METHOdology for DIH: Adding the Remote Macro-Class to the D-BEST Reference Model

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Abstract

Digital Innovation Hubs (DIHs) support businesses in their digital transformation, providing technological, educational, and financial services, as part of a rich ecosystem of stakeholders. Being quite new-born organisations, the offering of DIHs very often doesn't follow a common standard pattern. To support DIHs' daily activities both with customers but also in cross-regional initiatives and to define a sustainable offering matching the customer needs, a structured suite of approaches (called METODIH and grounded on the well-known and widely adopted D-BEST reference model) is proposed. The approach provides four basics tools: service portfolio analysis, customer journey analysis, digital transformation pipelines, and business and governance models. In particular, the paper introduces the addition to the D-BEST model of the Remote macro-class in the artificial intelligence domain. As a result, the DR-BEST model, based on six macro-classes, is presented as an improved version of the D-BEST, i.e., the previous standard framework for classifying DIH service portfolios.

Keywords

Service portfolio, remote services, DIH, didactic factories

1. Introduction

To boost the digital transformation of European enterprises [1], Digital Innovation Hubs (DIHs) are playing a key role, by helping companies to become more competi-tive with regard to their business using digital technologies and by promoting cooper-ation among them [2]. The objective is to ensure that every company can take ad-vantage of digital opportunities, by providing them with a different set of services also depending on the assets and competences characterizing each DIH (access to technical solution and facilities, funding opportunities, support for training and skills development) [3]. The DIHs offering is not addressed only to enterprises (identified as possible technology users), but also to technology providers, students, and policy makers, by managing a network of stakeholders, enhancing collaborative projects [4].

To this regard MIDIH project [5] conducted a preliminary analysis about tools and methods required to support DIHs in shaping their offering according to the ecosys-tem requirements. The set of tools and techniques elaborated in MIDIH and grounded on the original Ecosystem-Technology-Business (ETB) model [6], was initially im-proved and validated in the DIH4CPS project, under the name of the Data-driven Business-Ecosystem-Skill-Technology (D-BEST) reference model [7–9]. The DIH4CPS project developed the D-BEST Suite composed of the framework to con-figure DIHs service portfolios, the method to analyse the DIHs' customer journeys and the coupling of the ECOGRAI method [10] with the D-BEST model to develop KPIs for cross-collaboration among

DIHs. Finally, in the AI REGIO project, the D-BEST Suite proposed by DIH4CPS evolved in the METHOdology for DIHs (METODIH) composed of four tools: service portfolio analysis, customer journey analysis, digital transformation pipelines, and business and governance models. METODIH was developed and tested by the network of 13 DIHs belonging to AI REGIO, who developed further components to better answer to the needs of a specific domain (i.e., the artificial intelligence (AI)). The most important novelty has been the addition to the five main macro-classes of services composing the D-BEST model of the Remote dimension. The paper has the aim of introducing both the METHODIH approach and the extended taxonomy of the DR-BEST reference model, which repre-sents a key tool to run the service portfolio analysis. Indeed, this paper aims at provid-ing a more detailed understanding of the Service Portfolio analysis, which represents the first step of the methodology and has been adopted both by AI REGIO's DIHs and Didactic Factories (DFs).

The paper is structured as follows. Section 2 presents the METHODIH approach and its four modules, and Section 3 shows the DR-BEST. Section 4 reveals the results of the DR-BEST model to the AI REGIO network and Section 5 concludes the paper.

2. METHODIH approach

Paragraph METHODIH is a METHOdology for DIHs defined within AI REGIO project [11], aiming at supporting DIHs with a structured approach, providing four basic tools to define a sustainable offering matching their customer base needs:

- the Service Portfolio Analysis, to configure DIHs service portfolio according to a common framework, to facilitate DIHs collaboration and to stimulate the definition of new services to get an extensive portfolio,
- the Customer Journey analysis is proposed to understand typical needs, ex-pectations and interaction workflows by the various ecosystem stakeholders. Customizable templates for six different customer types (Technology Pro-vider, Technology User, Student, Policy Maker, Start-up, Experimenter) are provided, consisting in five-steps journeys that describe the main stages of the digital transformation process. A fundamental step in this analysis is the identification of blocking points where DIH should support the customer.
- the Digital Transformation Pipelines: to combine the demand (customer needs) with the offering (service portfolio), and to define in a structured way the customer interaction with the DIH and the steps to be pursued to imple-ment the evolutionary pathway and overcome blocking points. The temporal component is a fundamental aspect in a definition of service pipelines. If tai-lored on specific customers' profiles, pipelines are transformed in success stories to reinforce the catalogue of best practices to be followed.
- the Business and Governance Model: to guide the DIH in the definition of a model to describe its business, that takes into account the complexity of a its customer base and a multi-stakeholder network, including sustainability for cross-regional activities. One specific dimension is the Governance, that takes into account the complexity of the collaborative DIH's activities.

3. The DR-BEST Reference Model

The Service Portfolio analysis is performed by the DIH starting from a structured approach proposed, called DR-BEST analysis. The framework has been conceived for the DIHs, to define their as-is service portfolio and to identify in their offering the gaps to be filled. Services are classified according to a 3-levels taxonomy and this has a twofold advantage: on one side it shows a full picture of the possible services that a hub could provide and on the other, it guarantees that services are presented in a standard and comprehensible way. The macro-classification (level 1 of the taxonomy) groups services in six different classes (Data, Remote, Business, Ecosystem, Skills, Technology), from where the name DR-BEST comes; for each class, level 2 and level 3 are defined to better detail and classify the type of activity. In AI REGIO, the first version of taxonomy adopted was the D-BEST (without the "R"), as previously com-ing from MIDIH and DIH4CPS projects results [7, 8].

Then, to better describe the DFs offering (that typically have a more technological approach with respect to DIHs) and in response to increasing need of remote support (mainly related to the Covid-19 restrictions), the D-BEST service taxonomy has been enriched, including also the "R" class of services and becoming DR-BEST. The DR-BEST catalogue (Figure 1) con-tains in total 69 different services as level 3, distributed over the six classes.
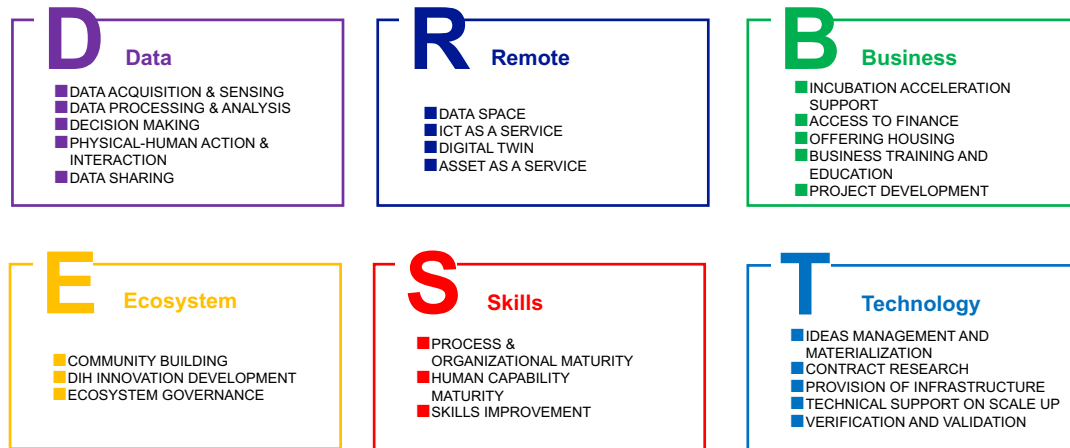

Figure 1: DR-BEST taxonomy - level 1 and 2

While a complete overview of the five macro-classes typically composing the D-BEST model is provided in [7–9], this paper wants to present the Remote dimen-sion, introduced mainly for the DFs operating in the AI domain. This class contains all the services that a DIH/DF may provide from remote to enable experimentation and that don't require the physical interaction with the customer. The sub-classes identified cover different degrees of DF-customer interaction, including four type of assets that can be put at disposal: data space (Real Time Industrial Data Platform, Assets Administration Shell, Assets Data Marketplace), ICT as a Service (Software as a Service, Platform as a Service, Infrastructure as a Service), Digital Twin (FEM/CFD/FSI simulation, Discrete event simulation, Ambient virtualization), Assets as a Service (Teleoperation, Monitoring platform, Avatar).

4. Results in AI REGIO project

The AI REGIO Ecosystem is based on a Network of 13 DIHs and 10 DFs and the purpose is to extend it within the end of the project. Both DIHs and DFs have been invited to compile their own Service Portfolio, leveraging on the DR-BEST model, with a threefold objective: i) to reason about their offering describing it according to a standard framework; ii) to identify strengths, weaknesses and areas to be enhanced, just by evaluating the gaps of their Portfolio; iii) to foster collaboration with other DIHs, comparing the Portfolios and sharing competences. Having at disposal the DIHs Portfolios of services, described according to a common pattern, has allowed to populate the AI REGIO portal [11], conceived as a collaborative platform to over-come the fragmentation of regional actors and to make their offer more visible and coherent. Figures 2 and 3 are extracted from the AI REGIO portal – Service Market-place, showing respectively the Service Portfolio of the DIHs Network and DFs Net-work, according to the DR-BEST taxonomy.
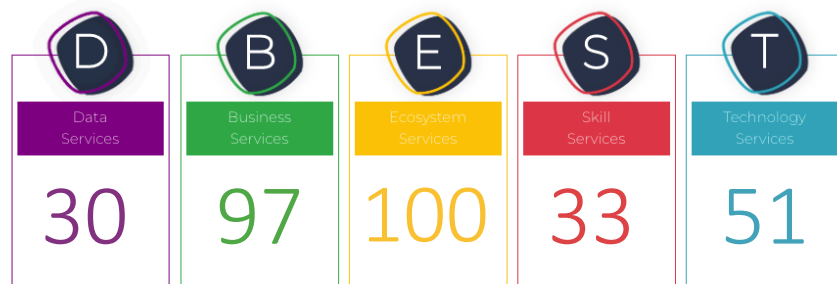
Figure 2: The AI REGIO Network of DIHs Service Portfolio

The DIH Network provides a total of 311 services, whose 30% is covered by Eco-system services; Business and Ecosystem offering cover together the 63% of the Port-folio denoting the strong attitude of DIHs in brokerage and financing activities and in Community management and organization of dissemination and promotion events.
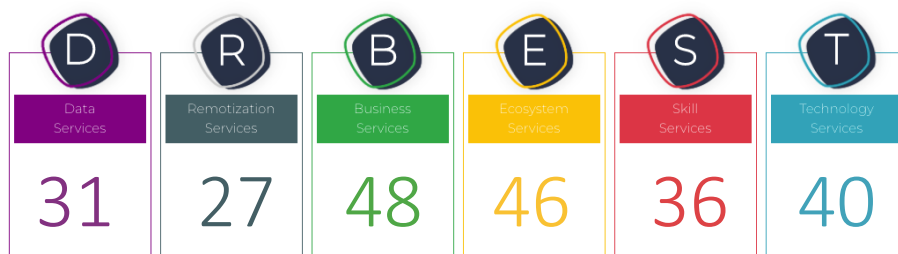
Figure 3: The AI REGIO Network of DFs Service Portfolio

On the other side, DFs present a different profile: even if Business and Ecosystem services still represent a large portion of the Portfolio, they together cover only the 40% of the total number of services, with a predominant percentage of educational and technical offering. Actually, by definition, a DF has a didactic component (that is, Skill related) and it is a Factory (that is, equipped with a facility where it is possible to test new technological solutions).

5. Conclusions

The paper provides an overview of the METHODIH framework with a specific fo-cus on the Service Portfolio analysis, which is the first step for DIHs willing to follow the methodology. It presents a concrete application inside the AI REGIO ecosystem, involving both Digital Innovation Hubs and Didactic Factories, having the opportuni-ty of describing their current portfolio in a structured way as well as starting reason-ing on Remote offering (that is getting more a more relevant in last years).

Finally, the DR-BEST analysis allows the DIHs/DFs to define their own profile in the perspective of collaborative activities: in the context of the paper the analysis has been shown only at Network level to provide a general picture of the two communi-ties; however, at single DIH level, the Service Portfolio analysis is very useful to put in light which are the strongest areas of competence and those to be better improved, outlining the DIH profile.

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