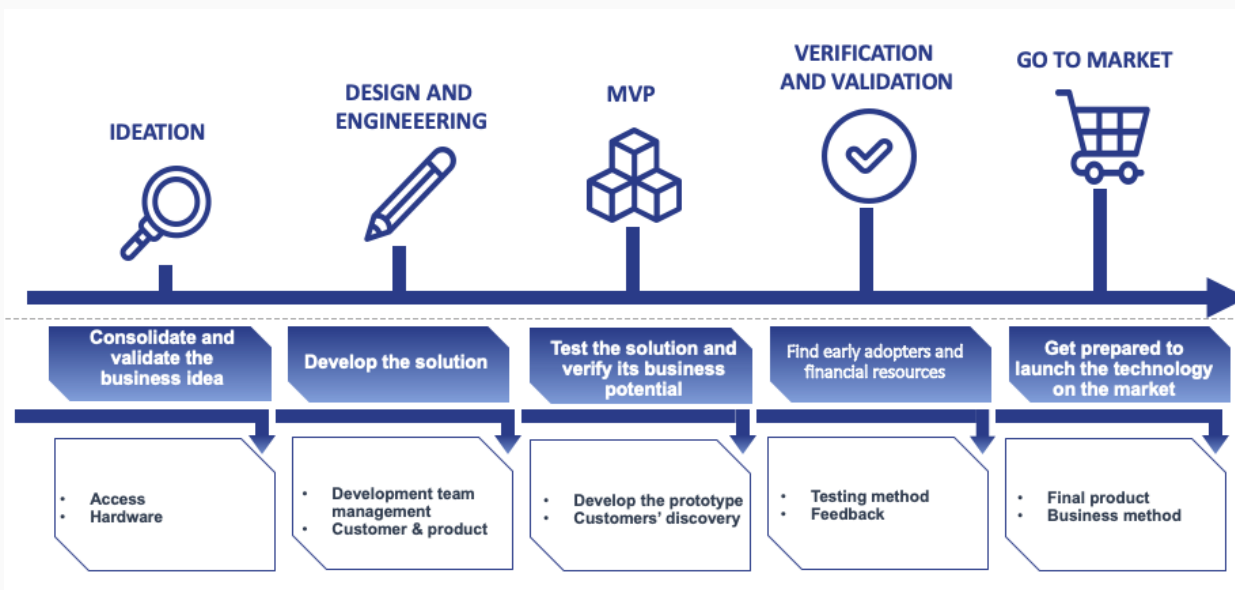


Figure 6 Customer Journey and Blocking Points for Technology Provider

3.2.3. Student CJ and Service Matrix

High-school or University students, in particular, might benefit from the services offered by DIHs considering that some of them collaborate with Didactic Factories or are considered a Didactic Factory themselves. Accordingly, some of AI REDGIO 5.0 DIHs affirm to have an educational strategy within their mission and have students as customers in their constituency.

Even if “young” students are the most representative profile belonging to this category, everyone who is approaching a training/education journey is defined as a student, besides the age.

The five steps are:

- **Engage** (understanding benefits and career opportunities),
- **Learn** (acquiring required knowledge),
- **Practice** (applying what was learned),
- **Share** (joining communities),
- **Exploit** (implementing own new ideas).

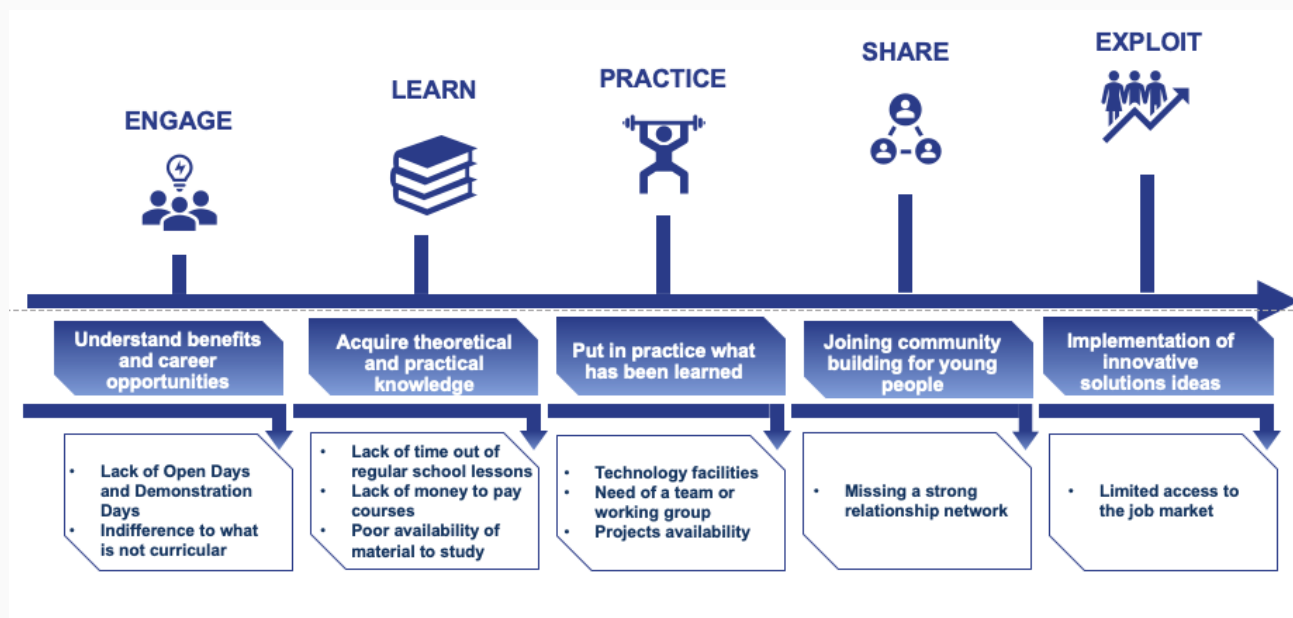


Figure 7 Customer Journey and Blocking Points for Student

3.2.4. Policy Maker CJ and Service Matrix

Policy Makers are defined as regional, national or European politicians, or stakeholders in charge of developing policies and funding programs, willing to be supported in the definition and implementation of R&I policies.

The five steps are:

- **Learn** (awareness of an issue),
- **Benchmark** (comparing regional situations with interregional ones),
- **Roadmap** (strategy and priority definition),
- **Implement** (the policy),
- **Impact** (collecting feedbacks).

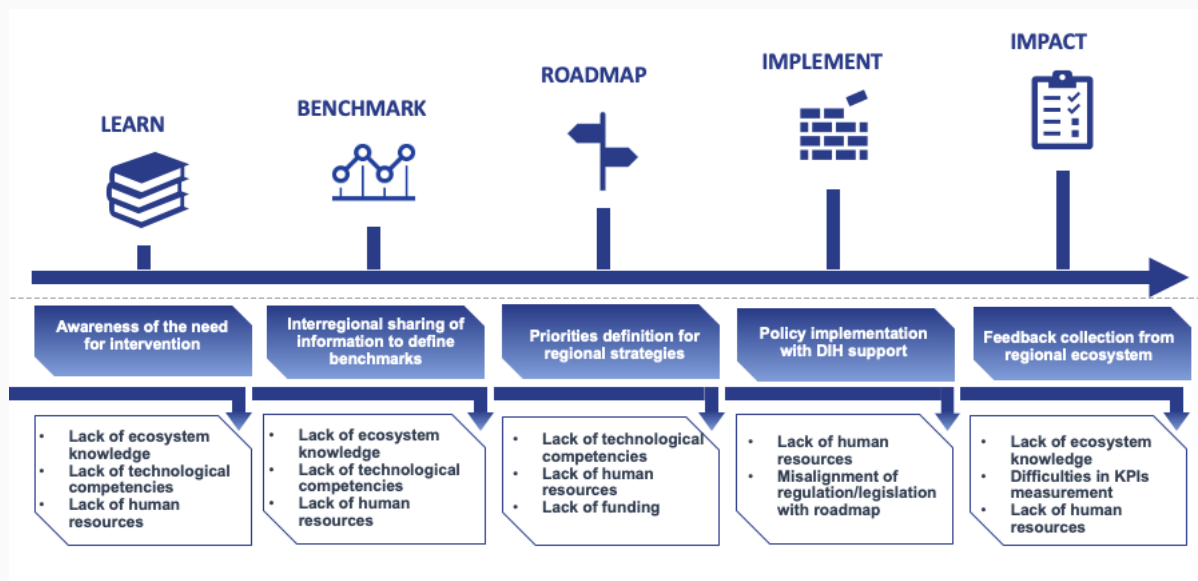


Figure 8 Customer Journey and Blocking Points for Policy Maker

3.2.5. Start-up CJ and Service Matrix

A start-up is an organization in the first stage of its operations, willing to achieve a maturity level for the proposed idea/solution and aimed at becoming a structured enterprise. Start-ups are often quite similar to Technology Providers and hence, their journey precisely reflects the one of tech providers.

The five steps are:

- **Ideation** (verifying the feasibility),
- **Minimum Valuable Product** (testing the solution and verifying its potential),
- **Validation** (finding early adopters and financial resources),
- **Scaling** (developing a full solution),
- **Maturity** (improving the solution and exploring new solutions).

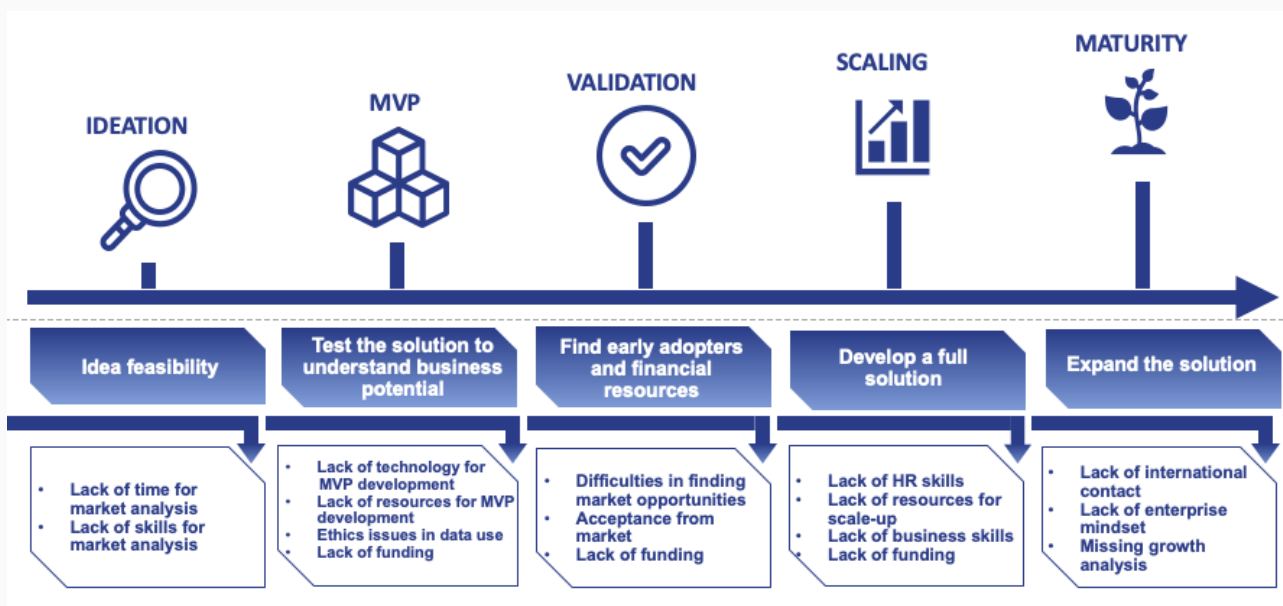


Figure 9 Customer Journey and Blocking Points for Start-ups

3.2.6. Experimenter CJ and Service Matrix

Experimenters are considered organizations joining Open Calls of R&I projects and willing to successfully adopt/develop the proposed solution within their business. They can belong both to the demand, as well as the offer side.

The five steps are:

- **Feasibility** (matching open call requirements),
- **Planning** (defining a roadmap to implement the solution),
- **Execution** (implementing the solution),
- **Assessment** (analysing the results),
- **Exploitation** (enhancing the solution at the organization level).

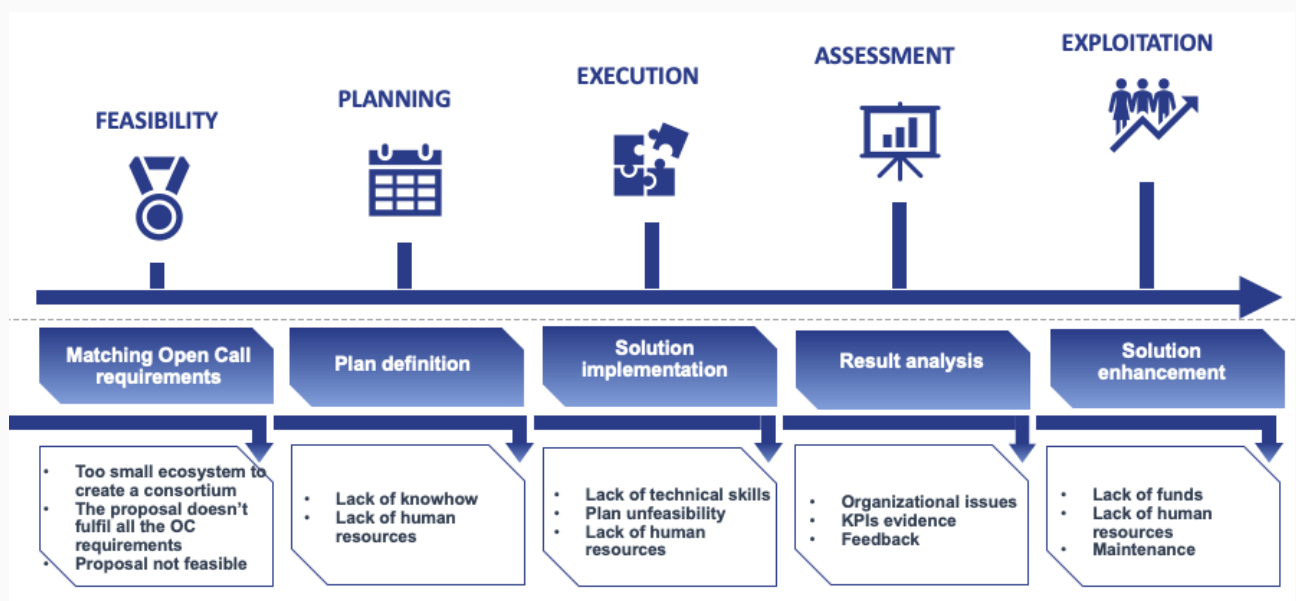


Figure 10 Customer Journey and Blocking Points for Experimenter

3.3. Digital Transformation Service Pipelines and Success Stories

Given the Digital Transformation Service Matrix described in the previous paragraph, the **Digital Transformation Service Pipeline** is built by connecting services with arrows, to create an evolutionary pathway from one level to the subsequent one. New TO-BE services may be required to complete the pipeline, in case the DIH realizes that some activities are missing.

A Service pipeline is typically associated with a specific customer and equipped with a timeline, to be able to measure progress and performances. The completion of the pipeline, presenting all steps to achieve the final digital transformation, represents a **success story**.

3.4. METHODIH Tutorial Workshops for AI REDGIO 5.0 EDIH network

As already mentioned, the basic concepts of AI REDGIO 5.0 METHODIH have been inherited by the MIDIH project before being validated and improved in the AI REGIO project to be applied in AI REDGIO 5.0 in collaboration with the 19 DIHs. Regarding the Service Portfolio, the services have been checked to ensure that all the relevant activities run by a DIH are included. Regarding Customer Journeys, two templates have

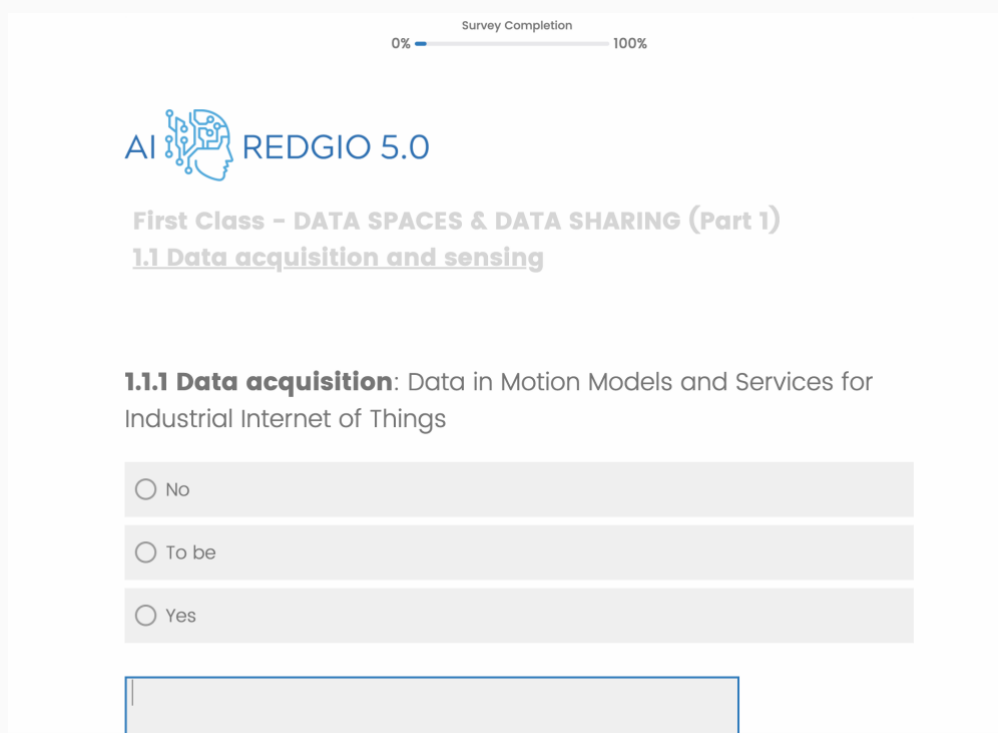
been inherited by AI REGIO project considering the identification of new blocking points for the MIDIH journeys (technology users and technology providers).

To keep partners actively aligned with the T3.1 and T3.2 activities, a number of workshops were organized with WP3 partners to present the methodology. The 19 DIHs were then asked to compile the Service Portfolio and to create their customer journeys and service pipelines.

On 16th May 2023, a one-hour online workshop session with all WP3 partners was organized and conducted to present for the first time the METHODIH methodology and respective pillars: Service Portfolio, Customer Journeys and Service Pipelines. The main objectives were:

- To explain the concept of the three-level taxonomy Portfolio, providing an overview of the classes of services and illustrating how the compilation works. It was stressed the fact that the exercise has a twofold purpose: on one side, to describe services according to a common framework (AS-IS services); on the other, to identify new service to be implemented within the AI REDGIO 5.0 project (TO-BE services)
- To validate the model, collecting feedback from partners
- To define a due date to compile the Portfolio

The workshop was mainly addressed to DIHs, but all the partners involved in WP3 activities were invited. In AI REDGIO 5.0 project, the responses for the service portfolio compilation were collected through the surveying tool Microsoft Qualtrics. Figure 11 shows a snippet of the Service Portfolio online version, specifically a question from the Data class as an example.



Survey Completion 0% 100%

AI REDGIO 5.0

First Class - DATA SPACES & DATA SHARING (Part 1)

1.1 Data acquisition and sensing

1.1.1 Data acquisition: Data in Motion Models and Services for Industrial Internet of Things

☐ No

☐ To be

☐ Yes

Figure 11 The header of the Service Portfolio Qualtrics questionnaire utilized

For each class of services, DIHs are required to outline a description of services already provided (AS-IS) or planned to be implemented in the short term (TO-BE). In the second case, it is required to specify possible collaborative activities in the implementation and additional needs.

- After the Service Portfolio presentation, the concepts of Customer Journey, service pipelines and Blocking Points were presented to WP3 partners. The aim was to make them familiar with the idea of a 5-step structure to describe a digital transformation journey and to stress the importance of identifying blocking points for each step since they represent the instances in which the DIH is expected to intervene to support the customer. Topics and concepts of the second pillar of the methodology addressed in the session were: presentation of technology users and technology providers customer journeys and related blocking points, Identification of the most relevant customer types for the 1 DIHs, to understand if the development of new journeys (besides the existing two) is required. As anticipated, it was agreed there is no need to develop other new journeys.

For each of the five steps, participants were invited to configure their customer journeys indicating the services that they usually provide at each correspondent stage of the customer transformation and focus on barriers and obstacles that their customer base needs to overcome.

In addition to blocking points that were presented as examples, participants were invited to identify new possible obstacles affecting their customers, that must be taken into consideration to define a suitable set of services fitting with the customers' requirements.

Regarding technology users and SMEs in particular, it came out that one of the main barriers is the lack of human resources, which brings, inevitably, reduced availability of different competencies: what is required are people taking care of funding projects to run research activities, expertise in AI and technological innovations, and competencies to re-train the workforce to adopt new innovative solutions. In some cases, the "Doing-well syndrome" has been highlighted as the main reason behind the lack of long-term vision representing an issue in terms of digital transformation (that typically requires a lot of time and effort). Needless to mention, the lack of funds and R&D budgets is considered among the most blocking points in a digital transformation process.

Regarding technology providers, having at their disposal more success stories, best practices, and lessons learned as examples, could stimulate their activity, also providing some guidelines to facilitate the implementation process. Moreover, DIHs should play the bridge role in linking technology providers with technology users, in order to make the former match the latter's requirements.

During the same session, together with the 19 DIHs, the concept of Digital Transformation Service Matrix and service Pipelines was presented to all WP3 partners.

Participants, DIHs in particular, were asked to analyse their customer base to identify the type(s) of customer they typically support and to build the associated matrix, combining services with the journey's steps to create a pipeline of services, that is, a list of activities following a chronological order. More than one pipeline for each customer type is expected since what drives the identification of services provided is not only the customer typology (and journey) but also the reason that pushes a customer to contact a DIH. However, it was only mandatory to provide at least one service pipeline, for the most common type of customer.

This first workshop session dedicated to Service Portfolio and Customer Journeys was followed by a second and a third online meetings to re-emphasize the METHODIH methodology, especially to the partners who couldn't attend the first version. The sessions were held on Monday 29th May and Tuesday 13th June respectively, to be sure that all the members of the network had a chance to attend. Finally, all the 19 members of the EDIH network attended at least one session.

On 7-8th September 2023, as part of the General Assembly held at month 9, the METHODIH was presented to the full consortium, during a one-hour webinar where the main aspects of the methodology were explained in detail also to partners not directly involved in WP3 activities.

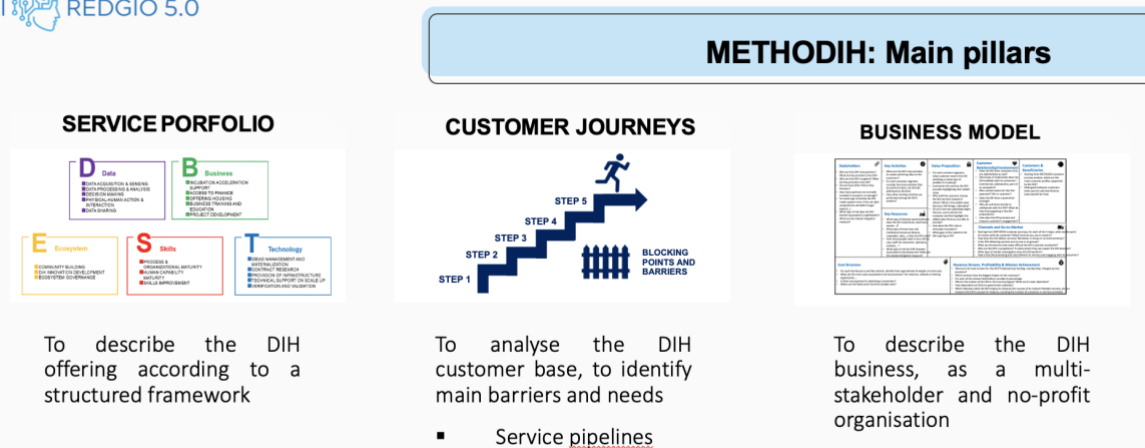


Figure 12 Slide of the METHODIH webinar, methodology overview

4. AI REDGIO 5.0 SERVICE PORTFOLIO ANALYSIS

4.1. Service Portfolio Analysis: a synthesis

The AI REDGIO 5.0 19 DIHs offer overall more than 185 services, classified according to the D-BEST taxonomy, with an average of 12 services per DIH.

The 66 % of services delivered belong to the Data, Ecosystem, and Technology classes, while fewer DIHs are specialized in activities related to Skills and Business Classes.

On the other side, the Service Portfolio configuration was used also to identify service “to-be implemented”, leveraging on resources put at the disposal of AI REDGIO 5.0 project, both from a financial point of view and from a knowledge ecosystem perspective.

Actually, 117 services (an average of 8 per DIH) are going to be evaluated as possible candidates to be implemented during AI REDGIO 5.0 project. The activity that addresses the TO-BE services is run in T3.3 (and it is not subject to the current deliverable but will be reported in D3.3), where the 117 candidates are analysed in terms of requirements, efforts, and resources, in order to establish, where possible, proper collaborations among DIHs, exploiting synergies.

Table 2 AI REDGIO 5.0 DIHs services split by class

CLASS	TOTAL AS-IS	TOTAL TO-BE
Data	36	31
Business	33	17
Ecosystem	36	30
Skills	29	22
Technology	51	17
TOTAL	185	117

Regarding Customer Journeys, not all the DIHs provide support to both categories of customers: the technology user (usually an SME) is the typical customer of almost all the DIHs of AI REDGIO 5.0 consortium, followed by technology provider.

Table 3 Number of DIH having that type of customer in their customer base

CUSTOMER	# of DIH
Technology user	18
Technology provider	12

4.2. Service Portfolio Analysis findings

The 15 Service Portfolios compiled out of the 19 DIHs of the project were analysed in detail in order to:

- Describe AI REDGIO 5.0 consortium of Digital Innovation Hubs by the set of services that they are currently providing, identifying their orientation toward data, business, ecosystem, skills, and technology activities. In this case, we have considered AS-IS services: this analysis is very useful for matching competencies available among the DIHs, finding gaps and overlaps of services in the

network, and considering the perspective of implementing collaborative scenarios (More details will be provided in D3.3);

- Identify new services to be put in place during AI REDGIO 5.0 activities, considering for this case, the TO-BE services.

Note that the analysis of the network numbers reported hereafter was conducted with only 14 service portfolios compiled since the fifteenth portfolio was compiled after the analysis was already conducted. As well, 4 DIHs didn't provide their input, so they were excluded from this first iteration analysis but they will be considered in the second iteration.

4.3. General overview of AI REDGIO 5.0 Service Portfolio

Firstly, a global analysis was run, grouping the DIHs altogether, to identify the trend of the consortium of both AS-IS and TO-BE services.

As mentioned, of the 185 AS-IS services, over one-fourth (28%) belongs to the Technology class, followed by Data and Ecosystem Classes with both counting for one-fifth of the services (19.45%). These two classes cover alone 39% of the entire Portfolio (72 on 185), while the sector with the least services implemented is the Skills class. The first conclusion to be retrieved from these numbers is that the skills class of service, represents a weakness of the project network and that interesting newcomers for it would be DIHs or EDIHs that can bring a wide offer of skill services in order to enhance the response to potential customers that can approach the network during the project or after it ends.

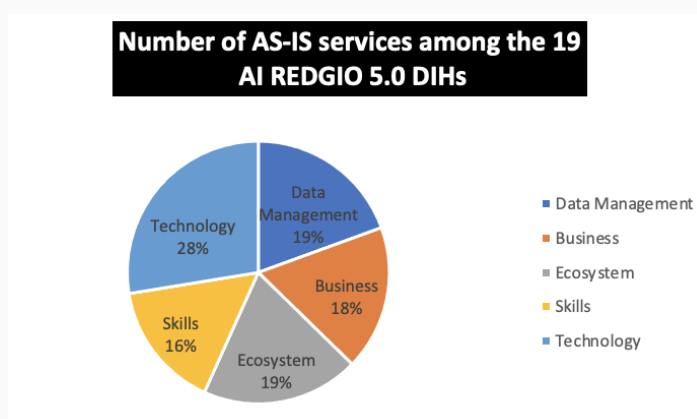


Figure 13 AI REDGIO 5.0 Service Portfolio by service class

Drilling down from service class to service type, as Figure 14 shows, it can be seen that the most represented category is “Technology – Contract Research”, that is, as mentioned earlier, includes both considering collaborative R&D projects (where the customer can develop the new solution with the support of other partners) and supporting the customer to prepare a Proof of Concept (PoC) of the solution, evaluating the feasibility, which counts the 8,64% of services provided in AI REDGIO 5.0 (16 services among the 14 DIHs). The second most popular type is “Data – Decision Making” (Data architectures and Decision Support and Development) counting 4,86% of total services.

Categories with a very low percentage of implementation are those related to the Business Services (Incubation Acceleration Support) and to Skills Services (Human Capabilities Maturity).

Please note, that in the chart below, the bar leading each group is the total of the class.

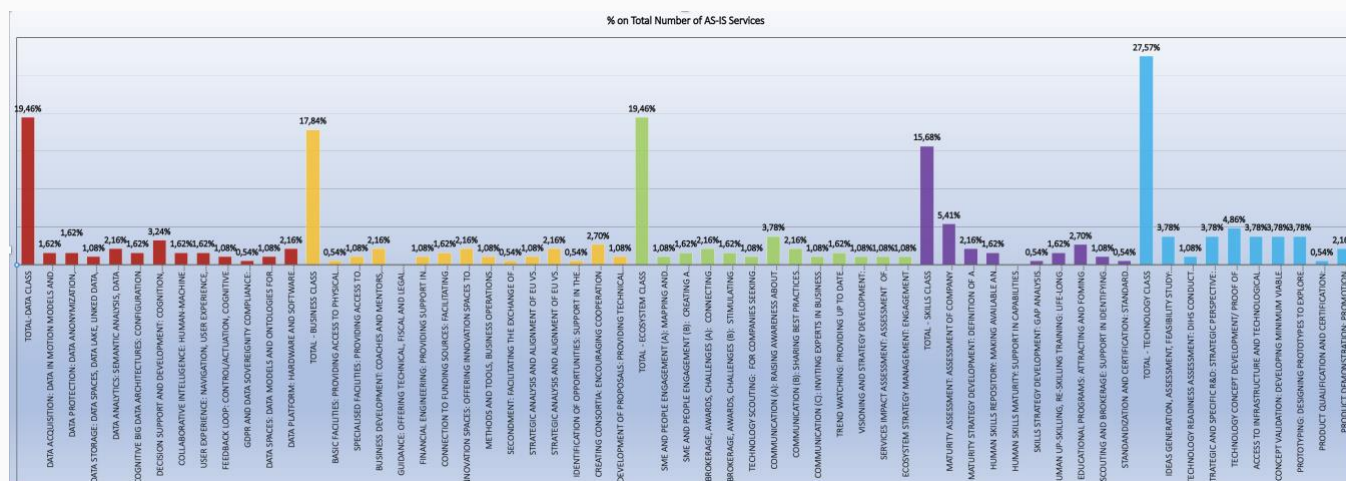


Figure 14 AI REDGIO 5.0 Service Portfolio by service type

4.4. Classification of DIHs according to the Service Portfolio

AI REDGIO 5.0 consortium fully covers the catalogue of services described in METHODIH framework, that is, all services (except 2) are implemented in at least one Digital Innovation Hub. However, each DIH has its specificities, and its expertise may be focused, for instance, on technologies services or ecosystem ones.

Of course, there are some services available in most partner hubs: “Technology Services – Contract Research – Technology Concept Definition” is provided by 9 DIHs out of 14. Important to mention, “Ecosystem services – Community Building – Communication (A)”, “Technology Services – Ideas Management and Materialization – Ideas Generation, Assessment, Feasibility Study”, “Technology Services – Contract Research – Strategic and Specific R&D” – “Technology Services – Provision of Infrastructure – Access of Infrastructure and Technological Platforms” – “Technology Services – Technical Support on Scale Up – Concept Validation” – “Technology Services – Technical Support on Scale Up – Prototyping” are provided by 7 out of 14 DIHs. Interesting to mention, despite the apparent deficiency of skills services, “Skills Services - Process and Organizational Maturity - Maturity Assessment” is provided by 10 DIHs out of 14 DIHs. In other words, apart from helping companies to assess their readiness towards Industry 5.0, only few skill-services are provided, since this area still needs to be boosted (hopefully during the AI REDGIO 5.0 project). On the other side, “Data sharing – GDPR and Data Sovereignty Compliance”, “Business Services – Incubation Acceleration Support – Basic facilities”, “Business Services – Business training and education – Secondment”, “Business Services – Project Development – Identification of opportunities”, “Skills Services – Human Capabilities Maturity – Skills Strategy Development”, “Skills Services – Skills Improvement – Standardization and Certification”, and “Technology Services – Verification and Validation – Product Qualification and Certification” are available only in one DIH each.

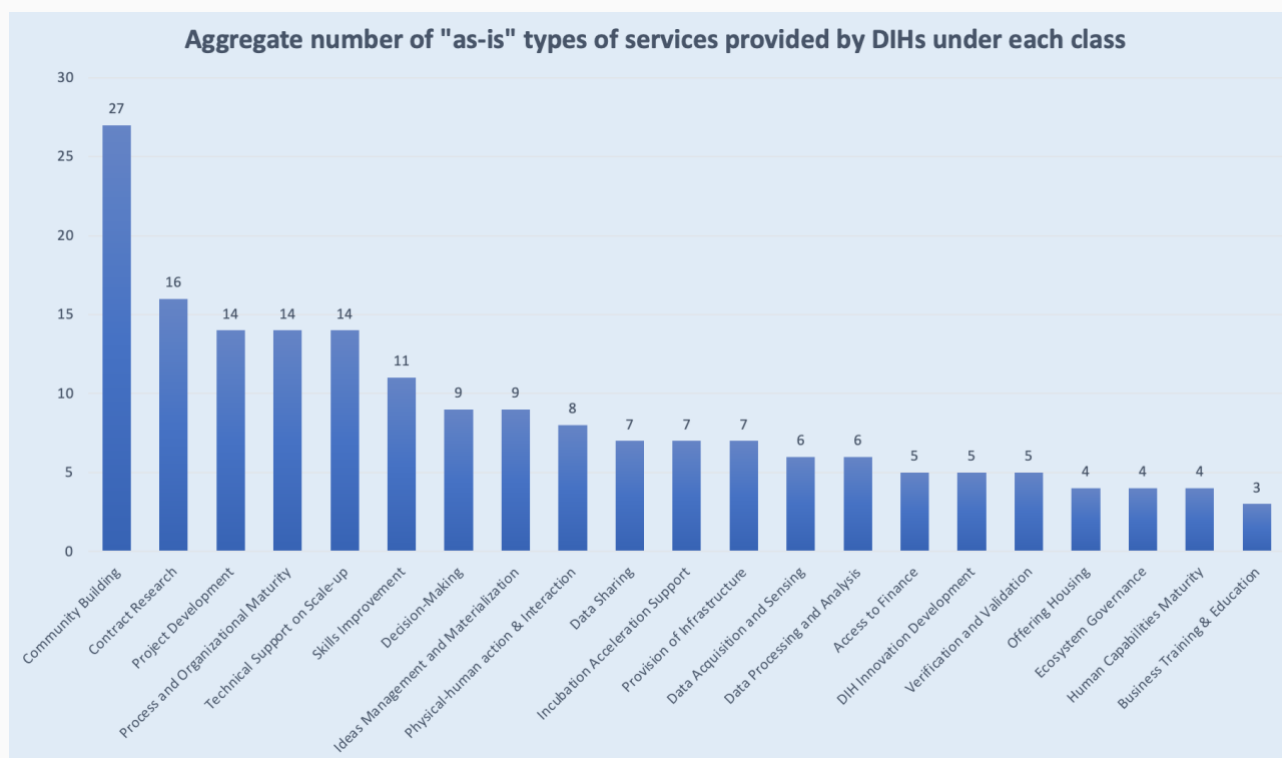


Figure 15 Aggregate Number of Services provided by DIHs

To provide a rough classification of the Digital innovation Hubs two main aspects have been considered:

- The **coverage of the Portfolio**, that is, the number of services that they offer compared to the full catalogue;
- The **orientation**, that is, in which of the five classes (Data, Business, Ecosystem, Skills and Technology) they are more qualified.

The average number of services per DIH is about 13, out of a total of 56 services available in the catalogue (it means that on average, a hub's Portfolio covers about the 23% of services). Three DIHs are definitely positioned highly above the average: Polymeris with a total of 30 services (91%), PBN with 25 services (71%) and CVUT with 22 services (63%). On the other side, Trentino and UTW are very small DIHs with a total of 4 and 5 services respectively.

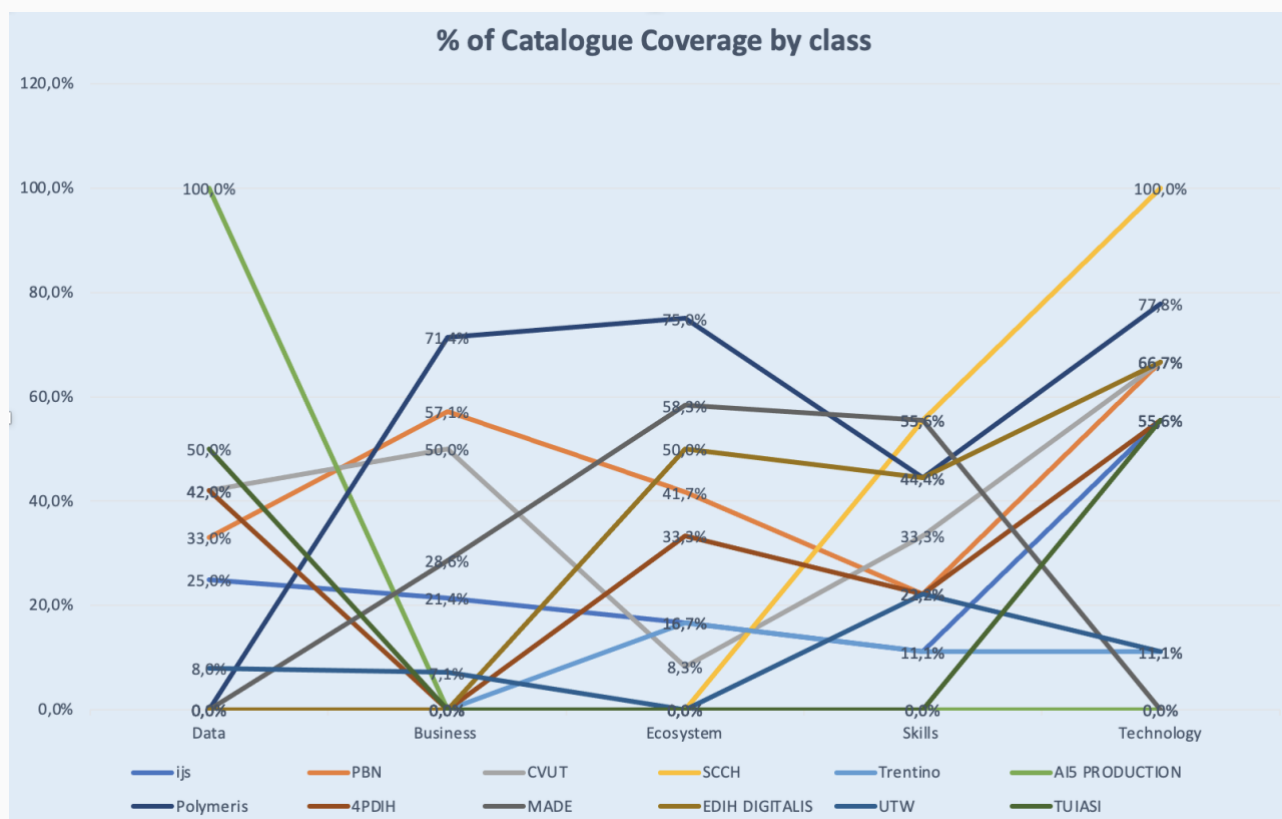


Figure 16 Percentage (%) of catalogue coverage by class

For each class of service, Figure 16 shows the percentage of coverage of the 14 DIHs: each coloured line represents a DIH. On top, close to 100%, those hubs who offer a larger number of services can be observed, while on the bottom those not providing any services, or providing just a few can be found.

For instance, CVUT (grey) presents relatively high percentages for Technology, Business, and Data compared to skills and Ecosystem classes. On the other side, SCCH (yellow) provides 100% of Technology services, but on the other side it does not have any specialization in Data management, Business and Ecosystem services, and hence, three zero points are shown. Conversely, other DIHs present a peak related to Ecosystem, such as Polymeris (dark blue), MADE (dark grey), and EDIH Digitalis (Brown). Also, Polymeris (dark blue), PBN (orange), and CVUT (grey) are well-positioned also regarding business services.

Another type of analysis that was conducted, to complement the previous one, is the identification of the DIH expertise by its portfolio.

Calculating, for each DIH, how services are distributed in its portfolio, that is, how many services belong to a class in percentage to the total number of services provided, it is possible to evaluate the strengths of the hub. This exercise is very useful in perspective to T3.3 activities when DIHs will be grouped to develop new collaborative services, matching requirements from one with competencies of the other one. Figure 17 shows an overview of the distribution of provided services, by class and by DIH. The last column, with a dots-pattern, shows how the full catalogue is distributed: the 56 services span quite homogeneously across the five classes, with a majority of Business services (14, that is 25% of the total), followed by Ecosystem and Data (12 for each, that is 21%) and finally Technology and Skills (9 for each, that is 16%). Trentino, MADE, EDIH Digitalis, and Polymeris seem to be more “ecosystem oriented”, since their portfolio is mainly dedicated to ecosystem services (50%, 44%, 38%, and 30% respectively); SCCH seems to be more “technology-

oriented”, with 64% of its services dedicated to technology activities; IJS, PBN, CVUT, POLYMERIS, 4PDIH, and UTW present quite a homogeneous portfolio, even if the latter doesn’t have Ecosystem competences.

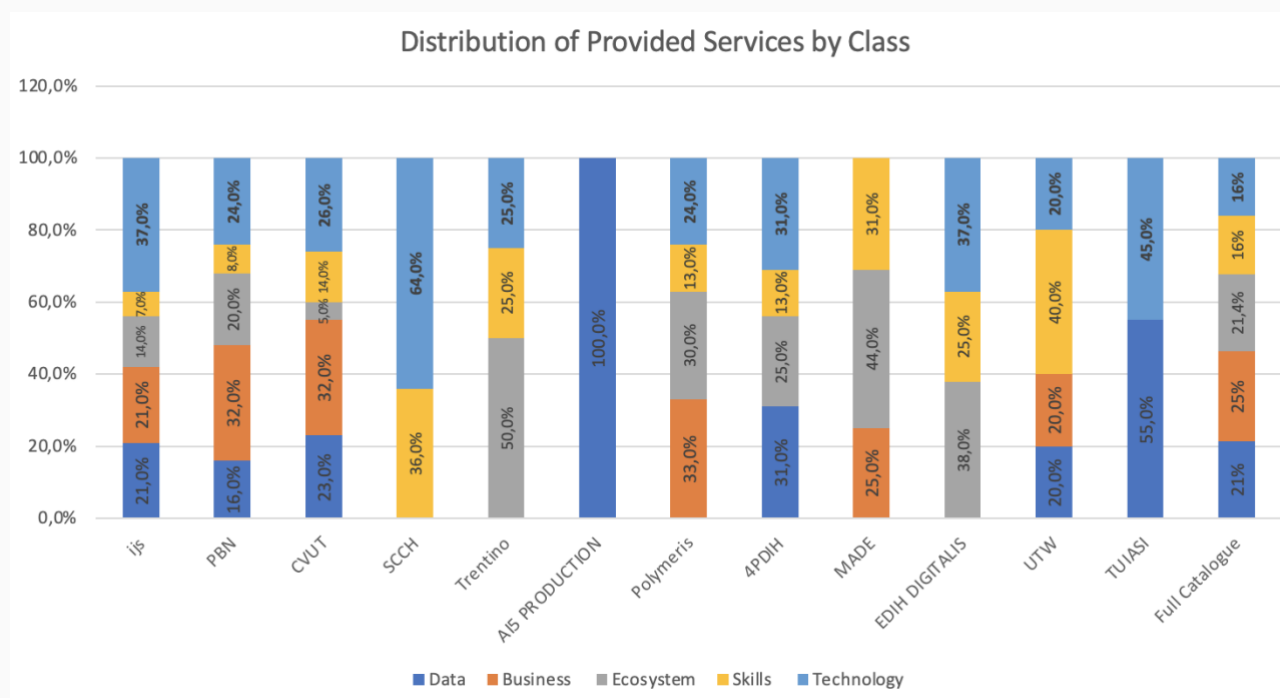


Figure 17 Distribution of provided services by class

4.5. General overview of services to be implemented in AI REDGIO 5.0

Having a look at the TO-BE services, it can be noticed that the distribution is quite different with respect to the AS-IS Portfolio.

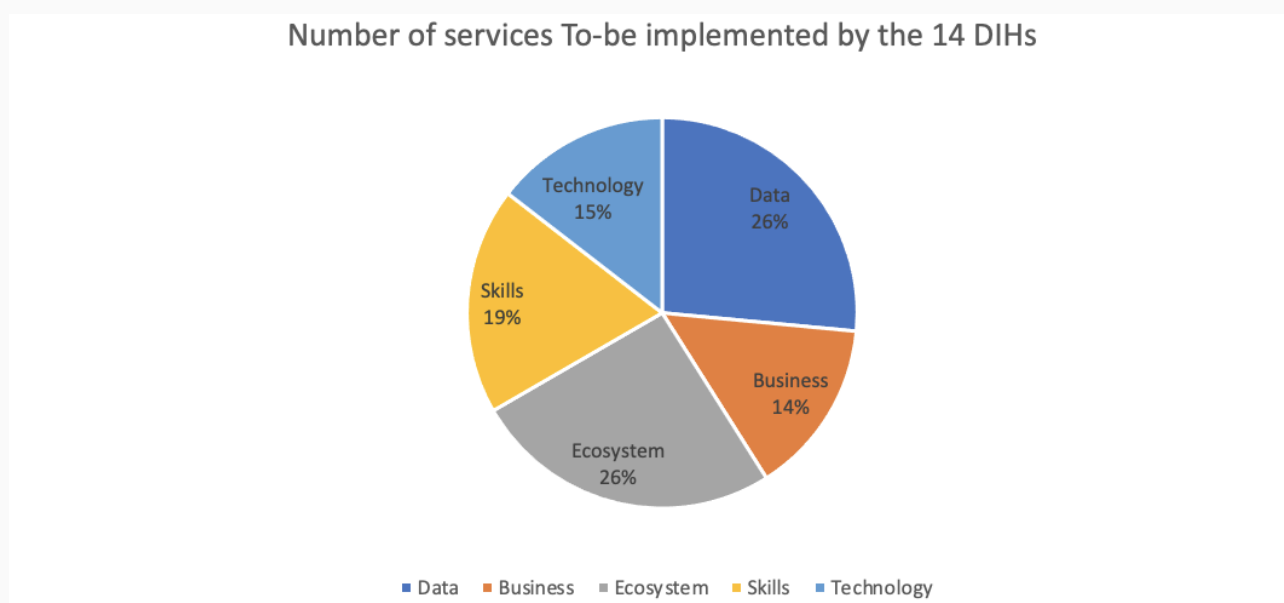


Figure 18 Services to be implemented, by service class

Aware of their gaps and probably driven by the more “as-is” technical approach of AI REDGIO 5.0, the 14 DIHs are instead more orientated towards the implementation of data-ecosystem and skills services. Figure 18 shows a more homogeneous distribution of the five classes and Technology and Business services here are not prevalent.

Next paragraphs will provide an overview of services to be implemented, also describing some examples directly collected from the 14 Portfolios.

4.5.1. To-be Data Services Analysis

According to the analysis conducted in WP3, 31 new Data services are planned to be implemented in AI REDGIO 5.0. In most cases, these are DIHs that are not expert at all about data, but wish to enrich they portfolio, providing a set of services strongly required nowadays.

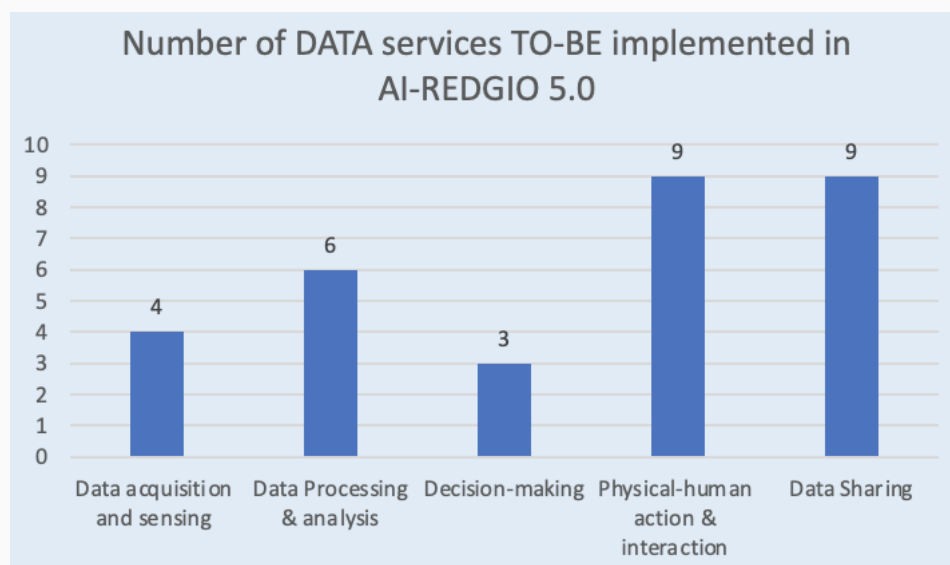


Figure 19 Number of DATA services to be implemented in AI REDGIO 5.0

UTW is planning to include for the first time 8 services dealing with data from scratch (currently, only “decision support and development” is available), related to all types of services:

- Utilization of Collaborative Intelligence, by offering services aimed at supporting clients in improving human-machine interface and interaction through the development of explainable and multilingual AI.
- Data Analytics, by providing companies with access to AI and advanced optimization algorithms as a service.

Jožef Stefan Institute is planning to enrich its portfolio by including some services related to Data management. Four different services are expected to be implemented:

- Regarding Data Processing & analysis: Data storage assistance (in local/distributed forms), by providing industrial companies with services aimed at the development of data lakes to store, process, and secure large amounts of structured, semi-structured, and unstructured data types.
- Physical-Human Action & Interaction: Collaborative Intelligence through the Provision of support/consultancy services for Human-Machine Interface, Human-Robot Interaction, and Human-Data Interaction

- Data sharing services aimed at providing both software (data models and ontologies) and hardware (connectors) architectures to ensure a secure exchange of data.

CVUT is planning to enrich its portfolio by including some services targeting Data management. Five different services are expected to be implemented:

- Physical-Human Action & Interaction: Collaborative Intelligence through the Provision of support/consultancy services for Human-Machine Interface, Human-Robot Interaction, and Human-Data Interaction. Also, plans are in place to provide services supporting clients to develop cognitive feedback loops to facilitate the operator's decision-making process.
- Data sharing services aimed at providing both software (data models and ontologies) and hardware (connectors) architectures to ensure a secure exchange of data. As well, CVUT is planning to provide consult clients to ensure their compliance with GDPR and data sovereignty.

It is, of course, the duty of T3.3 to evaluate what is feasible to be achieved, in terms of time, effort and costs.

4.5.2. To-be Business Services Analysis

17 new business services are planned to be implemented in AI REDGIO 5.0, mainly related to “Incubation and acceleration support” and “Project development” categories. In most cases, they are DIHs that, even if are already offering a wide range of business services, want to make the portfolio as complete as possible.

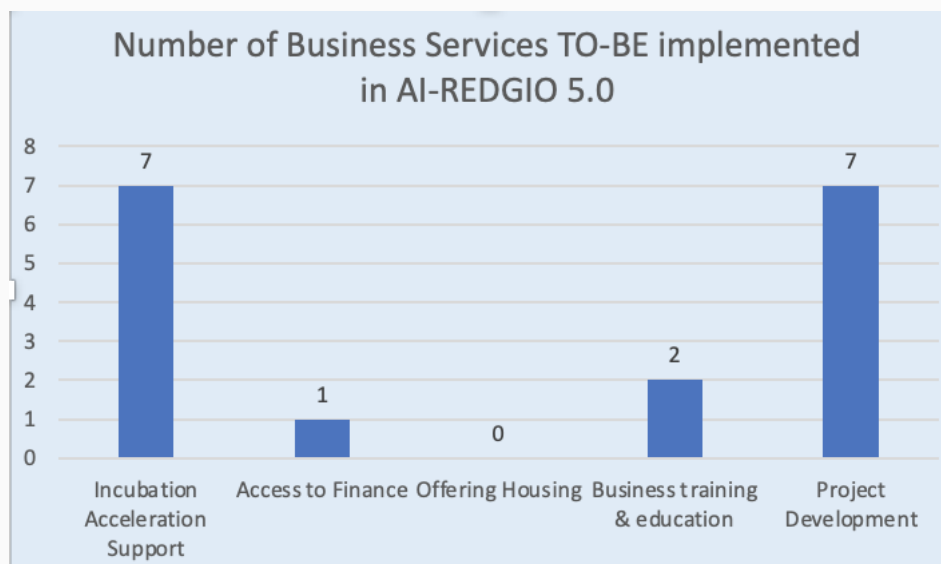


Figure 20 Number of BUSINESS services to be implemented in AI REDGIO 5.0

UTW is planning to include for the first time 12 services dealing with Business Services from scratch (currently, only “Innovation Spaces” is available), related to all types of services:

- Incubation Acceleration Support, by providing clients with physical infrastructure (i.e offices), telecommunication infrastructure, dedicated programmes to elevate business development, and both regulatory and administrative guidance.

- Project development, by providing services facilitating strategic analysis and market research to explore potential opportunities and possible synergies.

Jožef Stefan Institute is planning to enrich its portfolio by including some services related to Business services. Five different services are expected to be implemented:

- Incubation Acceleration Support, by providing clients telecommunication infrastructure (i.e high powered computing), and offering them regulatory technical/legal/fiscal guidance.
- Access to finance: Aiming to help eliminate the problems associated with lack of funds, with the plan to provide services in terms of financial engineering to better address the common financial issues.
- Project development, by provisioning technical assistance directed towards Proposals development (i.e funding proposals).

MADE is planning to enrich its portfolio by including a few services related to Business services. Two different services are expected to be implemented:

- Incubation Acceleration Support, by providing clients regulatory technical/legal/fiscal guidance.
- Project development, by providing services facilitating strategic analysis and trend watching to explore potential business opportunities.

Again, it will be the duty of T3.3 to evaluate what is feasible to be achieved, in terms of time, effort and costs.

4.5.3. To-be Ecosystem Services Analysis

30 new Ecosystem services are planned to be implemented in AI REDGIO 5.0, mainly related to “Community building” category. Not differently to business class, they are mainly DIHs that want to make the ecosystem portfolio as complete as possible, by developing some of those few missing services.

The ecosystem domain is by definition suitable to be collaboratively managed and indeed, a lot of services presented below are expected to be implemented leveraging the AI REDGIO 5.0 network.

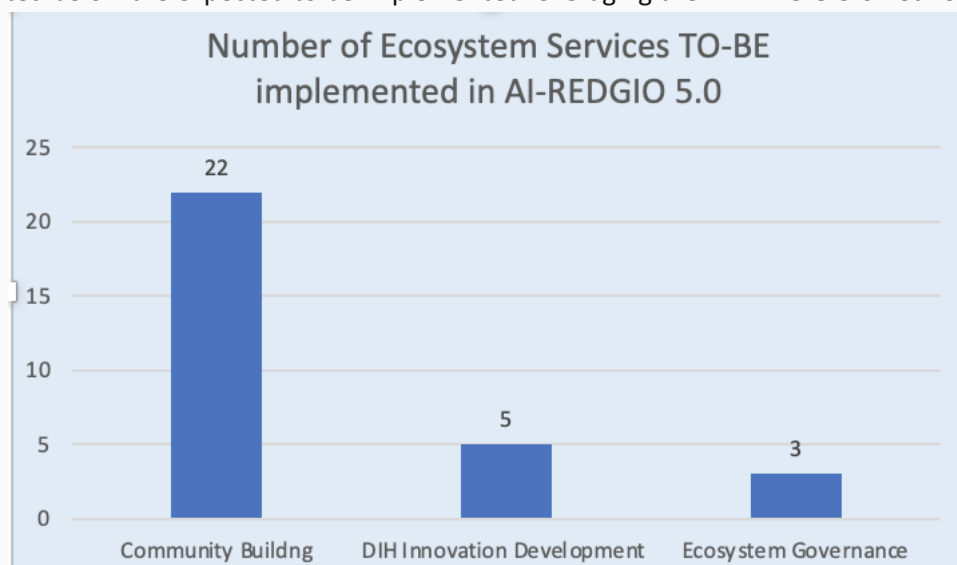


Figure 21 Number of ECOSYSTEM services to be implemented in AI REDGIO 5.0

AFIL is planning to add one new service to the portfolio of the 9 already provided, related to community building - Brokerage, Awards, Challenges, leveraging on Internal Private Funds (membership fees), External Private Funds, and External Public Funds. It is called “open Innovation Challenge”, thanks to which, End-user companies/Industrial champions are invited to propose technological challenges. AFIL mobilizes the community stimulating technology suppliers to propose specific innovative solutions in focused events (e.g. Hackathons), thus facilitating the match between offer and demand and fostering Start-ups, SMEs and LE collaboration in a pre-competitive environment. This process might also include a Reward, both in terms of visibility and financial support (with the involvement of a third party financing the initiative).

Referring to the apparent deficiency of ecosystem services in its offerings, Jožef Stefan Institute is planning to enrich its portfolio by adding 10 new services to the 2 already provided. The 10 new services expected are related to:

- Community Building, by helping clients organise various events to raise awareness of its value proposition and best practices/success stories within the innovation ecosystem to both enhance the chances of both business/technological partnerships and stimulate collaborative innovation and problem-solving. Also, IJS aims to help companies scout the trending technologies according to their customers’ profiles, needs, and surrounding ecosystem.
- DIH Innovation Development: Aiming to help start-ups and SMEs maintain their competitiveness in the market, IJS is planning to provide services that help clients articulate their vision and strategy according to the changes within the ecosystem (i.e trend intelligence platforms).
- Ecosystem Governance, by provisioning assistance towards the development of relevant KPIs to facilitate monitoring the quality of services provided to the ecosystem.

Apart from technology scouting services, MADE is planning to enrich its portfolio by adding 4 new services to the 7 already provided. The 4 new services expected are related to:

- Community Building, by helping clients organise various events to raise awareness of its value proposition and best practices/success stories within the innovation ecosystem to both enhance the chances of structured business and AI technology providers relationships.
- DIH Innovation Development: Through the provision of trend reports, deployment of trend intelligence platforms, and up-to-date amendments to the client’s business model, IJS aims to help companies foster communication inside the ecosystem of practical experience in the domain and react swiftly according to the changes in the market.

Despite its relatively rich portfolio when it comes to ecosystem services, EDIH DIGITALIS is planning to enrich its portfolio by adding 4 new services to the 6 already provided. The 4 new services are expectedly related to:

- Community Building, by providing clients with innovation spaces and incentive programs to stimulate collaborative innovation and problem-solving with other DIHs in the ecosystem. Also, EDIH DIGITALIS aims to help clients organise various events to maintain communication channels with industry experts, entrepreneurs, customers, and partners.
- Ecosystem Governance, by provisioning assistance towards the development of relevant KPIs to facilitate monitoring the quality of services provided to the ecosystem. Also, it aims to help companies define strategies to manage internal collaborations and engage external relationships.

Referring to the complete absence of ecosystem services in its offerings, UTW is planning to enrich its portfolio by adding 10 new services. The 10 new services expected are related to:

- Community Building, by helping clients organise various events to raise awareness of its value proposition, provide examples of experts/past beneficiaries, and update its new good practices within the innovation ecosystem to both enhance the chances of business/technological partnerships and stimulate collaborative innovation and problem-solving. Also, UTW aims to help companies scout the trending technologies according to their customers' profiles, needs, and surrounding ecosystem.

DIH Innovation Development: Aiming to help start-ups and SMEs maintain their competitiveness in the market, UTW is planning to provide services that help clients articulate their vision and strategy according to the changes within the ecosystem (i.e trend intelligence platforms).

4.5.4. To-be Skills Services Analysis

21 new Skills services are planned to be implemented in AI REDGIO 5.0. As already mentioned, the Skills services mainly deal with three areas:

- company assessment and strategy definition to improve competences,
- human assessment and strategy definition to improve competences,
- provision of training materials, courses, classes, and educational activities.

The first one (process and organizational maturity) is the one in which DIHs are currently spending more effort and coherently it is also the one in which very few services will be implemented in the next months. The opposite can be said for the second one (human capabilities maturity).

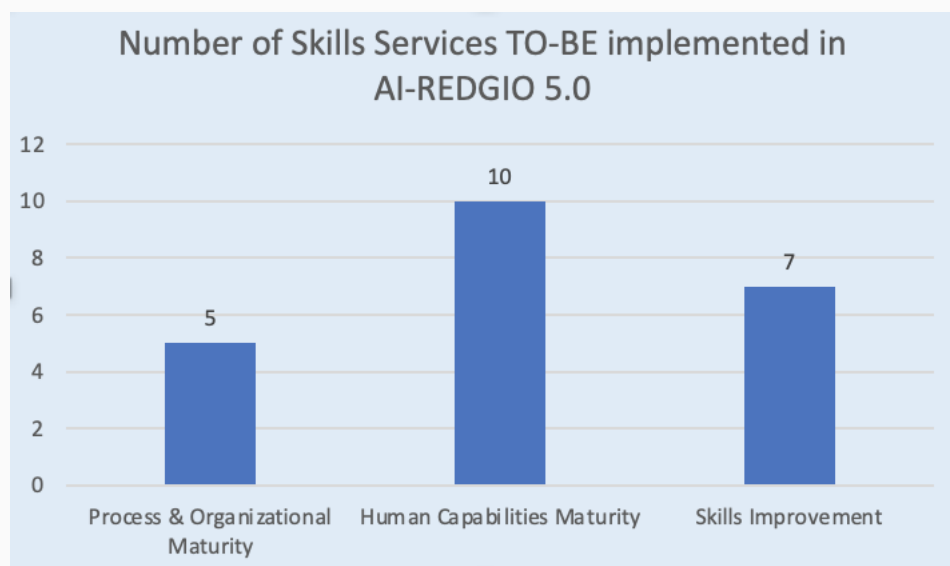


Figure 22 Number of SKILL services to be implemented in AI REDGIO 5.0

In addition to the 5 services already available in its portfolio, SCCH is planning to add 4 new services to provide a complete set of Skills services.

- Process & Organizational Maturity: based on the outcomes of the digital maturity assessment service provided by SCCH, a roadmap development system will be implemented, to support the definition of the strategy (and roadmap) for the adoption of new technologies and business models.

- Human Capabilities Maturity, by conducting interviews, SCCH aims to assist companies with capabilities screening to determine the “as-is” level of skills and provide a gap analysis to propose an action plan to get to the desired level.
- Skills improvement service, by adding the “Scouting and brokerage” services to its portfolio, SCCH aims to help clients identify the potential collaboration channels for knowledge transfer.

EDIH DIGITALIS aims to add 4 new services to provide an almost complete set of Skill services. To elaborate, EDIH DIGITALIS is planning to add 3 new services to the first two service classes (Similar to SCCH) as well as adding a service instance to the third class. The services are related to:

- Process & Organizational Maturity: based on the outcomes of the digital maturity assessment service already provided, a roadmap development system will be implemented, to support the definition of the strategy (and roadmap) for the adoption of new technologies and business models.
- Human Capabilities Maturity, by conducting interviews, a Human skills maturity assessment will be implemented, through an on-site visit to the company to screen the level of maturity of different job positions in the company and define the adequate tools to fill the skill-gap.
- Skills Improvement, by identifying training and re-skilling opportunities for SMEs at national and European levels, EDIH DIGITALIS aims to provide life-long training on technical and soft skills focused on AI at the corporate level, operational and the technology-specific level.

UTW is expecting to increase its portfolio with six new Skills services, related to the second and third classes:

- Human Capabilities Maturity, by developing a Human skills maturity assessment framework through an on-site visit to the company to screen the level of maturity of different job positions in the company and define the adequate tools and tactics to fill the skill-gap and enhance the readiness towards the adoption of I4.0 technologies. Also, UTW plans to provide an online repository that contains AI documentation and training materials.
- Skills Improvement, by identifying training and re-skilling opportunities for SMEs at national and European levels, UTW aims to provide life-long training on technical and soft skills focused on AI at the corporate level, operational and technology-specific level. Also, besides providing dedicated educational programs to eliminate the gap between the labor’s capabilities and the market demands, UTW aims to facilitate the identification of the potential collaboration channels for knowledge transfer.

4.5.5. To-be Technology Services Analysis

Given that the Technology class has dominated the “as-is” scene due to the huge presence of technology-oriented DIHs in the network, it was expected that an overall less focus on this class would be reflected in the “to-be” scenario. To elaborate, 17 new Technology services are planned to be implemented in AI REDGIO

5.0, covering the five categories associated with the class (provision of infrastructure, scale-up, validation, contract research, and ideas management).

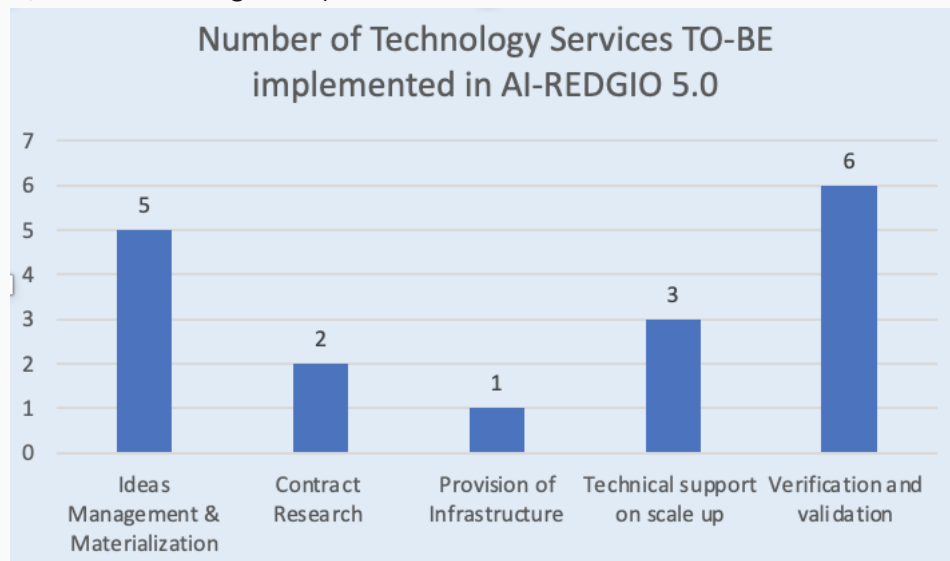


Figure 23 Number of TECHNOLOGY services to be implemented in AI REDGIO 5.0

In addition to the 5 services already available in its portfolio, TUIASI is planning to add 4 new services to provide a complete set of Technology services.

- Ideas Management & Materialization, by assisting companies in conducting a technology readiness assessment on products/solutions to maintain competitiveness in the market.
- Technical Support on Scale-up, by designing prototypes to help clients explore ideas and emerging technologies before going into production to reduce the risks associated with investments.
- Verification and Validation, by providing services that prepare companies to formulate adequate functional, quality assurance, and performance tests. Also, it aims to assist companies with the organisation of different offline/online events to demonstrate and promote their solutions to the clients.

Aiming to provide a complete set of technology services, UTW aims to add 7 new services that fulfill all classes. The 7 services are related to:

- Ideas Management & Materialization, by helping companies generate and assess innovative ideas along with conducting a preliminary feasibility analysis. Also, UTW targets assisting companies to conduct a technology readiness assessment on products/solutions to maintain competitiveness in the market.
- Contract Research, by facilitating collaborative R&D projects to support the translation of innovative ideas into demonstrable/feasible concepts, and applying technological innovation to develop new products/services or improve existing ones.
- Provision of Infrastructure, by providing clients with the ability to access a wide range of technological infrastructure facilities (i.e labs, equipment, etc...) for low costs.
- Technical Support on Scale-up, by providing support throughout the development of minimum viable products (MVPs) to be later validated by real customers in a real industrial context. Also, UTW is planning to provide services targeting fabricating prototypes to help clients explore ideas and emerging technologies before going into production to reduce the risks associated with investments.

- Verification and Validation, by providing services that prepare companies to formulate adequate functional, quality assurance, and performance tests. Also, it aims to assist companies with the organisation of different offline/online events to demonstrate and promote their solutions to the clients.

In addition to the 6 services already available in its portfolio, 4PDIH is planning to add 1 new service to the first class.

- Ideas Management & Materialization, by assisting companies in conducting a technology readiness assessment on products/solutions to maintain competitiveness in the market.

AFIL, leveraging on the AI REDGIO 5.0 network of stakeholders, is planning to collaboratively implement a new service about “Infrastructure identification”, to support the identification of technology infrastructures at a local level (i.e. competence centers infrastructures) as well as interregional level (leveraging on EU Initiatives such as Vanguard Initiative) to experience the technology.

ART-ER, wishes to collaboratively deploy infrastructures to access technology. Leveraging on EU Initiatives participation, ART-ER is setting up a network of High-Level laboratories able to cooperate on an inter-regional scale to provide AI-enhanced innovation services to SMEs and companies. Exploiting inter-regional cooperation, laboratories will be able to complement their service portfolio, and SMEs will be able to access the most complete and advanced set of shared infrastructure and shared knowledge.

5. AI REDGIO 5.0 CUSTOMER JOURNEYS AND SERVICE PIPELINES ANALYSIS

From the combination of services and customers, DIHs have developed Service Matrices, 5x5 matrices defined by: the classes of services as rows (Data, Business, Ecosystem, Skills and Technology) and the steps of the customer journey as columns. Hence, one matrix for each Customer Journey is expected.

Of course, the number of rows may change in case not all the classes of services are taken into account or new ones are added (as, for instance, the “R” of remotisation or “L” of Legal services, considered in other taxonomies).

To fill the matrix, the DIH is required to insert the services of its Portfolio (AS-IS and TO-BE), provided to the specific customer type, and to identify at which stage of the customer journey a specific service is provided (there may be services spanning more than one column).

The objective is twofold:

- On one side, it is a useful exercise to monitor services. Even if not all services from the portfolio are expected to be included in the same matrix (but only those related to the specific customer profile), all services are expected to be positioned in at least one matrix, since it means that they are provided;
- On the other side, it eases the identification of new useful services to be implemented.

The following step is to transform the service matrix in a Digital Transformation Service Pipeline, where services are linked with arrows, to create an evolutionary pathway of tasks and activities. According to the reason that drove the customer to address the DIH, the set of services provided may change, hence, there isn't a single pipeline for Customer Journey, but more than one is expected. The idea is to describe success stories leveraging on service pipelines: each success story should be representative of a specific user profile, to provide a full overview of the main customer profiles supported by the DIH.

In addition, the pipeline should be equipped with a timeline, to be able to measure progresses and performances.

In the next paragraph, the most relevant service pipelines identified among the 19 DIHs are presented. Not all the hubs refer to the same typology of customer: if technology users (mainly SMEs and industry) represent the typical client of a DIH and are part of each customer base, on the other side students, start-ups, etc, are not supported by all DIHs.

Table 4 Customer base by DIH

DIH	TECHNOLOGY USER	TECHNOLOGY PROVIDER
AFIL	X	X
KCSTV	X	X
JSI	X	
POLYTRONICS	X	X
MADEcc	X	X
DMIW	X	X
OOST NL	X	
UTW	X	
ART-ER	X	X
UL	X	X
HIT	X	X
TUIASI	X	X
CVUT	X	X
MAKE	X	X

GAIN	X	
MADE	X	
PBN	X	X
SCCH	X	
IMCEH	X	X

5.1. Technology Users Customer Journeys and Service Pipelines

As explained, the “technology user” is a macro-category of different stakeholders (from SMEs to larger companies) that includes several different profiles, typically associated with several success stories.

Among AI REDGIO 5.0 DIHs, some profiles have been outlined:

- The customer looking for R&I opportunities or the customer looking for key business partnerships and market access.
The set of services provided spans over the first stages (or initial steps) of the journey, and it is mainly focused on ecosystem and business activities. However, in case of participation in a funded project, the client may be accompanied till the end, when it needs mainly certification and maintenance support.
- The customer looking for support in digitalizing the business and is willing to experience the technology.
The DIH provides support till the latest steps of the journey and services are more technology and skills-oriented.
- The customer looking for a maturity assessment and a technological roadmap.
Services provided are more skills and technology-oriented and are implemented starting from “Experiment” phase.
- The customer looking for technological training.
As the title itself suggests, the pipeline is more related to skills services (Educational programs, maturity strategy, skills strategy), provided during the central phase of the transformation (“awareness” and “experiment”).

It is quite interesting to notice that the direct interaction with the customer, that happens typically starts from the second stage of the journey, it is always anticipated by a few preliminary contacts through workshops, seminars, public events, brokerage initiatives, etc (ecosystem services).

In the following sections of the report, some individual cases will be shown, including matrixes, service pipelines and customer journey descriptions provided by the partners themselves. To provide a more concise and effective report, a selection of activities conducted by the DIHs will be shown as an example of the activities conducted by the entire network.

5.1.1. AFIL Customer journey matrix, service pipelines and customer journey's descriptions

Figure 24 shows the service pipeline filled by AFIL to describe the set of services provided to SMEs that are looking for support to digitalize their business. Info-days, workshops and community engagement events represent the first contact with the customer. AFIL, which is more ecosystem and business-oriented, supports the customer by monitoring funding opportunities that could enhance the customer's business by providing a more digitized approach or by matchmaking stakeholders with different competencies but the same objectives.

Filling the service matrix and creating the related pipeline came out to be a useful exercise to identify new services, and to better answer to the customer requirements. For instance, "Find alternative funding" during the "Experiment" phase is a new service to complement the Funding opportunities monitoring already provided. To better contribute during the fourth step "Experience", AFIL (not having at their disposal their own technology facilities) is planning to put in place a service to identify infrastructures both at the local (Lombardy region, Italy) and interregional level.

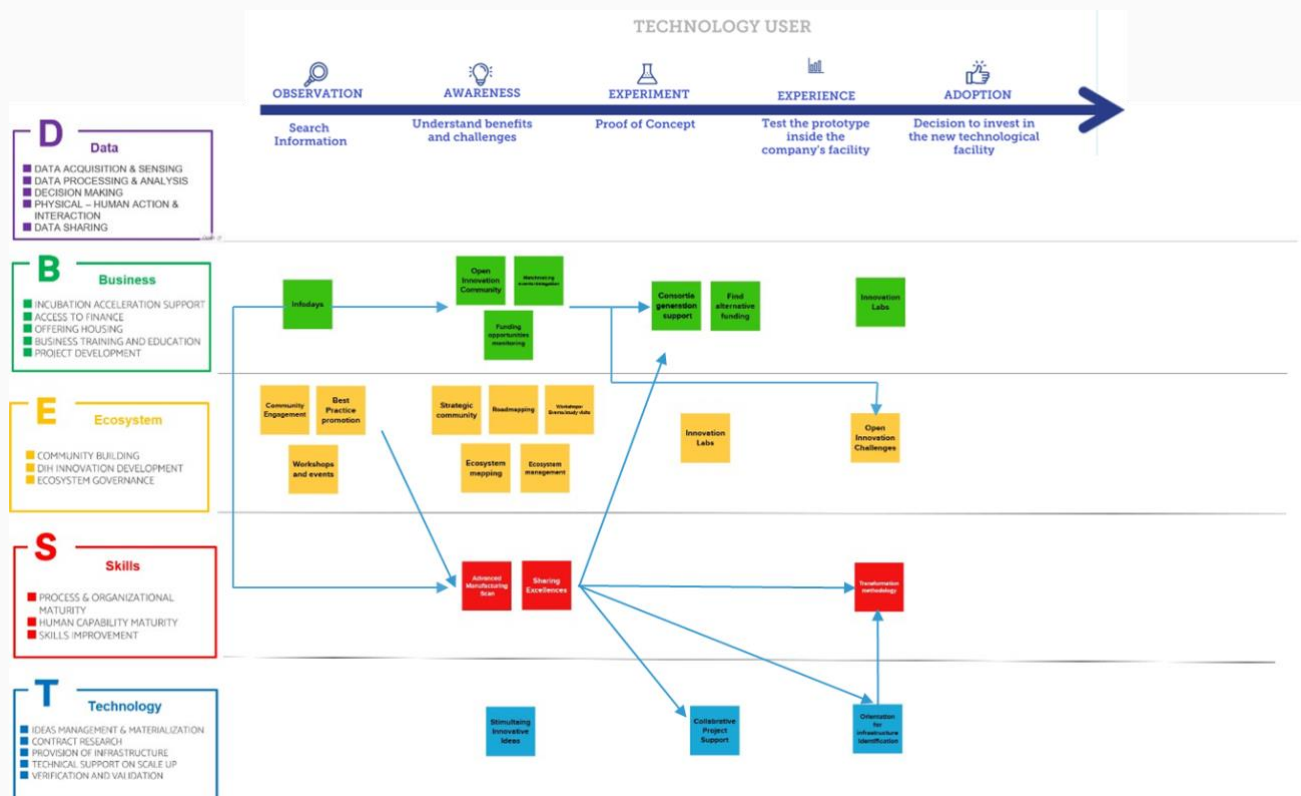


Figure 24 AFIL service pipeline for SME looking for support in digitalizing the business

5.1.2. Customer journey description provided by AFIL partner

Technology end-user's Customer Journey

Observation

In this phase the TU has a passive behavior, starting to have access to the R&I contents and coming across the concept of I4.0 by chance. The association with AFIL allows one to enter into contact with the regional ecosystem and participation in info days and AFIL events allows one to know the basics of Industry 4.0. The specific services implemented in this phase are tune-up to the community, best practice promotion, conferences, workshops and events, and Info days.

- Blocking points addressed:
 - Mindset
 - Focus on core business
 - Peculiar market feature
- Timelapse: up to 3 months.

Awareness

In this phase the TU starts to have an active behavior, trying to obtain targeted information and evaluating opportunities. The positioning within AFIL Strategic Communities at a local level and in the Vanguard Initiative at the EU level allows increased awareness of the benefits of the implementation innovative AI-based solutions. AFIL services connected with this phase are: Strategic Communities, Expert workshops and Study visits, Road mapping, Ecosystem management, Ecosystem mapping, Open Innovation Community, Matchmaking events and Funding opportunities monitoring.

- Blocking points addressed:
 - Access to knowledge
 - Ecosystem building
- Timelapse: up to 6 months.

Experiment

In this phase the TU introduces new technologies and new skills in its environment, unlocking new technological and business opportunities. AFIL, through its projects and other initiatives, provides the digital assessment, implementation, and transformation plan to the SMEs, and identification of relevant actions for its digital transition. Within the networks, AFIL identifies different available funding opportunities to join the EU project consortium and gives visibility to the achieved results within its ecosystem. AFIL services connected with this phase are Open innovation Challenges, Innovation Labs, Interregional benchmarking,

Collaborative project support, Consortia generation support, Find alternative fundings, and Advanced manufacturing Scan.

- Blocking points addressed:
 - Capital asset
 - Technological support
 - Pressure on results
- Timelapse: 6-12 months.

Experience

In this phase, the TU could test prototypes in the company's environment and evaluate the benefits through the KPIs analysis. Through participation in EU projects, SMEs could test in their facilities the developed digital solution provided by a technology user. AFIL supports the dissemination of results and offers the possibility to exploit new technologies thanks to the mapping of the ecosystem and the identification of new solutions and tech providers. AFIL also allows participation in business missions to identify new opportunities. The related services are Open innovation Challenges, Expert workshops, and study visits, Sharing Excellences, Orientation for infrastructure identification, Innovation platform, and Transformation methodology.

- Blocking points addressed:
 - Technological support
 - Organizational issues
 - KPIs evidence
- Timelapse: 6-12 months.

Adoption

In this last phase, TU chooses of technological adoption of innovative solutions at the company level, evaluating needed organizational and business models. At this stage, AFIL just supports the scouting of new opportunities and the dissemination of successful results. The services are Expert workshops and study visits, Sharing excellences.

- Blocking points addressed:
 - Technological support
 - Maintenance
- Timelapse: months.

5.1.3. Josef Stefan Institute Customer journey matrix, service pipelines and customer journey's descriptions

In the same way, INSTITUT JOSEF STEFAN has developed a service pipeline for SMEs looking for technological training and digitalizing their business, that encompasses five steps and five classes. The technological road-mapping consultancy that helps enterprises in shaping their vision and strategies will be enriched by several skills services, such as “Maturity assessment”, which would be vital to ease workers’ acceptance of the new solution by measuring the success of the training strategy at the completion of the journey.

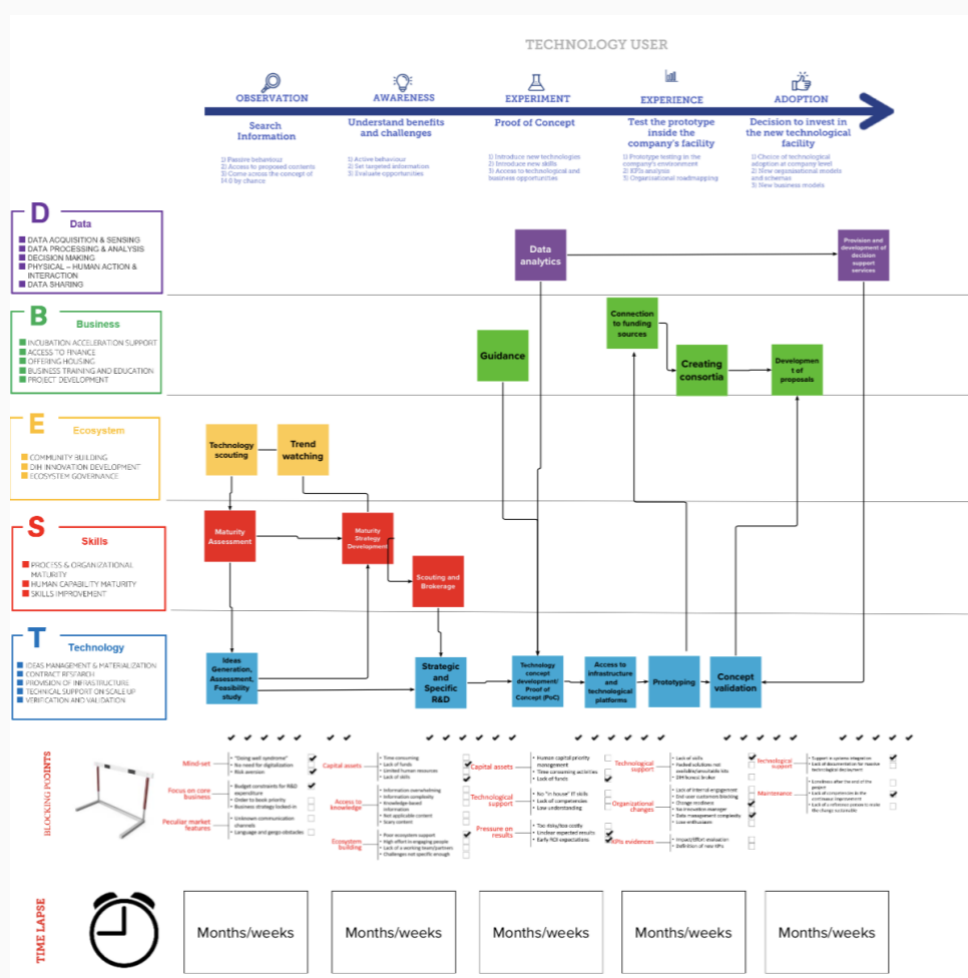


Figure 25 INSTITUT JOSEF STEFAN service pipeline for SME looking for technological training and digitalizing their business

5.1.4. Customer journey description provided by Josef Stefan Institute partner

Technology end-user's Customer Journey

Observation

- Maturity assessment: services aimed at assessing company readiness and maturity for I4.0
- Trend watching in the client's industry domain
- Technology scouting: Identification of emerging technologies in the domain; Identification of emerging technologies; Communication of technology related information to organizations
- Ideas generation, assessment, feasibility study: Generation and assessment of new ideas; Conduction of feasibility studies
 - Blocking points:
 - A: "Doing well syndrome"
 - B: Risk aversion
 - C: Budget constraints for R&D expenditures
 - Timelapse: 3 months

Awareness

- Maturity strategy development: Definition of a roadmap based on the maturity model assessment
- Scouting and brokerage: identifying channels, structure contacts, and collaborations intended to knowledge-transfer
- Strategic and Specific R&D: defining collaborative R&D projects to support the translation of innovative ideas into demonstrable concepts
 - Blocking points:
 - A: Lack of funds
 - B: Lack of skills
 - C: Poor eco-system support
 - Timelapse: 1 month

Experiment

- Data analytics services for analysing data through different approaches

- Guidance: Provision of regulatory assistance
- Technology concept development and Proof of Concept (PoC) development
 - Blocking points:
 - A: Lack of funds
 - B: Unclear expected results
 - C: Early ROI expectations
 - Timelapse: 1 month

Experience

- Connection to funding sources: facilitate access to EU and national funding sources
- Creating consortia aimed at encouraging cooperation and collaboration among organizations for applying to different calls
- Access to infrastructure and technological platforms: providing platform technology infrastructure and access to lab facilities; renting the equipment with lab operators
- Design of prototypes to explore ideas and emerging technologies before going into production via digital twins
- Concept validation: Development of minimum viable products that can be validated with real customers and/or in industrially relevant setting
 - Blocking points:
 - A: Lack of skills
 - B: Change readiness
 - C: Data management complexity
 - Timelapse: 3 months

Adoption

- Decision support and development based on data analysis: prediction, simulation and machine learning
- Development of proposals: providing technical assistance to invest in the new technology
 - Blocking points:
 - A: Support in system integration
 - B: Lack of competencies in the continuous improvement
 - Timelapse: 1 month

5.1.5. KCSTV Customer journey matrix and service pipelines

Figure 26 shows the service pipeline filled by KCSTV to describe the set of services provided to SMEs that are looking for support to digitalize their business and technology training. After a preliminary stage when it acts for identifying opportunities and funding resources, KCSTV participates in the core activities by providing demonstration facilities to show technical solutions behavior and supporting the development of data-based solutions.

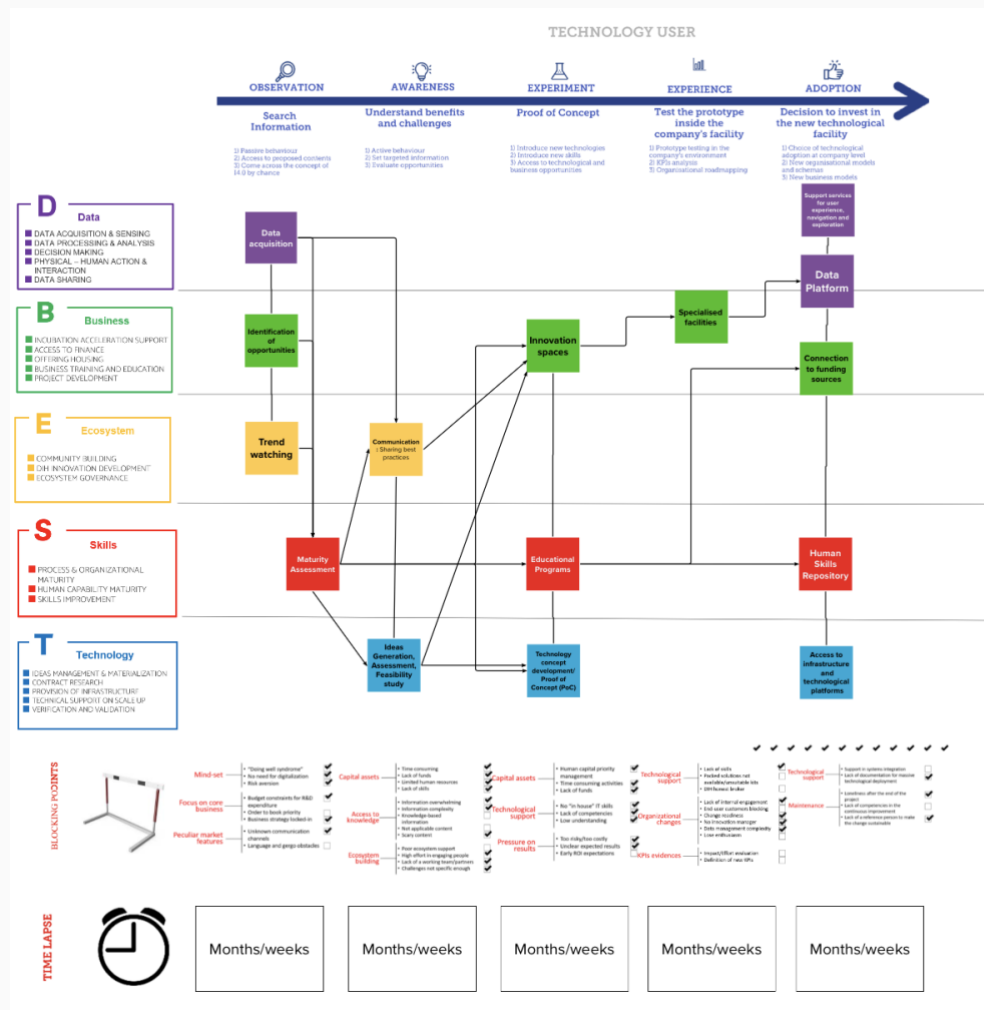


Figure 26 KCSTV service pipeline for SME looking for support to digitalizing their business and technology training

5.1.6. POLYTRONICS Customer journey matrix, service pipelines and customer journey's descriptions

Figure 27 shows the service pipeline filled by POLYTRONICS to describe the set of services provided to SMEs that are looking for R&I opportunities, support to digitalize their business, and technology training. After the preliminary stage when it acts for identifying opportunities and funding resources, POLYTRONICS participates to the core activities by providing demonstration facilities and services to facilitate both shaping a digital roadmap and following a smooth migration by workers respectively.

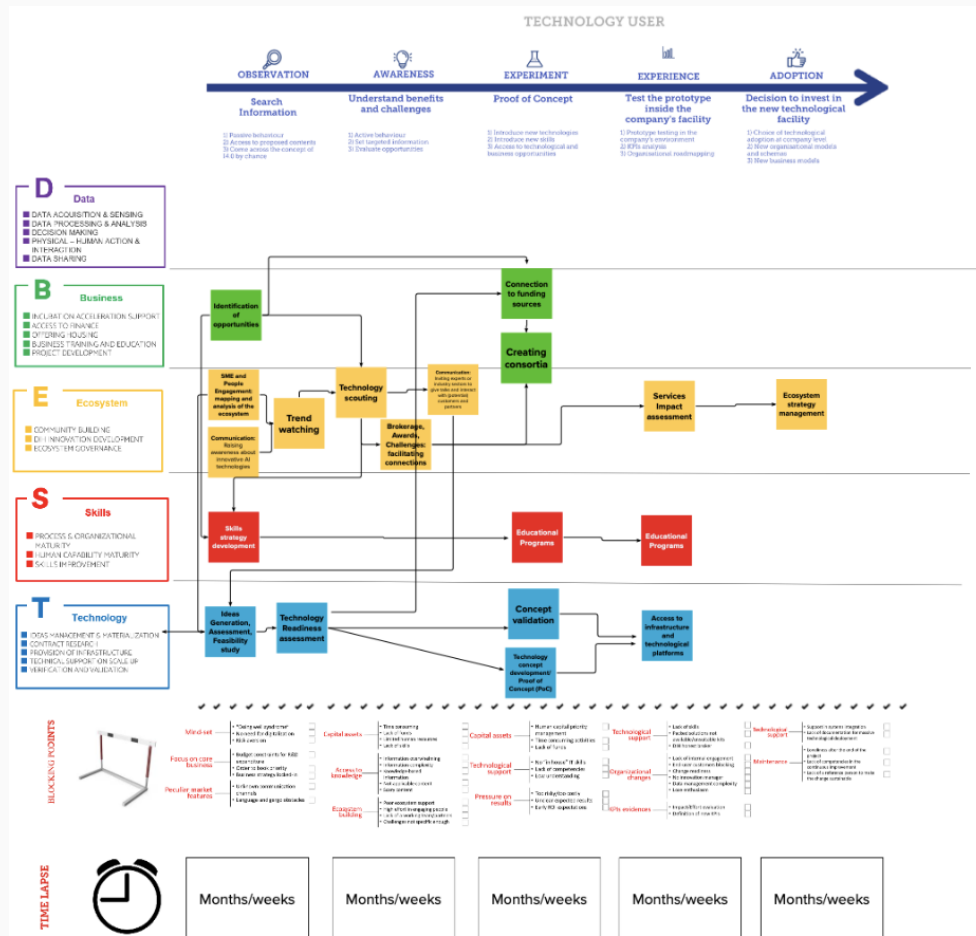


Figure 27 POLYTRONICS service pipeline for R&I opportunities support to digitalizing their business, and technology training

5.1.7. Customer journey description provided by POLYTRONICS partner

Technology end-user's Customer Journey

Observation

The observation phase of the Customer Journey for end users consists of search information thanks to ecosystem mapping, organisation of different thematic events, and identification of skills needs with RTOs.

- Blocking points:
 - Large ecosystem with multiple stakeholders
 - Large choice of events, among which some are not relevant with the customer's sector/need
 - No knowledge on the kind of skills required to adopt/use the IA technology
- Timelapse: 1-2 months

Awareness

The awareness stage enables end users to understand the benefits and challenges. For that, the DIH will organize different events like workshops, scientific committees, matchmaking events, or experts' pitches.

- Blocking points:
 - No awareness that other companies may have the same problems
 - Large choice of events, among which some are not relevant with the customer's sector/need
 - No access to potential partners/technology providers with whom the customer could work/be an end-user to improve its performance
- Timelapse: 2-3 months.

Experiment

The aim of the experiment is to achieve a proof of concept. POLYTRONICS will propose project management support, innovation labs, and collaborative Project support. The DIH will search for partners, funding opportunities, and support the consortium building. Training sessions will complete these actions.

- Blocking points:
 - Not all skills in the SME
 - Not knowledge on the funding opportunities
 - No contact for potential partners with whom building a collaborative project for funding
- Timelapse: 2-3 months.

Experience

The experience step is to test the prototype inside the company's facilities with digital maturity analysis and if needed training sessions or technology improvement.

- Blocking points:
 - No tools in the SME
 - Not all skills in the SME
 - Not enough staff members
- Timelapse: 6-12 months.

Adoption

Adoption is the final goal after the four previous steps with the decision to invest in the new technological facility. This may involve new organizational models and schemas or new business models.

- Blocking points:
 - Employees are afraid of the change (lack of educational training)
 - No understanding of the interest of the new tools by employees
 - Business model not fit to the new processes/competitiveness brought by the technology
- Timelapse: 3 months.

5.1.8. MADEcc Customer journey matrix, service pipelines and customer journey's descriptions

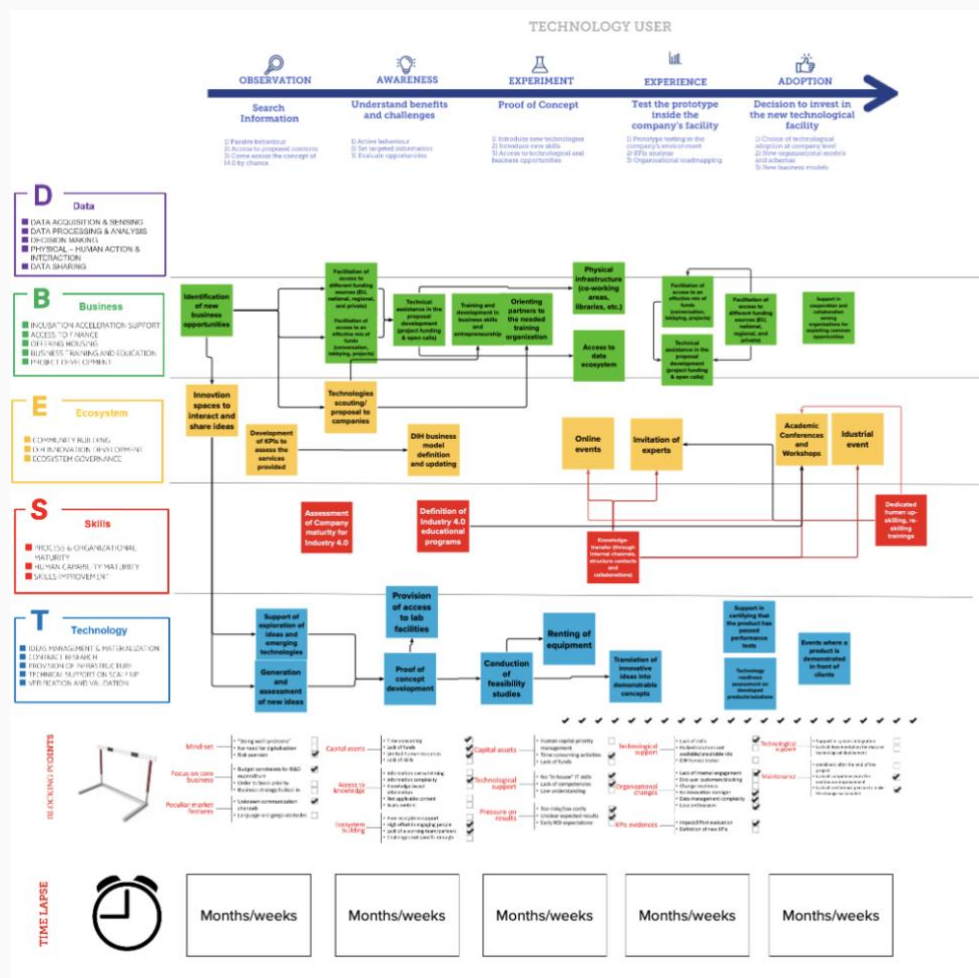


Figure 28 MADEcc service pipeline for R&I opportunities, support to digitalizing their business, and technology training

Almost like POLYTRONICS, Figure 31 shows the service pipeline filled by MADEcc to describe the set of services provided to SMEs that are looking for R&I opportunities, support to digitalize their business, and technology training. After a preliminary stage when it acts for identifying opportunities and funding resources, MADEcc participates in the core activities by providing demonstration facilities and services to facilitate both shaping a digital roadmap and following a smooth migration by workers respectively (developing dedicated up-skilling programs).

5.1.9. Customer journey description provided by MADEcc partner

Technology end-user's Customer Journey

Observation

The observation phase of the Customer Journey consists of the two class of Ecosystem and Business:

- Ecosystem - In this class MADEcc has developed services to be more present inside various network as to become an intermediary between the academic and the business sector. Thus, the DIH offers the following services:
 - Participation in academic conferences and sectoral fairs to understand technology trends through one-to-one meetings and collection of best practices.
 - Synergies with awareness-raising event developed, integrating information events with networking and pitch sessions among participants.
 - Business - In this class, MADEcc offers the following services such as telecommunication and videoconference opportunities to attend online network meetings open to the SMEs as to provide and represent the new trends in the market.
- Blocking points:
 - Mindset – Risk aversion. People are afraid to change and to innovate due to the high risk of no return on the investment.
 - Focus on core business – budget constraints for R&D expenditure, due to low private investment.
 - Focus on core business – business strategy lock-in.
 - Timelapse: Each 2 months.

Awareness

The awareness phase of the Customer Journey consists of the four class of Ecosystem, Technology, Business and Skills:

- Ecosystem - In this class MADEcc has developed services to be more present for its stakeholders as to become an intermediary between the academic and the business sector. Thus, the DIH offers the following services:
 - Online events, sharing of best practice experience and DIH annual event involving external stakeholder.
 - Vertical technology events on specific technologies, organised in cooperation with external stakeholder.
 - Technology information, such as online webinar, seminars and informative events on digital technologies hold by experts from the academia, industry, managers;

- Awareness raising, co-organizing seminars, workshops, company visit to digital champion (companies), Competence Center guided tours, to raise awareness on digital technologies impact for SMEs competitiveness.
- Technology matchmaking, matching supply and demand of innovative digital technologies and innovation capacity through the co organization of international brokerage events.
- Technology – MADEcc wants to provide the opportunity to the technology users to understand the potential of the technologies through the services of:
 - Conduction of feasibility ideas studies, assessment of new ideas and exploration of emerging technologies through workshops with external stakeholder, technology screening services.
 - Technology and digital audit to support identification of digital transformation needs.
- Business - In this class, MADEcc wants to focus on raising the awareness on the opportunities present in the market, developing the following service:
 - Awareness raising on R&D funding initiatives e.g. Horizon Europe, cascade funding, EIT Manufacturing) implemented both with one to one meeting as well as infodays and newsletter.
- Skills - In this class, MADEcc wants to focus on raising the awareness on the challenges and competencies needed in a company, developing the following service:
 - Assessment of company's I4.0 skills maturity, followed by an action plan identifying priorities and actions,
- Blocking points:
 - A. Lack of skills and human resources
 - B Overwhelming information
 - C. Challenges too generic
- Timelapse: Each 1 month.

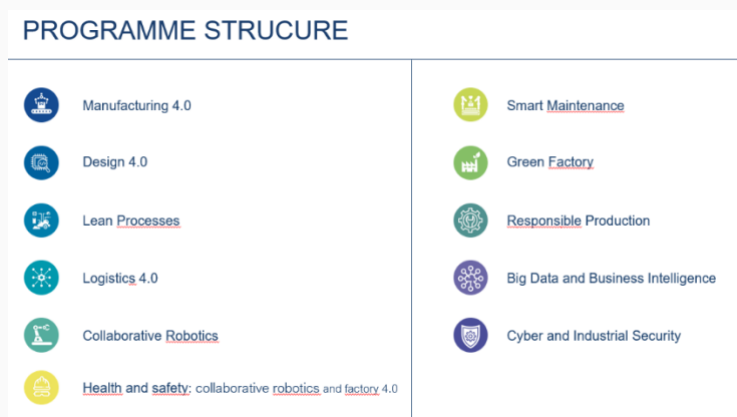
Experiment

The experiment phase of the Customer Journey consists of the three class of Technology, Business and Skills:

- Technology - MADEcc wants to provide the opportunity to the technology users to understand the applicability of the technologies through the services of: Provision Test Before Invest services aiming at raising technology level, bringing technology already demonstrated in relevant and operational environment (TRL 6/ TRL 7) to a complete system deployed at industrial scale (TRL 8/TRL 9) accordingly to the chose technology. Access to infrastructure is ensured in all Test Before Invest services, providing technical, technological and methodological environments and tools to practically test the concept (e.g., renting equipment, lab facilities, support to low-rate production).
- Thematic laboratories on technical application problems and horizontal technologies; technology assessment and business/economics impact analysis allow for the deployment of the technologies at industrial scale. In particular MADEcc provides:

- Proof of concept support, to understand the conceptual and technical feasibility of adopting a new digital technology in an existing process. It includes design of experiment concept development and validation, development of minimum viable products to be demonstrated with real customers.
 - Industrial pilot to optimize and scale up digital technologies already implemented at industry premises. It supports the codesign and optimization of requirements, demonstration, demo-cases to demonstrate in front of customers and prototyping (if appropriate). Industrial validation at customer pilot line and industrial consulting aims at supporting industrial uptake.
 - Technology verification to verify the correct execution of the digital solution provided by technology developer (e.g. system integrator). It encompasses solution qualification. and demonstration and demo-cases to demonstrate the product to customers
- Skills – In the experiment phase, the DHI wanted to define an I4.0 education programme both hands on and online. Thus, MADEcc has developed a school of competence based on strategic courses, practical courses, experiential learning. The School of Skills 4.0 is organized into single courses, experiences and training courses. Single courses vary in duration from 8 to 24 hours and can be attended individually or as part of a longer-term course or experience. They are distinguished between strategic, lasting 8 hours and offering a complete overview of the chosen topic, and technical-operational lasting 16 or 24 hours, more practical and experiential. The participant will be able to select from a range of 4 - 6 day experiences, complete courses lasting 8 - 11 days or choose only some of the single courses.

For each module, experience or path it is possible to build an ad hoc offer of duration and content customized according to needs. At the end of the training experience, an "Expert" MADE - Competence Center Industry 4.0 certificate will be issued based on the number and level of courses attended. Figure depicts main programme course



- Business - In the experiment phase, the DHI wanted to aid on the identification of funding opportunities, providing a customized advisory with a detailed description of the opportunity, context analysis, financial and operational feasibility analysis, benchmark of existing solution, action plan definition. MADE targets are the following: R&I European, National, regional R&I plan (e.g. Horizon Europe, EIC, cascade funding, ERDF); private and innovative financial instrument (e.g. EIB, EIF, VC funds, fiscal incentives).

- Blocking points:
 - A. Time consuming activities
 - B. Lack of funds
 - C. Lack of skills
- Timelapse: 1 month

Experience

The experience phase of the Customer Journey consists of the four class of Ecosystem, Technology, Business and Skills:

- Ecosystem – MADEcc wants to offer the opportunity to have the latest information and data for its stakeholders, providing access to EU trend technology platform.
- Technology - MADEcc wants to provide technology infrastructure to deploy test before invest services such as:
 - Proof of concept, to understand the conceptual and technical feasibility of adopting a new digital technology in an existing process. It includes design of experiment concept development and validation, development of minimum viable products to be demonstrated with real customers.
 - Industrial pilot to optimize and scale up digital technologies already implemented at industry premises. EDIH L support the codesign and optimization of requirements, demonstration, demo-cases to demonstrate in front of customers and prototyping (if appropriate). Industrial validation at customer pilot line and industrial consulting aims at supporting industrial uptake.
 - Technology verification to verify the correct execution of the digital solution provided by technology developer (e.g. system integrator). It encompasses solution qualification. and demonstration and demo-cases to demonstrate the product to customers.
- Skills - In this class, MADEcc wants to provide the opportunity to SMEs in expanding their competencies by offering the following services:
 - Implementation of Learning experience, on specific application problem and technologies focusing on the strategic, technical operational, cultural and organizational challenges. A fully customized learning path is developed mixing different learning tools (e.g. online modular platform, classroom at EDIH L and/or companies' premises). Intervention of expert (academia, industry) is foreseen whether appropriate.
 - Train the trainer, aiming at preparing and update industry trainers with skills, expertise on latest market digital technologies and methodologies. Teaching factory, to understand the use and operation of digital technologies with practical experience, simulating within a preindustrial manufacturing environment at EDIH L testing facilities

- A- Business – In this class, MADEcc wants to aid SMEs with the following services: Project implementation, to support proposal and business plan preparation and submission;
- B- Consortia creation, including international partner search, management and reporting of projects.

- Blocking points:
 - A. Lack of funds
 - B. Lack of human resources
 - C. Data complexity
- Timelapse: 5 months

Adoption

The adoption phase of the Customer Journey consists of the two classes of Ecosystem and Business:

- Ecosystem - In this class, MADEcc aid SMEs with the following service: Business support to define business KPIs, process consulting and identification of clients.
 - Business - In this class, MADEcc aid SMEs with the following services:
 - Go to market, defining an industrial business plan, strategy envisioning, and financial engineering.
 - Access to innovative financial pools such as local banks, EU financial instruments (e.g., loans, guarantee), venture capital, equity and quasi equity, business angels, fiscal incentives.
- Blocking points:
 - A Data complexity
 - B. Lack of human resources
 - C. Impact/effort evaluation
 - Timelapse: 5 month

5.2. Technology Providers Customer Journeys and Service Pipelines

Technology provider, together with technology user, is one of the main customers of AI REDGIO 5.0 DIHs, supported by 10 out of 19 hubs.

Also in this case, the classification of “technology provider” is too generic to catch all the possible reasons that drive a customer to contact the DIH and, consequently, to describe all the different ways of acting of the Digital Innovation Hub.

Among AI REDGIO 5.0 DIHs, main profiles have been outlined:

- The customer looking for R&I opportunities or the customer looking for key business partnerships and market access.

Similarly, to the technology user, the technology provider looking for projects needs support in the first stages of the journey, for ecosystem and business activities (brokerage, creation of consortium, business facilities, etc). Again, in case of participation in a funded project, the client may be accompanied till the end, when it needs mainly certification and maintenance support.

- The customer looking for support in digitalizing the business and is willing to experience the technology.

The support of the DIH is more required for business and technology subjects, during the first stages of the journey.

- The customer looking for its innovation strategy.

Business support is mainly required during the first stages when the customer is still developing its strategy, and if the customer requires maturity assessments and/or courses to improve its competencies, the business services may be complemented also with skills services. However, to implement a long-term strategy, support during the “go to market” phase to develop a proper exploitation business model can be required.

Similar to what happens with technology users, in this case, the first contact between the DIH and the tech provider is characterized by several exploratory interactions, thanks to workshops, seminars, public events, brokerage initiatives, etc (ecosystem services).

In the following sections of the report, some individual cases will be shown, including matrixes, service pipelines, and customer journey descriptions provided by the partners themselves. To provide a more concise and effective report, a selection of activities conducted by the DIHs will be shown as an example of the activities conducted by the entire network.

5.2.1. ART-ER Customer journey matrix, service pipelines and customer journey’s descriptions

Figure 29 shows an example of a pipeline for a technology provider looking for Identification of opportunities and funding resources, business digitalization, and innovation strategy. Besides the well-known ecosystem services used to initially approach the customer, ART-ER provides access to technology infrastructures and platforms and performs prototyping inside the company to evaluate the final solution.

Important to note, ART-ER didn’t define specific profiles for technology providers, however from its service pipeline provided below, it is possible to identify the most common path.

To elaborate, ART-ER’s provided matrix leans more towards an ecosystem and business-oriented profile. In other words, it means that the customer mainly needs support to find a consortium of partners for

collaboration both in the early stages (when the solution is simply an idea) and in the later stages (when SMEs are required to test and measure the MVP acceptance).

Furthermore, ART-ER coordinates and is supported by cluster associations. They are private thematic associations made of SMEs, innovation laboratories, and companies, aimed at creating ecosystems to be used to identify partners and stakeholders to develop innovation projects. The creation of heterogeneous multi-stakeholder groups is focused on specific challenges.

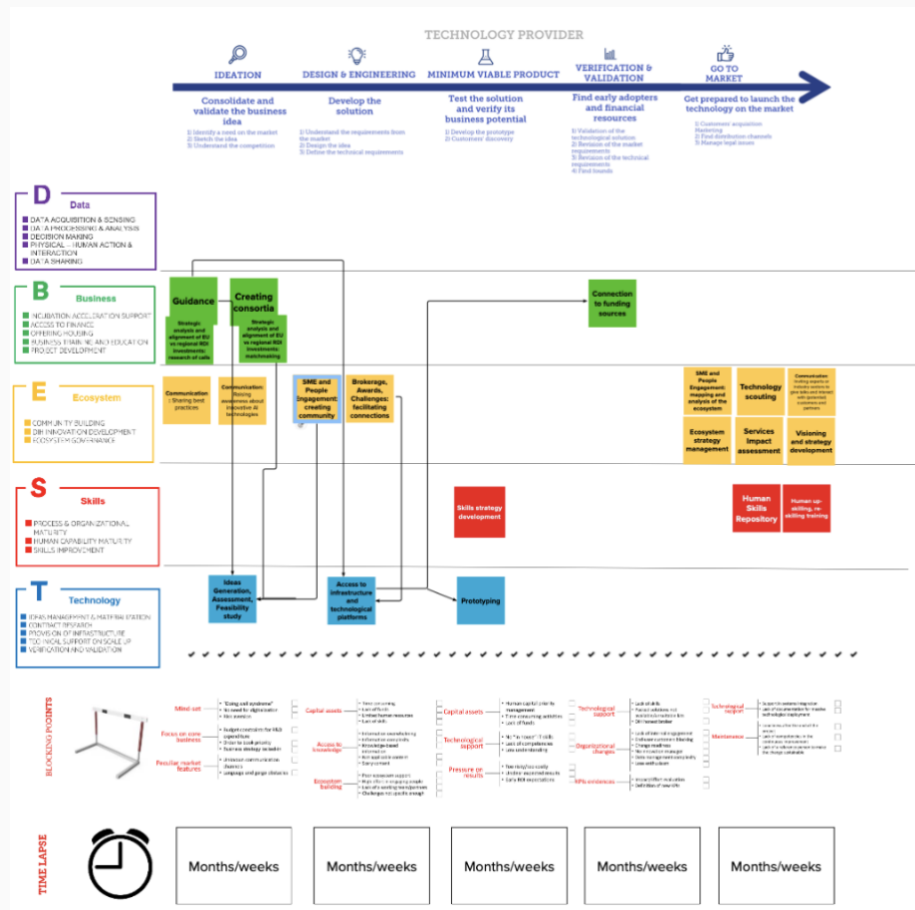


Figure 29 ART-ER service pipeline for provider looking for Identification of opportunities and funding resources, business digitalization, and innovation strategy

5.2.2. Customer journey description provided by ART-ER partner

Technology provider's Customer Journey

Ideation

Technology providers always need to perfectly know the needs of SMEs and their customers. This is a mandatory requirement to target customers, enhance their awareness of new technologies, and be competitive in the market.

ART-ER manages and coordinates the High Technology Network, a regional network of innovation laboratories able to share competencies, skills, and knowledge both in a regional and national base. Also,

Companies are invited to share their needs and targets on the network platform, to foster interaction and collaboration.

- Blocking points:
 - A Tech providers can be unwilling to share their vision on the market evolution
- Timelapse: months/weeks.

Design and Engineering

Design and Engineering for Tech providers' customers is strictly related, for ART-ER DIH, to the territorial creation of awareness. ART-ER DIH supports Tech Providers in designing relevant and successful tools and services managing the Emilia-Romagna Open Innovation Platform – EROI. It is a place where *Best Practices sharing*, and *Collective awareness creation* services take place. Companies and SMEs share their challenges on a moderate and animated Platform where Tech providers, start-ups, SMEs, and Innovation laboratories can interactively propose their solutions.

- Blocking points:
 - Lack of Digital specialized skills and professionals
 - Lack of interest from SMEs to share their needs on an open platform
- Timelapse: months/weeks.

Minimum Viable Product

ART-ER DIH is not directly involved in the definition of an MVP, or prototypes for Tech providers, but again the service is provided in cooperation with linked partners and external consultancy services. Territorial engagement is always supported and fostered, to involve SMEs and Laboratories in the definition of the best MVP and in the evaluation/test of prototypes.

- Blocking points:
 - Limited knowledge of experimental framework by smaller SMEs
 - Lack of availability of professionals able to support SMEs in these phases.
- Timelapse: months/weeks.

5.2.3. KCSTV Customer journey matrix and service pipelines

In the same way, KCSTV has developed the service pipeline for a technology provider looking to identify opportunities and funding resources, business digitalization, and innovation strategy. Unlike ART-ER, as shown in Figure 30, KCSTV complements its service offering with “skill services” including educational programs and maturity assessments to improve a customer’s competencies in dealing with a long-term digital strategy.

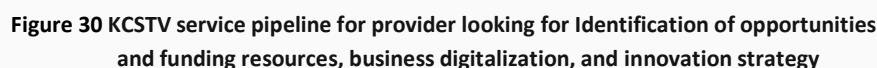


Figure 31 shows an example of a pipeline for a technology provider looking for Identification of opportunities and funding resources, R&I and key business partnership opportunities, business digitalization, and innovation strategy. Besides the well-known Business services used to support a customer during the initial stages of a project, POLYTRONICS provides financial engineering services to help reduce the risks accompanied by investments in the proposed technologies.

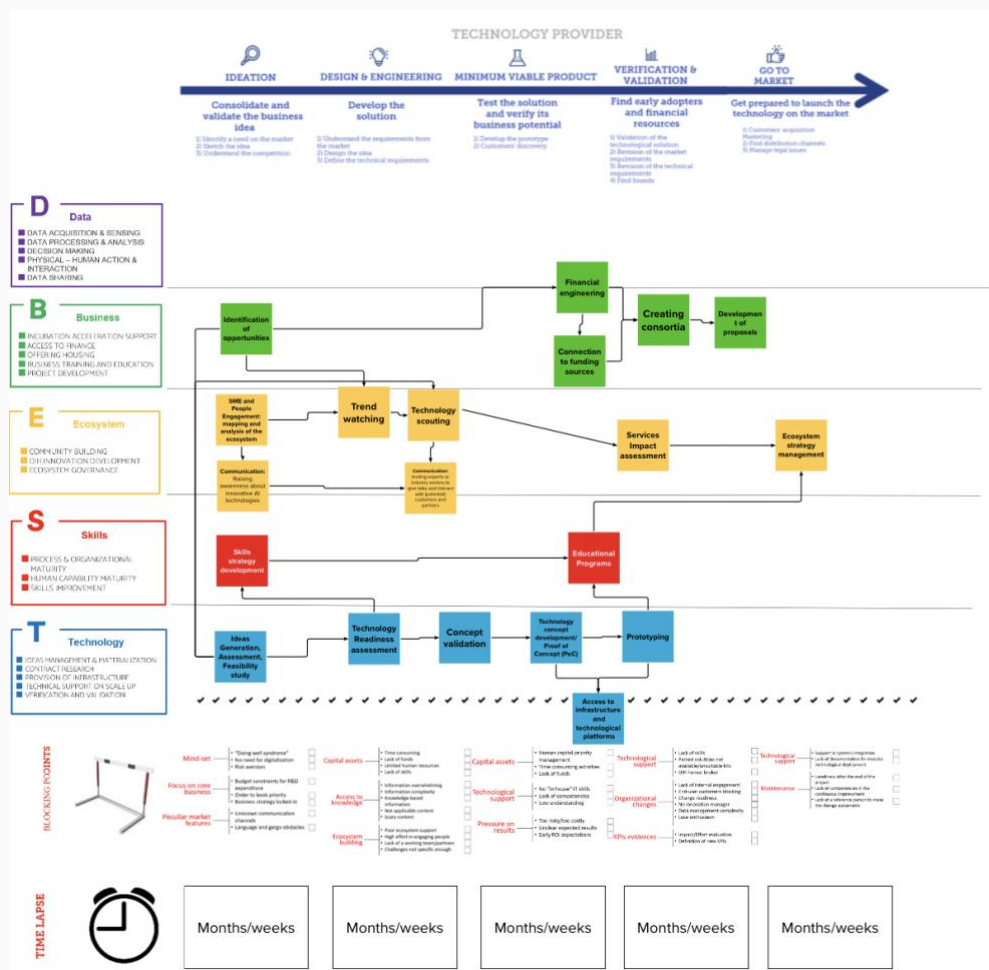


Figure 31 POLYTRONICS service pipeline for provider looking for Identification of opportunities and funding resources, R&I and key business partnership opportunities, business digitalization, and innovation strategy

5.2.5. Customer journey description provided by POLYTRONICS partner

Technology provider's Customer Journey

Ideation

Polytronics offers similar services for the ideation phase for a technology provider than for the end users observation phase, adapted to the customer's needs and requirements. The services are to map the innovation ecosystem and its stakeholders, to inform about the new solutions and technologies developed by companies and RTOs through a tailor-made technology watch and to foster participation in regional, national and international trade shows, matchmaking and thematic events organised by Polytronics partners in order for the technology provider to have a first approach of the innovation ecosystem, its latest trends, get to understand the market requirements and challenges and to encourage the matchmaking with potential partners and/or customers/end-users. The ideation phase also encompasses services dedicated to

the identification of skills needed by the technology provider to develop its technologies and go to the design & engineering phase and that are provided by the RTOs within the EDIH consortium.

- Blocking points:
 - Not enough knowledge on the needs of the market
 - Not enough knowledge on the new technologies in development
 - List of competitors not available
- Timelapse: 3-4 months

Design and Engineering

The Design and engineering step for the technology providers is focused on supporting the companies in starting their projects in AI and developing their solutions. In this frame, Polytronics facilitates the participation in specific workshops and events such as Techday events to help the technology provider meet with other technology providers or service providers that could help them design the solution. Polytronics will also offer services to support the SMEs in understanding the specific technical requirements of its technologies through the review of the solution in development by a scientific and technical committee. Technology providers will also be able to participate in match-making events and benefit from Polytronics communication channels to communicate and promote their ideas or look for partners to help the technology providers answer technical requirements and develop the solution.

- Blocking points:
 - No awareness that other companies may encounter the same problems/issues in their R&D
 - Large choice of events, among which some are not relevant with the customer's sector/need
 - Not a good understanding of the technical requirements of the market/technology
- Timelapse: 2-3 months.

Minimum Viable Product

The Minimum Viable Product services are designed to support the Technology-provider in developing their prototype and verifying the business potential. In this regard, Polytronics is offering access to infrastructures and pilot lines on IA and smart polymers for the companies to test their technologies before investing in them. It also offers access to innovation labs, support in project management, and in developing collaborative projects for prototyping and testing the solution. Links to this service, Polytronics offers an intelligence watch on funding opportunities and collaborative projects opportunities and helps the technology providers identify potential partners and join consortium to find end-users for testing their technologies. Also, Polytronics offers services for skills integration linked to IA in the company and training sessions are open to the companies' staff members.

- Blocking points:
 - High cost of access to infrastructure and low knowledge on the prototyping infrastructure

- accessible for technology-providers
- No contact for potential customers + partners to test the solutions
- Not knowledge on the funding opportunities
- Timelapse: 6-12 months

Verification and Validation

Polytronics supports companies in the verification and validation of their technology by implementing a complete digital maturity analysis to validate the technological solution or identify remaining barriers and weaknesses preventing the solution from being market-ready. Polytronics also offers revisions of the market requirements to make sure the solution is adapted to the market and mature enough. Like the MVP phase, Polytronics also offers services for the technology provider to identify potential partners to validate the solution and go to the next phase which is the go-to-market last step.

- Blocking points:
 - No review to the market
 - No certainty that the technology is mature enough to be put on the market
 - High cost of access to infrastructure and low knowledge on the infrastructure accessible for technology-providers
- Timelapse: 3-4 months.

Go to Market

Polytronics does not offer as many services linked to the Go-to-market phase compared to the previous phase. However, thanks to the development of an international online marketplace specialised in the polymer and IA industry (Global Polymer) Polytronics does offer access to explore international markets and facilitate match-making with potential partners/end-users thanks to this online platform. Polytronics also offers its members access to their innovation ecosystem (for example the Polymeris and Techtera clusters network) and to the main trade fairs and business events linked to IA and smart polymers to help Technology-providers find partners to bring the solution into new or existing markets.

- Blocking points:
 - No access to an ecosystem of potential customers/end-users
 - No knowledge of business events/major trade fairs linked to their technology field
 - No access to the international market
- Timelapse: 2-5 months

5.2.6. Flanders MAKE Customer journey matrix and service pipelines

Figure 32 shows an example of a pipeline for a technology provider looking for Identification of opportunities and funding resources, R&I and key business partnership opportunities, business digitalization, and innovation strategy. After a preliminary stage when it acts for identifying opportunities and funding resources, MAKE participates in the core activities by providing demonstration facilities to show technical solutions behaviour and supporting the development of data-based solutions.

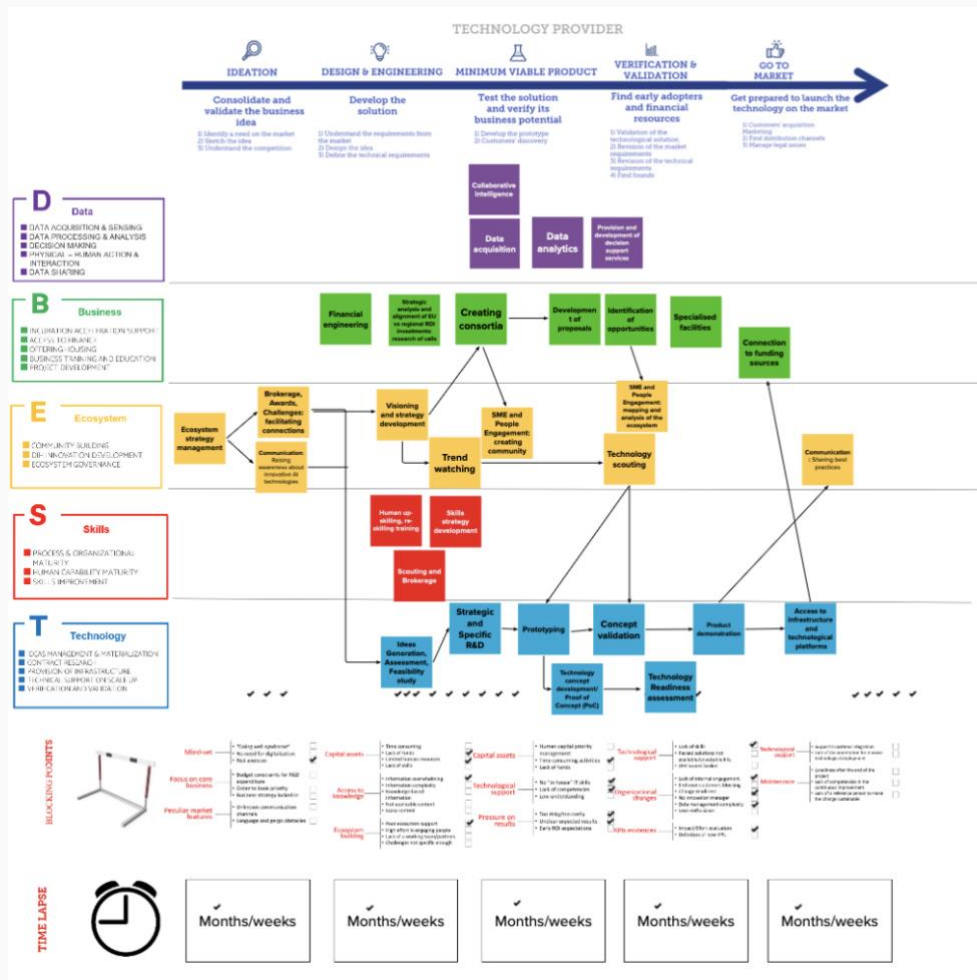


Figure 32 MAKE service pipeline for Identification of opportunities and funding resources, R&I and key business partnership opportunities, business digitalization, and innovation strategy

5.2.7. MADEcc Customer journey matrix, service pipelines and customer journey's descriptions

Figure 33 shows an example of a pipeline for a technology provider looking for Identification of opportunities and funding resources, R&I and key business partnership opportunities, business digitalization, and innovation strategy. Beside the well-known ecosystem services used to support a customer during the initial stages of a project, MADEcc helps customers develop convenient Key Process Indicators (KPIs) to evaluate the services provided. Also, MADEcc develops dedicated training programs to fill the skill gap that arise during the adoption of I4.0 frameworks. Finally, in an attempt to reduce the

risks associated with investment in I4.0 technologies, MADEcc offers customers the possibility to rent the required equipment during the initial stages of the project.

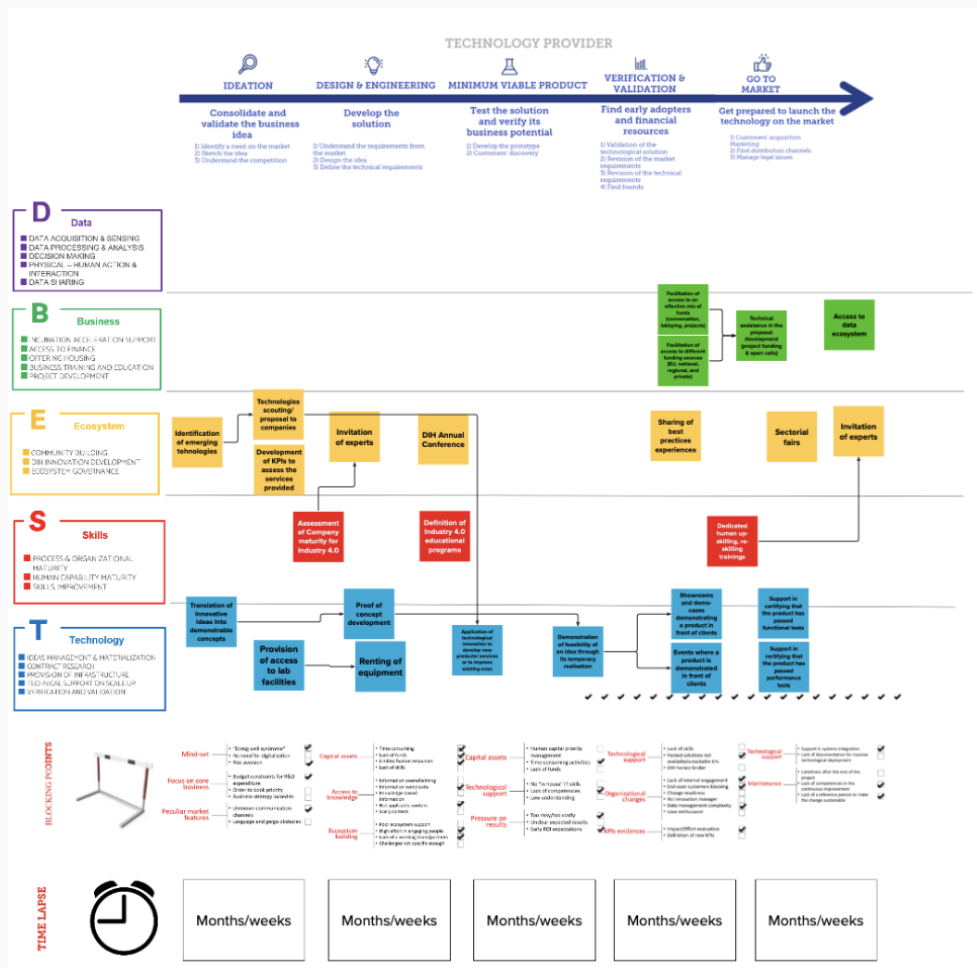


Figure 33 MADEcc service pipeline for Identification of opportunities and funding resources, R&I and key business partnership opportunities, business digitalization, and innovation strategy

5.2.8. Customer journey description provided by MADEcc partner

Technology provider's Customer Journey

Ideation

In addition to the end user, demo events services are provided to show the technologies and gather feedback from new end users.

- Blocking points:
 - IP protection

- Hardware validation
- Differing Ideas
- Timelapse: months/weeks.

Design and Engineering

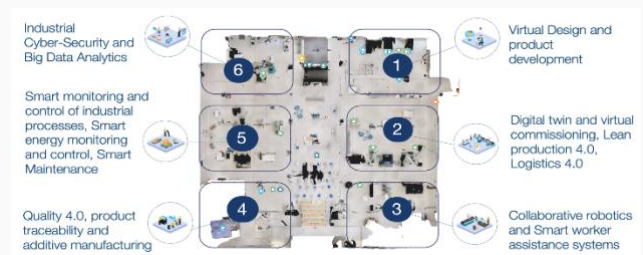
For the Design and Engineering phase, MADEcc focuses on the two classes of Ecosystem and Technology:

- Ecosystem – In this class, MADEcc wants to aid SMEs in envisioning and defining strategies, in parallel with technology scouting
 - Technology – In this class, the DIH wants to provide the following services definition of business and technology KPIs, definition of technical and human requirements; and technology and manufacturing readiness level to evaluate the maturity both from
- Blocking points:
 - Differing ideas
 - Find partner to validate the product
 - Timelapse: months/weeks.

Minimum Viable Product

For the Minimum Viable Product phase, MADEcc focuses on the three classes of Technology, Skills and Business:

- Technology – In this class, MADEcc has the main objective to offer services as follows:
 - Provision of lab facilities for test before invest purposes. MADE relies on technology use cases, available at MADE Competence Center, which are organised in 6 manufacturing technology scenarios simulating the integration of digital technologies in a complete manufacturing production process cycle
- Skills – In this class, MADEcc wants to aid SMEs with the following services:
 - Creation of education and learning path on specific technologies with dedicated human upskilling and reskilling strategies (see. School of competence)



Business – In this class, MADEcc focuses on the service access to EU funds implemented as per technology user.

- Blocking points:

- High testing costs
- Timelapse: months/weeks.

Verification and Validation

For the Verification and Validation phase, MADEcc focuses on the three classes of Technology, Skills and Business:

- Technology - In this class, MADEcc is the same as for MVP
- Business – In this class, MADEcc offers the provision of coworking spaces, advisory on fiscal incentives and R&D funding
- Skills – In this class, MADEcc offers services such as the deployment of school of competence and defining customized learning path
- Blocking points:
 - High testing costs
- Timelapse: months/weeks.

Go to Market

For the Verification and Validation phase, MADEcc focuses on the two classes of Ecosystem and Business:

- Ecosystem – In this class, MADEcc offers the following services:
 - Business support to define business KPIs,
 - Process consulting and
 - Identification of clients.
- Business – In this class, MADEcc offers the following services:
 - Go to market, defining industrial business plan, strategy envisioning, financial engineering.
 - Access to innovative financial pools such as local banks, EU financial instruments (e.g., loans, guarantee), venture capital, equity and quasi equity, business angels, fiscal incentives.
- Blocking points:
 - Business process for tech people is hard to understand
 - Difficulties in entering the market
- Timelapse: months/weeks.

6. Conclusion and Outlook

D3.1 offers a complete picture of AI REDGIO 5.0 DIHs ecosystem in terms of services provided and customer base analysis with the aim of evaluating the different competencies and expertise that can be exploited both inside and outside the project.

The current document contains the results of the first iteration of tasks T3.1 and T3.2, activities that involved several partners: POLIMI as WP3 and T3.1 leader, other consortium partners involved in the activities, and the 19 DIHs of the network playing a central role in the implementation and validation of the methodology.

D3.1 depicts the first approach with the ecosystem of Digital Innovation Hubs, with the objective to make them know and adopt a new methodology. It required preparatory activities but also the ability to coordinate at least 19 partners together.

The analysis has provided a deep analysis of the current situation (as-is) and a preliminary outlook of the future scenario (to-be). The AS-IS situation has revealed that the analysed network provides 185 services. To elaborate, 28% of the services are technologically oriented compared to 19% of Data Services, 19% of Ecosystem Services, 18% of Business services, and 16% of Skills Services.

Regarding the To-be situation, the network is planning to enrich its portfolio with 117 new services. To elaborate, unlike the current situation, 52% of the services are equally distributed between Data and Ecosystem services, compared to 19% of Skills Services, 15% of Technology Services, and 14% of Skills Services.

Also, the document has provided an analysis of the Customer Journey Service Pipelines to better visualize and classify the competencies of the different DIHs over the different stages of the customer's experience to better define the potential collaborative opportunities in the next deliverables.

As a result of implementation activities that will take place in future tasks and work packages, the 19 Service Portfolios will be updated in the next months and the same analysis run for D3.1 will be run again at month 27 and presented in D3.2. The number of DIHs composing the network is expected to grow, and the newcomers are expected to come from the two open calls of the project as well as manufacturing DIHs interested in becoming part of a strong and qualified ecosystem.