



D3.1 Service Portfolio and Customer Journeys V1

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List of Acronyms and Abbreviations

Acronyms	Description
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



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Executive Summary

AI REGIO WP3 - “Beyond BORDERS: AI DIH Ecosystem from Regional to pan-EU services”, started at month 3 and expected to last till month 36, aims at

- i. defining a common service framework for DIHs in the domain of AI;
- ii. defining customer journeys and Digital Transformation pathways;
- iii. defining cross-DIH collaboration scenarios;
- iv. studying and analysing possible business models, including models for DIH governance and socio-environmental sustainability;
- v. developing a one-stop-shop portal for service and assets offering by the AI REGIO DIH ecosystem and integrate it into the DIH4INDUSTRY marketplace.

To address all the requirements, five specific Tasks (WP3.1 – WP3.5) have been designed in order to better organize the activities listed above but, at the same time, to keep them linked together, since WP3's objectives are strongly dependent one to the other and it is fundamental to develop them granting consistency.

The current deliverable **D3.1 – “Service Portfolio analysis and Customer Journeys modelling”** is the first report of WP3 and it mainly deals with WP3.1 and WP3.2 achievements (corresponding to the first two bullets), but it takes into account also activities of other WP3 and WP2 tasks.

D3.1 is the result of 6 months collaborative activities where the 13 AI REGIO DIHs have been deeply involved, firstly to validate METHODIH (a METHODOlogy for DIHs, addressing point i. and ii., developed by POLIMI) and then, to collaboratively and participatively compile their Service Portfolio and Digital Transformation Service Pipelines with the support of METHODIH methods and tool.

D3.1 contains both the description of the methodology (and of the steps required to get to the current version) and a summary picture of AI REGIO ecosystem (by presenting the results of the several interactions had with the 13 DIHs).

Actually, even if a draft and basic version of METHODIH was already available at M3 (since it was sketched in previous H2020 I4MS projects), WP3 partners run a detailed analysis of the available methods and tools, improving them, adapting them to SMEs and the AI technologies, adding features not yet covered and customizing them according to AI REGIO requirements. Once the methodology was finalized, it was adopted directly by the DIHs, who were required to fill their own Service Portfolio and to analyse their customer base.

A general overview of the project ecosystem in terms of services and customers is provided as well.

The scope of **Service Portfolio analysis** is to identify competences and expertise of the DIHs and to pinpoint new services to be implemented within the duration of the project. More than half of the services provided are related to Business and Ecosystem activities. For instance, Community Building, Access to finance and Project development are the three most common types of services provided by the community of the 13 DIHs; 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”; very few hubs are specialised in Data management. To compensate the weakness in technology competences,



some DIHs are planning to implement new services to support the requirements of “testing before investing” and to guarantee full support to handle Data lifecycle.

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 includes also tech providers, policy makers and start-ups. As expected, the small and medium enterprise is the typical consumer for 13 out of 13 DIHs, but also the technology provider is part of the customer base for the majority of the hubs (10 out of 13). To better address the requirements of the AI REGIO ecosystem of DIHs, by describing all possible typology of client that may address to them (identifying the customers' needs and demands), WP3.2 run a deep analysis together with the 13 hubs about three new other types of customers. The result is that, even more frequently, legal entities (policy makers) contact DIHs asking for support; students, start-ups and experimenters (open call winners) are as well part of the client base.



1 Introduction

The main purpose of deliverable D3.1 – “Service Portfolio and Customer Journeys” is to report the activities performed in tasks WP3.1 and WP3.2.

The first one, “**AI DIH Service Catalogue 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-levels taxonomy to facilitate the exchange of services one DIH with the others. In order to provide it, the classification according to a suitable number of categories is inherited by MIDIH¹ and DIHINET², but AI REGIO WP3.1's main task is its enrichment and its application/validation to the ecosystem of 13 DIHs. Services already provided by DIHs (the so called AS-IS services) are described according to the taxonomy and, at the same time, new ones (the so called TO-BE services) are identified to be implemented during the project.

The second Task, “**AI DIH Customer Journeys Specification**”, aims at identifying the target customers of an AI DIH, with their specific requirements, issues and barriers, and at defining the related journeys, highlighting steps that a company goes through with the support of a DIH to get to the adoption of AI technologies. In addition, WP3.2 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.

The result of such activities is a methodology labelled **METHODIH** (that is, a METHOdology for DIHs), that provides tools and methods for Digital Innovation Hubs to be able to meet Customers' demand by a well-structured, sequenced and timed bouquet of services, built together with other DIHs in a collaborative and participative pool of workshops and interactive sessions.

This 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 will complement the current one since it will contain 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.

Since the activities run in the two Tasks has involved 13 DIHs, which is quite a large ecosystem, we prefer not to report hub by hub the results collected, to avoid repetition and to make the document as readable as possible. In fact, the deliverable shows pools of aggregated data to summarize the main indicators related to activities performed and when we go into details, the aim is to represent in the most exhaustive way as possible the entire ecosystem, by providing examples that cover all possible cases. The 13 DIHs, indeed, represent 13 different European regions and the purpose of the deliverable is to provide an overview of the entire ecosystem and not simply of some parts, to see variations and differences among them. The full set of documents, one for each DIH, is stored in the common repository of AI REGIO project and available on request for consultation.

To avoid repetitions along the Sections of the document, the geographical regions represented by the DIHs are listed here below:

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

² <https://dihnet.eu/>



Table 1 List of AI REGIO DIHs and related region of reference

DIH short name	DIH long name	Region of reference
i. AFIL	ASSOCIAZIONE FABBRICA INTELLIGENTE LOMBARDIA	Lombardy (North Italy)
ii. SEZ	STEINBEIS INNOVATION GGMBH	Baden-Württemberg (South West Germany)
iii. ACCIO/EUT	AGENCIA PER LA COMPETITIVIDAD DE LA EMPRESA/ FUNDACIO EURECAT	Catalonia (South East Spain)
iv. POLYTRONICS (PLASTIPOLIS)	PLASTIPOLIS	Rhone-Alpes region and Franche-Comté (South East France)
v. BRAINPORT	BRAINPORT DEVELOPMENT NV	Brabant Region (South Netherland)
vi. SKU	STICHTING KATHOLIEKE UNIVERSITEIT	North Netherland
vii. TAU	TAMPEREEN KORKEAKOULUSAATIO SR	Finland
viii. PRODUTECH (INESCTEC)	INSTITUTO DE ENGENHARIADE SISTEMAS E COMPUTADORES, TECNOLOGIA E CIENCIA	Porto (North West Portugal)
ix. ART-ER	ART-ER-SOCIETA CONSORTILE PER AZIONI	Emilia-Romagna (North Italy)
x. AIN	ASOCIACION DE LA INDUSTRIA NAVARRA	Basque Regions (North Spain)
xi. UM	UNIVERZA V MARIBORU	Slovenia
xii. COMET	COMET	Friuli-Venezia Giulia (North-East Italy)
xiii. TECNALIA	FUNDACION TECNALIA RESEARCH & INNOVATION	Basque Regions (North Spain)

1.1 Impact and target audience

The deliverable is a public report addressing mainly the DIH for Manufacturing community, the candidate EDIH and the EC wanting to have a complete overview of what has been done so far in WP3.1 and WP3.2 and to have a description of the 13 DIHs, in terms of services and customer base.

The document can be of relevance to everyone who is interested in METHODIH main concepts, since here the 3-levels taxonomy for service portfolios, the customer types and the rules to build the service pipeline are depicted in details (for a more precise description of the six customer journeys please refer to D2.3 “AI REGIO Requirements Engineering Methodology”, while for the complete analysis of the possible business models for DIHs, please refer to D3.5 – “AI REGIO DIHs Business and Governance” when it will be published at month 12).

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

The methodology described in the D3.1 has been conceived with the main purpose to be a framework for all Europe DIHs in general (not only for AI REGIO ecosystem), in order to be easily disseminated inside other communities to share the results achieved in AI REGIO, but also to make it adopt by a larger number of Hubs providing them a set of common tools and techniques.

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



1.2 Dependencies in AI REGIO

D3.1 (and in general activities run in WP3.1 and WP3.2) presents a number of dependencies inside AI REGIO.

First of all, as mentioned in previous paragraph, the Service Portfolio analysis in AI REGIO DIHs community is propaedeutic to WP3.3 – “AI DIH Collaboration Scenarios” activities (described in D3.3 - “Collaboration Scenarios for AI REGIO DIHs” M12), 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 competences and requirements, is fundamental to outline 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 expectation, expressed in a common language.

WP3.4 – “AI DIH Business Model and Governance System” (that aims at defining possible business models for AI DIH services) will develop the third pillar of METHODIH and it is the natural sequel of WP3.1 and WP3.2 activities. It means that D3.5 – “AI REGIO DIHs Business and Governance”, due at month 12, will complement the structured documentation of METHODIH presented in D3.1.

WP3.5 – “AI DIH pan-EU Service Marketplace, Innovation Portal and Open Calls support”, dealing with the deployment of AI REGIO 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 WP3.1 and WP3.2 interacting with DIHs.

Beside WP3, that is strongly related to results achieved in the first two tasks and hence also to D3.1, other work-packages are affected by it and could take advantage by reading the current deliverable.

D2.3 – “AI REGIO AI DIH experiments scenarios” and D2.5 – “AI REGIO User Requirements Specification”, presenting respectively the innovation scenarios and technical/business requirements (also) of the 13 DIHs contains lot of references to METHODIH. Actually, both leverage on the customer classification based on the six different customer journeys defined in WP3, since scenarios and DIH’s requirements widely change if a hub is supporting a type of customer or another.

WP7.2 – “Didactic Factories and Experimental Facilities Network” deals with Didactic Factories, aiming at coordinating and interoperating them providing a pan-EU AI-oriented portfolio of services in order to allow exchanges of resources, best practices and lessons learned. The starting point is the service classification introduced in METHODIH (actually, the taxonomy for remote services has been conceived mainly in perspective of WP7.2 activities).

WP4 – “Beyond PLATFORMS: AI DIH Open Platforms and DIH platform”, that is coordinating the deployment of online portals, is in charge of making METHODIH tools as much interactive as possible, moving from Excel sheets and PowerPoint slides to a more user-friendly and easy-to-use solution.

1.3 Document Structure

The document is organized according to six different chapters, including the current **Section 1** containing the Introduction to the document, its structure and impact/dependencies.

Section 2 presents METHODIH main pillars, that is, Service Portfolio analysis, Customer Journeys and Digital Transformation Service Pipelines. A detailed description is provided in order to present Section 2 in shape of a structured documentation for the methodology, useful to understand main features and applications. It contains also the list of interactions had with AI REGIO DIHs ecosystem,



mainly in terms of online webinars/workshops and online interactive sessions, presenting also the most relevant results achieved during meetings.

Section 3 and **Section 4** provide a full picture of AI REGIO DIHs ecosystem by presenting aggregated indicators about Service Portfolio and Service-Customer pipelines respectively. As already mentioned, to make the document as much readable as possible and to avoid repetition by listing one by one the information collected from the 13 DIHs, charts and graphs summarizing information are displayed. Section 4 presents: a general overview of the hundred services provided in AI REGIO ecosystem, with a specific focus on services to be implemented during the project and a preliminary classification of DIHs according to their specificities and expertise and the coverage of the portfolio. Section 5 deals with Digital Transformation Service pipelines: for each Customer Journey identified, the most relevant pipelines are presented, putting in light commonalities among DIHs but also differences coming from a distinct approach and portfolio of services offered to own customer base.

Section 5 contains the conclusion and future outlook in the wp3 perspective, but also in the perspective of the whole AI REGIO project and I4MS programme.

2 AI REGIO METHODIH

Starting from the results achieved in MIDIH project³, where a preliminary analysis about tools and methods to support DIHs for Smart Manufacturing were conducted, AI REGIO has finalized METHODIH, that is, a METHOdology for DIHs, specialised in AI for Manufacturing Industry.

The set of tools and techniques elaborated in MIDIH has been validated, developed, improved in collaboration with the AI REGIO ecosystem of 13 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 to DIHs in order to define their as-is and to-be service portfolio. Services are classified in 6 main top-level categories (**DR BEST⁴ Data, Remote, Business, Ecosystem, Skills, Technology**), while a 3-levels taxonomy with examples is provided in order to support DIHs in the definition and description of their as-is and to-be services.

The objective is twofold: on one side, DIHs are equipped with a standard Service Portfolio that allows to interact with other European organizations, “speaking the same language”; on the other, it represents a stimulus to define new services in order to get a complete range of services to be offered to the constituency.

In particular, for the implementation of to-be services, three main categories have been depicted: **Project-supported, Project-inspired, Project-collaborative services** with an increased degree of co-operation with the projects and its beneficiaries. (More details will be presented in D3.3 and D3.4, in charge of WP3.3)

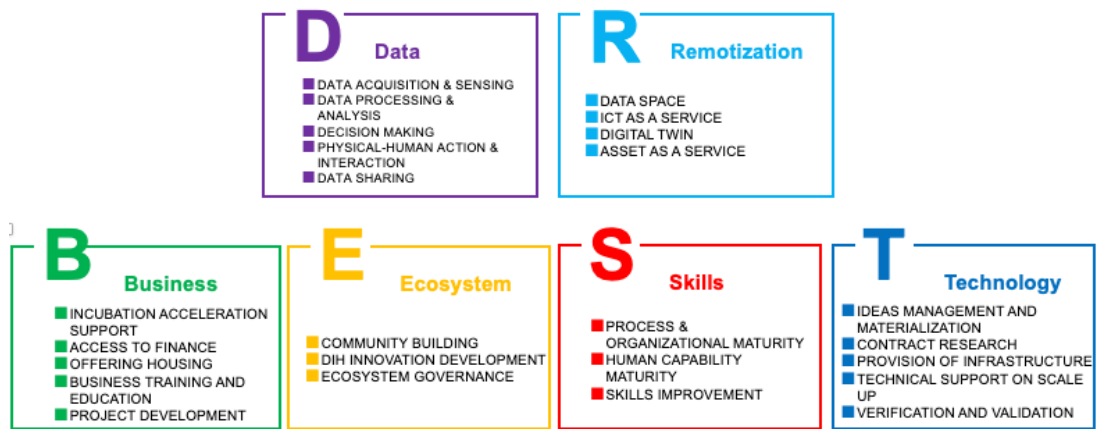


Figure 1 The DR BEST classes of services

- **Customer Journeys (CJ) and Blocking Points (BP).** A Customer analysis is proposed in order to understand typical 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, Experimenter**) are provided.

Customer Journeys are then defined as level-by-level Digital Transformation evolutionary pathways that typically model the customer interaction with a DIH.

³ <https://www.midih.eu/>

⁴ The R dimension has not been considered in this first iteration, because it is still under refinement and specifically tailored to regional AI Testing and Experimentation Facilities for Manufacturing

A third step in this analysis is the identification of Blocking Points, i.e. of factors preventing customers to evolve their Digital Transformation from one level to the subsequent one.

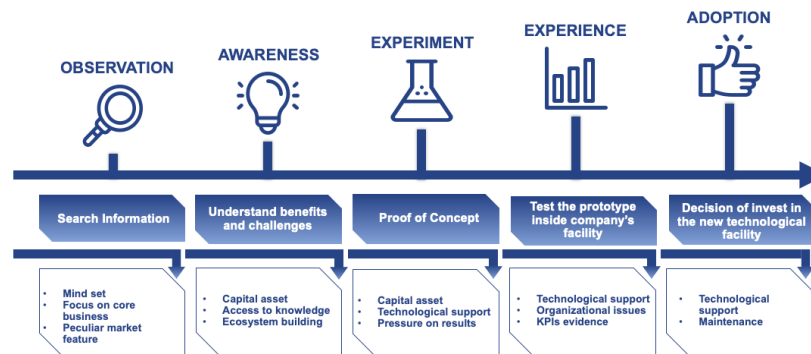


Figure 2 Example of blocking points for Technology User Journey

- **Digital Transformation Pipeline.** The third step of the methodology consists of populating the Customer Journeys with as-is and to-be Services in order 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 takes into account the complexity of a DIH customer base, that typically is a multi-stakeholder system, and the cross-regional activities that the hub will perform both inside the project and autonomously. It will be defined at three different levels: at **Single DIH** level, at **DIH-DIH level** and at **Coordinator level** (AI REGIO project or DT Accelerator in the future).

Even if it is part of METHODIH tools and methods, the definition of the business model is subject of WP3.4, hence, more details will be presented in D3.5 and D3.6 (respectively expected at month 12 and month 36).

2.1 DR BEST Service Portfolio (a description of the framework)

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

“3-levels taxonomy” means that services are organized according to a three levels categorization:

(i) class; ii) type iii) services): for each class of services (Data, Remote, Business, Ecosystem, Skills, Technology), some sub-classes (labelled as types) have been defined and the types include the proper services.

Excluding the “remote service” that are still under definition, the D BEST Service catalogue contains in total **56 different service types**: 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 DR BEST taxonomy.

2.1.1 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 competences, 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 competences or being itself the technology provider.

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

- **Data acquisition and sensing**, that focusses on the first stages of a data lifecycle, including mainly activities as data acquisition (also using sensors), data protection, ETL implementation;
- **Data processing and analysis**, that includes data storage and a 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 human and machines are allowed to work together);
- **Data sharing**, starting from data anonymization and governance rules' definition for GDPR compliancy to Data Spaces implementation.

2.1.2 Remote Services

Services belonging to this class are those that the Digital Innovation Hubs may provide remotely, without a physical interaction with the customer, related to industrial assets (that typically require a physical interaction).

This set of services started to acquire more and more importance due the covid-19 pandemics, after which it became quite fundamental.

Four different sub-classes have been identified:

- **Data Space**, to allow access to data guaranteeing the sovereignty of the data owner and the respect of privacy. In the manufacturing context, it means to access real time generated data, but also to historical datasets or to Data marketplaces.
- **ICT as a Service**, that is, providing Software, Platform and Infrastructure as a Service. It means, for instance, to allow the use of a licenced software remotely (in accordance with a subscription previously signed) or to put at disposal remote computing services able to handle large volume of data or complex computations.
- **Digital Twin**, used to simulate a physical manufacturing production. In this way, the customer can remotely visualize the infrastructure and the process.
- **Asset as a Service**, that is, an asset that can be operated remotely, also able to communicate all the useful information to be monitored.

At the time of the current deliverable publication, this class is still under validation.

2.1.3 Business Services

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

In fact, for small companies (such as for SMEs that do not have dedicated resources but also for start-ups not yet integrated in the ecosystem) it is often difficult to orientate among the large amount of projects and funded initiatives and, indeed, the support of DIHs, that are well aware of the ecosystem around them, is required.



Five different sub-classes have been identified:

- **Incubation acceleration support**, to drive customers to access to 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 sharing ideas;
- **Business training and education**, providing formal courses, workshops and seminars about business topics. 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.
- **Project development**, identifying opportunities through strategic analysis of the ecosystem and trend watching (see next class Ecosystem), developing new proposals, creating consortia.

2.1.4 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 transformation of sectors of interest and 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.

2.1.5 Skill Services

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

The training activities can be of any kind and dealing with several different subjects. Again, according to the DIH's level of competences, 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, readiness for Industry4.0 and AI adoption. Typically, such assessments are followed by a collaborative stage involving experts where the roadmap toward transformation is defined.
- **Human capabilities maturity**, measuring the level of digital/technological skills at worker level. As it happens at 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, also **standardization and certification** tasks are included, since the provision of standards and tools for standard certifications is considered as a sort of teaching activity.

2.1.6 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 the robustness before investing large amount of money. Support may be provided starting from 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 to prepare a Proof of Concept (PoC) of the solution, evaluating the feasibility.
- **Provision of infrastructure**, that is, providing to the customer a set of tools, platform, 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 and quality assurance tests and by organizing public demonstration in front of possible clients.

In this first release of D3.1, the R dimension, still under development and refinement by our WP7 community of Didactic Factories and Testing / Experimentation Facilities. So, the following paragraphs will report on a D BEST service classification.

2.2 Customer Journeys and Service Matrix

Following MIDIH's approach, in AI REGIO three new customer journeys have been developed in addition to those already defined in MIDIH project. Namely,

- Customer journeys for **technology users**, **technology providers** and **students** are inheritance from MIDIH;
- Customer journeys for **policy makers**, **start-ups** and **experimenters** were developed from scratch in AI REGIO.

Each journey is a five steps path, including the main phases of the customer Digital Transformation and the related blocking points. Blocking points represent barriers that a customer typically face and must overcome during its transformation journey and it is here where usually the DIH intervenes 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 following paragraph, you can find just a short description of the five steps for each customer journey, since they are analysed in detail in deliverable D2.3 and D2.5.

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 (of course, there may be services spanning more than one column).

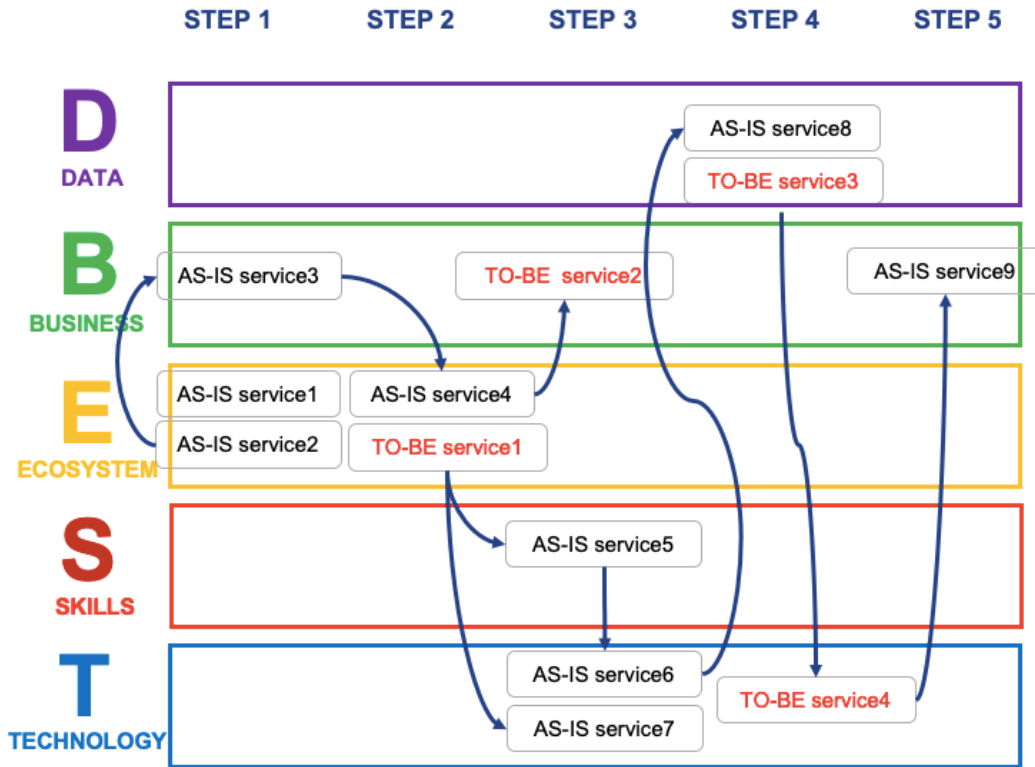


Figure 3 A generic Digital Transformation Service Matrix

2.2.1 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) and **Adoption** (deciding to invest in new technological facilities).

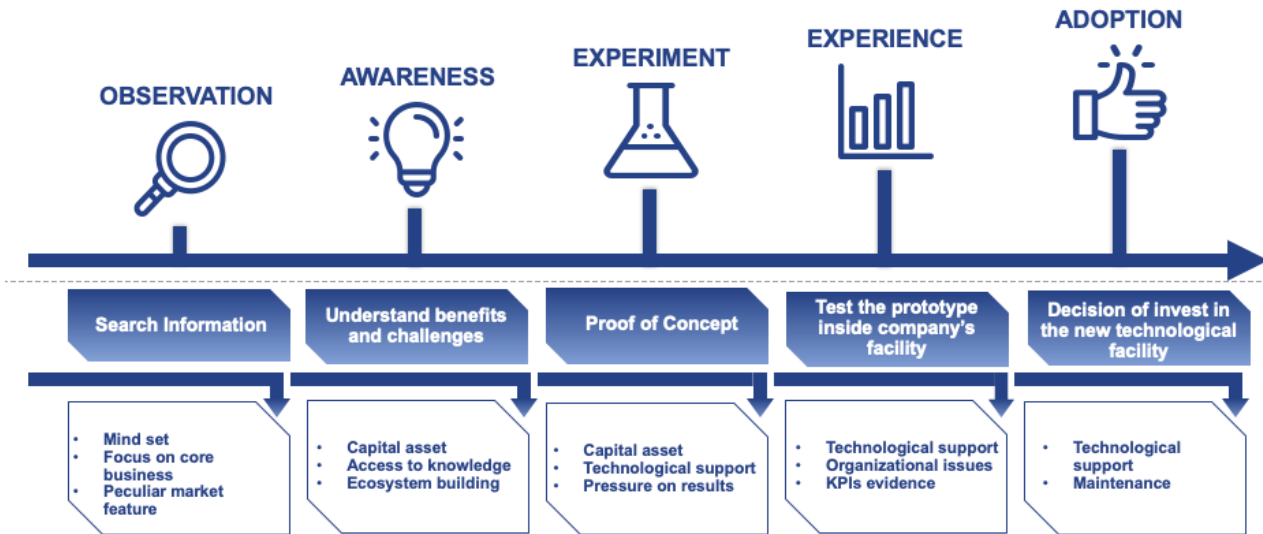


Figure 4 Customer Journey and Blocking Points for Technology User

2.2.2 Technology Provider CJ and Service Matrix

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).

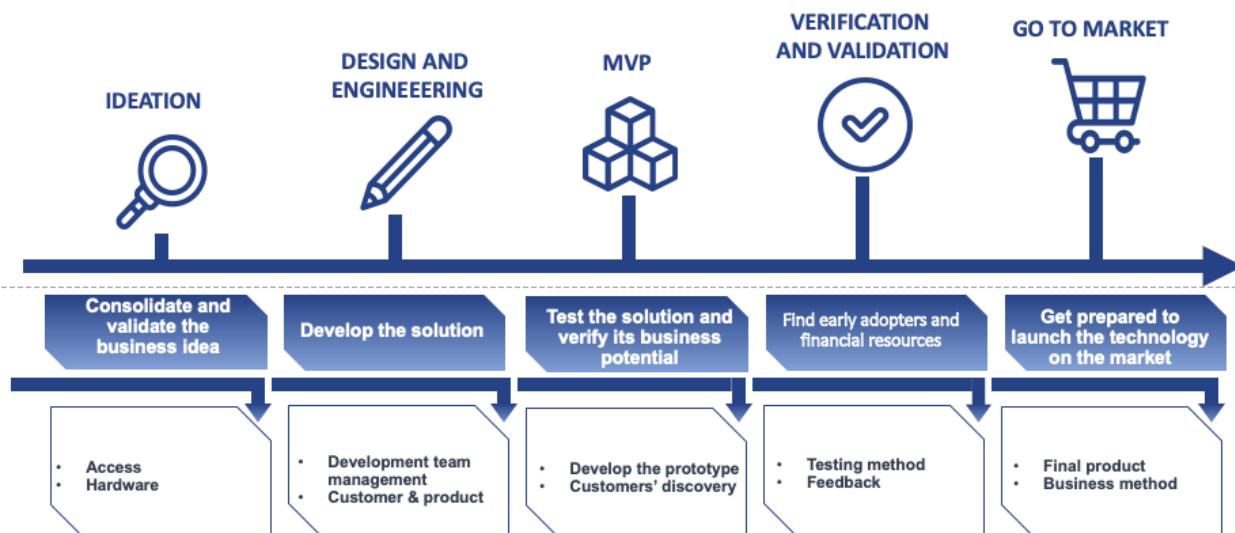


Figure 5 Customer Journey and Blocking Points for Technology Provider

2.2.3 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 collaborates with Didactic Factories or are considered a Didactic Factory themselves. Accordingly, some of AI REGIO DIHs affirm to have an educational strategy within their mission and 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 learnt), **Share** (joining communities), **Exploit** (implementing own new ideas).

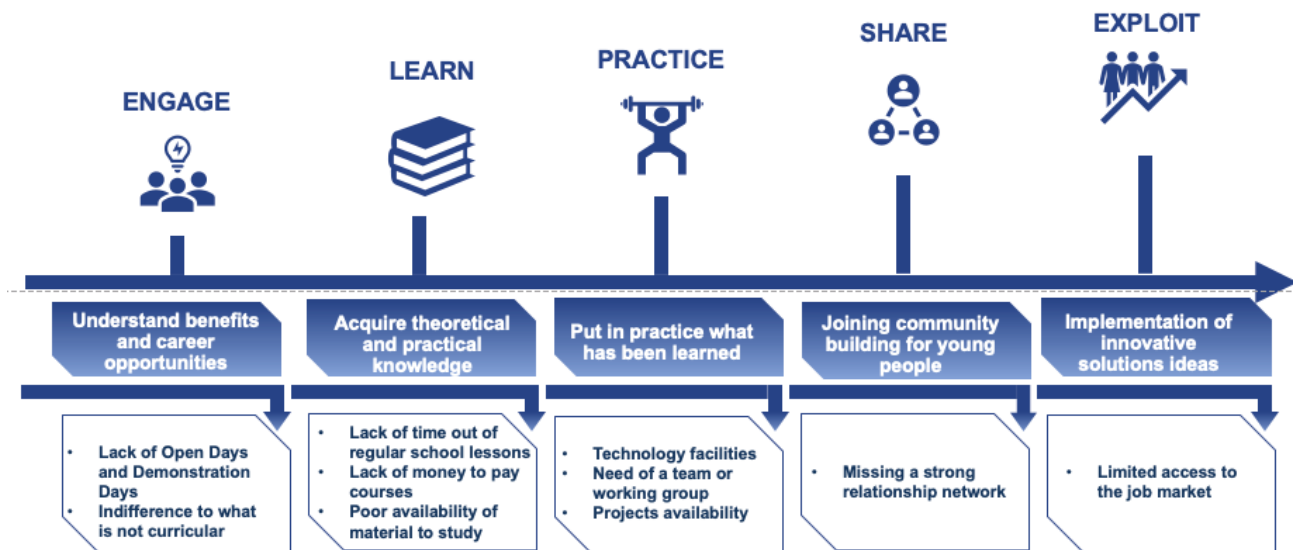


Figure 6 Customer Journey and Blocking Points for Student

2.2.4 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 situation with interregional ones), **Roadmap** (strategy and priority definition), **Implement** (the policy), **Impact** (collecting feedbacks).

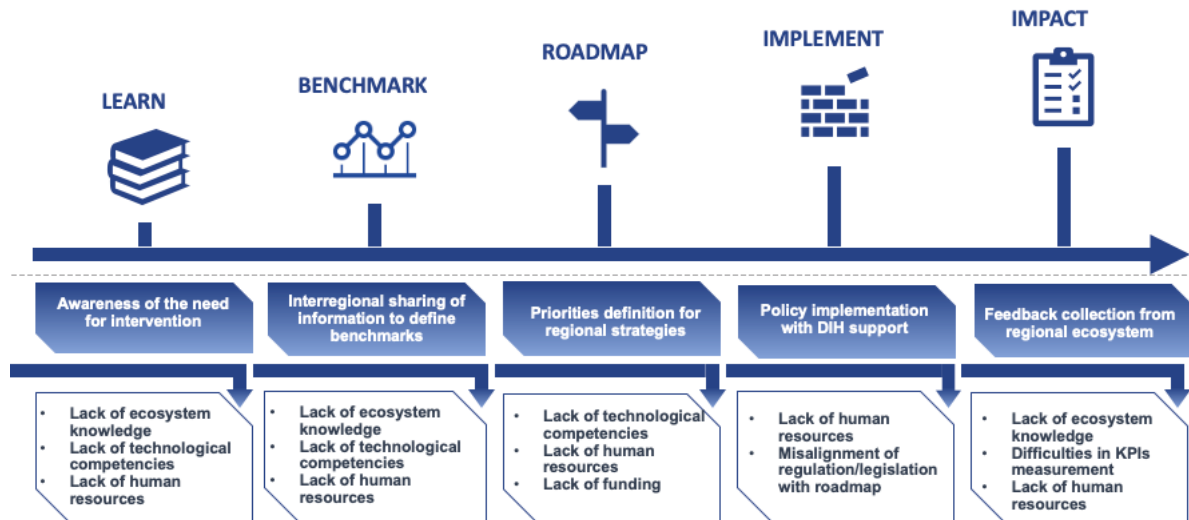


Figure 7 Customer Journey and Blocking Points for Policy Maker

2.2.5 Start-up CJ and Service Matrix

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 verifying its potential), **Validation** (finding early adopters and financial resources), **Scaling** (developing a full solution), **Maturity** (improving the solution and exploring new solutions).

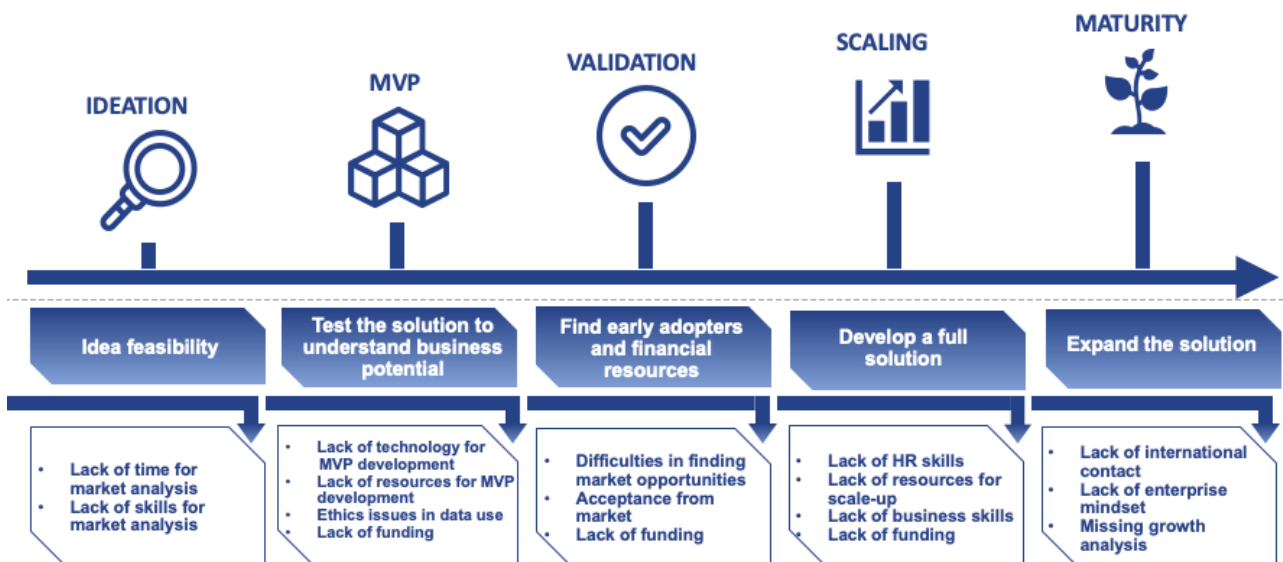


Figure 8 Customer Journey and Blocking Points for Start-up

2.2.6 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 organization level).

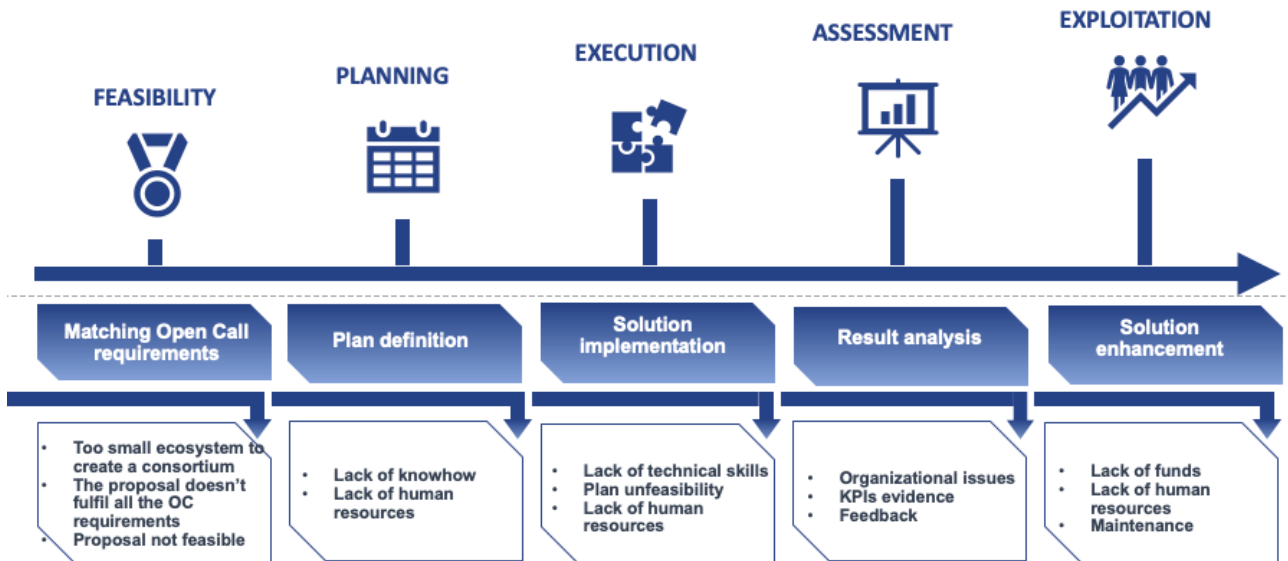


Figure 9 Customer Journey and Blocking Points for Experimenter

2.3 Digital Transformation Service Pipeline and Success Stories

Given the Digital Transformation Service Matrix described in previous paragraph, the **Digital Transformation Service Pipeline** is built by connecting services with arrows, in order 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 to a specific customer and equipped with a timeline, in order to be able to measure progresses and performances. The completion of the pipeline, presenting all steps to achieve the final digital transformation, represent a **success story**.



2.4 METHODIH Validation in AI REGIO DIHs

As already mentioned, the basic concepts of AI REGIO METHODIH have been inherited by MIDIH project, but, before adopting it, WP3 conducted a detailed analysis in collaboration with the 13 DIHs to validate and improve it.

- Regarding the Service Portfolio, the services have been discussed to check that all the relevant activities run by a DIH are included.
- Regarding Customer Journeys, new blocking points for the MIDIH journeys (technology users, technology providers and students) were identified and three new journeys were developed from scratch (policy makers, start-ups and experimenters).

A number of workshops was organized with WP3 partners to present the methodology, actively working on it and to run WP3.1 and WP3.2 activities. The 13 DIHs were then asked to compile the Service Portfolio and to create the customer pipelines.

On **28th January 2021**, we organized an online plenary session with all WP3 partners to present for the first time the **Service Portfolio**. The main objectives were:

- To explain the concept of 3-levels 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 REGIO project (TO-BE services).
- To validate the model, collecting feedbacks 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. Figure 10 shows the header of the Service Portfolio excel version, plus the first line as example (in collaboration with WP4, the online version of portfolio will be available in the portal).

CLASS	TYPE	SERVICE	Description	Provided?	AS-IS service description	AS-IS Sources of funds used to cover costs	TO-BE service description	TO-BE Sources of funds used to cover costs	Collaborative services	Needs, Requirements and KPIs	EXTERNAL REFERENCE of the SERVICE	
				YES and/or TO-BE	• Name of the service, reference, link • Specific characteristics	• Internal Private Funds • Internal Public Funds • External Private Funds	• Name of the service, reference, link • Specific	• Internal Private Funds • Internal Public Funds • External Private Funds	• Collaboration within the AI REGIO DIH • Collaboration external to the AI REGIO DIH	• Technological Resources • Financial	• Additional details to the service • Link to website, video	
ECOSYSTEM BUILDING	Community building	SME and People Engagement	A. Mapping and analysis of the ecosystem requirements in order to enable the identification of consortium partners (or partnerships) for establishing the DIH network, with a specific focus on AI technology providers		To fill only if P4=YES	To fill only if P4=YES	To fill only if P4=TO-BE	To fill only if P4=TO-BE	fill only if P4=TO	fill only if P4=TO	To fill only if P4=TO-BE	To fill only if P4=YES

Figure 10 The header of the Service Portfolio presented on 28th January 2021

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

On **1st February 2021**, the concept of **Customer Journey and Blocking Points**, as was conceived in MIDIH project, was presented to WP3 partners during a two-hours online workshop. The goal was to make them familiar with the idea of a 5-steps structure to describe a digital transformation journey and to stress the importance of identifying blocking points for each step, since they represent the moment where the DIH is expected to intervene to support the customer.

The meeting agenda dealt with three main topics:

- Presentation of technology users, technology providers and students customer journeys and related blocking points, outlined in MIDIH project;

- Validation and identification of new blocking points for the previous three journeys, fitting with AI REGIO requirements and use cases;
- Identification of the most relevant customer types for the 13 DIHs, to understand if the development of new journeys (beside the existing three) is required. As anticipated, it was agreed to develop three new journeys (policy maker, start up and experimenter).

The activity related to identification of blocking points was run using an online board⁵ organized in three different panels, one for each journey inherited from MIDIH. For each of the five steps, participants listed the services that they usually provide at that stage of the customer transformation and mainly focussed on barriers and obstacles that they need to overcome.



Figure 11 Interactive Session's Online Board on 1st February, 2021

The workshop was really participated, especially regarding the first two journeys (see Figure 11), since technology users and technology providers represent the majority of a DIH customer base.

In addition to blocking points that were presented as example, participants identified lot of 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 barrier is the reduced number of personnel that brings, inevitably, to have **reduced availability of different competences**: what it is required are people taking care of funding projects to run research activities, expertise in AI and technological innovations, competences to re-train the workforce to adopt new innovative solutions. Sometimes, also **lack of a long-term** vision represents an issue in terms of digital transformation (that typically requires lot of time and effort).

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

This first preliminary session dedicated to customer journeys was followed by a couple of further online meetings to develop the three new pathways, together with partners interested in it.

⁵<https://app.mural.co/t/polimi3712/m/polimi3712/1611227634433/81f2fdd68d074995a05c74bc3e8fc8564b26ac12?sender=silviarazzetti4266>

On 19th February, 2021 (together with the 13 DIHs) a meeting was run to define the journeys of start-ups and policy makers and of experimenters. The format used was the same already described: an online board⁶ where participant added examples of services provided and obstacles to be overcome in each of the 5 steps.



Figure 12 Interactive Session's Online Board on 19th February, 2021

On 10th February 2021, WP3 organized an online one-hour webinar to present the concept of **Digital Transformation Service Matrix/Pipeline**, involving 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 him/her to contact a DIH.

On 31st March 2021, 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.

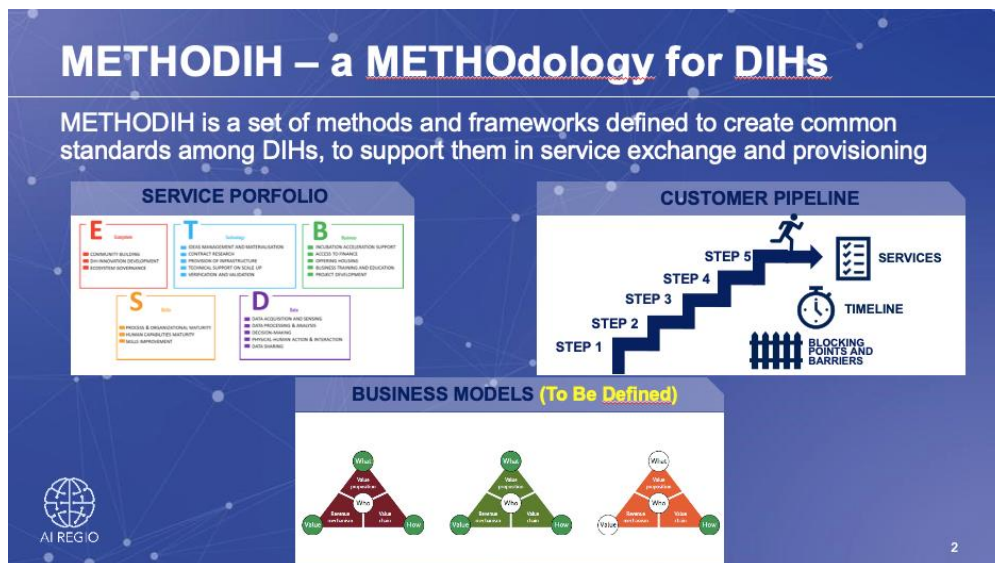


Figure 13 Webinar about METHODIH on 31st March, 2021

⁶<https://app.mural.co/t/polimi3712/m/polimi3712/1613725730275/b34cd8eed49342d6829135c3de6ac36af00432a6?sender=silviarazzetti4266>

3 AI REGIO SERVICE PORTFOLIO ANALYSIS

3.1 Service Portfolio Analysis: a synthesis

The AI REGIO 13 DIHs offer overall more than 270 services, classified according to the D BEST taxonomy (the R class is not taken into account for the moment since it is mainly addressed to TEFs and it is still under validation), with an average of 21 services per DIH.

The 65% of services delivered belongs to the Business or Ecosystem class, while very few DIHs are specialized in activities related to Data management.

Among the 277 services, 73 have been identified as “to be improved”, that is, the owners are planning to work on them in order to make them more appealing and better fitting with their customers’ requirements.

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

Actually, 88 services (an average of 6.8 per DIH) are going to be evaluated as possible candidates to be implemented during AI REGIO project (Project-funded, Project-inspired, Project-collaborative services). The activity is run in WP3.3 (and it is not subject of the current deliverable but will be reported in D3.3), where the 89 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 REGIO DIHs services split by class

CLASS	TOTAL AS-IS (to be improved)	TOTAL TO-BE
Data	19 (14)	20
Business	87 (22)	12
Ecosystem	94 (26)	17
Skills	35 (5)	23
Technology	42 (6)	16
TOTAL	277 (73)	88

Regarding Customer Journeys, not all the DIHs provide support to all the 6 categories of customers: the technology user (usually an SME) is the typical customer for a DIH and belongs to the customer base of all the 13 DIHs of AI REGIO consortium, followed by technology provider.

The Policy Maker is client of five hubs and this is the reason that drove WP3 to develop its journey from scratch, identifying blocking points and barriers and providing to DIHs the right set of tools and analysis to help them.

Experimenters, that is, “Open call winners” who address the call’s requirements supported by a DIH, are currently customers only of a hub. For sure, D3.2 (the updated version of the current one) expected at the end of the project after AI REGIO open calls, will reflect a situation slightly different.

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

CUSTOMER	# of DIH
Technology user	13
Technology provider	10
Student	2
Policy Maker	5
Start-up	2
Experimenter	1

3.2 Service Portfolio Analysis findings

The 13 Service Portfolios compiled by the 13 DIHs of the project were analysed in detail in order to:

- describe AI REGIO consortium of Digital Innovation Hubs by the set of services that they are currently providing, identifying their orientation toward business, technology, ecosystem activities. In this case, we have taken into account AS-IS services: this analysis is very useful to match competences available among the DIHs, with the perspective (see WP3.3) of implementing collaborative scenarios;
- identify new services to be put in place during AI REGIO activities, both as Project-funded, Project-inspired and Project-collaborative services. In this case, we considered TO-BE services.

3.2.1 General overview of AI REGIO Service Portfolio

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

As mentioned, of the 277 AS-IS services, the majority (34%) belongs to the Ecosystem class, followed by Business ones (31%). These two classes cover alone the 65% of the entire Portfolio (181 on 277), while the sector with the least services implemented is Data management.

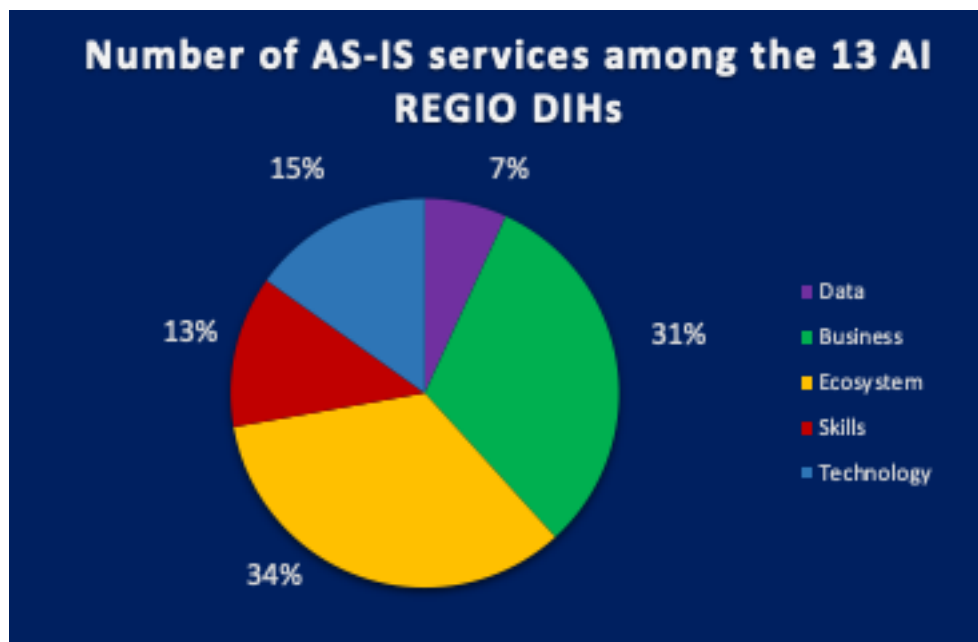


Figure 14 AI REGIO Service Portfolio by service class

Drilling down from service class to service type, as Figure 15 shows, you can see that the most represented category is “Ecosystem - Community Building”, that is, the capacity of mapping and engaging stakeholders to create consortia, performing technology scouting, communication activities and brokerage roles, that counts the 23,5% of services provided in AI REGIO (65 services among the 13 DIHs). The second most popular type is “Business - Project development” (strategic analysis, identification of project opportunities, proposal development) counting 14,4% of total services.

Categories with a very low percentage of implementation are those related to the Data scenario (Data acquisition and processing, but also data analysis and decision making) and to technology support (Verification and validation and scale-up).

Please note, that in the chart below, the red bar with yellow border is the total of the class.

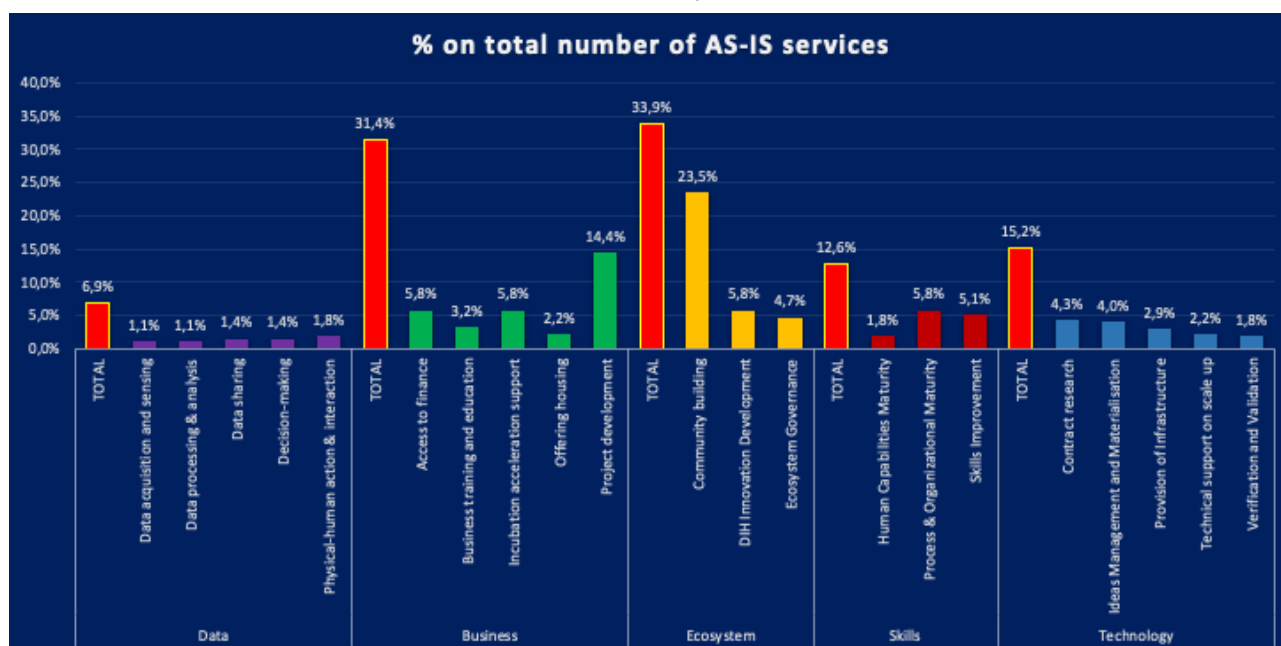


Figure 15 AI REGIO Service Portfolio by service type

3.2.2 Classification of DIHs according to the Service Portfolio

AI REGIO consortium fully covers the catalogue of services described in METHODIH framework, that is, all services 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 (almost) each hub: “Ecosystem - community building” is provided by 13 DIHs out of 13, while “Business - project development” and “Business - access to finance” is provided by 12 DIHs out of 13 (only TECNALIA is missing, since it doesn't support any Business service). On the other side, “Data processing and analysis” and “Data sharing” are available only in two hubs: SKU and AIN shared the interest for the former, SKU and ACCIO/EUT for the latter. Actually, as mentioned before, only few data services are provided, since this area still needs to be boosted (hopefully during AI REGIO project).

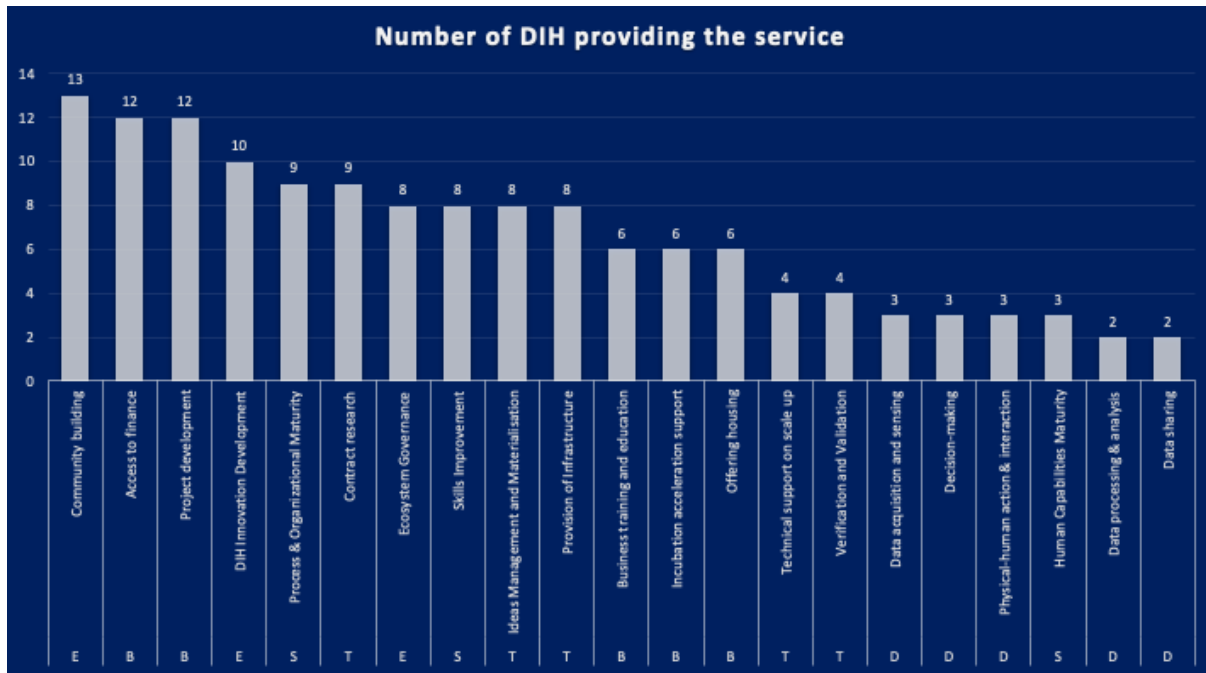


Figure 16 Number of DIH that provide at least one service of that type

To provide a rough classification of the Digital innovation Hubs we have taken into account two main aspects:

- 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 21, out of a total of 56 services available in the catalogue (it means that on average, a hub's Portfolio covers about the 40% of services). Three DIHs are definitely positioned above the average: SKU with a total of 51 services (91%), AIN with 40 services (71%) and PRODUTECH with 35 services (63%). On the other side, ART-ER and TECNALIA are very small DIHs with a total of 9 and 8 services respectively.

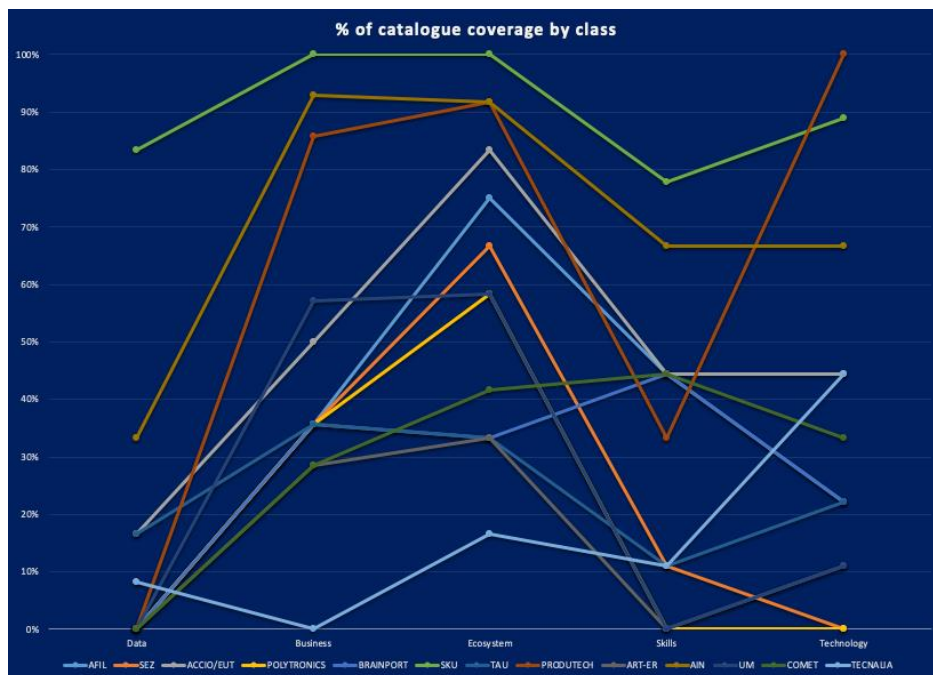


Figure 17 % of catalogue coverage by class

For each class of service, Figure 17 shows the percentage of coverage of the 13 DIHs: each coloured line represents a Digital Innovation Hubs. On top, close to 100%, you have those hubs who offer a larger number of services, while on the bottom you can find those not providing at all, or providing just few, services. For instance, SKU (light green) and AIN (brown) present high percentages for all classes and they are positioned at the top of the chart; PRODUTECH (red) provides the 100% of Technology services, but on the other side it has not any specialization in Data management, and hence a two big peaks are shown; despite the lower percentages, TECNALIA (light blue) focused its portfolio on Technology services where the line rises. Conversely, other DIHs present a peak related to Ecosystem, as ACCIO/EUT (grey), AFIL (light blue), SEZ (orange), POLYTRONICS (yellow), UM (blue), well positioned also regarding business.

Another type of analysis that we run, 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 evaluate the strengths of the hub. This exercise is very useful in perspective to WP3.3 activities, when DIHs will be grouped to develop new collaborative services, matching requirements from one with competences of the other one. Figure 18 shows an overview of the distribution of provided services, by class and by DIH. 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 the 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%). AFIL, SEZ and POLYTRONICS seem to be more “ecosystem oriented”, since their portfolio is mainly dedicated to ecosystem services (45%, 57%, 58%, respectively); ART-ER and UM combine both business and ecosystem services (together, they cover the 88% and 94%, respectively); TECNALIA seems to be more “technology oriented”, with 50% of its services dedicated to technology activities; ACCIO/EUT, SKU, TAU, AIN, BRAINPORT, PRODUTECH and COMET present quite an homogeneous portfolio, even if last three do not have Data management competences.

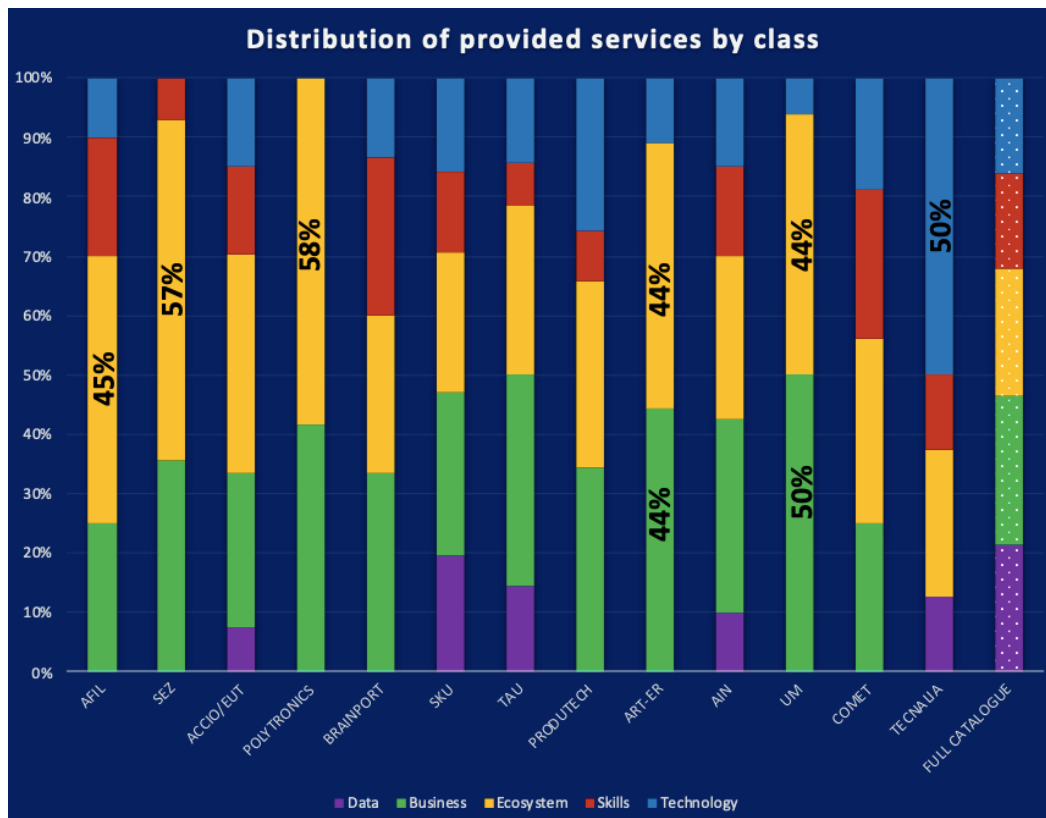


Figure 18 Distribution of provided services by class

3.2.3 General overview of services to be implemented in AI REGIO

Having a look at TO-BE services, you can notice that the distribution it's quite different with respect to the AS-IS Portfolio.

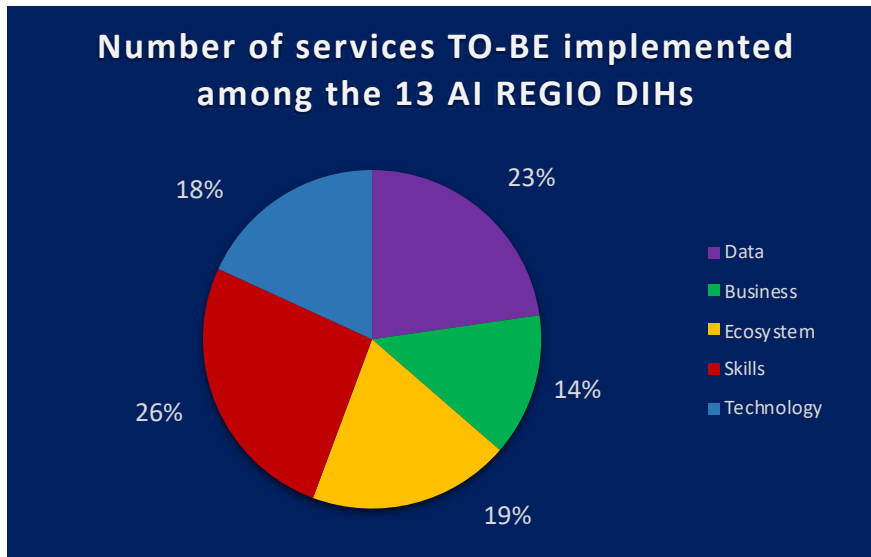


Figure 19 Services to be implemented, by service class

Aware of their gaps and probably driven by the more technical approach of AI REGIO, the 13 DIHs are generally more orientated toward the implementation of data-technology and skills services. Figure 19 shows a more homogeneous distribution on the five classes and Ecosystem and Business services here are not prevalent.

Next paragraphs will provide an overview of services to be implemented, describing also some examples directly collected from the 13 Portfolios.

3.3 To-be Data Services Analysis

According to the analysis conducted in WP3, 20 new Data services are planned to be implemented in AI REGIO. In the majority of cases, we are talking about DIHs that are not expert at all about data, but wish to enrich they portfolio, providing a set of services strongly required nowadays.

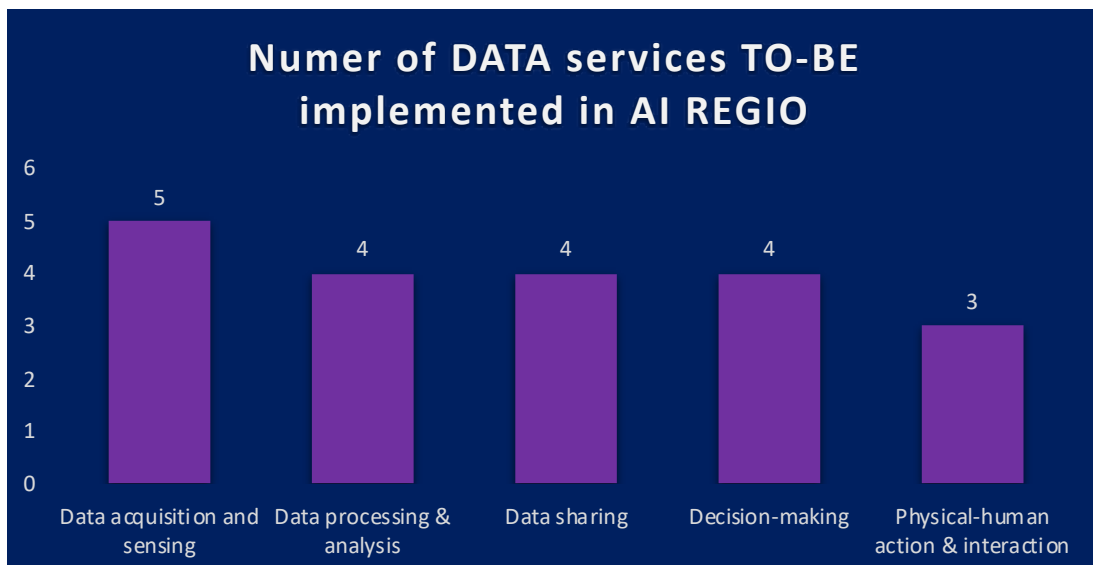


Figure 20 Number of DATA services to be implemented in AI REGIO

PRODUTECH is planning to include for the first time a couple of services dealing with data (currently, this class of services is not covered at all), both related to Data processing and analysis category:

- Data Storage assistance, by providing industrial companies with services for data management and modelling and information management services, for data quality assurance, based on IDS standards.
- Data Analytics, by providing companies with access to AI and optimization algorithms as a service

TECNALIA is planning to enrich its portfolio by including some services related Data management (currently only “decision support and development” is available). Four different services are expected to be implemented from scratch, supported both by private and public funds:

- Regarding data acquisition and sensing: encryption and privacy preservation services, data acquisition service/system for industrial processes;
- Regarding decision making: design and deployment of Big Data architectures;
- Regarding data sharing, platform and architecture: IDS connectors configuration service.

POLYTRONICS is trying to boost its competences in data management, by developing from scratch all the 12 services available in the catalogue: the main goal is to develop methods to manage the data acquired by projects, to ensure that collected data is owned by an entity and is protected, to manage data sovereignty and to collaborate to define methods and tools to analyse data. It is, of course, duty of T3.3 to evaluate what it is feasible to be achieved, in terms of time, effort and costs.

SKU, that already provide a number of services related to Data, is planning to improve the already existing one and to deliver two services from scratch: Data acquisition and Cognitive Big Data architecture.

3.4 To-be Business Services Analysis

12 new business services are planned to be implemented in AI REGIO, mainly related to “incubation and acceleration support” category. In the majority of 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.

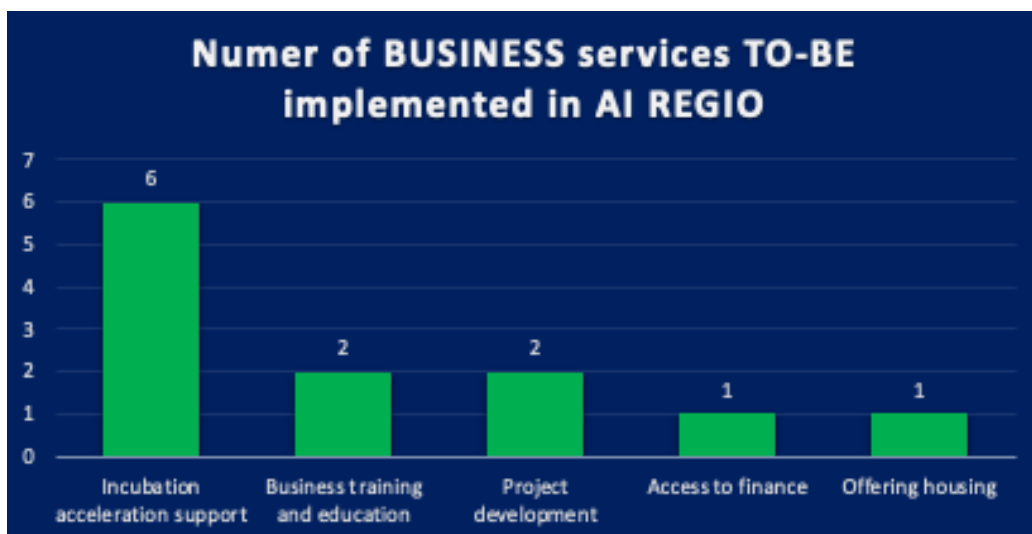


Figure 21 Number of BUSINESS services to be implemented in AI REGIO



SEZ, that already presents 5 business services in its portfolio, is planning to implement a new service related to project development, leveraging on external public funds: the goal is to run a matchmaking activity, by bringing together supply and demand side (e.g. SME that can benefit from AI and technology providers), through market place platforms. The DIH is looking for external collaboration.

UM, that already presents 8 business services in its portfolio, is planning to implement a new service related to incubation and acceleration support: the hub is investing in technological centre INNOVUM, which will offer substantial spaces for laboratories and state of the art equipment to be available to companies. Basic facilities will be incorporated in the frame of INNOVUM.

POLYTRONICS is trying to boost its business competences, by developing from scratch all the services available in the catalogue that are not currently provided (9 out of 14): the main goal is to provide IP and legal support, to analyse the market of plastics, rubber et composites to promote technology providers which are align with companies strategies and needs, to tutor on the integration of AI in production and products, providing of premises and teaching tools, to scout external experts to make them intervene on specific topics... Again, it will be, of course, duty of T3.3 to evaluate what it is feasible to be achieved, in terms of time, effort and costs.

3.5 To-be Ecosystem Services Analysis

17 new Ecosystem services are planned to be implemented in AI REGIO, 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, lot of services presented below are expected to be implemented leveraging on the AI REGIO network.

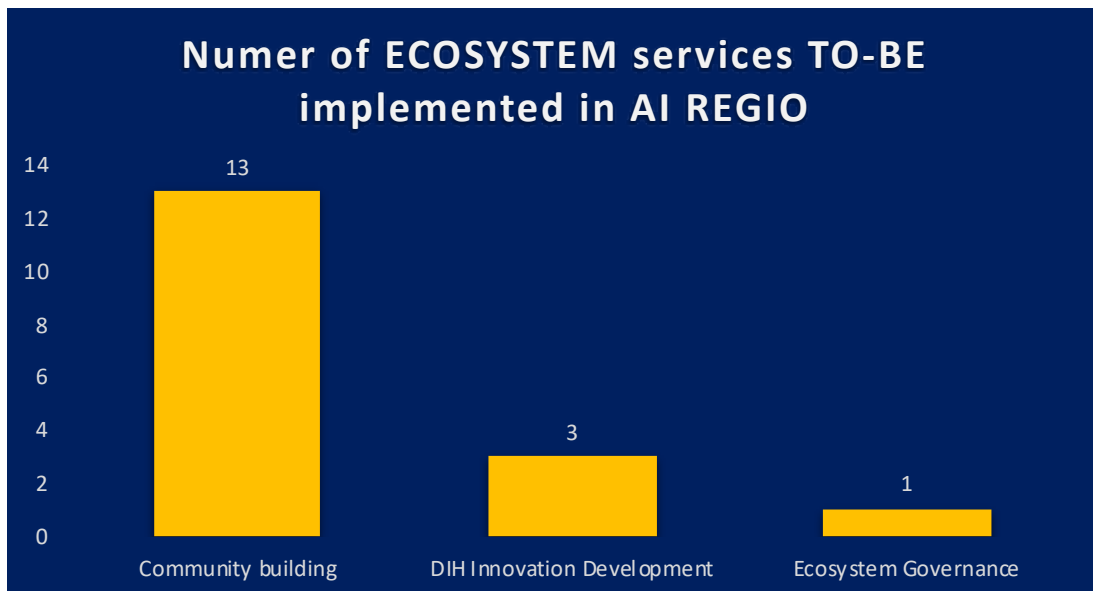


Figure 22 Number of ECOSYSTEM services to be implemented in AI REGIO

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, 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. Hackathon. This process might also include a Rewarding, both in terms of visibility and financial support (with the involvement of a third-party financing the initiative).

SEZ is looking for internal and external collaboration and required funds, to develop a new ecosystem service, in addition to the 8 already existing, related to community Engagement. The goal is to become a bridge between Europe and SMEs and research institutions from the Baden-Württemberg region that are interested in the application of AI technologies.

ACCIO/EUT is waiting for internal public funds to establish an ecosystem mapping service, in order to map AI providers and other relevant stakeholders in a more structured way.

POLYTRONICS wishes to implement the five missing ecosystem services, with the objective of:

- Stimulating and rewarding collaborative innovation and problem solving, by creating a number of online services to record and to respond to specific requests (community building);
- Sharing best practices experiences, by fostering communication actions to EDIH community members and EU partners with articles publication on Internet website and social media (community building);
- Inviting experts in business or industry sectors and supporting both start-ups and SMEs in shaping their vision and strategies, by organising events and pitches to broadcast benefits for digitalisation (community building and DIH innovation development);
- providing examples of experts/past beneficiaries and updating of new good practices (DIH innovation development);

AIN will complete its ecosystem portfolio of services by organizing workshops, networking events and study-visits, leveraging on the ongoing regional, national and European DIH communities and EU initiatives where some members are involved, in order to share the latest trends and technologies and innovations in digitalization. Experts will be identified to join the workshops, events and present technological trends.

UM is going to implement from scratch two new collaborative services, leveraging on external public funds.

- Related to community building activities, digital innovation challenge for students/professors-mentors, Start-up's and SME's will be organized together with yearly DIH UM promotional conference. Partners could act as jurors in the competition and would afterwards get a brochure with top finalist ideas, to be able to share the innovation ideas with their clients;
- Related to communication activities, best-practice workshops in a certain sector will be organized in the next year (ideally, one workshop per month per specific market sector), correlated with specific market sector best practice brochure. Partners will be invited to present their best practices in specific market sector.

TAU's plan is to duplicate the number of ecosystem services available in the portfolio, from 4 to 6, by implementing from scratch a number of new collaborative services:



- Mapping exercise of Robotics solution providers for the field of agile production and other relevant stakeholders a more structured way, leveraging on EU project funds via collaboration projects, and national/regional funding;
- Partner research and matchmaking, to support the access to collaborative innovation projects coming from Horizon Europe or via FSTP funds. In addition, service offering descriptions, service brokering via virtual/physical meetings, connection to the marketplaces will be part of the set of new activities. The idea is to leverage on AI REGIO DIHs community to provide EU matchmaking services;
- Trends analysis, to support companies and other stakeholders who demand specialised and customised studies on Robotics, ICT/IoT/AI for manufacturing and cyber-security for specific niche or sector. The analysis will include also periodic publications of general trends and ecosystem analysis;
- Still related to community building, roadshows and DeepDives to specific locations to showcase of developed technologies will be provided, share use cases and innovative AI technologies and solutions among the AI REGIO network;
- About DIH innovation development category, regular technology trends review and watch will be put in place, offering information from different thematic context in collaboration with Tampere manufacturing cluster and national EDIH;
- Development of a governance model in 2022, when TAU will develop and offer services via one or more upcoming EDIH.

3.6 To-be Skills Services Analysis

23 new Skills services are planned to be implemented in AI REGIO. As already mentioned, the Skills services mainly deals with three area: i) company assessment and strategy definition to improve competences, ii) human assessment and strategy definition to improve competences, iii) provision of training materials, courses, classes, 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 next months. The opposite for the second one (human capabilities maturity).

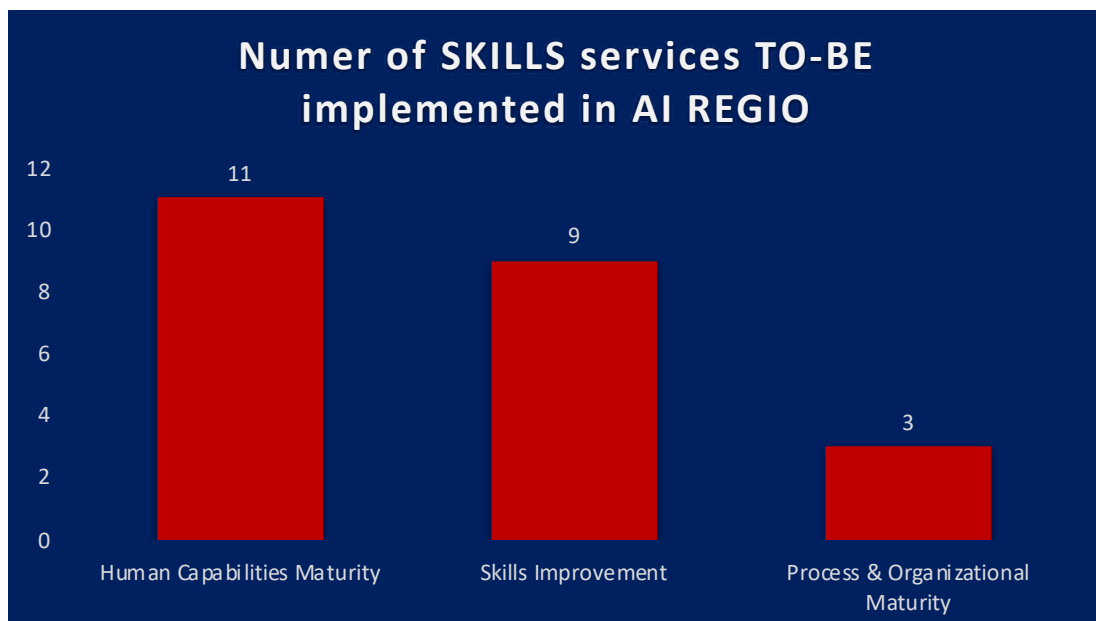


Figure 23 Number of SKILL services to be implemented in AI REGIO

TAU is planning to add to the existing digital maturity assessment, one service for each category:



- As Process & Organizational Maturity service, a strategy and roadmap development system will be implemented, to support the definition of the strategy (and roadmap) for the adoption of robotics, AI/ICT/IoT and cyber-security in a company / organization;
- As Human Capabilities Maturity service, a specific intranet will be developed containing training material;
- As skills improvement service, Training on Robotics and IOT/ICT for agile production is envisioned and material is being prepared. The members will add more material that is suitable for self-study and as a paid service (via university courses or as a direct training for company).

PRODUTECH is expecting to increase its portfolio with three new Skills services, related to the second and third category:

- 14.0 Skills Maturity service, to provide access to a framework to evaluate the maturity of people in SMEs in terms of its capabilities to work with Advanced Manufacturing Technologies;
- 14.0 Skills Strategy service, to support in the identification of capabilities and competences for the professionals in the SMEs to improve their technological maturity.
- Re-Skilling & Training service, identifying training and re-skilling opportunities for SME at national and European level.

ACCIO/EUT is preparing a human skills repository, by developing a “Skills intranet”, specific to contain training material; BRAINPORT will be involved in job placement for students, universities and colleges, by temporary providing access to cost-efficient skilled workforce; SKU will add services related to skills strategy development and standardisation and certification.

ART-ER, UM and POLYTRONICS are planning to introduce for the first time skills services in their portfolio.

ART-ER is preparing activities for the operators up-/re-skilling. Inside the AI DEMO LAB GRID, ART-ER will start upskilling/re-skilling training services aimed at supporting workers and SMEs/Companies in the evolution of working environments due to the application of AI/VR/AR enhanced innovation to production lines. Services for the public sector are also envisaged.

UM will focus on human capabilities maturity, by deploying the three services described in the catalogue

- UM website will be exploited as repository, but some help in structuring it correctly is needed;
- 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. Right tools to do it are required;
- Skills strategy development, supported by a gap analysis between the AS-IS and the desired level of AI skills, together with an action plan definition will be put in place, but again, right tools to do it are required.

3.7 To-be Technology Services Analysis

16 new Technology services are planned to be implemented in AI REGIO, covering the five categories associated to the class (provision of infrastructure, scale-up, validation, contract research and ideas management).

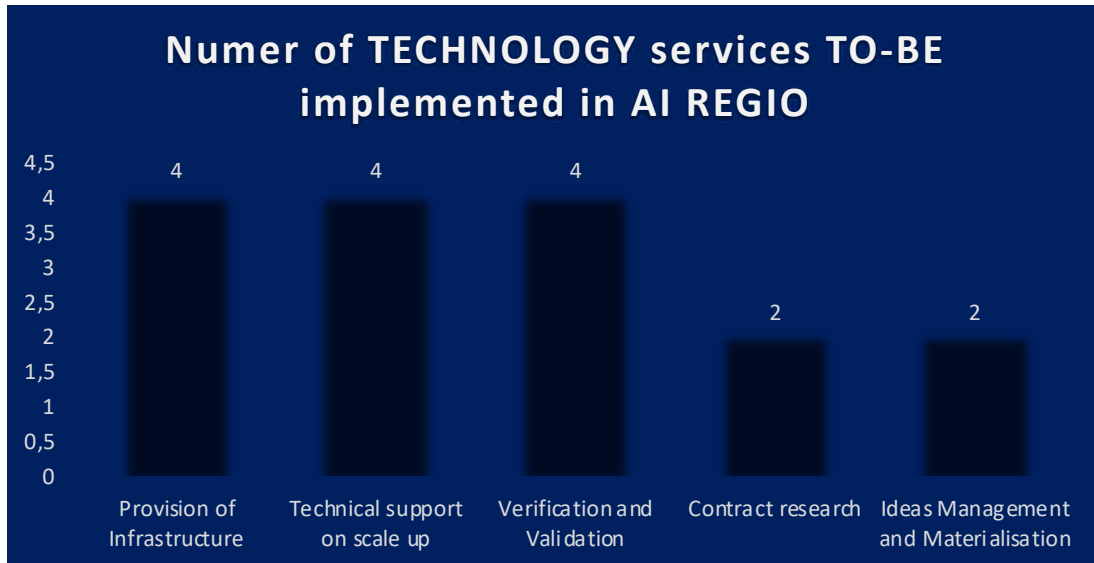


Figure 24 Number of TECHNOLOGY services to be implemented in AI REGIO

AFIL, leveraging on the AI REGIO network of stakeholders, is planning to collaborative implement a new service about “infrastructure identification”, to support in the identification of technology infrastructures at a local level (e.g. competence centres infrastructures) as well as interregional level (leveraging on EU Initiatives such as Vanguard Initiative) to experience the technology.

To boost product demonstration activities, ACCIO/EUT is planning to build a showrooms for the AI node to showcase the results of the services performed in the framework of the AI DIH node.

ART-ER, wishes to collaboratively deploy infrastructures to access to 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 to the most complete and advanced set of shared infrastructure and shared knowledge.

As already mentioned, UM is investing in the technological centre INNOVUM, which will offer substantial spaces for laboratories and state of the art equipment to be available to companies. This facility will be available for companies to test before invest (Provision of Infrastructure), to develop the MVP and design prototypes (Technical support on scale up) and to demonstrate the solution in front of possible clients (Validation).

POLYTRONICS is trying to boost its Skills competences, by developing from scratch all the services available in the catalogue: it will be, of course, duty of T3.3 to evaluate what it is feasible to be achieved, in terms of time, effort and costs.

The main goals identified are: the provision of an analysis of the current company situation and required target to define intermediary stages to minimize the gap; the conduction of digital maturity diagnosis, to analyse the current company situation; the development of methods and tools to adapt the provided services to standard certification.

3.8 To-be Collaborative Services Analysis

As already mentioned, the development of new services by the Digital Innovation Hubs can take three different ways: Project-supported, Project-inspired, Project-collaborative services, according to the needs of the Hub and feasibility of the solution.

WP3 is paying a great attention to the latter, since collaborative activities (that, of course, are really effective in terms of ecosystem creation, synergies exploitation and knowledge sharing, which are main pillars of AI REGIO project) require a powerful coordination system behind. Hence, there is a specific task dedicated to it: WP3.3 – “AI DIH Collaboration Scenarios” ’ objective is to take charge the definition of the ways DIHs can collaborate, for the time being by outlining different collaborative scenarios and by analysing the services portfolio to check feasibility, later on by actively coordinating activities.

Three different collaborative scenarios have been identified: **development of a new services from scratch**, in case a DIH decides to enlarge its offerings leveraging on skills and capabilities available within the network; **partnership to provide service jointly**, to deliver services in cooperation with other partners with complementing competences; **matchmaking**, when the DIH needs to support a customer in identifying potential partners with competencies that it itself doesn't have.

Since the collaborative scenario is part of WP3.3, more details will be provided in D3.3 expected at month 12; here, we will present simply an overview of services identified as “collaborative” inside the Service Portfolio.

Among the 88 services to be developed from scratch, more than the half (48, to be precise) has been flagged as “collaborative” and DIHs are looking for partnership and competences to do it (actually, mainly inside AI REGIO project).

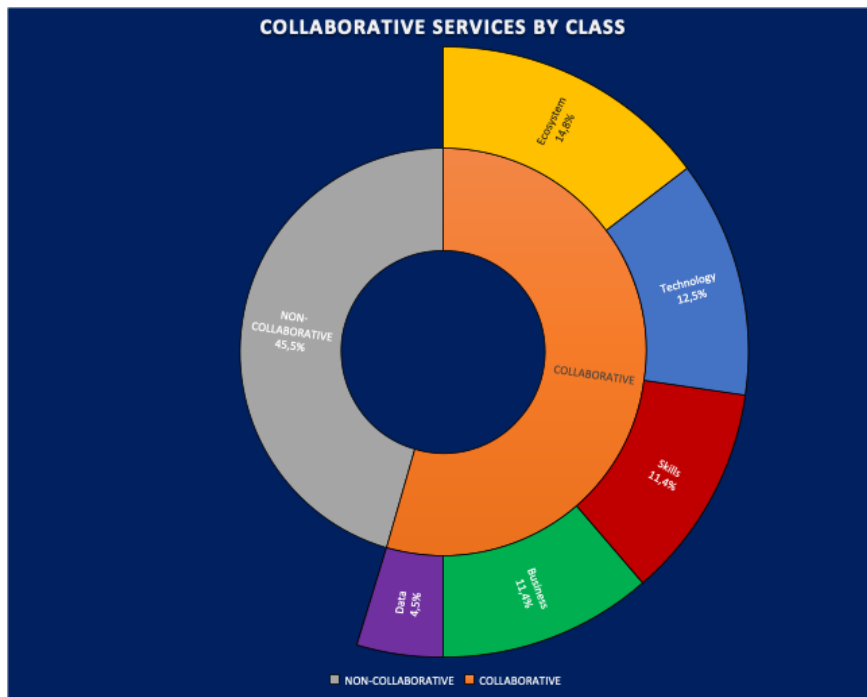


Figure 25 Percentage of collaborative by class

For example, brokerage activities, both related to technology and business domains, are boosted by being part of a community since it is possible to leverage on others experience and networks. For



the same reason, also services related to community building and people engagement can be easily and more successfully implemented in a collaborative way, instead of individually. Hence, DIHs not yet committed in such activities are planning to start them with the support of other stakeholders.

Not only new services (that is, to be developed from scratch) have been identified as collaborative, but also some improvement to be applied to already existing ones, that can benefit from AI REGIO project activities and ecosystem.

For instance, 73 AS-IS services (among the 277 described in Section 3.1) has been selected to be improved during AI REGIO project (feasibility is still under analysis); the 45% of them (33 to be precise) is marked as collaborative.

Not surprisingly, half of them belongs to the Ecosystem and Business classes: it is the case of Digital Innovation Hubs that have identified the opportunity of making part of an ecosystem of other DIHs but also SMEs to improve their brokerage activities or that have finally found a strong community to share and collect success stories.

In addition, also data sharing (and a shared data space, in general) is an activity foreseen to be enhanced by creating a common repository for AI data used to train models, in collaboration with the different stakeholders involved in the project.

4 AI REGIO 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, Skill 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, still under validation).

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, 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 really 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 to 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, in order to provide a full overview of the main customer profiles supported by the DIH.

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

In next paragraph, the most relevant service pipelines identified among the 13 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	STUDENT	POLICY MAKER	START-UP	EXPERIMENTER
AFIL	X	X		X	X	
SEZ	X	X				
ACCIO/EUT	X	X		X		
POLYTRONICS	X	X				
BRAINPORT	X					
SKU	X					
TAU	X	X	X			
PRODUTECH	X	X	X	X	X	X
ART-ER	X	X				
AIN	X	X				
UM	X			X		
COMET	X	X		X		
TECNALIA	X	X				

4.1 Technology Users Customer Journeys Pipelines

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

Among AI REGIO DIHs, lot of 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 of the journey and it is mainly focused on ecosystem and business activities. However, in case of participation to 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 willing to experience the technology.
The DIH provides support till latest steps of the journey and services are more technology and skills oriented.
- The customer looking for **maturity assessment** and 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 starting from the second stage of the journey, is always anticipated by a number of preliminary contacts by workshops, seminars, public events, brokerage initiatives, etc (ecosystem services).

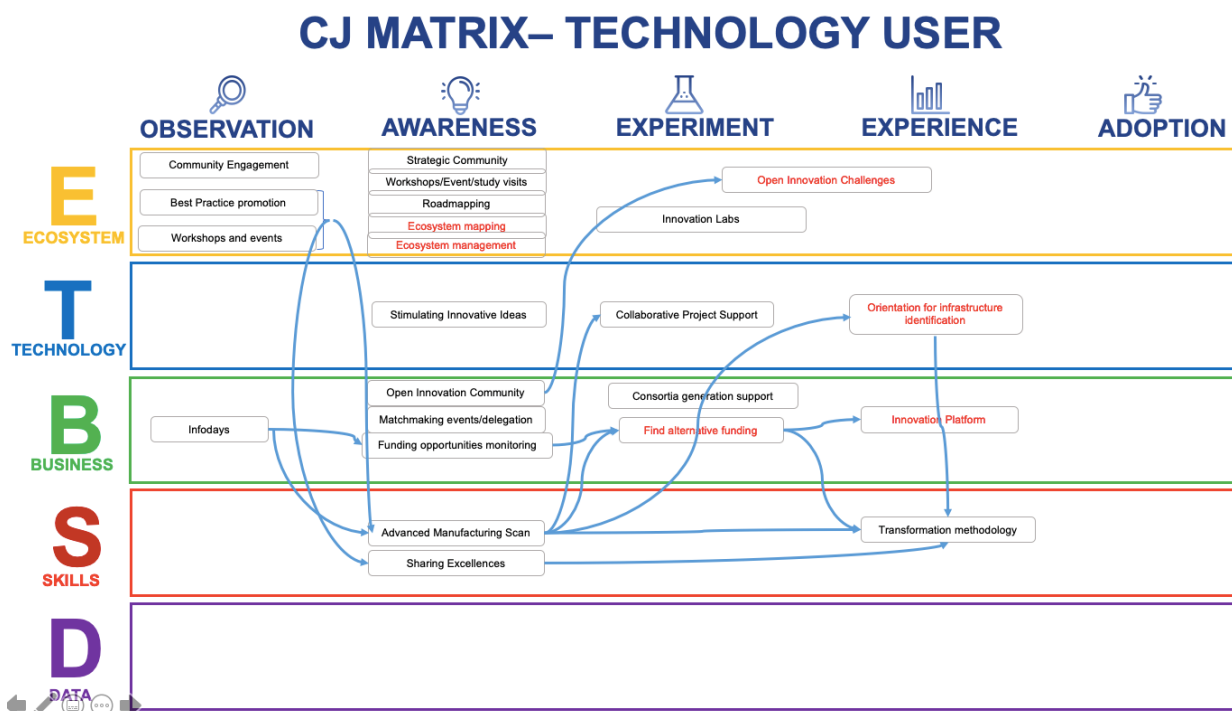


Figure 26 AFIL service pipeline for SME looking for support in digitalizing the business

Figure 26 shows the service pipeline filled by AFIL to describe the set of services provided to SMEs that are looking for support to digitalizing their business. Info-days, workshops and community engagement events represent the first contact with the customer. AFIL, that is more ecosystem and business oriented, supports the customer by monitoring funding opportunities that could enhance the customer business providing a more digitized approach or by matchmaking stakeholders with different competences but same objectives.

Filling the service matrix creating the related pipeline came out to be a useful exercise to identify new services, 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 a disposal own technology facilities) is planning to put in place a service to identify infrastructures both at local (Lombardy region, Italy) and interregional level.

In the same way, PRODUTECH has developed the service pipeline for SMEs looking for technological training, that encompasses five steps and four classes, including new services not already provided but to be implemented soon. Actually the technological road-mapping consultancy that helps enterprises in shaping their vision and strategies will be enriched by a number of skills services, such as “I4.0 skills strategy” and “re-skilling trainings” to ease workers’ acceptance of the new solution by identifying (and providing) courses and “I4.0 skills maturity” assessments to measure the success of the training strategy at the completion of the journey.

CJ MATRIX– TECHNOLOGY USER

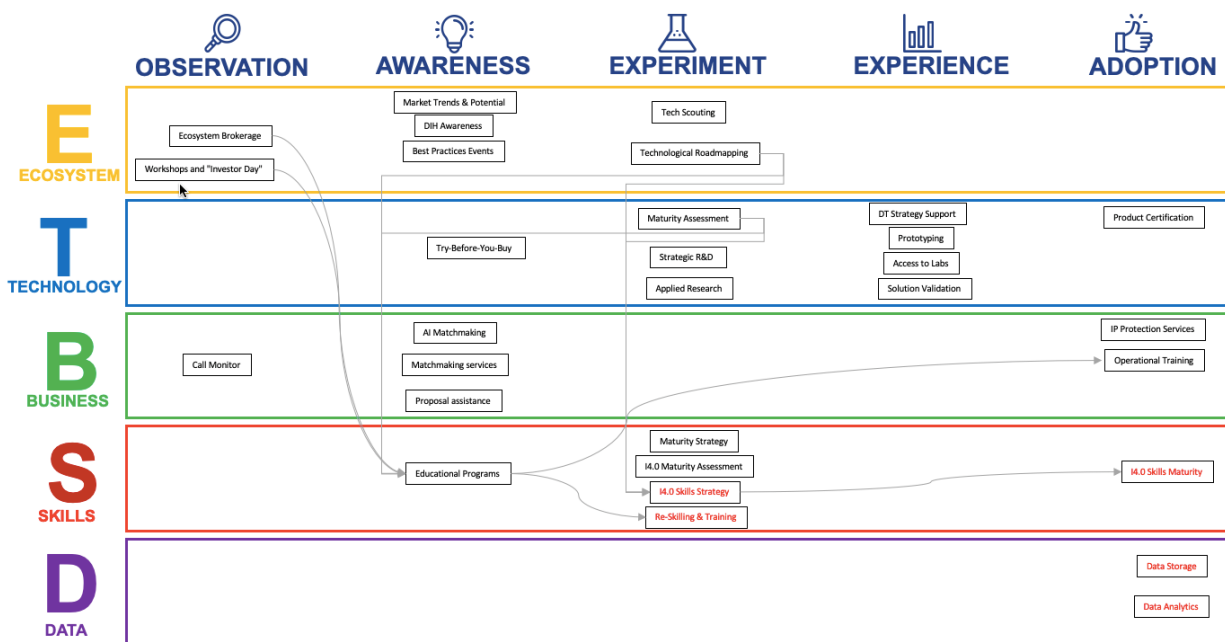


Figure 27 PRODUTECH service pipeline for SME looking for technological training

TECNALIA (Figure 28) has elaborated an easier pipeline for technology users (without specifying the profile), that includes data consultancy during the “experiment” phase. Actually, after a preliminary stage when it acts for identifying funding opportunities and creating consortia, TECNALIA participates to the core activities by providing demonstration facilities to show technical solutions behaviour and supporting the development of data-based solutions.

CJ MATRIX– TECHNOLOGY USER

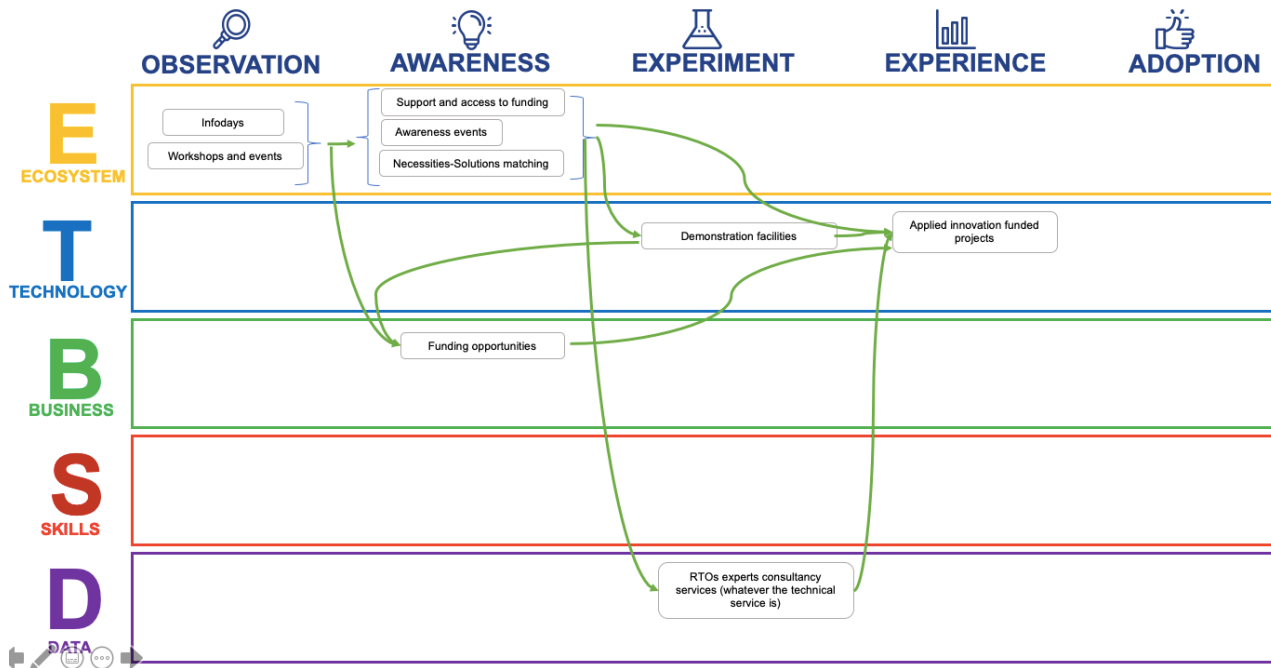


Figure 28 TECNALIA service pipeline for technology user

4.2 Technology Providers Customer Journeys Pipelines

Technology provider, together with technology user, is one of the main customers of AI REGIO DIHs, supported by 10 out of 13 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 way of acting of the Digital Innovation Hub.

Among AI REGIO 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 technology user, also the technology provider looking for projects needs support in the first stages of the journey, for ecosystem and business stuffs (brokerage, creation of consortium, business facilities, etc). Again, in case of participation to 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 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**.
The 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 competences, business may complemented also with skills services. However, to implement a long-term strategy, also support during the “go to market” phase to develop a proper exploitation business model, can be required.

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

Figure 29 shows an example of pipeline for a technology provider looking for business digitalization. Beside the well-known ecosystem services used to initially approach the customer, AIN provides access to technology infrastructures and platforms and performs tests inside the company to evaluate the final solution. The hub offers a set of infrastructures (called SIESS), talent, training, laboratories of experimentation, meeting spaces and services: IRIS Lab is the virtual platform developed with the objective of becoming capable of bringing together both the supply and demand of the region around digitization, developing the one-stop-shop concept, which is one of the pillars on which the next physical infrastructures and facilities of the Innovation Pole will be based.

To increment the offer, AIN is specializing in AI services, creating new infrastructures more tailored for artificial intelligence. To complete the journey, accompanying the customer till the “go to market” phase, the hub is planning to put in place new ecosystem services, for supporting the development of business models to exploit the new solutions just implemented and to monitor the market.

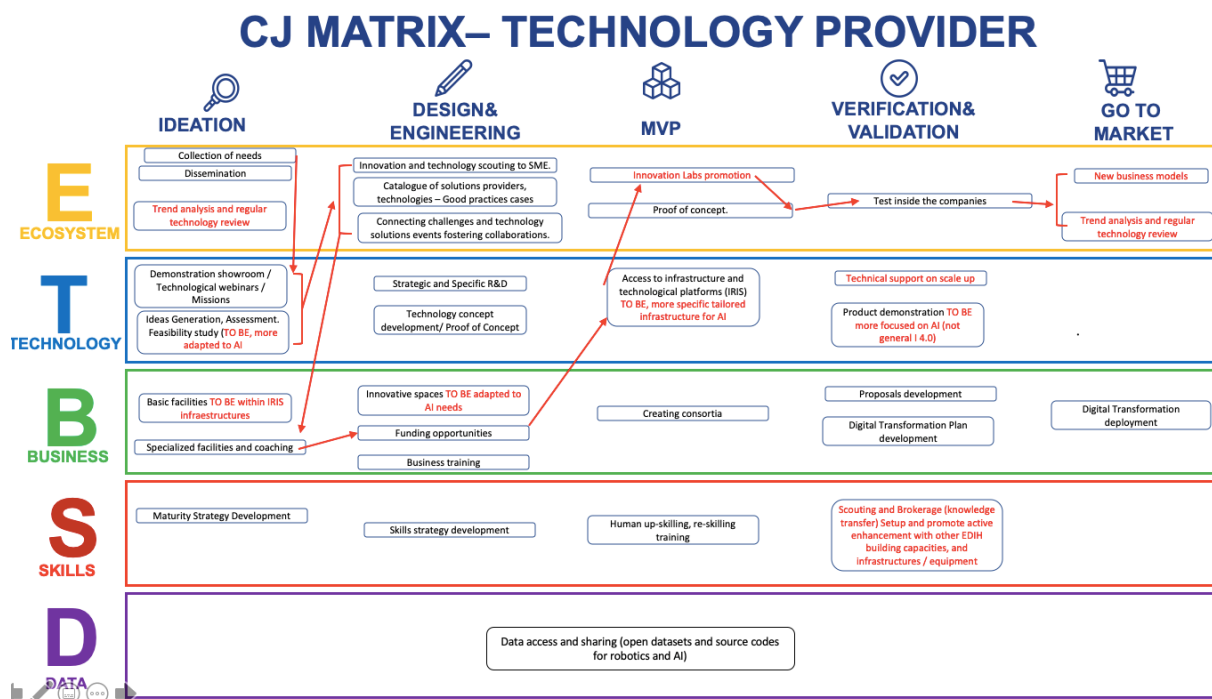


Figure 29 AIN service pipeline for provider looking for business digitalization

ART-ER didn't define specific profiles for technology providers, however from its service pipeline (Figure 30) it is possible to identify different paths.

The first one is more “ecosystem oriented”: 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 later stages (when SMEs are required to test and measure the MVP acceptance).

Actually, ART-ER coordinates and is supported by Clust-ERs 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 new innovation projects. The creation of heterogeneous multi-stakeholders groups is focused on specific challenges.

The second path is more “skills oriented”: it means that the technology provider is looking for trainings to re/up-skill, but also of skills maturity assessments to measure the readiness of end users (SMEs) to accept the proposed new solutions.

CJ MATRIX – TECHNOLOGY PROVIDER

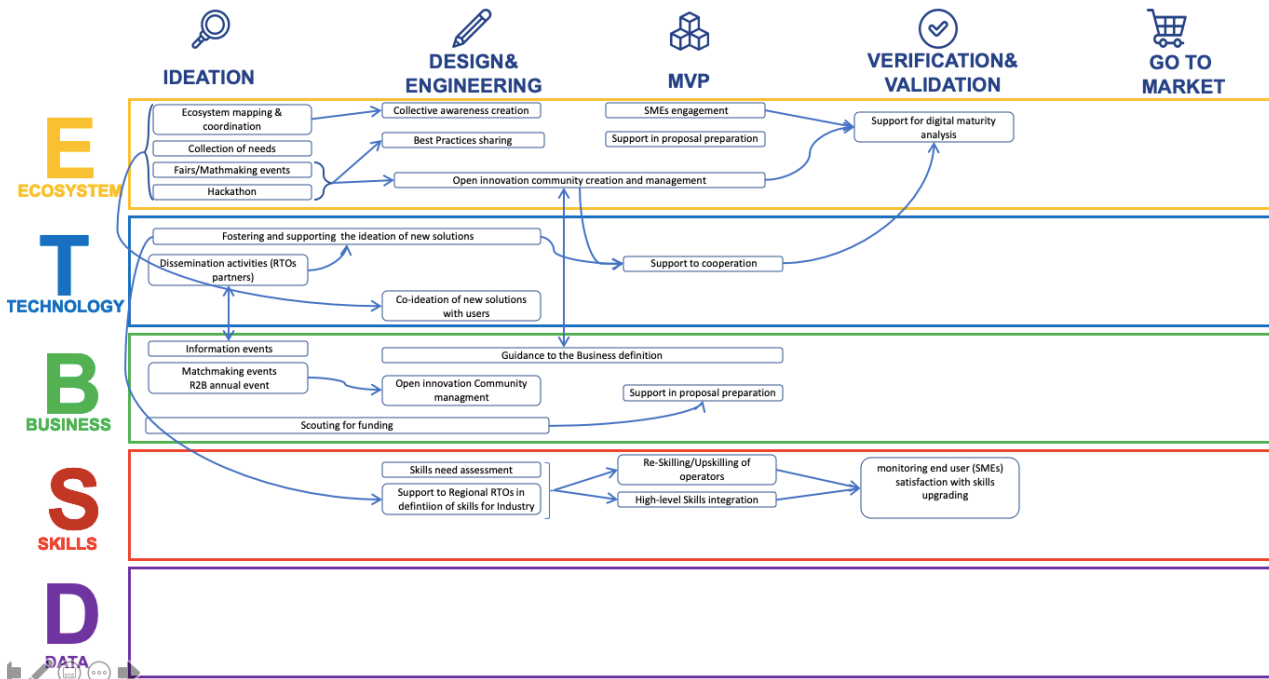


Figure 30 ART-ER service pipeline for technology provider

4.3 Students Customer Journeys Pipelines

Only two DIHs have students in their customer base, PRODUTECH and TAU. It's quite interesting to compare the different pipelines that have been elaborated by the two partners.

The first one offers only a small subset of services, during the first three steps of the journey:

1. The attempt of “engaging” students happens mainly by organizing workshops and events to share best practices (ecosystem services);
2. It is then followed by educational activities during the “learn” phase (skills services);
3. Finally, the DIH guarantees the access to the facilities to put in “practice” what was theoretically learnt (technology services).

Once the re-skilling and training services will be implemented, they will be provided to consolidate knowledge acquired during the “learn” phase.

CJ MATRIX- STUDENT

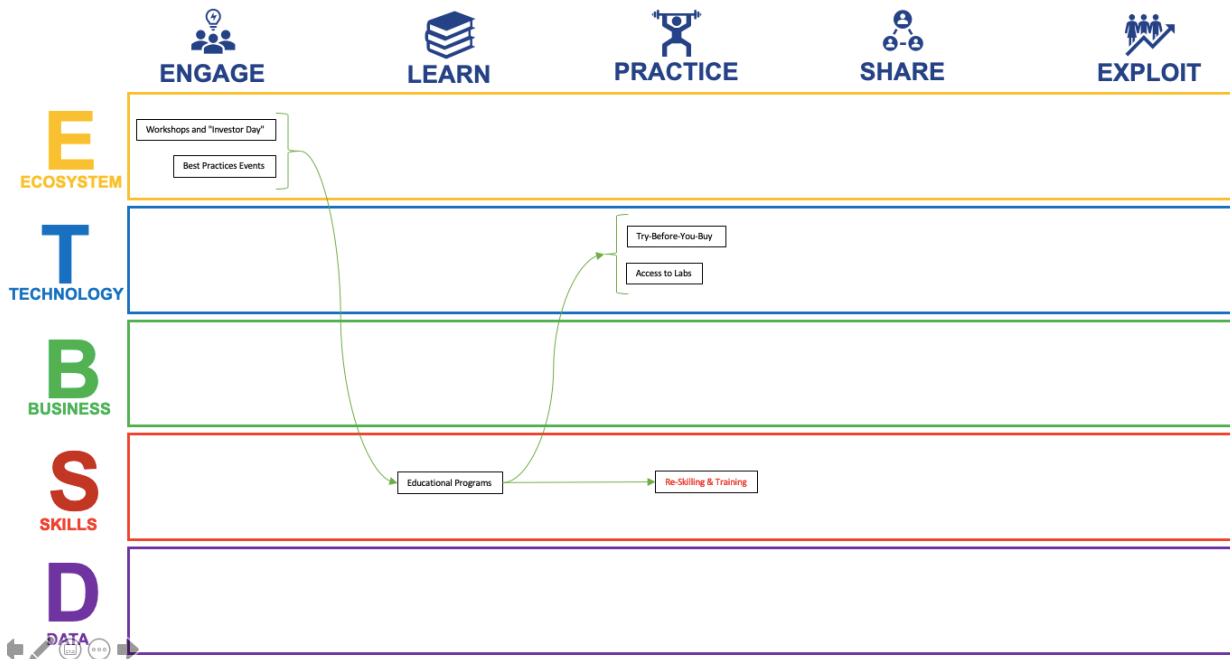


Figure 31 PRODUTECH service pipeline for student

On the other side, TAU has elaborated a more complex pipeline, encompassing all the 5 classes of services.

1. Step one starts, accordingly to previous example, during the “engage” phase characterized by dissemination activities, organizing lectures with industries and, once they will be implemented, by sharing publications deriving from trend analysis and by matchmaking different stakeholders with students. This set of services describes also the “learn” stage. “Practice” phase may be supported by a number of different steps:
 - a. Students have access to existing dataset and/or are allowed to generate new ones to develop solutions mainly related with AI. This activity runs till the fourth and fifth step. (Data services)
 - b. Alternatively, students will be provided (as soon as they will be available) with trainings and training materials (skills services), before having access to technical infrastructures (technology services);
 - c. Once the service will be available, during the “practice” stage students will be allowed to put in practice what has been learnt also collaborating with experts in business and/or industry sector (Ecosystem services), before having access to technical infrastructures (technology services).

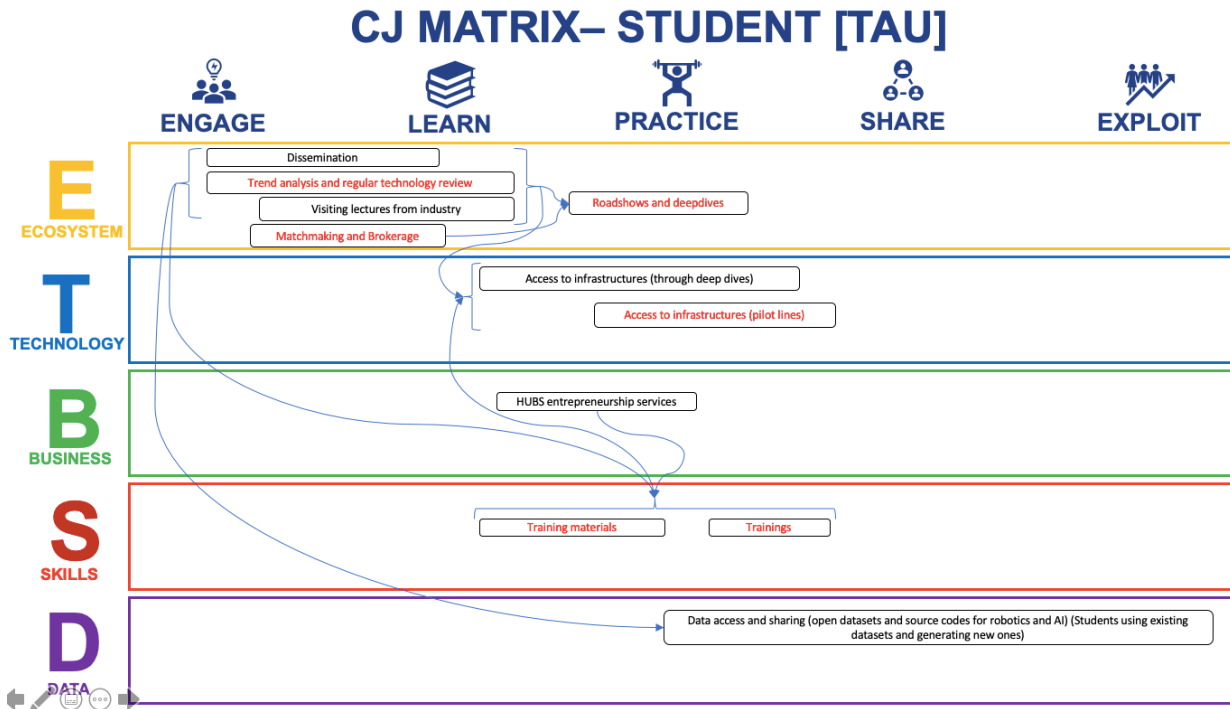


Figure 32 TAU service pipeline for student

4.4 Start-ups Customer Journeys Pipelines

Two Digital Innovation Hubs out of 13 have expressed their interest in the compilation of the start-up journey: AFIL and PRODUTECH.

Comparing the two pipelines, it is quite evident that the two DIHs intervene in different phases of the start-up journey:

- AFIL (Figure 33) is active during last stages, when the customer needs support to scale the solution to properly launch it in the market. The DIH provides a number of ecosystem and business services typical of the early stage of a technology provider journey, since the tech provider is conceptually the evolution of a start-up.
- PRODUTECH, that designed the pipeline specifically for customers looking for networking and investors (Figure 34), assists the start-ups from “ideation” to “validation”, offering a number of ecosystem and business services that analyse market trends and matchmaking services.

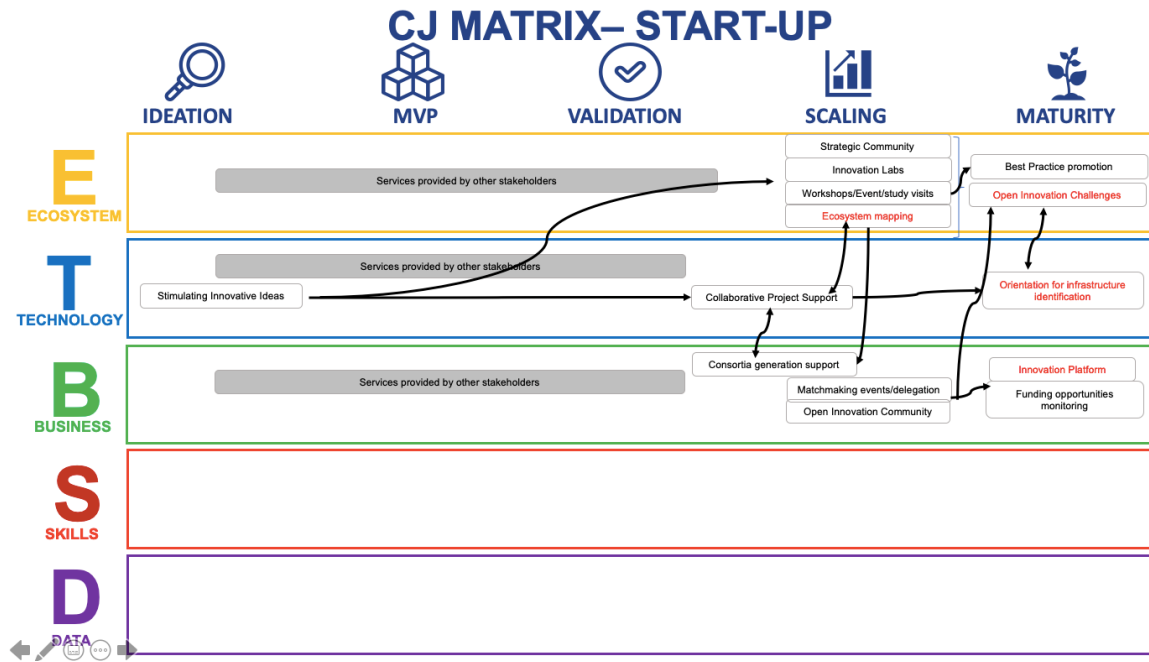


Figure 33 AFIL service pipeline for start-up

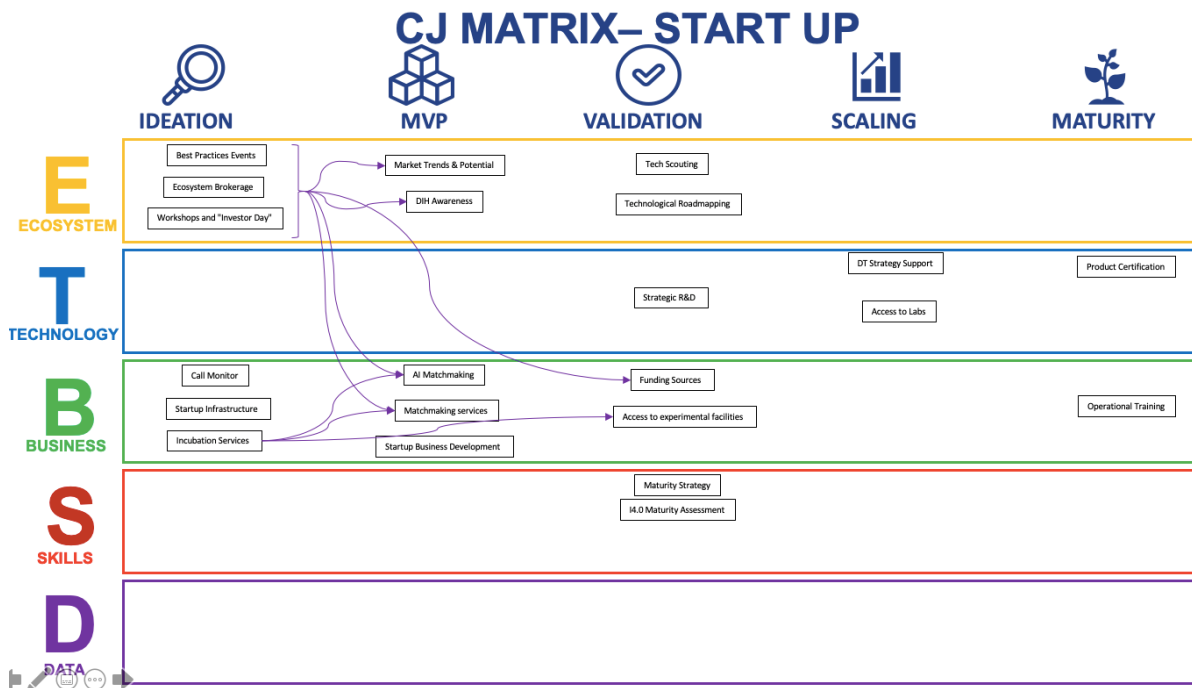


Figure 34 PRODUTECH service pipeline for start-up looking for networking and investors

4.5 Public Bodies Customer Journeys Pipelines

Five Digital Innovation Hubs out of 13 support public bodies during their journey. Here below you can find three examples, from COMET, UM and ACCIO/EUT.

Lot of services are ecosystem services since having access to communities that share their ideas it is fundamental for a public body working to define new regulations impacting people.

However, also providing access to data is considered of great importance and it is prerogative of hubs that own such competencies/facilities.

With a specific focus on policy makers dealing with AI regulation and governance that need to acquire more competences regarding the subject they are handling, DIHs offers training and courses about artificial intelligence.

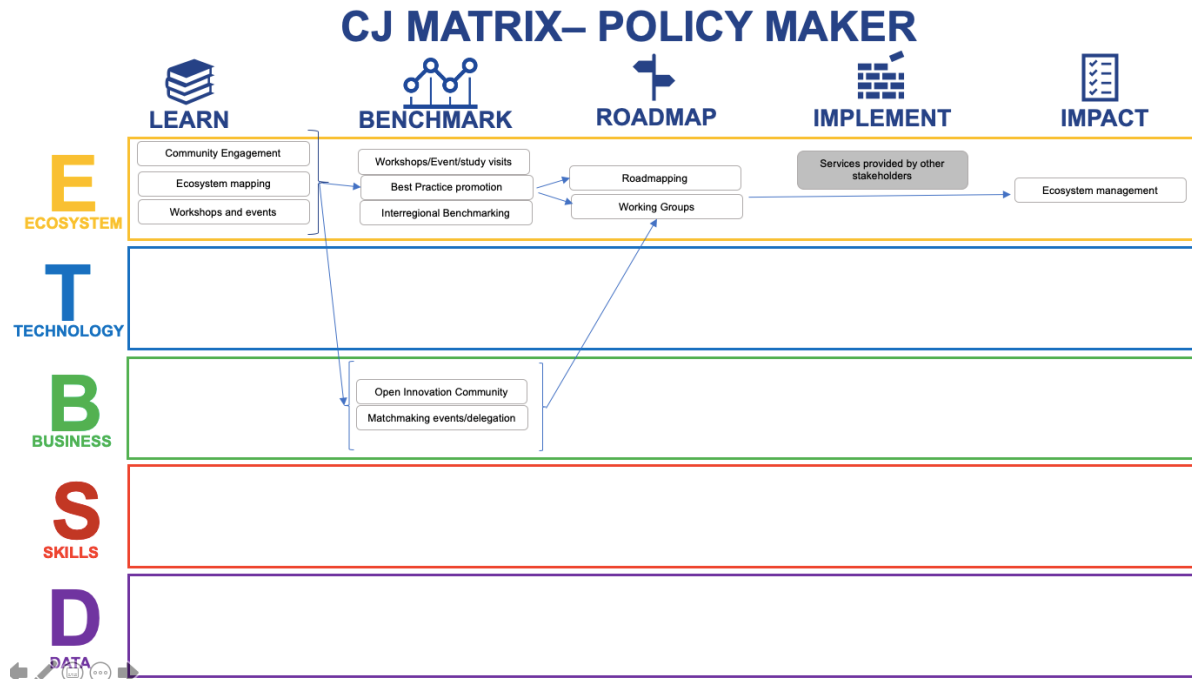


Figure 35 COMET service pipeline for policy maker

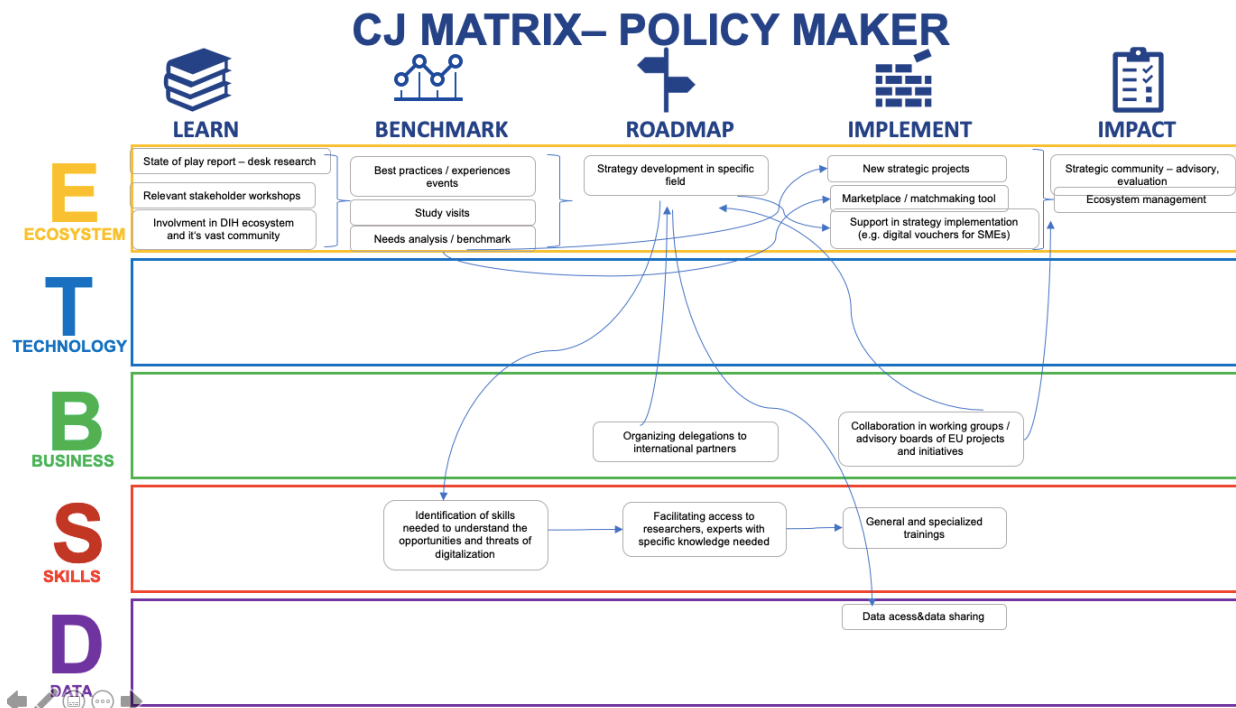


Figure 36 UM service pipeline for policy maker

CJ MATRIX– POLICY MAKER

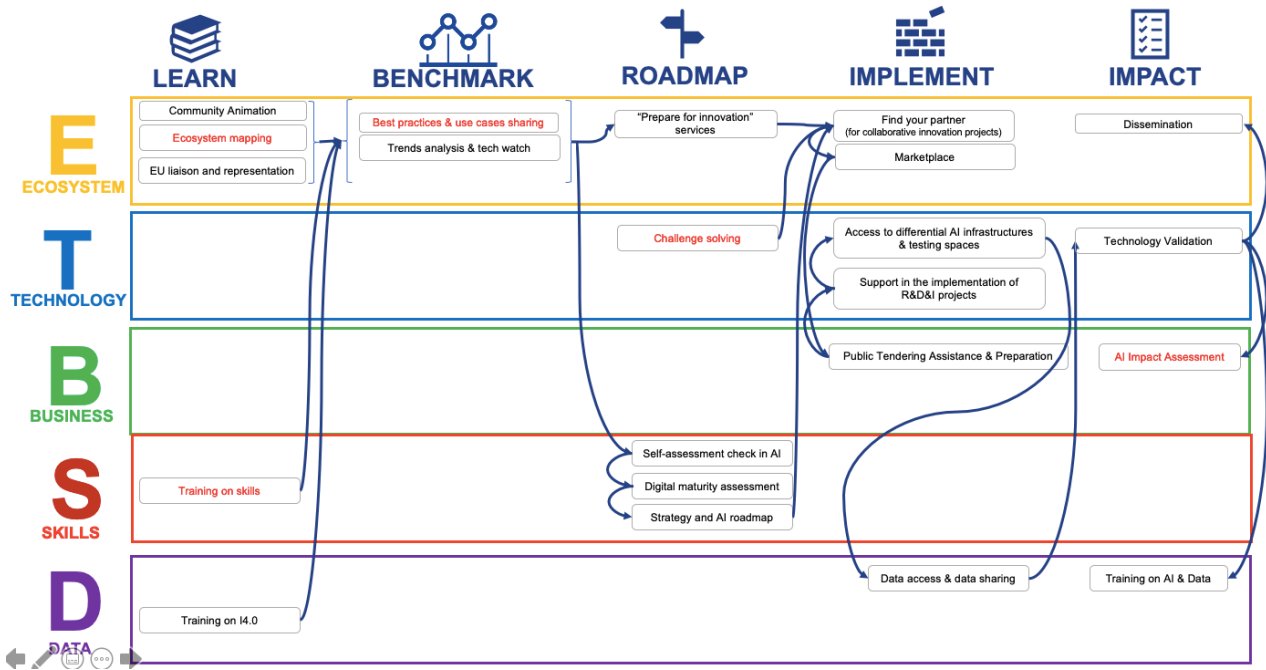


Figure 37 ACCIO/EUT service pipeline for policy maker

4.6 Experimenters Customer Journeys Pipelines

PRODUTECH is the only DIH of the consortium that expressed its interest for this type of customer. The pipeline of services provided is quite linear and can be summarized as follow:

- In a preliminary phase, when the experimenter is still evaluating if it is equipped with the right set of competences, facilities and features to win the call, the DIH intervenes by monitoring the call and keeping contact inside the consortium to gather updates and by organizing workshops to present the initiatives and consolidate the cluster.
- PRODUTECH supports the experimenter along the full journey, helping in the plan and strategy definition but also putting at disposal the digital technology labs (inside the DIH's competence centre) that have permanent technology demonstrators installed to be visited by companies. Moreover, the same competence centre offers also services of prototyping and solution validations/certification.
- The new Data services that PRODUTECH is planning to implement in next months will be offered during the "exploitation" phase: for instance, services for data management and modelling and information management, for data quality assurance, based on IDS standards and access to AI and optimization algorithms as a service.

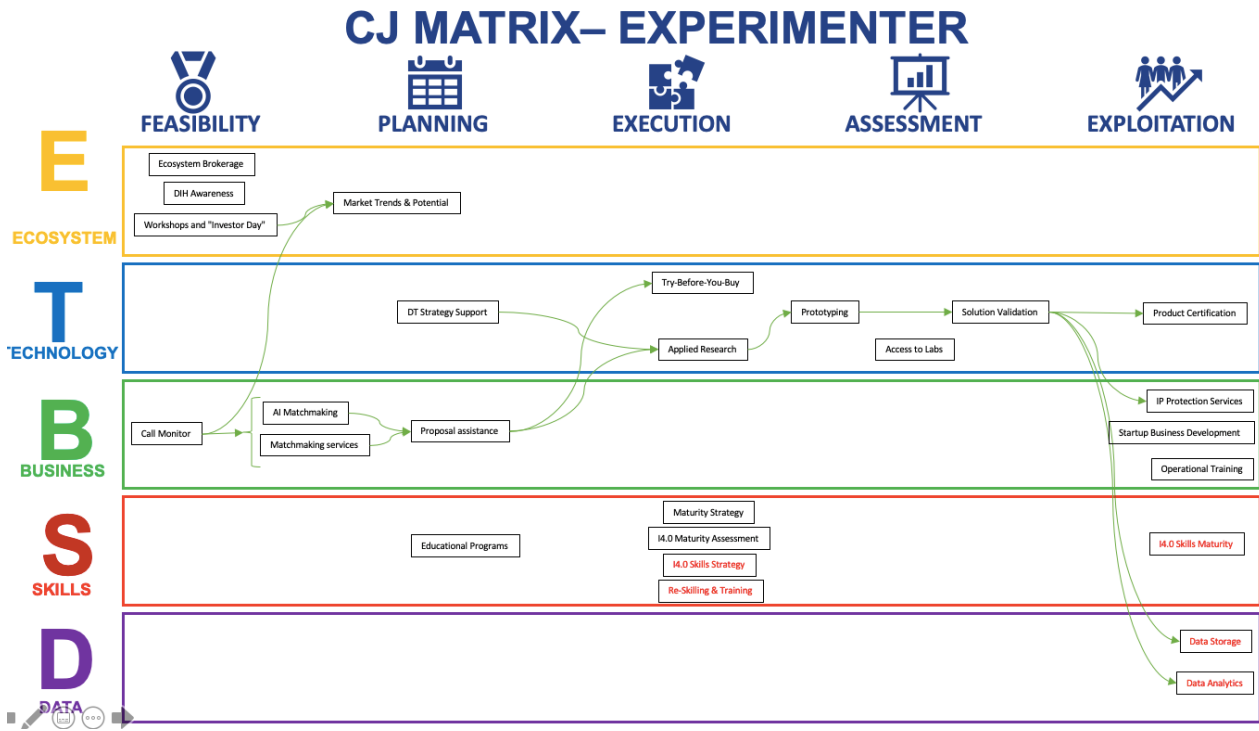


Figure 38 PRODUTECH service pipeline for Experimenters



5 Conclusion and Future Outlook

D3.1 offers a complete picture of AI REGIO DIHs ecosystem in terms of services provided and customer base analysis in order to be able to evaluate the different competencies and expertise that can be exploited both inside and outside the project.

As a result of implementation activities that will take place in other Tasks and work packages, the 13 Service Portfolios will be updated in next months and the same analysis run for D3.1, will be run again at month 27 and presented in D3.2.

The R class of services of DR BEST portfolio, that is, the set of activities that can be run remotely, was outlined and presented in D3.1 but it is still under validation and this is why results about remote services are missing in the current document.

In addition, the fourth pillar of METHODDIH methodology was not expected to be presented in D3.1: the Business Model analysis for DIHs will be described initially in D3.5 – “AI REGIO DIHs Business and Governance” and then finalized in its updated version, D3.6.

However, the current document contains the results of about 6 months of activities involving several partners: POLIMI as WP3 and WP3.1 leader, the 13 DIHs playing a central role and a number of other partners involved in WP3 tasks.

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 ability to coordinate at least 13 partners together.

In preparation to D3.2, the approach initially pursued to collect information will be improved, also thanks to the support of digital and online tools that will ease DIHs' compilation and backend analysis as well.