EOSC Future

D8.5

Digital Innovation Hub Final Results and Sustainability Plan

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D8.5 / Digital Innovation Hub Final Results and Sustainability Plan

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Abstract

This document covers the final report of activities of the EOSC Digital Innovation Hub (EOSC DIH) including the monitoring and evaluation system and the sutainability plan.

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List of Abbreviations

Acronym	Definition
DIH	Digital Innovation Hub
DMA	Digital Maturity Assessment
EC	European Commission
EDIH	European Digital Innovation Hub
SLA	Service Level Agreement
OLA	Operation Level Agreement
EOSC	European Open Science Cloud
KER	Key Exploitable Result
TRL	Technology Readiness Level
USP	Unique Selling Point
ERDF	European Regional Development Fund
CRL	Customer Readiness Level
BRL	Business Readiness Level
IRL	Intellectual property Readiness Level
FRL	Funding Readiness Level
HRL	Human resource Readiness Level
KPI	Key Performance Indicator

1 Executive Summary

1.1 Main achievements

The European Open Science Cloud Digital Innovation Hub (EOSC DIH) has been created as the main channel for collaboration between EOSC and the private sector (start-ups, SMEs and large companies). The EC funded EOSC-Hub project provided with initial funds to establish an operational EOSC DIH while the EOSC Future project has been instrumental in maturing the processes and services, validating the value received by private sector and impact generated. During EOSC Future, EOSC DIH has been very successful in scaling its operations with a wider community and increasing the service offer, professionalizing its many processes and in introducing new mechanisms for monitoring and validation. Overall, the EOSC DIH has successfully consolidated in its role of acting as a bridge between EOSC and private sector.

The EOSC DIH aims to ***Enable Innovation with SMEs and Industry through Procurement of Commercial Services and EOSC Digital Innovation Hub***. The EOSC DIH was expected to provide direct support of business pilots with commercial market players, targeted at start-ups and SMEs to attract prospective commercial entities as users and data or service providers to the EOSC. The objective was to directly provide a variety of EOSC resources along with dedicated expertise and support as well as conduct joint development activities to stimulate innovation and increase digitisation. Two pillars serve as the foundation for these EOSC DIH's general objectives. The first pillar focuses on helping the EU private sector in becoming more competitive and digitalized, with a particular emphasis on SME integration and active engagement in the EOSC DIH community as well as private sector adoption of cutting-edge EOSC services such as HPC computing or AI. The second pillar entails the strengthened position of EOSC as a catalyst for novel and disruptive ideas. These pillars can be translated into two main categories of activities: EOSC collaboration with industry in the demand side, supporting business pilots and companies to grow; and in the supply side, where the private sector plays the role of co-development agent for enhancing the EOSC service offer to the research community.

On the demand side, with the collaboration with nine EOSC related projects, EOSC DIH provided a wide range of services for pilots to help them test and validate new concepts to develop innovative products and services. 29 organizations were engaged via different engagement channels with an additional 15 companies receiving direct assistance from consulting activities. Through these 27 pilots have been established and even without the direct funding unavailable to the pilots, 22 out of the 27 pilots completed their activities successfully with several of them increasing the TRL levels of their respective products and services. For the five pilots that are still ongoing, EOSC DIH facilitated the negotiation with providers and other projects for continued support after September 2023.

On the supply side, EOSC DIH along with the company awarded through tender process co-developed a solution for the Poznan University of Life Science (phenological research). The overall activity was quite successful with solution developed resulting in an innovative commercial service onboarded in the marketplace. Additionally, the knowledge and experience gained during this procurement activity will be extremely useful in similar future activities.

Another important component of the EOSC DIH is its community, which has grown significantly during the project. Numerous businesses joined the community and actively participated in community meetings, events, training, webinars, and other networking opportunities. Along with growing partnerships and engagement with EOSC-related projects, multipliers, and other DIHs and EDIHs, the database of experts in many fields has been significantly widened.

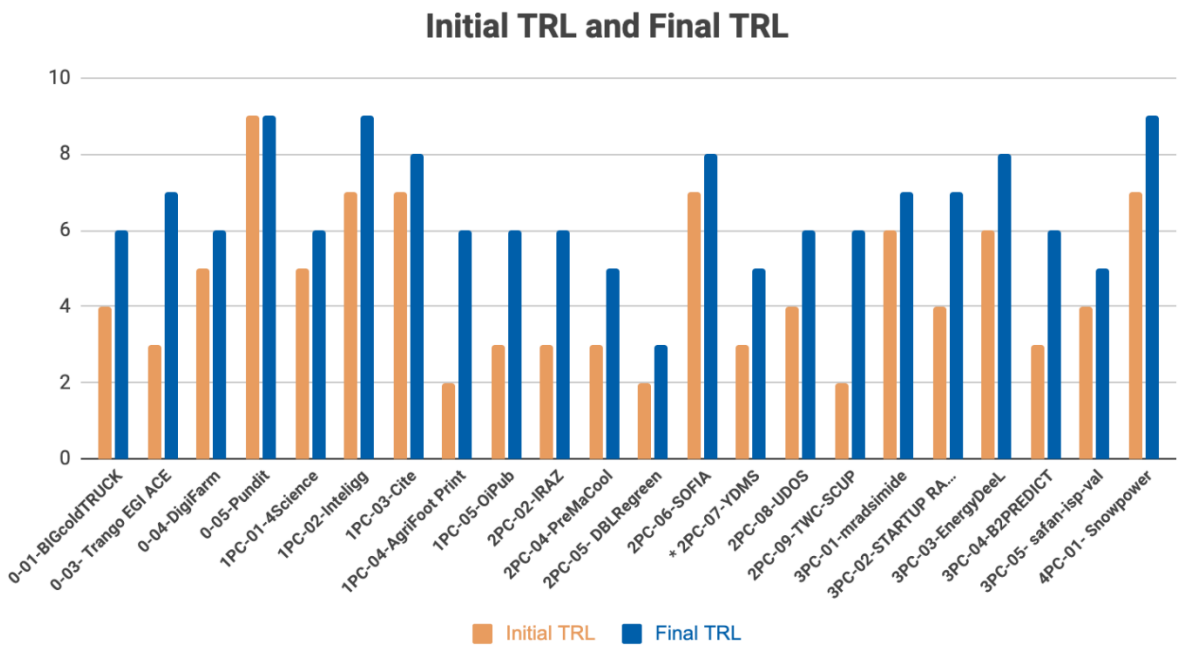
The EOSC DIH's long-term strategy is to continue to evolve as a channel to both exploit the EOSC resources and to enrich the EOSC portfolio with resources from private sector. The sustainability analysis performed considers multiple options to sustain the EOSC DIH in the long term, presenting different operational and revenue models. A final decision will be made after taking into consideration the feedback provided by the pilots and impact assessment interviews to be carried out during the project extension, as well as the agreements in terms of ownership of assets that will be discussed in the upcoming months. An update on these matters will be provided in the enhanced version of this document to be provided in March 2024

1.2 EOSC DIH in numbers

1.3 Impact on the business pilots

The EOSC DIH played a key role in supporting pilots across various domains with a substantial increase in their Technology Readiness Level (TRL). Most pilots experienced 1-2 level increase in their TRL, reflecting the tangible progress made under the guidance and assistance of EOSC DIH.

Although the increase of TRL could be associated to multiple factors and not only to the role played by the EOSC DIH, the technical expertise, the infrastructure and resources, the collaboration opportunities and the assistance for accessing funding and grants provided by the EOSC DIH certainly contributed to these achievements as it has been recognized in some of the satisfaction interviews that took place with those pilots who finished during this period. As some of the pilots have not been interviewed yet, an update on the impact including detailed information about the satisfaction and impact assessment will be provided in the update of this deliverable in March 2024.



To further evaluate the impact of EOSC DIH services, the monitoring and evaluation team is also conducting pilot's digital maturity assessment (DMA). This assessment will reveal the specific areas in which enterprises had already invested in digitalisation and areas where they initiated investments after the piloting. It will also highlight the measures adopted both before and after the piloting to foster digitalisation. The results from the DMA will be available in March 2024. Preliminary trends based on the first set of carried out DMAs, suggest a positive impact from DIH operations and offered services to the digital maturity attributes of SMEs.

2 Background and Objectives

2.1 DIH concept

According to the European Commission, Digital Innovation Hubs (DIHs) are one-stop shops that help companies become more competitive regarding their business/production processes, products or services using digital technologies. DIHs provide access to technical expertise and experimentation, so that companies can "test before invest". They also provide innovation services, such as financing advice, training and skills development that are needed for a successful digital transformation.

European Digital Innovation Hub (EDIH) was a label created by the European Commission to reinforce those Digital Innovation Hubs with regional focus and following the smart specialization of the regions that would receive financial support. Following the adoption of the Digital Europe Programme work programme (DIGITAL)[1], the first restricted call for EDIHs was completed with 136 projects selected to become operational during 2023. The list of all the DIH and EDIH are collected under the EC DIH Catalogue.

2.2 Starting point

The EOSC DIH was created in 2018 during the EOSC hub project and was marketed as the mechanism for business organisations (e.g., start-ups, SMEs, large enterprises) to directly engage the European Open Science Cloud (EOSC). The long-term strategy of the DIH was to live beyond the life of the project and to be the single, future mechanism for industry to engage with the EOSC. Therefore, the DIH was branded as the EOSC DIH with all online and promotional material reflecting this decision: dedicated service offers; package of EOSC DIH logos; own URL (eosc-dih.eu) and social media accounts (Twitter; LinkedIn); brochures; posters; reusable slide decks; video; entry to the EC DIH Catalogue, etc. The following table shows the main assets that have been achieved in both projects.

Table 2-1: Before and after comparative table of EOSC DIH

EOSC hub	EOSC Future
Creation of branding (logo, URL, slides, video…)	Maintain
Launching of website and social media profiles	Evolve with new content
Publication in DIH catalogue	Maintain
Publication of training materials	Evolve with new training materials
Success story publication 2019 and 2021	Success story publication 2023
Definition of roles and procedures	Evolve with new EF partners and new activities
Open Call for pilots	Adaptation to Business Pilot engagement campaigns with webinars
Creation of a community with companies (~50), collaborators, DIHs, service providers.	Consolidated in a database and enhanced with new contacts, including companies from multipliers (~700) and domain experts.
Value proposition and SWOT analysis	Evolved
Preliminary sustainability analysis	Evolved
-	Design and implementation of a monitoring framework
-	Tender process documentation and templates

Under the EOSC Future project, the EOSC DIH matured and contributed to the expected impact from the INFRAEOSC-03 call: *"Build an agile EOSC and increase the uptake of its services by public and private sectors stakeholders, across Europe, exploiting solutions and technologies for the benefit of all areas of economy and society."* The outcome of the EOSC DIH also supports the EOSC SRIA by widening the EOSC user base targeting the private sector.

[1] Digital Europe Programme work programme (DIGITAL)

2.3 Objectives

The EOSC DIH under EOSC Future project covered the ***General Objective 5: Enable Innovation with SMEs and Industry through Procurement of Commercial Services and EOSC Digital Innovation Hub***. The EOSC DIH was expected to provide direct support of business pilots with commercial market players, targeted at start-ups and SMEs to attract prospective commercial entities as users and data or service providers to the EOSC. The objective was to directly provide a variety of EOSC Resources along with dedicated expertise and support as well as conduct joint development activities to stimulate innovation and increase digitisation. Particularly the specific objectives associated to the General Objective 5 are:

- 5.1 Select, prioritise, and procure relevant services from the commercial sector to deliver missing functionalities.
- 5.2 Provide dedicated support to SMEs and industry.
- 5.3 Promote participation of the commercial sector in EOSC to increase the supply and demand sides.

The EOSC DIH activities have been supported under WP8, where the engagement with the private sector was facilitated by two mechanisms: the EOSC DIH (T8.2) and the Commercial cloud services procurement (T8.1). The EOSC DIH was oriented to engage with industry in the demand side via the support of business pilots (mainly run by SMEs, start-ups, and spin-offs), and in the supply side, but only for specific cases that required the co-development of solutions for covering research communities' needs. T8.1 looked into the provision mechanisms of commercial cloud services that are readily available on the market.

The following schema represents the distinction of the work under the WP8.

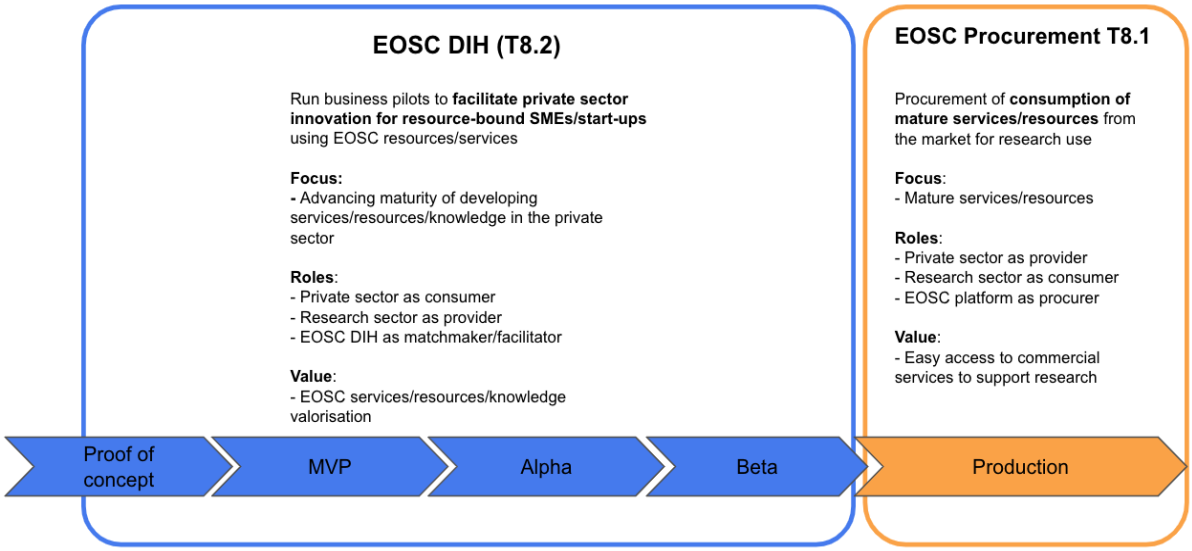


Figure 2.1: EOSC Future T8.2 vs T8.1

Considering the General Objectives of the EOSC Future project and the overview of the WP8, the following table summarises the objectives and actions specifically defined for the EOSC DIH as they were defined in the D8.4 (M6).

Table 2-2: General and Specific objectives and Actions

General Objectives	Specific objectives	Actions
O1. Manage an effective and sustainable EOSC DIH	O1.1 Achieve effective management of the EOSC DIH operation	A.1.1 Define roles and responsibilities for the EOSC DIH team. A1.2 Define clear procedures and rules for the EOSC DIH operation and activities. A1.3 Define the timeline for main activities and supervise deliverables and milestones. A1.4 Monitor human and technical resources allocation and usage. A1.5 Set up and maintenance of collaborative tools (mailing lists, repositories). A1.6 Organise and conduct regular management team meetings.
	O1.2 Coordinate external communication and community building mechanisms to sustainably engage with Industry stakeholders (customers)	A1.7 Maintain the EOSC DIH website and social media channels and enlarge their user base. A1.8 Generate and disseminate communication material to target groups. A1.9 Organize and attend events /conferences and industry related fairs. A1.10 Analyse sustainability models and engage with EOSC Governance
O2. Expand EOSC with Added-value Services	O2.1 Attract new private sector services into EOSC to further grow it with innovative tools and services	A2.1 Explore industry services of EOSC DIH community or other industry opportunities to be onboarded or integrated in the EOSC. A2.2 Conduct the appropriate purchasing mechanism to onboard innovative services enhancing the EOSC and EOSC DIH
	O2.2 Promote the EOSC services with potential exploitation in Industry through the EOSC DIH.	A2.3 Conduct regular meetings and establish clear mechanisms with WP5 to identify and define the exploitation paths of EOSC services through the EOSC DIH.
O3. Integrate EOSC in the pan- European DIH network	O3.1 Increase the EOSC DIH offer with external capacities from regional/ national DIH and innovative projects.	A3.1 Develop partnerships for integrating external technical offers into the EOSC DIH, and into the EOSC Marketplace when appropriate.
	O3.2 Exploit the EOSC DIH offer	A3.2 Identify and define strategic synergies with external multipliers as potential users of the EOSC DIH offer and EOSC exploitable results. A3.3 Participate in European networks and alliances as well as actively contribute to events and conferences (International, National, and regional level).
O4. SME integration in the EOSC DIH community	O4.1 Involve companies in the EOSC DIH	A4.1 Run campaigns for business pilots. A4.2 Evaluation of candidates according to the EOSC DIH strategy and the service offer.
	O4.2 Mature mechanisms to ensure support for pilots	A4.3 Analyse technical requirements and fulfil the specific agreements to cover them (SLA/OLA).
O5. Successful adoption of innovative EOSC services by industry pilots	O5.1 Support Business pilots	A5.1 Develop detailed work plans including objectives, milestones, KPIs, IPR and exploitation plans. A5.2 Provision and enable access to the requested EOSC services. A5.3 Provide first-level support and monitoring progress. A5.4 Support the SMEs with the process of onboarding of services into EOSC Exchange.
O6. Contribute to generate added	O6.1 Increase the impact of the pilots	A6.1Define pre-commercial agreements for continued business relationships.

value to the digital market		A6.2 Help SMEs to identify market/business opportunities and assess opportunities for further innovation (i.e. direct support, project innovation management activities).
O7. Establish a quality framework to ensure continuous improvement of EOSC DIH	O7.1 Design the EOSC DIH monitoring and evaluation (M&E) system.	A7.1 Refine the EOSC DIH objectives tree and intervention logic. A7.2 Define the indicators framework and KPIs.
	O7.2 Implement the EOSC DIH M&E system.	A7.3 Ongoing monitoring of the EOSC DIH operations. A7.4 Conduct the EOSC DIH final evaluation.

3 EOSC DIH Operations

3.1 General Management

The general management of the EOSC DIH covers the **General Objective *O1: Manage an effective and sustainable EOSC DIH***. The overall EOSC DIH planning and resource management of the EOSC DIH were conducted, with regular communication with the subtask representatives. Scheduling and means for the regular EOSC DIH meetings in a bi-weekly fashion were provided, with agendas and materials provided in advance via Indico.

Also, regular meetings have been taken place with the WP8 leader for managing deviations or additional resources needed. Reporting and review meetings and rehearsals were conducted in collaboration with WP leader. This alignment with the WP8 leader (and project coordinator, and project officer when requested) were also focused on general outcomes of the WP8, KPIs achievement, project roadmap or extension discussions.

A special remark must be considered for the financial discussion during 2022 for the consumption of the 60ok EUR budget initially allocated for the support of SMEs both in the demand and supply side, that requested several legal interventions and in-depth analysis.

3.2 Supply side: Enriching EOSC

This activity covers the **General Objective *O2: Expand EOSC with Added value services*,** exploring business services of EOSC DIH community or other private sector opportunities to be onboarded or integrated in the EOSC.

3.2.1 Purchase of services

The purchase of innovative services from the private sector contributes to enhance the service offer with *ad hoc* valuable services for researchers. However, the process is challenging due to the complexity on the legal framework for the purchase. Therefore, the activities carried out here were considered as a test for the purchasing mechanism.

An initial budget of EUR 60oK was available for the purchase of services. Due to the complexity of the process, it was decided that only a maximum of 3 services could be purchased. The following sections describe the process for the purchase: the demand analysis, the procurement, the co-development phase as well as the description of the wining use case and one case study that having started discussions for the purchase, finally decided not to enter into the process.

Demand analysis

In Autumn 2021, a collection of requirements from research communities started with a joint survey in collaboration with T8.1. Preliminary feedback was very generic with no many specific needs that could be covered via a purchase process for dedicated development.

During spring and summer 2022 further work was required to go in depth in the demand analysis with direct discussions with research communities. T8.2 contacted clusters and participated in a WP6 meeting to present the EOSC DIH and the initiative to collect feedback for research needs. A template was shared to collect basic info from applicants, the problem to solve, the description of the tool requested, the use case scenario, where the community find the problem, where they expect to find the solution, the description of user group, the importance of the too, constraints and considerations, and the estimated cost of the tool.

In total 3 requests were selected:

- A toolset based on modern natural language processing techniques that allow for automatic extraction and processing of information from the GCN Circulars and Astronomers Telegrams, from the FINCA at Turku University, Turku
- An automation and efficient application of ML tools in time series analysis of images from phenological imaging of: 1) crop plants, their vegetative or generative parts, in order to predict their yield under climate change conditions; 2) ecosystems towards the analysis of key species development during the growing season in the context of carbon and water balance studies in order to describe quantitatively and qualitatively the impact of climate change on ecosystem functioning, from the Poznan University of Life Sciences (PULS).
- A data annotation tool to improve the quality and optimization of the annotation process in Machine Learning for the European plant phenotyping community (EMHASIS)

After further discussions with the 3 candidates only PULS community expressed interest and full commitment to enter in a co-development phase via a tender process with the EOSC DIH and run by EGI Foundation. Therefore, PULS community was selected and T1.5 was informed for the approval of the process.

Procurement process

The EOSC DIH launched a procedure for the purchase of a "*Software services for image analysis in phenological research with implementation, licensing, support and maintenance*" for the Poznan University of Life Sciences (PULS). The tender as published via the EGI website (the contractor) with all the tender documentation (Contract notice, invitation letter, Tender specifications, Template Service Contract) and templates needed for the application: Cover Letter, Identification, Power of Attorney, Declaration of honour, Economical and financial capacity, List of previous projects, Commitment letter, Technical Offer and Financial offer.

The tender process was widely distributed via EOSC DIH, EOSC Future channels as well as partners' channels.

In total 3 bids were received and after the evaluation process, the application from the company SETH software in Poland was selected in March 2023 with a financial offer of 149.899 EUR. The list of tenderers, the minutes from the evaluation committee, the technical evaluation report, the financial evaluation, and the resolution of the tender are also available in the tender page.

Co-development

From April 2023 to August 2023, the solution was co-developed by the company with the collaboration of PULS and the supervising and coordination of the EOSC DIH, and finally onboarded into the EOSC Marketplace in September 2023.

A second solution was explored during Q2 2023 to be onboarded into the Marketplace as Open-Source: RSpace, an electronic lab notebook and sample management system that was already part of the EOSC DIH business pilots. However, the purchase contract was not a suitable mechanism for

the company, as a more collaborative environment was required, and more time requested to better evaluate the best Open-Source scenario and business model to follow.

The awareded solution: PULS use case

The solution developed by SETH software is a web based open-source application called AI4PHENO, available at the EOSC Marketplace. The heart of the problem relies in the domain of Phenology - a discipline studying vegetation's temporal changes. Traditionally, it targets seasonal events such as budding, fruiting, flowering, and ageing. Due to the influence of both environmental factors and human activities on plant developmental stages, this science yields invaluable insights into the state of our landscape's vegetation cover. Such data proves pivotal especially in the context of climate change, where progressive shifts challenge the health and occurrence of plant species.

While various methods exist to detect phenological stages, there remains a void in the market for open tools aiding in the collection and analysis of digital phenological imagery using machine learning (ML) techniques. The proposed tool intended to fill this gap by offering an automated, efficient means to apply ML in time series image analyses of vegetation impacted by climate changes.

With AI4Pheno users will be endowed with a comprehensive IT solution. This integrated platform will not only streamline the processes of image acquisition, storage, and analysis but also offer scalability to accommodate further research areas like landscape analysis or crop yield forecasting.

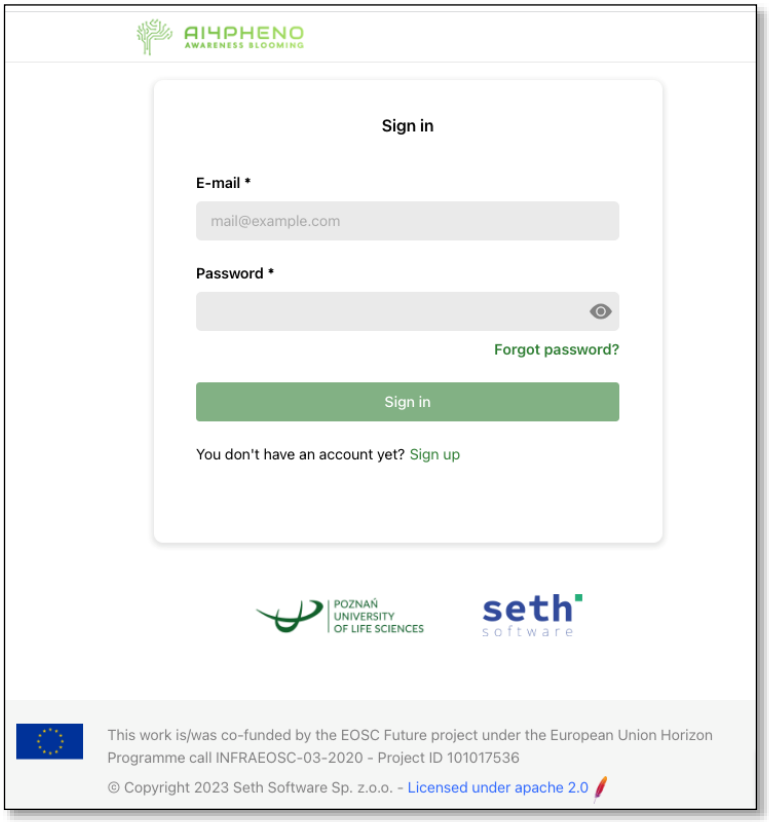


Figure 3.1: AI4Pheno web application

Further information about the AI4Pheno solution:

- AI4Pheno app: https://ai4pheno.seth.software/
- AI4Pheno at EOSC Marketplace: https://marketplace.eosc-portal.eu/services/ai4pheno?return_path=search%2Fall&search_params=q%3Dai4pheno
- AI4Pheno Source Code (Apache 2.0 license) at GitHub: https://github.com/EOSC-AI4PHENO/AI4PhenoEOSC

- AI4Pheno User Manual: https://eosc-dih.eu/eosc-dih-success-story-ai4pheno/

Study case: Rspace

A second solution was explored during Q2 2023 to be onboarded into the Marketplace as Open-Source: RSpace, an electronic lab notebook and sample management system that was already part of the EOSC DIH business pilots. However, the purchase contract was not a suitable mechanism for the company, as a more collaborative environment was required, and more time requested to better evaluate the best Open-Source scenario and business model to follow.

3.2.2 Pilots onboarding services into the EOSC MP

Among all the pilots from the EOSC DIH, several services were identified by the T8.2 members and by the pilots their selves to have potential interest for the research community and therefore they were invited to bring their services into the EOSC Marketplace:

- **Pundit**: cloud service that allows users to "take notes" on web documents, like a web page or a PDF file. It consists of a set of components, amongst them the Annotator, a free extension for the Google Chrome browser used by users to create the annotations.
  - Status: Onboarded https://marketplace.eosc-portal.eu/services/eosc.net7.pundit

- **OiPub**: A Digital Platform for Enhanced Discovery & Discussion of Research
  - Status: Under discussion

- **RSpace**: a digital research platform that includes a fully featured electronic lab notebook integrated with a sample management system.
  - Status: Under discussion to be onboarded

- **DigiFarm**: AI enhanced EO data for digital farming and forestry
  - Status: Started onboarding process 2022 but cancelled

- **S-LABS:** An energy management solution
  - **Status:** Started onboarding process in September 2023

The role of the EOSC DIH has been on supporting them on the validation process as service provider as well as during the validation of the service.

3.3 Demand Side: Supporting Business Pilots

The onboarding and support to business pilots covers the EOSC DIH **General Objective *O4: SME integration in the EOSC DIH community*** and ***O5: Successful adoption of innovative EOSC service by industry pilots.*** For this purpose, business entities have been engaged, evaluated their proposals, and technically supported via Business pilots.

The services offered to the business pilots are those provided by the EOSC INFRAEOSC 07 projects (EGI ACE, DICE, Reliance, OpenAIRE Nexus and C-SCALE). The full list of services can be found here https://eosc-dih.eu/list-of-all-services/.

Initially, 25 pilots were expected to be engaged via the use of 600K budget allocated under T1.5 (24K EUR per pilot) under Other Direct Costs (Art.10). However, the use of this budget for the stimulation of the EOSC services adoption was not possible and after financial and legal discussions, the budget was allocated only for the purchase of services as described in section 3.2.

With no direct funding to support business pilots, the endeavour to promote the consumption of EOSC Services by the private sector seemed very challenging. However, a business pilot engagement strategy was key for a successful private sector engagement.

3.3.1 Business pilot engagement

The goal of the business pilot engagement was to onboard businesses developing innovative solutions and – with EOSC technologies and services – help them bring products and services to market. The EOSC DIH has considered 3 ways of engagement:

1. **Via the EOSC DIH community**: The contact with the EOSC DIH community was possible at any time. A total of 5 pilots engaged with the EOSC DIH during 2021 and after an initial collection of requirements they started the onboarding process.

2. **Via pilot campaigns**: the EOSC DIH launch specific cut-off dates for promoting the participation of companies. EOSC DIH run 4 Pilot Campaigns during the EOSC Future project period. Applicants were able to select services provided by EOSC Future, C-SCALE, EGI-ACE, OpenAIRE-Nexus, DICE and Reliance.
   - April 2020: https://eosc-dih.eu/results-open-call/
   - December 2021: https://eosc-dih.eu/eosc-dih-onboards-4-new-pilots/
   - October 2022: https://eosc-dih.eu/results-from-the-3rd-eosc-dih-call-for-pilots/
   - December 2022: https://eosc-dih.eu/eosc-dih-4th-and-final-expression-of-interest-for-business-pilots/

   Further description of the promotion of the campaigns and evaluation process is described in section 3.3.2.

3. **Via a multiplier subcontracted**: As agreed in the DoA, PSNC run the subcontracting of a company to widen the outreach ang engagement with the private sector. The partner PSNC ran a process for subcontracting a multiplier according the DoA. As a public sector entity in Poland, PSNC was obliged to select a subcontractor in accordance with the applicable procedure, through a tender. The application determines the requirements and time needed to complete individual parts. The tasks included informing 500 well selected and targeted entities (that can be potentially interested in EOSC services) from SME-specific sectors about the EOSC DIH initiative and offer, engaging the companies and encouraging them to join the EOSC DIH community (with the goal of including 40 companies to the EOSC DIH community) and to encourage the companies to define common pilot with EOSC DIH. The contractor, FundingBox, was selected and, after signing the contract, it performed the commissioned work in two stages, both completed within the time specified in the contract provisions. Thanks to further collaboration with multiplier additional 4 pilots has been defined, and over 40 companies joined the EOSC DIH community.

In total, 29 pilots were selected via pilot campaigns, direct contacts from the community or via the subcontracting that is aligned with the initial expectations at the beginning of the project.

3.3.2 Pilot campaigns

Communication

Pilot campaigns were communicated with the support of the partners websites (example[2]) and social media channels, and were accompanied by a dedicated webinar, allowing potential candidates to

[2] https://eoscfuture.eu/newsfuture/eoi-for-dih-business-pilots-3rd-round/

discover the possibilities and ask questions (example of a recording and slide can be found here[3]). The application form was available via the EOSC Future website.

Evaluation

The evaluation of pilots Expression of Interest received were conducted in a systematic way, with the assignment of experts on the services requested as evaluators. Each business pilots had between 3 and 7 evaluators (depending on the number of services requested), each of them providing their own evaluation in 4 different categories:

Table 3-1: Evaluation guidelines for the business pilot campaigns

C1. Overall Quality of the Pilot Application (0,00 to 10,00) - Threshold is 6,00	
Is the concept of the pilot well described and aligned within the framework of the EOSC DIH?	
Novelty of the pilot	Is the pilot novel and is information provided to support this?
Relevance of the objectives	Are the objectives well described, achievable and measurable?
Process to achieve objectives	Is a methodology (or similar) provided to demonstrate how the objectives will be achieved?
Capacity/Experience/Knowledge	Does the applicant/ consortium adequately describe their capacity/experience/knowledge to implement the pilot?
C2. EOSC Services (0,00 to 10,00) - Threshold is 6,00	
Selection of services	Does the application justify how each of the services selected will be used in the pilot to achieve its objectives and proposed objectives.
Complementarity of services	Are the services selected complementary to each other?
Services	Is the benefit of the EOSC services requested clear?
Alignment with EOSC	Does the applicant/ consortium adequately describe commitment to the objectives of the EOSC DIH?
Sector	Is the sector from the list provided or at least relevant
C3. Result (0,00 to 10,00) - Threshold is 6,00	
Pilot outcomes	Is information provided regarding the expected outcomes?
Exploitation of results	Does the pilot describe the steps that will be taken to exploit the results achieved?
Dissemination of results	Does the pilot describe how it will disseminate results, including specific dissemination activities?
Timeline	Is the timeline reasonable for the expected milestones to achieve?
C4. Impact (0,00 to 10,00) - Threshold is 6,00	
TRL	Is the initial TRL of the product/service and the expected final TRL to achieve defined?
Socio economic	Does the pilot propose a significant socio-economic impact?
Market potential	Does the pilot describe its market potential (i.e. possibility of taking the results to market) and impact of results at the European level?

[3] https://eosc-dih.eu/expression-of-interest/

3.3.3 Pilot summary

The following table shows the basic information about the business pilots (name, sector, country, descriptions, the EOSC services used, the status and the impact assessed as TRL increase). Further description of each pilot is provided in Annex 1: EOSC DIH Business Pilots and available at EOSC DIH website.

Table 3-2: EOSC DIH Business pilots

	Pilot	Sector	Country	Description	Technical Services	Status
	Pilots from Community contacts					
1	BigColdTrucks	Logistics	Spain	Big data analytics for cold chain logistics optimization in refrigerated trucks.	Deep Cloud Platform	Finished
2	Trango	Mobility	Spain	Best location for car sharing	EGI-ACE: Computing, Storage, Data management	Finished
3	MICADO	IT	Germany	Cloud and Container Orchestrator	EGI-ACE Computing	Finished
4	DigiFarm	Agriculture	Norway	Detecting the world's highest accuracy field boundaries to power precision agriculture	EGI-ACE Computing	Finished, onboarding cancelled
5	Pundit	Open Science	Italy	A web annotation tool for researchers to empower note taking.	EGI-ACE Computing	Finished and onboarded
	Pilots from 1st Pilot Campaign					
6	CITE	Open Science	Greece	Offering in-place access to millions of Open Science Research Products, at a glimpse.	OpenAIRE Graph, login, explore EGI-ACE Computing, Cloud Container Compute	Finished
7	4SCIENCE	Open Science	Italy	OpenAIRE ELD-Enrich Local Data via the OpenAIRE Graph – ADVANCE	OpenAIRE Research Graph, broker	Finished
8	Intellig	Energy	Greece	integrAted iNtelligent thErmostat SYStem.	EGI-ACE Computing, OpenAIRE amnesia	Finished
9	Agrifootprint	Agriculture	Ukraine	Cloud model for Carbon Footprint assessment in crop growing and agri food value chains.	EGI-ACE Computing, EGI Online storage, EC3 OpenAIRE Research Graph, Zenodo, Amnesia, OpenAIRE monitor, OpenAIRE broker	Finished
10	OiPub	Open Science	Malta	A Digital Platform for Enhanced Discovery & Discussion of Research	EOSC DIH Testing and proof of concept EGI-ACE: Computing OpenAIRE: Research Graph, Explore, OpenCitations, ScholExplorer	Finished, onboarding in progress
	Pilots from 2nd Pilot Campaign					
11	GTFO HPC	Energy	Netherlands	Earth optimised HPC workload at the edge	EGI-ACE Computing,	Cancelled
12	IRAZ	Open Science	UK	Integration of RSpace ELN with Argos and Zenodo	OpenAIRE: Argos, Zenodo	Finished

13	LongTermData	Open Science	Finland		DICE: B2SAFE	Cancelled
14	PreMaCOOL	Energy	Greece	AI For Predictive Maintenance In Commercial Refrigeration Unit Systems	OpenAIRE: Explore, ARGOS EGI ACE: Notebook, AI4EOSC Deep training facility B2SHARE	Finished
15	Regreen	Energy	Italy	Creating an AI based solution to identify the most promising sites for an efficient co-generation of removable energy	EGI online storage OpenAIRE Zenodo Reliance Adam Platform	Finished
16	SOFIA DSS	Financial	Greece	A Decision Support System to Automate the Innovation Scoring Process in the Financial Sector	EGI DataHub, OpenAIRE Zenodo, ARGOS Reliance Enrichment API	Finished
17	YDMS	Energy	Italy	Yuppies Data Management System for Smart Building Analysis	EOSC DIH proof of concetp DICE: B2SAFE	Finished
17	UDOS	Real state	Austria	Urban Dynamics Observation Service	C-SCALE: Copernicus – eoSC AnaLytics Engine FedEarthData:	Finished
18	TWC-SCUP	Forestry	Germany	Integrated management tools for forestry operations and owners	C-SCALE: FedEarthData	Finished
	Pilots from 3rd Pilot Campaign					
19	MRADSIMIDE	Radiation	Italy	Matter RADiation interactions SIMulations and Innovative radiation Detectors development	EGI Cloud Computing Reliance: ROHub, API	Finished
20	Start-up Radar	Business	Spain	Bringing AI to corporate innovation and facilitating internal team communication around innovation scouting and monitoring	OpenAIRE Graph, Monitor	Finished
21	EnergyDEEL	Energy	Portugal	Deep Learning Model for Energy Time Series in Local Communities	EGI ACE Computing OpenAIRE: Amnesia, ARGOS	Finished
22	B2Predict	Mobility	Italy	Transferring technological solutions to e-bike producers and renters to achieve predictive maintenance through AI and ML	EGI ACE: computing, online Storage	Finished
23	SAFAN	Health		Validation and comparison with other technologies of the SAFAN-ISP technology for in silico profiling of small molecules and peptides.	DICE: Computing, Porting of code	Finished

	Pilots from 4th Pilot Campaign					
24	Snowpower	Energy	Italy	Climate Forecast for Hydropower Generation	C-SCALE FEDEarthData	Finished
	Pilots via multiplier (Fundingbox)					
25	Granoole	Agriculture	Poland	Marketplace B2B for agriculture	PSNC Support and consultancy	Ongoing
26	sLABS	Energy	Poland	Home energy management solution	Consultancy and Support for onboarding EOSC MP	Ongoing, onboarding in progress
27	MIFood	Agriculture	Poland	Robot for agriculture harvesting	AI4EOSC Training service PSNC Cloud resources	Ongoing
28	PHIX	Culture	Romania	Psychosocial risk assessment platform-technical feasibility of digital twin	Consultancy	Ongoing
29	AWARE	Dron	Greece	Aero Waste Assessment with the use of Robotics Equipment	DEEP training service	Ongoing

3.3.4 Technical Support and Service Provider Management

With the goal of ensuring smooth operations for the end-users of the services offered by the project, a technical support framework has been put in place and this paragraph highlights the iterative process of managing service providers, resource provisioning, and addressing any challenges encountered during the project lifecycle.

1. **Collection of requirements**: the initial phase involved interactions with the SMEs to gain insights into their initial technical needs and expectations, identify the specific requirements and do a matchmaking with the EOSC services when needed. Through comprehensive requirements gathering, the EOSC DIH aimed to define clear service specifications that would guide the technical team in selecting suitable EOSC service providers. Possible improvements: more in-depth description and documentation of the services, to streamline the requirements collection process and better set the initial expectations.

2. **Service provider selection and negotiation**: following the collection of requirements, the EOSC DIH support team had to identify potential service providers among the EOSC business-oriented service offer. For this selection process, a thorough evaluation and negotiations may be necessary in case of multiple service providers, to ensure alignment with pilots' needs and the resource availability of the service provider. Key factors considered during this phase included service reliability, availability of resources (quantitatively and qualitatively), provider localization, and service certifications.

3. **Service Level Agreement (SLA) preparation**: the EOSC DIH team also dedicated significant attention to the formulation of a robust Service Level Agreement (SLA) which encompasses the services provided to the pilots. The SLA based on the EGI services template was crafted to define the precise parameters, expectations, and responsibilities governing the relationship between our project and the selected service providers. It outlined key performance indicators, response times for issue resolution and provisions for escalations in case of critical incidents.

4. **Documentation and information sharing**: once SLAs are finalized, the next step involves sharing pertinent information and documentation with the users to streamline the access and usage of the service. Clear and concise documentation was prepared to guide users on the proper utilization of the services and during the project it has been improved to address in advance the most common requests.

5. **Ongoing support and issue resolution**: the pilots had access to the direct support of technical experts via instant messaging service and email. This encompassed addressing any specific needs that were not covered by the initial documentation. Technical support played a pivotal role in promptly resolving any issues that arose during the project and their responsiveness and expertise were instrumental in ensuring a seamless user experience and minimizing disruptions.

6. **Resource provisioning re-negotiation**: for some pilots, it became evident that resource requirements could evolve from the initial estimation, particularly with the utilization time of the service which was often underestimated. To accommodate changing needs, the EOSC DIH engaged in re-negotiations with service providers to ensure that, if possible, the required resources were available when needed.

7. **Provider migration**: in specific use cases, it became necessary to consider migrating from one service provider to another, especially in the cloud provision services. This decision was

triggered by concerns related to the storage performance of the cloud environment which initially was not evidenced as a sensible metric during the requirement collection process.

3.4 Monitoring And Evaluation

The monitoring and evaluation address the EOSC DIH ***General Objective 07: Establish a quality framework to ensure continuous improvement of EOSC DIH***.

The Impact Assessment and Exploitation main achievements are related to the design and implementation of the monitoring framework for the internal assessment of the pilots and the overall DIH impact. This task has worked for the submission of the "M&E framework Inception Note" setting up the background for the EOSC DIH framework in terms of policy context, key objectives, and features of the EOSC DIH. It also defines the intervention logic, the monitoring framework, and related indicators and KPIs. Interviews were conducted with other DIHs (HPC Poland, Aragon DIH and Basque DIH) to better understand the value and benefits stemming from the collaboration with the EOSC DIH, the perceived added value of the EOSC DIH compared to other existing networks and initiatives, and the criteria and indicators used by other DIHs to assess their activities.

A monitoring and evaluation (M&E) system has been designed and implemented to ensure a regular assessment and ongoing improvement of the EOSC DIH operations, in line with its specific objectives. To track the progress of the EOSC DIH activities, the study team relies on three main data collections tools, namely (1) periodic monitoring, (2) conducting interviews with pilots that finished their piloting, and (3) administering a Digital Maturity Questionnaire around 3 months after the pilot has finished its piloting.

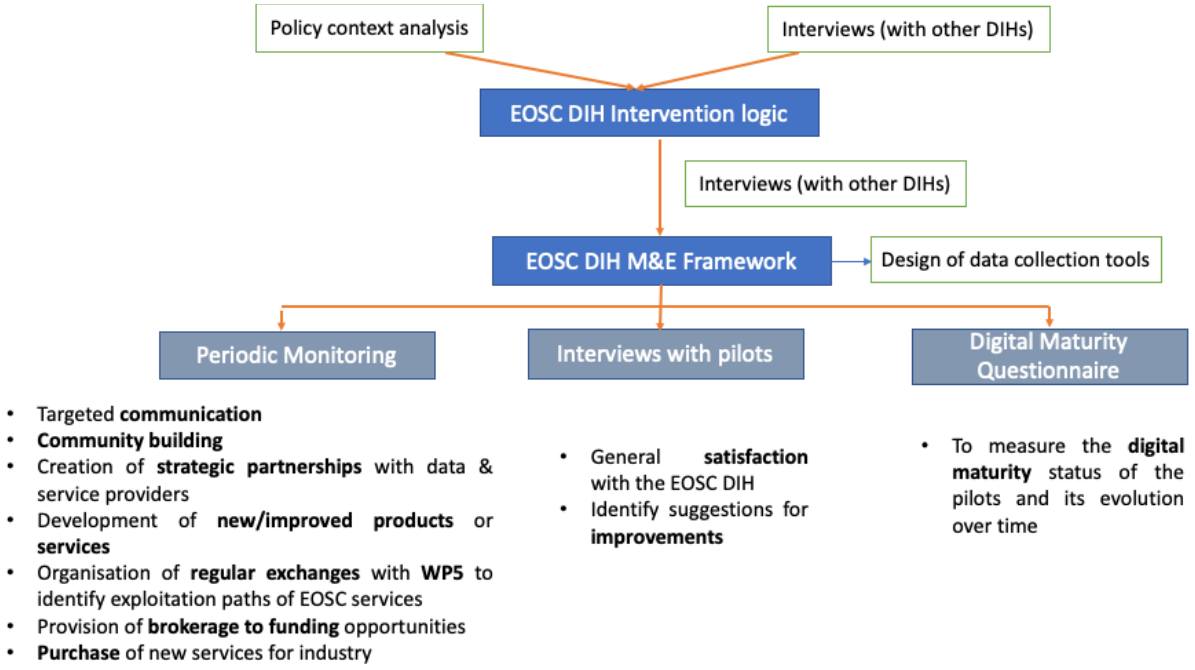


Figure 3.2: EOSC DIH Monitoring and evaluation framework

3.4.1 Periodic Monitoring

Three monitoring reports were produced based on the ongoing monthly monitoring of activities and context. The Monitoring Reports present the data collected from the completed Monitoring Templates, which are collected every two months by the EOSC DIH team with the purpose to gather information about the progress in the implementation of the EOSC DIH activities. It is important to highlight that while the data collected for all activities came from the completed monitoring

templates, the data linked to the first activity (targeted communication) was retrieved from Twitter analytics, LinkedIn analytics, the YouTube channel, as well as the Jetpack application from the EOSC DIH WordPress. The timing of the Monitoring Reports is aligned with the project periodic reports to ensure that monitoring data is available for each project review.

Several meetings between the M&E team and the EOSC DIH were established to ensure a good understanding of the indicators selected and the optimal quality and accuracy of the information collected. The monitoring reports were delivered in June 2022, October 2022, and May 2023. A summary with the main outcomes of these internal monitoring reports are included in Annex 5: Annual Reports.

In the last quarter of the EOSC Future project timeline, the activities of the EOSC DIH M&E team will focus on the integrated analysis of the data collected during the project timeframe and the drafting of the EOSC DIH evaluation report. The delivery of the EOSC DIH evaluation report is foreseen for March 2024.

Table 3-3: M&E Reporting activities

Reporting activity	Timeframe
First Monitoring Report	June 2022
Second Monitoring Report	October 2022
Third Monitoring Report	May 2023
Evaluation Report	March 2024

3.4.2 Interviews with pilots

The Pilot Interview guidelines (See Annex 3: Interview guidelines EOSC DIH – Pilots) have been defined, and an interview with each pilot is planned at the end of the piloting process. The aim is to better understand the pilot's general satisfaction with the EOSC DIH and the services offered (such as the technical and experimentation services, consultancy and trainings, commercialisation services). Additionally, the interviews seek to assess the value-added stemming from the piloting (in terms of changes in the pilots' innovation capabilities, financial and economics returns, as well as change in their technological readiness levels) and identify suggestions from improvements.

The interview guidelines also include a follow-up section to check whether the pilots would be interested to get involved for a second time in similar initiatives supporting SMEs. Pilots are also asked whether they would be willing, if they were to participate again to the EOSC DIH, in contributing financially or cover some of the cost of the support received. Pilots are offered the opportunity to select different funding models, such as a fixed or variable "service fee", a success fee, equity participation, or any other option. The data collected from the pilots will feed directly into the sustainability analysis.

3.4.3 Digital Maturity Questionnaire

The Task has also designed the **Digital Maturity Questionnaire** (adapted from the EC Digital Maturity Tool)[4] (See

[4] https://digital-strategy.ec.europa.eu/en/events/digital-maturity-tool-and-innovation-radar

Annex 4: Digital maturity Tool). This simplified questionnaire consists of 8 questions and is administered to each pilot around 3 months after the end of their piloting. The aim of this Digital Maturity Questionnaire is to measure the digital maturity status of the pilots and its evolution over time (by comparing its status before and after the EOSC DIH intervention). The rationale behind the creation of this tool is that measuring the digital maturity status of an enterprise and its evolution over time will provide an **indication of the effectiveness and longer-term impact of EOSC DIH**. This questionnaire could also provide practical feedback to EC services about the EC Digital Maturity Tool concept and methodology.

3.4.4 KPIs

The table below describes the progress of the EOSC DIH to reach its KPIs. The KPIs listed were identified from Deliverable 8.4. The baseline is based on the results from the EOSC-hub project (end of March 2021). The EOSC DIH consider two checkpoints during the project, the first one is in M18 of the project (September 2022) and at the end of project in M30 (September 2023).

The EOSC DIH has created a centralised database to collect input from the EOSC DIH community. The database collects information about pilots, mentoring experts, SMEs informed, multipliers and DIHs contacted as well as formal partnerships established. This database was key to report on the progress in reaching KPIs as presented in Table 3-4.

Table 3-4: Progress to reach KPIs (as agreed in the Deliverable 8.4)

KPIs	Baseline April 2021*	Target Sep 2022**	Performance Sep. 2022**	Performance Sep. 2023**	Target Sep. 2023 (final)**
Number of directly informed SMEs and innovators	30	150	**218**	**770**	200
Number of strategic DIH partnerships with multipliers and added value service providers	8	12	**18**	29	15
Number of EOSC-related project collaborations	4	6	**6**	9	8
Number of industry events and direct participation in industry events	12	20	24	34	25
Number of regional DIHs connected	2	6	**5**	10	10
Number of individual SMEs directly supported by EOSC DIH (i.e., business pilots)	24	40	**43**	72	60
Number of services offered in EOSC Marketplace, thanks to DIH	4	6	6	**6+1 *** **	8

Notes:
* Start of the EOSC DIH activities
** Takes into account the performance of EOSC Hub (baseline) + EOSC DIH activities in EOSC-Future
*** Onboarding of 1 pilot is in progress
EOSC DIH has exceeded or met the final target set for its KPI.
EOSC DIH is on a good track to reach the final target set for its KPI for M36
EOSC DIH needs to deploy additional efforts to reach the final target set for its KPI.

3.5 Communication and Dissemination

Communication and dissemination follow the ***O1. Manage an effective and sustainable EOSC DIH*** to coordinate external communication and community building mechanisms for the industry and stakeholders' engagement.

3.5.1 Dissemination networks

The main communication channels of the project are the EOSC DIH website, LinkedIn and Twitter account, and the YouTube channel.

- Website: https://eosc-dih.eu/
- LinkedIn: https://www.linkedin.com/company/65002258/admin/feed/posts/
- Twitter: https://twitter.com/eosc_dih?lang=en
- YouTube: https://www.youtube.com/channel/UCVpibRCw78boNZypApALDpA

In addition, the supporting projects and partners, such as EOSC Future, OpenAIRE, EGI-ACE, DICE, C-Scale, and Reliance amplified EOSC DIH messages via their own social media channels, websites and newsletters.

3.5.2 Social media Statistics[5]

- LinkedIn: 300 followers, average engagement rate: 7.5%, 205 shares, 9K impressions
- Twitter: 810 followers, average engagement rate 0.15%[6]. Overall: more than 30K impressions
- YouTube with webinar recordings and demonstrations, 283 views

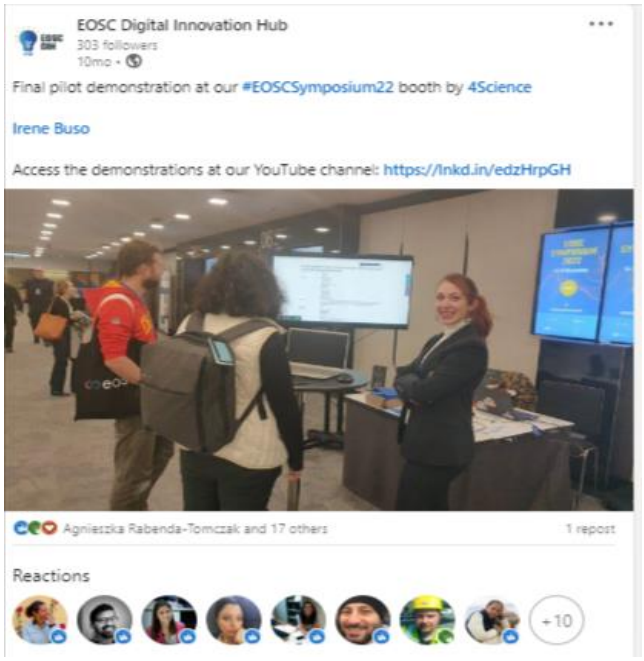


Figure 3.3: EOSC DIH Twitter account

For a full report of all statistics related to the Expressions of Interest - please refer to the Campaigns Interim & Final Impact Report and Recommendations deliverables (D10.3)

3.5.3 Materials

When in-person events started happening again (mid-2022), sets hand-outs and materials were created to accompany our booths: roll-ups, flyers and sets of so-called Moo-cards, with a QR code for quick access to our website.

[5] As measured on August 31st, 2023

[6] Given the recent changes at Twitter, the project's use of the medium and the average engagement rate of our followers has declined steeply since the start of the project. Analysing the impact of the medium is challenging.

Figure 3.4: Dissemination materials

Several video animations were created to show on TV-screens in the booths:

- Booth video (long)
- Booth animation (short)

Demo videos: Several pilots recorded short demonstration videos for use at events booths:

- Demonstrations

3.5.4 Website

The EOSC DIH website received over 21500 views from 7950 unique visitors. The focus of the website, aside from general information about the project, its partners, and its outputs, is to inform the public about the services offered by EOSC DIH, information about selected pilots and the services they are using and the announcing of trainings, webinars, and events.

3.5.5 Training materials

As the project evolved, more resources became available - organised on a thematically organised page, visitors can now consult webinar recordings, service documentation, and resources focused on technical support.

Figure 3.5: Training materials and courses

3.5.6 Events

EOSC DIH has been present at more than 25 events (See Annex 2: List of Events), 24 of them industry related.

At key conferences such as BDVF or the EGI Conference, EOSC DIH was present with a booth, on the programme with presentations, and with dedicated workshops. EOSC DIH partners also was actively present at business and industry events throughout Europe. Finally, the EOSC DIH also had an active presence at EOSC related events such as EOSC Symposium and the EOSC Future Open Days.

A main goal of our presence at these events is not only to showcase the project, but also to actively scout for interested business partners (for example start-ups and SMEs) who wanted to take part in the pilot programmes, and to show them the relevance of EOSC for commercial partners.

Figure 3.6: EOSC DIH Bootcamp

3.6 Training and consultancy

As part of "Training and Support" service, the EOSC DIH organised multiple training and webinars during the EOSC Future project. The topics of these training and webinars were selected based on the requirements from the community and delivered by both internal and external trainers. The participation to online events was open to anyone even if they were not part of the community. Materials and recordings from these webinars can be found on the DIH website.

3.6.1 Webinars

Table 3-5: Webinars organised by the EOSC DIH

	Webinar Title	Date	Registered Participants	Link to Materials
1	Pilot information webinar	15/06/2022	8	N/A
2	Pilot information webinar	07/10/2022	14	N/A
3	Rapid Prototyping	27/10/2022	20	https://eosc-dih.eu/eosc-dih-training-program-rapid-prototyping/
4	Community Engagement	31/01/2023	20	https://eosc-dih.eu/eosc-dih-training-community-engagement/
5	EIC Funding	19/04/2023	22	https://eosc-dih.eu/eosc-dih-training-european-innovation-council-eic-funding/
6	SOFIA, a Data-Driven Decision Support System to Automate Innovation Scoring Process in the Financial Sector*	26/04/2023	7	https://eosc-dih.eu/eosc-dih-pilot-webinar-sofia-a-data-driven-decision-support-system-to-automate-innovation-scoring-process-in-the-financial-sector/
7	Human Leadership	07/06/2023	11	https://eosc-dih.eu/eosc-dih-webinar-human-

				leadership/
8	Team Building	14/09/2023	21	https://eosc-dih.eu/eosc-dih-webinar-thriving-teams/

*This was a DIH pilot webinar. The main goal was to showcase and disseminate the product developed by the pilot to the community and beyond.

3.6.2 EOSC DIH Bootcamp

EOSC DIH Bootcamp was an in-person session organised during the EGI Conference 2023. EOSC DIH Bootcamp consisted of 2 tracks:

1. Pitch training session
   Trainer: David Pickett (Best3Minutes)
   This pitch training session is designed to help participants improve their ability to deliver concise and effective pitches.
2. User Experience workshop
   Trainer: Adam Sipowicz (APROCO)
   This workshop was designed to collect feedback on the user experience of the private sector as users of the European Open Science Cloud (EOSC) with the aim to bring together stakeholders from academia, industry, and the public sector, to discuss and exchange ideas on how to improve the user experience of private sector users on the EOSC platform.

38 participants registered for the day. More details about the format and objectives can be found here: https://www.egi.eu/event/training-eosc-dih-bootcamp/

Through the user experience workshop, multiple suggestions for improvements for EOSC portal were identified,

1. Content filtering: Most participants indicated that the main problem they encountered was the lack of content filtering. They wanted to find accurate information related to their business.
2. Clearer Value Proposition: Several respondents found the serious, scientific language difficult to understand. It is credible with articles on the website. However, on the landing pages (when first entering the site) benefits described in simpler language is missing.
3. Improved interface: 20% of respondents indicated that the portal's interface is unpleasant due to outdated graphics. 3 respondents indicated that there are no photos or recordings that would catch the recipient's attention faster.
4. Ability to undo: The inability to easily return to the home page after opening the selected tab made the users of the portal feel lost. Introducing easier navigation in this area would be a big improvement to the portal.
5. Clarity of communication: After visiting the eosc-portal.eu website, in the "For Businesses" tab, entrepreneurs should immediately be able to answer the question "Why am I here?". It is worth adding an explanation of what the portal is and how entrepreneurs can use it.

3.6.3 Business Consultancy

As it was initially stated in D8.4, for the provision of business and market consultancy support services, especially addressing the exploitation prospects of the selected business pilots selected, the EOSC DIH reviewed and eventually rolled-out a widely accredited and well-established framework called the 'Real-Win-Worth' (R-W-W). The R-W-W framework applies decision criteria for assessing the

competency and future potential of an innovation pilot/project based on three fundamental topics-questions: Is it Real? Can it Win? Is it Worth it[7]?
The first topic (Real) assesses the market potential and the feasibility of developing the product; the second topic (Win) assesses whether the innovation and the company can be sufficiently competitive; and the third topic assesses the profit potential and whether the innovation makes strategic sense in the long term.
In order to apply in a practical way the above framework in the selection process, these 3 topics are analysed in further sub-topics, each one containing a set of business consultancy aspects, i.e. Real is made up by "Market Attractiveness" and "Product Feasibility" sub-topics; Win is made up by "Product Advantage" and "Team Competence" sub-topics; and, Worth is made up by "Expected Return" and "Growth Potential" sub-topics.

Topic	Sub-Topic
Real	Market Attractiveness
	Product Feasibility
Win	Product Advantage
	Team Competence
Worth	Expected Return
	Growth Potential

Based on the above framework, a Business Toolkit and a respective Business Consultancy process was created, presented to and shared with all the participating EOSC DIH Pilots. The Business Toolkit comprised of the following business support canvases and templates:

- Problem-Solution Fit canvas
- Product-Market Fit canvas
- Business Model canvas
- Value Proposition canvas
- SWOT analysis
- Minimum Viable Product experiment canvas
- Marketing Plan canvas
- Financial Planning template
- Pitch Deck template

By using the above tools, additional dedicated (i.e. 1-on-1) business consultancy was offered during the reporting period to the Pilots that requested it. This included the following two pilots:

- **Pundit pilot** (including both offline as well as online support at 18/05/2023)
- **SnowPower pilot** (including both offline as well as online support at 20/07/2023)

[7] A good analysis and background of this model is provided in the following publication in Harvard Business Review: Is It Real? Can We Win? Is It Worth Doing?: Managing Risk and Reward in an Innovation Portfolio

3.7 EOSC DIH Collaborations

This activity covers the General Objective ***O3: Integrate EOSC in the pan-European DIH network***, developing partnerships with external communities, projects and DIHs for promoting the expansion and exploitation of EOSC beyond the research communities.

3.7.1 Cross-WP collaboration

WP1

The collaboration with the WP1 has been conducted for 2 main purposes, keep the T1.5 informed and up to date with the discussions and evolution of the funding scheme to use the 600K budget with the private sector on the supply side, validating the selection of the research community to cover and approving the tender process; and secondly with the T1.4 and the EOSC DIH as part of the EOSC Future KER, to provide EOSC DIH description and validating the future exploitation paths.

WP5

T8.2 has worked with the WP5 for the Marketplace User Experience providing feedback on the private sector engagement, requirements and working during the workshops and meetings on the design canvas for the new version of the EOSC Marketplace.

WP6

Initial survey for the demand analysis was shared with the clusters and presentation of the call for EoI from research communities was promoted during a WP6 regular call.

WP9

The collaboration with WP9 has been to coordinate some of the training activities that took place under the EOSC DIH and the generated materials.

WP10

EOSC DIH has collaborated closely for dissemination and communication with the project's main communication WP (WP10).

This collaboration includes mutual mention on social media, the use of EOSC Future branding elements on EOSC DIH communications, assistance by WP10 for promotion of the Expressions of Interest, Trainings, and Events. As part of the final dissemination phase of EOSC Future, the series 'EOSC in Practice' was released. Up until now, two EOSC DIH Pilots are featured: Pundit and PreMaCOOL.

Figure 3.7: Dissemination of Pundit as EOSC in practice story

3.7.2 Collaboration with EOSC Related Projects

EOSC DIH has established collaboration agreements with multiple EOSC related projects:

1. **EGI ACE**: a mission to empower researchers from all disciplines to collaborate on data- and compute-intensive research through free-at-point-of-use services. EGI-ACE delivered the EOSC Compute Platform and contribute to the EOSC Data Commons through a federation of cloud compute and storage facilities, PaaS services and data spaces with analytics tools and federated access services. The objective of this partnership was:
    - To offer EGI-ACE services through the EOSC DIH service offer: EGI DNS service, Cloud compute, Cloud container compute, EGI Data transfer, EGI DataHUb, EGI HTC, EGI Notebooks, EGI online storage, Deep training facility, EC3.
    - Support business pilots
    - Reciprocate dissemination and promotional activities and results.
2. **OpenAireNexus:** OpenAIRE-Nexus brings in Europe, EOSC and the world a set of services to implement and accelerate Open Science, to embed in researchers workflows, making it easier for them to accept and uptake Open Science practices of openness and FAIRness, to give the tools to libraries, research communities to make their content more visible and discoverable, and to assist policy makers to better understand the environment and ramifications of Open Science into new incentives, scientific reward criteria, impact indicators, so as to increase research and innovation potential. The objective of this partnership was:
    - To offer OpenAireNexus services through the EOSC DIH service offer: OpenAire Researach Graph, Zenodo, EpiSciences, Amnesia,Argos, OPenAire Monitor, OpenCitations, ScholExplorer, Usage accounts, OpenAPC, Open Science Observatory, OpenAire Login, OpenAire Provide, OpenAIRE EXPLORE, OpenAIRE CONNECT, OpenAIRE Broker, OpenAIRE Validator
    - Support business pilots
    - Reciprocate dissemination and promotional activities and results.
3. **DICE:** DICE provided cutting-edge data management services and a significant amount of storage resources for the EOSC. The data services offered via DICE through EOSC are designed to be multidisciplinary and to fulfil the needs of different research communities. The goal was to enhance the EOSC infrastructure and ensure the best possible support to guide European research and innovation into the future. The objective of this partnership was:
    - To offer DICE services through the EOSC DIH service offer: B2Safe, B2Handle, B2Drop, B2Share, B2Access,
    - Support business pilots
    - Reciprocate dissemination and promotional activities and results.
4. **Reliance:** RELIANCE brings into EOSC more than 3,000 research objects from research communities like Earth Science, represented by three project partners, but also others like Astrophysics and Bioinformatics, which have embraced research objects concept and tools, and will become the best ambassadors to enlarge and engage new communities. The objective of this partnership was:
    - To offer Reliance services through the EOSC DIH service offer: ROHub, ADAM platform, Enrichment API, Recommendation API, Search API
    - Support business pilots
    - Reciprocate dissemination and promotional activities and results.
5. **C-Scale:** C-SCALE empowered European researchers, institutions, and initiatives to easily discover, access, process, analyse and share Copernicus data, tools, resources, and services through the EOSC Portal, a catalogue of possible services for EOSC. The C-SCALE project enhanced the EOSC Portal with pan-European federated data and computing infrastructure services for Copernicus. The objective of this partnership was:

- To offer Reliance services through the EOSC DIH service offer: Data Lookup Service, FedEarthData, On demand seasonal drought forecast
- Support business pilots
- Reciprocate dissemination and promotional activities and results.

6. **AI4EOSC**: The project vision is to increase the service offer in the EU landscape by expanding the European Open Science Cloud (EOSC) ecosystem to support the effective utilization of state-of-the-art AI techniques by the research community. The objective of this partnership was:
    - To offer AI consultancy and technical support to business pilots
    - Reciprocate dissemination and promotional activities and results.
7. **OPERAS**: OPERAS is the Research Infrastructure supporting open scholarly communication in the social sciences and humanities (SSH) in the European Research Area. Its mission is to coordinate and federate resources in Europe to efficiently address the scholarly communication needs of European researchers in the field of SSH. The objective of this partnership was:
    - To explore potential collaboration via business pilots
    - Reciprocate dissemination and promotional activities and results.
8. **DECIDO**: DECIDO aims to boost the use of EOSC by Public Authorities enabling innovation in the policy making sector, removing European fragmentation, allowing cross-support and cross-collaboration and the use of secure compute – and data – intensive services. The objective of this partnership was:
    - Explore and discuss common strategies for widening the EOSC to the public and private sector.
    - To explore potential collaboration via business pilots
    - Reciprocate dissemination and promotional activities and results.

3.7.3 Collaboration with Multipliers

As part of the community building, multiple collaborations with multipliers have been established.

- **Other projects related to industry engagement**: L4SMEs, StairwAI, EUH4Data, Pledger, DigitBrain, Bowi, Sodalite, AI4Europe and Datamite.
- **SME networks**: Fundingbox, egg-enter-griw.go, Business finland, emGORA, Lira, Collabwith
- **Industry associations and clusters**: gi-cluster, si-cluster, Ufficio regionale di transferimento tecnologico.

The main objective of these collaborations was to integrate new technical offers into the EOSC and EOSC DIH and define strategic synergies for the use of EOSC DIH services and other EOSC exploitable results.

3.7.4 Collaboration with EDIHs

The EC funding call[8] launched in 2021 for the creation of European Digital Innovation Hubs (EDIH) Network had the goal of cover all regions in Europe, addressing the needs of the public and private sectors, including all economic sectors, offering a wide range of specialised digital transformation services. EOSC DIH was not eligible to participate in this call as the requirements for the participation was to have a regional focus and be pre-selected by the national bodies. In the case of Netherlands where the EOSC DIH is established under the EC DIH catalogue, the selection of DIH as candidates for the EDIH network was a political decision creating 6 new DIH distributed in the across the Dutch regions and covering different specialisation sectors.

[8] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/digital-2021-edih-initial-01

The notification of the selected EDIHs took place in the second half of 2022. However, the need of cofounding with regional sources made the setup of EDIHs evolved slower than expected, with many EDIHs not in operational mode yet.

Despite not being eligible for the EDIH label and the delay in the real EDIH network implementation, the EOSC DIH has established partnerships with other DIHs and EDIHs in Europe to keep on strengthening the potential collaboration in the DIH context. With all of them the objectives are the complementarity of services, the exchange of practical information about business models and sustainability and the joining contribution for dissemination.

1. **Damas Leonardo:** DAMAS is focused on two digital key technologies indicated by the Digital Europe Programme (DEP): HPC and AI. It is then specialised along the following digital enablers: Cloud & Edge computing; Big Data Analytics, High Performance Data analytics; Computational Fluid Dynamics; Virtual Reality/Augmented reality; Fast Prototyping including 3D printing; Additive manufacturing; Digital Twin Simulation & Modelling; Space Technologies - Geo Information and Sustainable Computing

2. **EGI DIH**: EGI DIH is a virtual space where companies and technical service providers meet to test solutions before investing. EGI DIH offers different services on advanced computing to help companies in the digitalization improve their productivity. EGI DIH acts as a one-stop-shop to provide technical assets, knowledge, expertise and support on business, market, and finance, leading to sustainable innovation.

3. **ITI Data Hub DIH**: The mission of the Data Cycle Hub is to be a reference one-stop shop DIH in the Valencia region to foster data driven and artificial intelligence-based innovation. The objective is to bridge the gap between research and industry, specifically SMEs, providing innovative solutions and services that require advanced data analytics, automatic learning and artificial intelligence.

4. **DihGiGal DIH**: DIHGIGAL's goal is to boost the digital transformation of all industry focusing on SMEs and mid-caps needs. This will be achieved by the diverse composition of its consortium: *3 leading manufacturing sectors (automotive, naval and food) represented by their clusters (CEAGA, ACLUNAGA & CLUSAGA) bringing together not only their companies but also their technology centres along with a cross-sectorial ecosystem (Galicia Digital) which opens the EDIH to whole industrial sector. *4 leading competence centres combining the best capacities in HPC and AI represented by CESGA-Supercomputing Centre, ITG and Universities of Vigo and Coruña (which chairs the Spanish Association for AI) along with the private supply through the ICT cluster. *3 complementary agents (FEUGA, KPMG & Inovalabs) to provide service to the entire digital ecosystem.

5. **Tuscany X.0 DIH**: Tuscany X.0 is one of the 13 Italian winning projects of the European call for the creation of a European DIH with the aim of promoting technology transfer through the adoption of advanced digital technologies, AI, HPC, Computer Security. Its objective is to help SMEs and Tuscan public administration to start the path of digital transformation and innovation that can derive from it, in a simple way, "low cost" and accessible at kmo. The technical coordination of Tuscany X.0 has been entrusted to GATE 4.0 – Tuscan Regional District "Advanced manufacturing 4.0", together with the Navacchio Technological Pole which will take care of the administrative coordination.

6. **DigiGov InnoHub DIH**: digiGOV innoHUB DIH aims to support the development of a new generation of public services based on advanced digital technologies, open standards and open-source solutions for citizens and businesses; to enrich the ecosystem of Digital

Transformation actors; and to facilitate innovation in Public Administration, transforming it into a large innovation buyer and investor.

All these collaborations have been valuable for understanding other DIH structures, business models and operational aspects. It is expected to continue evolving the collaboration once the EDIHs are more matured and Digital Europe launch new opportunities fo fund DIH activities.

4 EOSC DIH Joint Ownership Agreement and Governance

During its lifetime in EOSC-Hub and EOSC Future projects, EOSC DIH has developed a variety of intellectual assets which includes the logo, website, branding, promotional materials, training materials and other documentation. The choice of operational models and revenue models presented in the next section very much depends on clarifying the ownership of these assets and the rules for exploitation and use. Therefore, the discussion on the ownership of the assets of the EOSC DIH developed under EOSC future project will take place during the project extension period.

Details on the decisions made under T8.2 will be included in the updated of this Deliverable to be submitted in March 2024.

5 Sustainability Analysis

The Sustainability Analysis of the EOSC DIH covers the **General Objective *O1: Manage an effective and sustainable EOSC DIH***. This section present the work done on refining the value proposition of the EOSC DIH, the analysis of the operational models and revenue models.

5.1 Refining The Value Proposition

No users are created equal. EOSC and its ecosystem is, at its current stage, geared towards researchers and remains a bit complicated for start-ups and SMEs to traverse on their own. This is where the biggest value of EOSC DIH lies. Consultancy, support, and coordination services provided by the EOSC DIH lowers the entry barriers for this user group. This is a gap in the market that is receiving more attention as similar initiatives are popping up to support other user groups for EOSC, for example, the public sector[9]. EOSC DIH in this scenario is an already established brand which has now been operating for more than 5 years and has well-established and repeatable processes for managing the interaction.

EOSC DIH offers a joint umbrella of services from EOSC-related projects. So, SMEs and start-ups get access to a wide range of services from disparate sources through one open call, thereby making the proposition more enticing to them. The other aspect to consider is that some of these SMEs and start-ups eventually end up onboarding their services and resources in EOSC itself, thereby creating a positive feedback loop. So not only is EOSC DIH a viable exploitation channel for EOSC and its services, it is also a growth engine for EOSC.

5.1.1 Multi-sided Value Proposition Canvas

Considering the nature of the EOSC DIH, a Multi-sided Value Proposition Canvas (MVPC) is used to further showcase its value towards both the private sector and towards EOSC. This canvas has been proposed by Paul Belleflamme and Nicolas Neysen[10] to describe the multi-stakeholder relationships for digital platforms. "*Digital platform business models rely on a particular mode of value creation–focused on matchmaking in a multi-sided environment–which highly differs from the traditional vertically integrated models (or 'value chains')*." And though not all aspects of the platform apply to EOSC DIH, the matchmaking role that the DIH plays, makes it important to use the MVPC instead of the traditional Value Proposition Canvas. The various sections in MVPC are as follows:

[9] https://www.decido-project.eu/wp-content/uploads/2022/10/EOSC-Competence-Centre-for-Public-Authorities_2.pdf
[10] https://www.researchgate.net/publication/348399118_A_Multisided_Value_Proposition_Canvas_for_Online_Platforms

1. The *'Wants'* section focuses on the emotional drivers that will lead people to join the platform.
2. The *'Needs'* section covers all the rational drivers that encourage someone to become a participant of the platform.
3. The *'Experience'* section covers what the users feel and find on the platform.
4. The *'Benefits and Features'* covers all elements that create value for the users.
5. The *'Fears'* section includes all kinds of risks that someone would typically associate, consciously or not, to the fact of joining and transacting over the platform.
6. The *'Trust levers'* represent crucial elements that the platform should put in place to reassure users and allay their fears.
7. The *'Substitutes'* section on the bottom includes all the alternative ways users can find to fulfil their needs, irrespective of whether this involves a third party or not.
8. Finally, the 'Mitigating Actions' sections highlights actions that the DIH has taken or can take to differentiate itself from the substitutes and maintain its competitive advantages.

Table 5-1: Value proposition canvas

Private Sector Organisations	EOSC DIH	EOSC
Wants	**Experience**	**Wants**
Customised support and tailored solutions. Support to grow the business. Collaboration opportunities with other organisations. Training and educational resources to upskill the workforce.	Technical Support Business Consultancy DIH Community Trainings and webinars	Coordinating the access of resources by the private sector. Consultancy and support towards the private sector. User database for feedback collection.
Needs	**Benefits and Features**	**Needs**
Access to trusted technology and resources to grow. Funding and investments. Mitigate risk with innovation and technology adoption. Expand and scale their business. Quick and cheap design cycles.	Matchmaking service to connect private organisations with relevant EOSC providers depending on their requirements. Dissemination and support in accessing funding opportunities. Enables Test before Invest. Support for onboarding services of the private organisations in EOSC. Support for pilot development and continued technical consultancy. Sector agnostic allowing for cross-pollination.	To grow its user base. To develop an intuitive and user-friendly platform. To grow its resource portfolio. Accelerate the creation of new knowledge and spur innovation. Enable storing, managing, analysing, and re-using research data.
Fears	**Trust Levers**	**Fears**
Investing time and resources into utilising EOSC resources and not seeing a return on investment	Feedback mechanisms. Community Building Success stories.	Not being able to effectively serve and meet the needs of the private sector. Fear of not being able to attract and retain a diverse range of users to the EOSC ecosystem. Fear of not being able to effectively scale the EOSC ecosystem to accommodate growing demand.
Substitutes	Mitigating Actions	Substitutes

Direct Access of EOSC resources EDIH/Other DIHs Commercial Providers	Threat: Mid Added layer of consultancy and value-added services on top of EOSC services. EOSC DIH is Europe wide and sector agnostic. EOSC DIH offers an assortment of various kinds of services under one umbrella.	Threat: Low EOSC DIH is Europe wide and sector agnostic allowing for a much wider user base. EOSC DIH has been connected with the EOSC ecosystem for more than 6 years and has enormous amounts of know-how required to navigate this environment.	EDIH/Other DIHs

5.1.2 Competition

As mentioned in the MVPC above, EDIH and other regional/organisation DIHs pose the biggest competition to EOSC DIH. Recent years have seen a significant rise of regional DIHs, eDIHs and institutional DIHs (referred as local DIHs). These local DIHs provide or aim to provide similar services and have a similar value proposition with a focus on digitalisation rather than on open science.

Specifically, collectively, the EDIHs have a much larger reach, scope, and budget than the EOSC DIH, however individually they often target only a small geographical region and/or a specific industry segment. So, they lack the interdisciplinarity of EOSC DIH. They also do not have EOSC as their main focus and may themselves need the support and consultancy to navigate EOSC.

So even though EOSC DIH and EDIHs will compete for resources, there are areas where complementary synergies can be found and developed. EDIHs can help EOSC DIH in reaching a more local pool of organisations while the EOSC DIH can provide access to resources from across Europe while also facilitating networking and knowledge sharing through its wider community.

5.1.3 Updated SWOT And PEST Analysis

The SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) was presented initially in the D8.4 EOSC DIH Strategy and Plans[11].

Table 5-2: Swot analysis

STRENGTHS	WEAKNESSES
• Expertise in advanced computing and data services. • Pan-European approach enables EOSC DIH to offer cross-border solutions. • Well-established network boasting abundant infrastructure resources and proficient technology experts. • All EOSC DIH partners are well connected to the EOSC ecosystem. • Comprehensive suite of services aligned both with the mandates of the European Commission and with the requirements of the private sector. • EOSC DIH brings together a diverse range of experts from different fields, enabling holistic solutions for start-ups and SMEs.	• Limited financial and human resources might constrain the DIH's capacity to fully capitalise on emerging opportunities. • Lack of direct involvement of regional clusters. The pan-European approach facilitates the global EOSC collaboration, but not as much regionally. Some local connection is needed to understand the sectoral and technological needs. • Complexity of the EOSC ecosystem and evolving state could have a significant impact on the EOSC DIH strategy and actions. • Involvement of multiple partners can sometimes slow down the decision-making process. • Distributed partners and networks may increase

[11] https://eoscfuture.eu/wp-content/uploads/2022/12/EOSC-Future-WP8-EGI-Foundation-D8.4-DIH-Strategy-and-Plans-2021-09-30.pdf

• EOSC DIH has demonstrated the ability to adapt to changing technological landscapes, ensuring its offerings stay relevant. • EOSC DIH's association with EOSC and its partners lends credibility and visibility in the European digital innovation ecosystem.	coordination overhead.
OPPORTUNITIES	**THREATS**
• Collaborating with other tech-focused initiatives could lead to synergies and innovative solutions. • The diverse ecosystem of start-ups and SMEs offers ample opportunity to develop tailored solutions. • Partnering with industry associations could enhance EOSC DIH's engagement with SMEs. • Continued collaboration with EDIH corridors and regional clusters. • Growing external interest can enhance DIH value. • Potential participation from incubators, investors, and angels. • Partnerships with other Horizon Europe and Coordinated Support Action projects may amplify the value proposition.	• Competition from multiple innovation initiatives. • Private sector's risk aversion in unpredictable economies. • Duplication of efforts within EOSC collaborations. • Lack of specific European funding for EOSC DIH activities. • The need to develop sustainable business models tailored to the EOSC DIH within the EOSC context poses a significant challenge. • Dependency on key partners may create vulnerability. • Potential overlap of efforts within the EOSC collaboration landscape necessitates careful delineation of roles to avoid duplication.

The PEST analysis also presented first in D8.4 provides the external political, economic, societal, and technological factors at a European scale that could affect the work of the EOSC DIH and the achievement of its objectives. Update of the same is provided below,

Table 5-3: PEST analysis

POLITICAL	**ECONOMIC**
• The European Commission (EC) is reorienting DIH emphasis towards the national/regional level, necessitating adaptability in EOSC DIH's approach. • The evolution of EOSC governance introduces complexities stemming from various structures and coordination requirements. • Encouraging participation of regional governments in EU-level initiatives demands tailored incentives. • The EC's Digital Single Market initiative aims to bolster cross-border cooperation and transactions, influencing EOSC DIH's role in enhancing digital integration. • The uneven pace of digital development across Europe challenges the EOSC DIH to tailor strategies to regional nuances. • The EC's heightened focus on AI, HPC, and cybersecurity underscores the need for EOSC DIH to align with these priorities to remain competitive globally.	• The Digital Europe Programme and Horizon 2020/Horizon Europe Coordination and Support Actions remain significant avenues for EC funding for DIHs. There are other revenue models that could augment the funding model. • EOSC Procurement could have potential impact on the business model of the DIH. • The pandemic's economic repercussions, marked by SME challenges, underscore the importance of adaptable strategies for EOSC DIH's engagement with these entities. • Navigating EOSC DIH's financial sustainability, including funding mechanisms and business models, stands as an imperative for its growth. • The availability of funding mechanisms for data-driven innovation aligns with the European Green Deal and Digital Transformation objectives, influencing EOSC DIH's strategic directions.
SOCIAL	**TECHNOLOGICAL**
• The presence of digital natives in the workforce creates fertile ground for tech-driven start-ups and innovation. EOSC DIH can leverage this trend to foster a culture of innovation and entrepreneurship. • EOSC DIH's efforts to bridge the gap between digital natives and traditional SMEs are crucial. Providing accessible training and support can empower SMEs to	• The prevalence of commodity technologies calls for EOSC DIH to differentiate through value-added services. Identifying industry-specific needs and tailoring services accordingly will be key for competitive advantage. • As the EOSC ecosystem expands, EOSC DIH should focus on developing efficient mechanisms for

adopt new technologies effectively. • Traditional SMEs' slow technology adoption due to lack of digital skills presents a challenge and opportunity for EOSC DIH to bridge this gap. • Society committed with science and the fact that digitisation contributes to political and economic support for innovation.	filtering and managing the growing number of services, enabling users to find what's relevant.

5.2 EOSC DIH Operational Models

The EOSC DIH currently offers to its pilots and community members the following services:

1. **Technical Resources**: The DIH offers Compute (HTC, HPC, Cloud), Storage (Online/Archive), Data Management, Open Research Data and other Tools & Applications through EOSC.
2. **Piloting and Co-design**: The DIH guides pilots in the process of gathering requirements, definition of the architecture, identification and selection of technical services and their technical integration. It provides the pilots with an Environment to Experiment.
3. **Training and Consultancy**: This includes training on digital skills, digital business, and support for commercialization. The DIH also provides brokerage to Funding & Opportunities
4. **Visibility**: Finally, the DIH offers media exposure as well as visibility at international conferences and events along with Community for sharing best practices.

To enable this provision of services, the DIH operations is split into following activities:

1. General Management: This includes the general management of the DIH including meetings between partners, reporting to the funding projects and establishing partnerships.
2. Pilot Campaigns and Evaluations: This includes the management of the campaigns for attracting pilots along with the evaluation of the applications.
3. Onboarding and Managing Pilots: This includes the onboarding of the selected pilots and their ongoing management. This also includes the organisation of DIH community meetings.
4. Technical Support: This includes technical assessment of the pilots, resource provisioning and providing technical support as required.
5. Monitoring and Evaluation: This includes the monitoring and evaluation of both the performance of the DIH and as well as the individual pilots.
6. Communication and Dissemination: This includes all things related to the promotion be that may of Pilot Campaigns, Events as well as individual pilots and success stories.
7. Business Consultancy and Training: Finally, this activity covers arranging training, ad-hoc business consultancy and support for funding opportunities.

Through a series of internal workshops held by the consortium partners (Workshop #1: Value of the EOSC DIH; Workshop #2: Scaling and Revenue Models; and Workshop #3: Operations) and the discussion that ensued, the following potential operational models have been identified for the DIH:

5.2.1 Matchmaking

This is the current core operational model of the DIH. This is where the DIH runs the pilot campaigns, evaluates pilots, connects them to EOSC and provides technical and business support. Through this model, the DIH acts as a single-entry point for the private sector towards EOSC. This is the model for which the DIH has well established processes and has years of experience in implementing. The DIH can exploit its existing community of start-ups, spin-offs, SMEs, providers, and other collaborations to continue to deliver value.

However, this model is also the most difficult to scale up (in this case scaling up refers to increasing the number of pilots supported). In current mode, the amount of effort required scales up almost linearly with every pilot. The effort required may be reduced with some optimisation of the activities

and the team has identified bottlenecks and will make recommendations for improvements in the next section.

5.2.2 Matchmaking Plus

This is an extension of the earlier model where the DIH extends its network and consultancy services towards EC funded projects instead of just to the private sector. Just with EOSC projects in consideration the approach towards innovation management and exploitation can be wildly different depending on the consortium. There may be a need to adopt a singular approach to ensure consistent management of innovation which can smoothen the procurement activities. There is also often a need for business modelling in the projects, the expertise for which may be lacking in the project partners. The DIH can leverage both its internal expertise and the private sector organisations in its community to fill these needs or gaps.

The advantages and disadvantages of the Matchmaking model apply to this one as well. However, this added offering towards the project opens an additional source of revenue for the DIH which can then be maintained while continuing to contribute towards the growth of the private sector in Europe. It does with an added disadvantage of having to find project(s) willing to take on DIH to provide these services.

5.2.3 Community Management Or Matchmaking Light

This model tries to solve the scaling up problem by trying to offload certain activities from the current operations to the EOSC projects. In this model, the DIH focuses on running the campaigns, evaluating the pilots, and managing the community while providing the business consultancy and training. Communication, Dissemination, Technical Support and Monitoring of the pilots are covered by the projects.
This will significantly reduce the workload requirements for sustaining the EOSC DIH and hence represents the easiest model to scale up significantly. It, however, does mean that the central coordination provided by the EOSC DIH is lost and the pilots will have to face a significant burden to work with processes of each individual project.

5.2.4 Business Lab

This represents a significant evolution in the DIH mode of operations as compared to the previous models. In this model, the DIH acts as a Business Lab, sort of an incubator to support start-ups, SMEs, and even large corporations in developing new products and services. Leveraging the open resources available from EOSC combined with the expertise, the DIH can provide a testbed for experimentation at an extremely low cost. The businesses can perform the experimentation themselves in the lab or the DIH can act as an external lab to the business and manage the entire development process.
This is an attractive operations model as it represents the best possibility for a self-sustaining DIH while maintaining its original mission of supporting the private sector to exploit EOSC resources. The DIH can play an interesting role to spur the growth of industry in Europe. However, this radicality comes at the cost of having to establish a separate legal entity for the DIH. It is also an untested model at this moment with lots of uncertainties and unknowns.

5.3 EOSC DIH Revenue Models

As it stands, there is currently no funded action that will support the operation and maintenance of the EOSC DIH beyond the EOSC Future project. The following sections present potential revenue models that have been identified by the consortium partnership for the EOSC DIH to adapt and support its activities.

5.3.1 Public Sector financing

5.3.1.1 A Small Role In A Horizon Europe(HE) Project

This has been the staple for managing the EOSC DIH operations in the past few years. During its inception in the EOSC Hub project and its continued operation during the EOSC Future project, the DIH activities were supported through a specific Task in the project. And during both these projects, the DIH operations have been supported by a single project alone. This can be expanded so that DIH plays a similar role in multiple projects at the same time to scale up its activities and to diversify its activities.

However, this diversification will come at an additional cost of fragmentation of effort, increased need for coordinating activities across projects and dealing with varying reporting requirements and timelines of different projects. This also means that the revenue stream for the EOSC DIH is uncertain as its operations may not be part of the priorities set by the funding organisation, meaning there would be no incentive for projects to include the DIH within their workplan.

5.3.1.2 Dedicated CSA Project

An alternative to the role in HE project will be to have a dedicated Coordination and support action (CSA) for supporting the activities of the DIH. This ensures that there is sufficient funding for maintaining the operations in the near-term future. It will also make it easier for the EOSC DIH to set up collaboration activities with relevant projects in the EOSC ecosystem. Overall, a dedicated CSA can provide crucial funding, collaboration opportunities, and policy support for the EOSC DIH.

However, participating in a CSA may require the DIH to align its activities with the objectives and priorities set by the funding organisation. This could limit the DIH's autonomy in decision-making and hinder its flexibility in responding to evolving user needs and market dynamics. Relying on a CSA for funding means that the EOSC DIH's financial stability is tied to external sources. If the CSA funding is reduced or terminated in the future, it may impact the DIH's sustainability and ability to continue its operations.

5.3.1.3 Procurement

Procurement could be a potential way of sustaining the DIH operations. Much similar to the EOSC Core and Horizontal services, EOSC DIH could be a service that is supported through a Procurement action. This will ensure sustainability over a long period of time while providing policy support, autonomy in decision making and flexibility (for the procurement winner).
However, the key barrier to this way of sustaining the DIH is that unlike the core and horizontal services which are IT based, the DIH is mainly a 'know-how' based. This would make it extremely difficult to handover and transition smoothly to the next operator without significant investment upfront.

5.3.2 Private Sector financing

5.3.2.1 Pilot Costs

One approach for funding the EOSC DIH is to have start-ups and SMEs themselves pay for running pilots with the DIH. This model of user-funded pilots offers several advantages. Firstly, it allows the DIH to generate revenue directly from the users who benefit from its services, creating a sustainable funding source. Secondly, start-ups and SMEs have a vested interest in the success of their pilots, which can lead to a more focused and committed engagement with the DIH. Additionally, user-funded pilots can provide valuable feedback and real-world use cases, allowing the DIH to improve its offerings and tailor its services to better meet the needs of its target audience.

However, there are some barriers and disadvantages to consider. One potential barrier is the financial capacity of start-ups and SMEs, as they may have limited resources and budgets for engaging in paid pilots. This could pose a challenge in terms of affordability and accessibility for certain user groups. Moreover, start-ups and SMEs may be hesitant to invest in pilot projects if they perceive the risks to be high or the potential benefits uncertain. This can slow down the adoption and uptake of the DIH's services. Additionally, the DIH must ensure that the pricing structure and payment models are fair, transparent, and aligned with the value provided to the start-ups and SMEs, to maintain trust and attract participation. These barriers can be somewhat overcome by offering flexible pricing options, such as tiered payment plans or subsidies for early-stage start-ups or economically disadvantaged SMEs.

Structuring the payment for pilots in the case of the EOSC DIH can be done in various ways, depending on the specific context and objectives of the pilots. Some potential approaches could be,

- Fixed Fee Model: This model involves setting a fixed fee for the pilot project based on the scope, duration, and complexity of the engagement. The fee can be determined by considering factors such as the number of resources provided by the DIH, the level of technical support required, and the expected outcomes.
- Usage-based Model: This model charges the start-ups and SMEs based on the actual usage of the DIH's resources and services during the pilot. For example, the DIH can charge based on the number of hours of technical support, data storage capacity utilised, or similar usage numbers.
- Tiered Pricing Model: This model offers different pricing tiers with varying levels of services and benefits. Start-ups and SMEs can choose a tier that aligns with their specific needs and budget. Each tier can have a fixed fee or usage-based pricing structure.
- Subsidised or Grant-funded Model: In some cases, the DIH may offer subsidised pricing or grants for specific target groups or innovative projects. This approach can support early-stage start-ups, socially impactful initiatives, or projects aligned with specific research domains or policy priorities.

5.3.2.2 Freemium Model

The EOSC DIH can adopt a Freemium model, offering a set amount of technical set of services and resources for free to start-ups and SMEs while charging for support or for additional services. This approach has several advantages. Firstly, it facilitates user acquisition by attracting a larger user base and fostering a strong community of start-ups and SMEs. Secondly, the Freemium model provides opportunities for upselling premium features and advanced services to users who require more capabilities or additional support. This helps generate revenue while catering to diverse user needs. Additionally, the model enables easy scalability as the EOSC DIH can accommodate a large number of users without significant incremental costs. Free users also provide valuable feedback, allowing the DIH to improve and enhance its offerings based on user preferences. Lastly, the network effect comes into play, where the increasing number of start-ups and SMEs on the platform enhances its value, attracting even more users. However, there are some challenges to consider. Converting free users into paying customers can be a hurdle, and finding the right balance between offering compelling free services and generating revenue from premium users is crucial. Managing resource allocation and ensuring a positive value perception for both free and premium services are also important considerations. By addressing these challenges and implementing effective conversion tactics, the EOSC DIH can leverage the Freemium model to attract users, generate revenue, and create a thriving ecosystem of start-ups and SMEs.

5.3.2.3 Membership Fees

Membership fees can be a very important revenue stream for EOSC DIH and are meant to be charged to organisations that have access to the services and expertise of the EOSC DIH under a "member participation" status.

Membership fees can be structured in various ways, such as monthly, quarterly, or annual payments. The fees can be fixed or variable, i.e., a flat fee or a percentage of revenue. Additionally, there can be a tiered pricing structure based on the level of membership and/or service provided. Lastly, membership fees can vary widely depending on the nature (e.g., public or private sector) and/or size (e.g. start-up, SME or large corporation) of the organisation receiving the services.

Based on information from various DIHs, typical membership fees can range from a few hundred euros to several thousand euros per year. As an example, the Aachen Digital Innovation Hub (Homepage - digitalHUB Aachen) charges an annual membership fee ranging from 600 euro for the basic service package for start-ups (or even 0 € for early stage start-ups) up to €50,000 for the full-scale service package for large enterprises.

In a similar manner to other DIHs, EOSC DIH could offer different types of memberships (e.g., "standard", "premium", "elite" etc.) with varying levels of access to services and facilities. As an example, basic membership may include only access to online resources and events, while premium membership may provide access to funding, dedicated consultancy services and privileged support for EOSC services.

The following table provides an indicative membership fee structure for EOSC DIH:

Table 5-4: Possible membership fee structure

EOSC DIH annual membership fee	**STANDARD membership**					**PREMIUM membership**	**ELITE membership**
Company size	1-9 HCs	10-49 HCs	50-249 HCs	250-999 HCs	1000+ HCs	All sizes	All sizes
Companies fee	1.000 €	2.500 €	5.000 €	7.500 €	10.000 €	15.000 €	20.000 €
Start-ups fee (<5yrs old)	250 €					500 €	1.000 €

Eventually, the levels and mixture of membership tiers, company sizes and service packages, for the case of EOSC DIH will be finalised based on:

- the **market intelligence** that EOSC DIH has about its prospective customers e.g., client mixture, typical client, etc,
- its **business plan**, including operational costs' baseline (e.g., minimum annual costs to sustain a core EOSC DIH team of 3 FTEs), alternative long-term revenue streams that are secured (e.g., public funding via European projects),
- its **strategic roadmap**, particularly its legal form (e.g., becoming a separate legal entity), its for-profit or non-for-profit status, the wider EOSC ecosystem developments (e.g., EOSC Association), and other related aspects.

5.3.2.4 Equity Vs. Success Fee

An alternative (and complementary) revenue stream, that has limited short-term yield but potentially significant long-term gains, is to associate the EOSC DIH support offered to start-ups with some sort

of return-of-investment (ROI) metric, usually some form of capital raising from private investors. This way, EOSC DIH becomes a "partner" with its clients, in a win-win framework, where the success of the company benefiting from the EOSC DIH services will return to EOSC DIH in a pro rata manner. There are two main ways to achieve this form of revenue stream:

- **Acquiring equity**: this involves obtaining a share of the company, typically in the form of company stock. EOSC DIH could acquire equity in a company either in exchange for the services it offers and/or in exchange for providing financing in the form of investment (either directly or through a dedicated investment arm e.g., a VC fund). The percentage of equity to be taken varies, starting as low as 2-3% and going up to 9-10% or higher (particularly if investment or other forms of financing is provided). However, obtaining a percentage of a company can be a complex and risky process that requires consulting with legal and financial experts before pursuing such arrangements, something that does not seem easily accessible in the case of EOSC DIH for the foreseeable future. Furthermore, most start-ups would be reluctant to offer equity if no direct investment is involved, while more mature SMEs and larger companies are unlikely to consider such an option in the context of the services offered by EOSC DIH. The best option would be for EOSC DIH to establish a strategic partnership and pursue this activity in collaboration with an external dedicated investment arm that would carry out the respective arraignments. There are several organisations in Europe with an investment interest in the technology sectors where EOSC DIH has a competitive advantage (e.g., Big data, AI, etc) so this is a path worth exploring.
- **Success fee:** this involves establishing a Success Fee agreement between the EOSC DIH and the company, typically in the form of a bilateral agreement with the scope of achieving a certain milestone for the benefit of the company i.e., funding, which in turn will trigger an event of giving back to the EOSC DIH a portion of this financial gain. Such an agreement should be established prior to the company receiving EOSC DIH services and should remain in force for at least 12 months after the service delivery has been completed, so that to cover any investment-raising activities being finalised after the EOSC DIH support. The percentage of success fee can be a fixed number applying horizontally, or a variable number depending on the level of funding raised. The latter is a fairer method (and more acceptable by companies) hence it is recommended that EOSC DIH goes with this option. An indicative success fee table follows below:

Table 5-5: Possible success fee

Amount of capital raised	Success Fee
Up to one million euro (1.000.000,00 €)	**7%**
One million euro and one cent (1.000.000,01 €) up to two million euro (2.000,000,00 €)	**6%**
Two million euro and one cent (2.000.000,01 €) up to three million euro (3.000,000,00 €)	**5%**
Three million euro and one cent (3.000.000,01 €) up to four million euro (4.000,000,00 €)	**4%**
Four million euro and one cent (4.000.000,01 €) and above	**3%**

Eventually, the ranges of capital raised and the corresponding success fee percentages, are recommended to be finalised, not only according to internal EOSC DIH business plan calculations, but also based on the feedback from actual pilots with which the EOSC DIH has established collaborations, via data collected from e.g., satisfaction surveys or dedicated focus groups.

5.3.2.5 Sponsorships

Sponsorships can be another important revenue stream for EOSC DIH. Effectively sponsorship involves partnering with companies or other organisations that are willing to provide (direct or indirect) financial support in exchange for marketing opportunities and brand exposure; in this respect, it is vital that EOSC DIH capitalises in the best possible way upon the EOSC brand.
In terms of sponsor target groups, typical examples could be major ICT corporations, having a strategic (i.e., business) interest in the EOSC sector and ecosystem and its industry-engagement activities. Another interesting target group would be large financial institutions with a CSR/marketing interest to support European SMEs and start-ups.
In terms of sponsorship types, the most straightforward one is to provide financial support directly to the DIH managing organisation which can then allocate it to support its operations as it best sees fit. Typically, there would be different sponsorship levels or tiers (in similar fashion to the membership tiers), such as:

- **Gold sponsor**: this tier could include prominent branding on the EOSC DIH website and marketing materials, as well as exclusive access to EOSC DIH events and workshops. This tier could also include opportunities for the sponsor to participate in an EOSC DIH Advisory or Industry Board and thus advise on the EOSC DIH's strategic direction. A price for becoming a gold sponsor could range from **€25,000 up to €50,000 annually**.
- **Silver sponsor**: this tier could include branding on the EOSC DIH website and marketing materials, as well as access to EOSC DIH events and workshops. This tier could also include some opportunities for the sponsor to participate in EOSC DIH working groups and provide feedback on specific initiatives. The price for this tier could range from **€10,000 to €25,000 annually**.
- **Bronze sponsor**: this tier could include basic branding on the EOSC DIH website and marketing materials, as well as access to some EOSC DIH events and workshops. The price for this tier could range from **€5,000 to €10,000 annually**.

Another approach is for the sponsor to provide financial support, on a case-by-case basis (vs. a set time duration (e.g., yearly) mentioned above) for specific EOSC DIH activities (vs. generic EOSC DIH operations mentioned above), such as:

- **Event Sponsor**: such sponsors can provide financial support to help organise EOSC DIH events like conferences, workshops, and hackathons, thus helping the EOSC DIH to cover the costs (partially or in full) for organising such events.
- **Pilot Sponsor**: such sponsors can provide financial support to help the implementation of a specific Pilot that EOSC DIH is running, in exchange for exposure to the participating start-up/SME of this pilot.

Besides sponsorship in cash, there can be many forms of in-kind sponsorship. For example, EOSC DIH could partner with:

- **Technology companies:** offering access to specialised software, apps, equipment or tools for prototyping and testing for the EOSC DIH users.
- **Universities:** offering training and educational programs tailored to the EOSC DIH users.
- **Incubators and Accelerators:** offering office space or mentorship to the start-ups and SMEs supported by the EOSC DIH.
- **Marketing agencies:** offering branding and advertising guidance to EOSC DIH users.
- **Consulting firms**: offering strategic coaching and business advisory to the companies supported by EOSC DIH.

Sponsorships can be a mutually beneficial arrangement for both EOSC DIH and the sponsor. EOSC DIH can secure vital funding or in-kind resources to support its operations, while the sponsor can gain exposure to a targeted audience, reach potential customers within the EOSC DIH network, or demonstrate its social commitment in supporting European start-ups and innovative SMEs.

Nonetheless, it is important for EOSC DIH to carefully select its sponsors to ensure that the partnerships align with its long-term strategy and objectives.

5.3.3 Establishing A Separate Legal Entity

Funding by the Private sector or attracting sponsorship requires that the EOSC DIH Management is "spun out". This can impact both its sustainability prospects -by attracting more easily sponsorships and having a more streamlined balance sheet and budget control- as well as its scaling up efforts -by maintain a more flexible and lean operational and organisational model.
Selecting the most appropriate legal form for such a spin-off would depend on a variety of factors, including strategic and business plan aspects. Main legal form alternatives for EOSC DIH can include the following:

- **Non-profit organisation**: A non-profit organisation could be a suitable legal form for the EOSC DIH should its primary objective remain strictly in promoting research and innovation and accelerating industry take-up in the field of open science, rather than generating profits for its owners or shareholders. This legal form could potentially allow the EOSC DIH to apply for tax-exempt status and to access funding from public and private sources.
- **Public-private partnership**: A public-private partnership (PPP) could be a suitable legal form for the EOSC DIH if it aims to move forward together with a wide range of stakeholders from the public and private sectors as opposed to its current status. This legal form could enable the EOSC DIH to access funding and expertise from both the public and private sectors, while also allowing for greater flexibility and innovation than a purely public or private organisation.
- **Limited liability company**: A limited liability company (LLC) could be a suitable legal form for the EOSC DIH if its primary objective is to generate revenue (and eventually profits) through its activities. This legal form could provide the EOSC DIH with greater flexibility and autonomy than a non-profit organisation, while also limiting the liability of its owners or shareholders.

The above (and other) options are driven mainly by its business model (to be documented in an EOSC DIH's business plan / strategy roadmap) before the most suitable legal form can be selected.
One thing for certain is that, depending on its business model and respective legal form, a quite different set of Key Performance Indicators (KPIs) would have to be selected for its Monitoring and Evaluation (M&E) processes, compared to what have been currently identified and deployed as part of its project status within the EOSC Future context. Specifically, some more business/operational KPIs that would help track sustainability aspects, could include the following:

- **Revenue generated**: tracking the revenue generated from different services -such as membership fees, sponsorships, consulting services and training- is important in order to help the EOSC DIH to gradually optimise its pricing strategy (e.g. value-based vs. cost-plus vs. competitive vs. freemium vs. membership pricing) and identify further areas for growth. This is an important KPI for the financial sustainability of the EOSC DIH.
- **Time-to-market for new products or services**: tracking the time-to-market for new products or services that EOSC DIH has helped to develop for its clients can help to identify areas for process improvement and ensure that EOSC DIH is providing efficient and effective services. This is an important indicator of the EOSC DIH's ability to promote innovation and commercialization in the field of open science.
- **Number of patents or publications**: tracking the number of patents or publications that result from pilots or other collaborations/projects that EOSC DIH's clients have worked on can help to demonstrate EOSC DIH impact on innovation and research outcomes. This is an important indicator of the scientific and technological impact of the EOSC DIH's activities.
- **Readiness Levels expansion**: thus far, among various readiness levels, only Technology Readiness Level (TRL) is being monitored by EOSC DIH for the supported pilots. It is recommended to expand this to address other Readiness Levels e.g. the KTH Innovation Readiness Level model, such as: Customer Readiness Level (the maturity level for market

demand and customer interest for the project/product), Business Readiness Level (the maturity level of the economic viability and feasibility of the project/product's revenue model and scalability), Intellectual property Readiness Level (the readiness level of the intellectual property status and related protection), Funding Readiness Level (the readiness level for securing the necessary funding to bring the project/product to market) and Human resource Readiness Level (the maturity level of the SME team's skills and alignment).

Of course, existing KPIs in the current M&E framework, such as **Number of pilots served**, **Pilot satisfaction ratings**, **Number of Collaborations and Partnerships**, and others, should continue to be tracked in any of the above scenarios.

5.3.3.1 Scaling Up

Scaling up for EOSC DIH means either supporting more pilots or offering more consultancy services (and not EOSC service). Considering the goals of EOSC and EOSC DIH, scaling up would make sense in terms of offering pilots. In its current form EOSC DIH with its customised consultancy for each start-up and SMEs cannot scale unlimitedly.

5.4 Selected models and scenario to operate

Although multiple options are described it should be highlighted that the final decision on the models to follow with be taken during the extension period considering the insights from the impact and satisfaction assessment of the business pilots that will be carried out in the upcoming months. Therefore, the conclusion of this analysis will be provided on the updated version of this deliverable in M36.

6 Recommendations for future

Multiple lessons have been learned in the period and this section collects a number of recommendations for the project consortium, EOSC DIH managers and contributors, and stakeholders including EOSC Association, European Commission and other funders.

6.1 Branding

The branding of the EOSC DIH should evolve to better align with its target audience, which consists of start-ups and SMEs in the private sector. To ensure the branding of EOSC DIH effectively evolves, a thorough analysis of other DIHs' branding strategies provides valuable insights. A quick comparative study reveals that successful DIHs catering to start-ups and SMEs have adopted a brand identity that emphasises agility, innovation, and industry relevance. They utilise modern and dynamic visual elements, such as clean and minimalist logos, vibrant colour palettes, and contemporary typography, to resonate with their target audience.

Applying these findings to the branding of EOSC DIH, it is crucial to consider the development of a fresh and contemporary visual identity that aligns with the values and objectives of the DIH. This may involve designing a new logo that embodies the essence of digital innovation, collaboration, and growth. The colour palette should be carefully chosen to evoke trust, professionalism, and energy, while also resonating with the target audience. Typography plays a significant role in brand communication. Selecting modern and versatile fonts that are legible across various platforms and devices is essential. The typography should strike a balance between being approachable and professional, reflecting the DIH's commitment to supporting start-ups and SMEs while maintaining a high level of expertise.

Beyond visual elements, the messaging and positioning of EOSC DIH's brand should be refined to effectively communicate its unique value proposition as discussed earlier. It is crucial to highlight the tangible benefits and outcomes that start-ups and SMEs can achieve through engagement with the

DIH. This can be achieved through the creation of compelling content, such as success stories, testimonials, and case studies that demonstrate the real-world impact and value generated by collaborating with EOSC DIH. The current website does have this content however, the way of communicating its message effectively should be improved.

While evolving the branding, it is vital to maintain consistency and alignment with the overall EOSC brand identity to ensure a cohesive and unified image. Collaborative stakeholder consultations and engagement should be an integral part of the rebranding process. This approach allows for valuable insights and feedback, ensuring that the new branding resonates with the target audience and is embraced by the ecosystem.

However, it is important to approach the rebranding process with caution and gradual implementation to avoid confusion and maintain continuity with existing stakeholders. Clear communication and a well-executed transition plan will help manage potential challenges and gain support from both the research community and the private sector.

6.2 Marketing

There was a comprehensive communication and dissemination plan developed to promote the EOSC DIH. These activities have been quite successful as demonstrated in the KPI's and through the attracted pilots. However, there is still room for amount of improvement in terms of attracting SME's and startups to its open calls and events. Similarly, the DH community can be significantly expanded by increasing the network of EOSC DIH.

Both of these improvements, indicate the need of a more comprehensive marketing plan which complements the dissemination and communication strategy. A robust marketing strategy helps in reaching right target audience where in communication and dissemination can then help in communicating the right message. A comprehensive marketing plan will be help in achieving the following objectives,

- Increasing awareness of the DIH and its services within the private sector;
- Broadening the DHS reach to engage with the wider range of potential collaborators;
- Building strong relationships through networking events and personalized outreach;
- Establish the DI H as a thought leader.

Following elements can be considered while developing this aforementioned marketing plan,

1. Targeted Digital Campaigns: The DIH may consider utilizing digital marketing techniques like search engine optimization (SEO), paper click advertising (PPC), and social media advertising and developing targeted campaigns based on specific industry verticals, geographic regions, or technology domains. These techniques will require devoted special budget to cover these activities.
2. Tailored Content Strategy : In addition to the existing training materials on the website and pilot information and success stories, a content strategy that focuses on creating valuable and useful content for SMEs and startups can be developed. This can include blog articles, case studies, video tutorials, and expert interviews. The training and webinar program of the DIH will be a good avenue for steady stream of content for promotion. Share this content through various channels to establish thought leadership and attract the target audience.
3. Collaboration and Partnerships: The DIH should continue to engage with multipliers who can support in marketing its activities with a special focus to be paid on mainstream accelerators and incubators. Special focus will have to be paid on establishing partnership with EDIHs as they mature in the coming years.

Branding decisions from section 7.1 will have a significant impact on the marketing plan.

6.3 Standardisation / Automation

EOSC DIH has already developed several standardised processes and procedures for delivering its services to its pilots, yet these can be further improved. This would help to further reduce the time and effort required to deliver services, improve the level of consistency and quality, reduce the need for manual intervention, and make it easier to scale up its operations. Areas where further optimisation and improvements can take place, include indicatively the following:

- Expand knowhow in **project** management, **client** management, and **financial** management **skills**, through respective **training** and **certification** of the EOSC DIH staff.
- Roll out dedicated project management **tools** to automate tasks such as task allocation, progress tracking, and resource management within the EOSC DIH team, helping to keep operations on time and within budget.
- Apply customer relationship management (**CRM**) tools to automate tasks such as client onboarding, communication, and follow-up, helping to ensure that clients receive a high level of service and support.
- Introduce lean **accounting** and **financial** management tools to automate tasks such as invoicing, expense tracking, and financial reporting, helping to reduce errors and ensure that financial records are accurate and up-to-date.
- Adopt new **e-learning** platforms that can facilitate an easier delivery of training and education programs, both synchronous and asynchronous.
- Implement **quality management** systems, such as ISO 9001, to ensure that services are delivered to a consistent standard of quality and help build trust with clients and stakeholders.

Of particular interest would be for EOSC DIH to adopt a standardised method for evaluating the business progress and prospects of the pilots/companies' products, market, competition, teams, risks, and other key areas, as part of its consulting services.

6.4 Partnering With Other Organisations

EOSC DIH can partner with other organisations, such as business-support networks, academic institutions, or even other DIHs, to scale up its reach and service delivery capabilities. Partnering with other organisations can be a valuable tool for EOSC DIH to scale up its operation and access new resources and expertise. In particular, EOSC DIH should focus on the following partnering activities:

- Leveraging existing **business-support networks**, such as industry associations and business-support structures (e.g., business incubators and accelerators) and identifying potential partners and collaborators. These networks can provide general opportunities for networking and knowledge sharing, but of particular interest are the **Mentors** that these networks usually have access to. Accessing external mentors (on a pro bono basis) can help the EOSC DIH to offload its consulting operations and specialised services.
- Partnering with **universities** and other academic institutions to scale up its **training** and **education** offerings. Getting access to readily available training content is significant time and effort saving for EOSC DIH. A by-product of such partnerships is getting the opportunity to collaborate on research funding projects and initiatives thus adding additional revenue opportunities.
- Entering into joint ventures and strategic alliances with **other DIHs** to combine resources and expertise as well as to pursue shared goals and objectives. This can help to expand the reach and impact of EOSC DIH, and to access new markets and opportunities. Of high value and interest is the fact that other DIHs can increase the **deal-flow** channel of new pilots towards EOSC DIH. However, it is important to ensure that partnerships with other DIHs are structured in a way that is mutually beneficial and sustainable over the long term (i.e., avoiding conflicts of interest). This is best achieved by pursuing partnerships that have already identified specific areas of complementarity between the two DIHs.

6.5 Co-development activities via purchasing services

In the context of procuring commercial services from the private sector for co-development with a research community several key insights have emerged from our experience.

- **Satisfactory experience with a legal entity support:** The procurement endeavour was significantly aided by the support provided by a legal entity, which helped navigate the complex paperwork associated with the tendering process. This support ensured that the necessary legal requirements were met efficiently.
- **Mutual commitment**: The development phase of the project proceeded smoothly due to the strong commitment and cooperation of both parties involved, namely the private sector service providers and the research community. This alignment of interests and dedication to the project's success were crucial factors in its success.
- **Bureaucratic overload**: However, one of the notable encountered challenges was an overwhelming bureaucratic burden. The abundance of administrative requirements and regulatory hurdles added unnecessary complexity to the procurement process. This bureaucratic overload not only extended timelines but also consumed valuable resources.
- **Timelines and phases of open procedures**: Another issue that came to light was the timeline associated with various phases of the open procurement procedures. Delays in these processes can be costly and can impede the ability to execute multiple tender processes effectively.
- **Insufficient initial demand Analysis**: An important lesson learned was the lack of information from the initial analysis of demand (not included in the DoA) that was run via an initial survey with very generic answers and complemented with some desk research. The dedicated resources were limited on time and overlapped with other duties of the EOSC DIH. Future actions should consider dedicated resources and planning for better communication and systematic way of collecting research communities' needs.

Considering these insights, the overarching lesson learned is the critical importance of improving the EOSC DIH procurement practices. Specifically, it's needed to streamline bureaucratic processes, optimize procurement timelines, and enhance the initial demand analysis. These improvements are essential not only to achieve greater efficiency in procurement but also to enable multiple tender processes. By addressing these challenges, the EOSC DIH could foster healthy competition in the private sector partnership and better meet the needs of research communities, ultimately leading to more successful and impactful projects.

7 Conclussions

The EOSC DIH has achieved remarkable milestones during its journey as a bridge between the EOSC and the private sector. The initial funding from the EOSC-Hub project laid the foundation, and the EOSC Future project further refined its processes and services, validating its value to the private sector. Throughout EOSC Future, the EOSC DIH successfully expanded its operations, broadened its community, and introduced new mechanisms for monitoring and validation. It is now firmly established as a vital channel for collaboration between EOSC and the private sector, with a focus on SMEs and start-ups.

The EOSC DIH primary objectives revolve around enabling innovation, with a strong emphasis on SME integration, active engagement in the EOSC DIH community, and private sector adoption of advanced EOSC services.

On the demand side, the EOSC DIH worked with 9 EOSC-related projects to provide various services for pilots, helping them test and validate new concepts, resulting in 27 established pilots. Most of these pilots successfully completed their activities, even without direct funding, and some significantly increased TRL of their products and services. The EOSC DIH played a pivotal role in increasing this TRL with most pilots experiencing a 1-2 level increase during their engagement. While it's acknowledged that multiple factors contributed to this progress, the technical expertise, resources, collaboration opportunities, and assistance in accessing funding and grants provided by the EOSC DIH undoubtedly played a crucial role, as confirmed by the satisfaction interviews. The EOSC DIH also facilitated negotiations for continued support for ongoing pilots beyond September 2023.

On the supply side, the EOSC DIH, in collaboration with a selected company through a tender process, developed a solution for phenological research at the Poznan University of Life Sciences. This endeavour considered as a test for the EOSC DIH on the purchase process led to an innovative commercial service that was onboarded in the marketplace, providing valuable experience for future procurement activities.

The EOSC DIH community has grown significantly, with numerous businesses actively participating in various events, training, and networking opportunities. Partnerships and engagements with EOSC-related projects, multipliers, and other (E)DIHs have expanded, and the database of experts in various fields has significantly broadened.

The EOSC DIH journey is marked by substantial accomplishments, and its continued efforts promise to further strengthen the bridge between EOSC and the private sector, fostering innovation and digitalization in both scenarios. The long-term strategy for the EOSC DIH involves continued evolution as a channel to exploit EOSC resources and enrich the EOSC portfolio with private sector resources. Sustainability options and operational models are being considered, with feedback from pilots and impact assessment interviews informing the final decision. Further updates on these matters will be provided in an enhanced version of this document in March 2024 along with an in-depth impact assessment, including detailed information on satisfaction and impact of the pilots.

8 Annex 1: EOSC DIH Business Pilots

DIGIFARM ***Detecting the world's highest accuracy field boundaries to power precision agriculture***	DigiFarm

Company: DigiFarm

Country: Norway

Sector: ag-tech start-up

Description: The project included developing and model training deep neural network model for detection of entire-country sized regions including Germany, Austria, Belgium, and the United Kingdom.

The solution benefit agricultural organizations to optimize operations, making better data-driven decisions, reducing seasonal uncertainty, minimising production costs, increasing crop-revenue and enabling key development in Carbon capture leading to reduction in Co2 footprints. DigiFarm delivers software as a service seamlessly integrated into clients (B2B/B2G) digital solutions (API). The pilot results will be implemented into corporate partners (KWS) commercial FMS-solutions after the pilot has been finalized.

Achievements: DigiFarm managed successfully to delineate field boundaries and seeded acres across the AOIs including Germany, Austria, Belgium, and the United Kingdom. DigiFarm managed to achieve the targeted accuracy (IoU) of 0.94+ across all the regions. This resulted in achieving 10-12% higher accuracy than LPIS (Land Parcel Identification System) Cadastral data which was benchmarked against our field boundary delineation assessed across 200k hectares in England, Belgium, and Austria. Thanks to the pilot that allowed it to produce the valuable data the company was able to attract new clients.

How they used EOSC Services: They used the EOSC services to train the deep neural network model to automatically and accurately detect agricultural field boundaries based on the deep-resolution Sentinel-2 at 1m per pixel resolution Satellite Earth Observation data. In order to be able to train and develop a highly accurate AI-model (image segmentation) it was critical for DigiFarm to be able to leverage the HPC and high-performance GPUs in order to train the models, this would not have been possible to do in a commercial setting as it's too expensive, hence, the ability to leverage this partnership along with the internal team's expertise was critical to our success. They used EGI-ACE GPU-enabled cloud resources at INFN-CNAF, and EOSC-DIH technical consultancy, visibility, and funding opportunities service. In addition, the company is in the process of adding the service into the marketplace. (there were unfortunately some EOSC Portal technical issues with registering company as a provider).

Impact:

- The company thanks to new data attracted new potential clients and applied successfully for next kind of funding.
- 10-12% higher accuracy than LPIS - the dataset of the high quality
- Company gained knowledge, of how to leverage and optimize model training and GPU-setup, how to build and develop a scalable, automatic, and cost-efficient data processing pipeline.

Provider	Service
EGI-ACE	Computing Infrastructure
EOSC DIH DIGITAL INNOVATION HUB	Technical Consultancy, Funding opportunities

BIGCOLDTRUCK ***Big data analytics for cold chain logistics optimization in refrigerated trucks.***	OdinS

Company: Odin

Country: Spain

Sector: Logistics

Description: Odin Solutions (OdinS) is a SME founded in August 2014 and accredited as an innovative ICT company (EIBT) by MINECO and ANCES. OdinS has a strong background in the R&D fields of Internet of Things, Security and Data Analytic. The pilot contributes to the development of the supply chain 4.0, specifically the cold chain, and it is aligned with the interest of OdinS to contribute to the emergence of smart environments.

Achievements: The company provided a solution that shows the following information: Ranking of the products, Trip Duration statistics, Seasonality of products' demand, Geographic Representation of the trips.
The company has indexed the data using Elasticsearch and connected their dashboard to it using the Elasticsearch package. They provided daily and weekly predictions on the demand of each of the products for the management of the products. They have studied and detected anomalies in fuel consumption and in trip durations to do predictive maintenance and in order to optimise the trucks' routes. The pilot started in the context of the EOSC-hub project and was extended/continued and finalised in the EOSC-Future project.

How they used EOSC Services: Deep Hybrid DataCloud was used for deploying a Jupyter instance in the DEEP CLOUD testbed with a GPU. This served to ease the machine learning models training that were tested for the prediction of the demand of different products (multivariate approach) and in the detection of anomalies by means of univariate predictive algorithms. They also were supported with technical consultancy service in Big Data to fasten up the descriptive analysis that is shown in their Dashboard. Following the advice, the company used the Elasticsearch solution, that was deployed in one of their machines, for data indexing. They were able to connect dashboard to their machines by means of ssh tunnelling and the computing speed of the results was greatly improved. In the extension of the project the company adapted this mechanism to make it real-time, for when the data is continuously injected to a database. Mechanism of storing the data in a private environment was investigated.

Impact:

- Improved company product
- Reduction of computing time for the machine learning models.

Provider	Service
deep Hybrid DataCloud	Deep Cloud platform
EOSC DIH DIGITAL INNOVATION HUB	Technical consultancy in BigData Computing infrastructure

MICADO ***Cloud and Container Orchestrator*** ***Orchestration Framework for Cloud Resources and Application Container***	

Company: cloudSME

Country: Germany

Sector: IT

Description: MiCADO is an auto-scaling framework for Docker containers, orchestrated by Kubernetes. It supports autoscaling at two levels. At virtual machine (VM) level, a built-in Kubernetes cluster is dynamically extended or reduced by adding/removing cloud virtual machines. At Kubernetes level, the number of replicas tied to a specific Kubernetes Deployment can be increased/decreased.

MiCADO requires a TOSCA-based Application Description Template to be submitted containing three sections:

- the definition of the individual applications making up a Kubernetes Deployment,
- the specification of the virtual machine and the implementation of policies for scaling and monitoring both levels of the application.
- the format of the Application Description Template for MiCADO is detailed later.

Achievements:
CloudSME ran a feasibility study to use EOSC computing services, developing a cloud resource adapter allowing MiCADO to run on EGI compute resources. This adapter was required by MiCADO to start and configure cloud instances. The result of the feasibility study demonstrated some limitations and security constraints on using the infrastructure.

How they used EOSC Services:
CloudSME used the EGI compute resources to test their cloud resource adapter and got EOSC DIH technical consultancy support to use the EGI infrastructure. In addition, CloudSME has participating in multiple community activities, getting information for funding opportunities and got visibility in the communication activities.

Provider	Service
	Technical support Training Comms & sustainability
	Visibility, Funding opportunities

TRANGO. TRIP AND GO *Best location for car sharing*	

Company: Agilia Center

Country: Spain

Sector: Software

Description: Trango provides a platform that combines carsharing with the ridesharing model within a social network to facilitate the interactions among users and their communication with service administrators. This service provides transparency between car owners, drivers and passengers who want to hire the vehicle, adding some benefits to the owners and to and to passengers and drivers. A demand prediction functionality for each city suggests locations to car owners or fleet administrators to improve their revenues. Additionally, an incentivisation service offers escrow and price discounts based on user behaviour and selects travel partners based on their reputation.

How they used EOSC Services:

Trango used EGI Cloud computing for testing for a year. Trango have also participated in dissemination activities and community meetings, sharing discussions with other pilots.

Achievements: During this period, Trango achieved the TRL 7 and run a real pilot for 10 days in the city of Huelva in September of 2022. In this pilot was registered 61 users in the platform and complete 28 trips with 58 occupants.
The service is improved with the following innovations:
- SLA evaluation: Automatic and decontrolled assessment of the service through Smart Contracts (Blockchain): The information to evaluate the agreement is collected from different
sources.
- Assurance of payments and Escrow: User charges are stored in a smart contract in advanced and released after sharing cost or after evaluating the SLA (Blockchain)
- Social Network: A community is grown around the service in every city
- A demand prediction allows the operator or the owner to allocate the vehicle in the city in advance to attend this demand (Artificial Intelligence)
- A dynamic price (reward) tries to match the end location of a travel with the next high demanding zone (Artificial Intelligence and Blockchain)

Impact:

Working with EGI as Cloud provider, offered testing of different solutions at the same time, increasing the number of concurrent market tests.
Working with the EOSC DIH as Innovation Hub, had value in sharing information and discussion among different pilots and interest in a wide diversity of fields:

- space to understand other business models.
- innovative solutions that can be applied to these sector/solutions.
- In the next phase we will adapt the service to the market since new challenges have been discovered in the last year, especially in the use of cryptocurrency and in the city electric mobility.

Provider	**Service**
EGI-ACE	Compute Storage Data Management Networking

PUNDIT ***A web annotation tool for researchers to empower note taking.***	PUNDIT

Company: Net7
Country: Italy

Sector: Software

Description: Pundit is a cloud service that allows users to "take notes" on web documents, like a web page or a PDF file. It consists of a set of components, amongst them the Annotator, a free extension for the Google Chrome browser used by users to create the annotations.
Annotations can be highlights of text parts or comments, applied either on a selection of the text or on the whole document. It is also possible to create annotations to tag a selected text or an entire web page. This creates a free-form personal category that can be reused in other annotations.

How they used EOSC Services: Thanks to collaboration with EOSC DIH pilot, Net7 onboarded Pundit in the EOSC Marketplace to give to this tool a significant boost in visibility, especially amongst European researchers. In addition, business exploitation options for Pundit were considered, and created a solid, viable, and long-term sustainability model for this service.
Pundit was hosted by using Amazon AWS and it wanted to validate and test the movement forwards other infrastructure. Pundit within the pilot verified the possibility to host Pundit in an EOSC infrastructure.

Achievements:

- Onboarded Pundit in the EOSC Marketplace
- Integration with EOSC computing services
- Commercial exploitation strategies defined

Impact:

- Larger visibility gained.
- From a technical viewpoint, the migration work from Amazon AWS (that has started in the pilot).
- From a business perspective, following the indications and suggestions for a possible business exploitation of Pundit.
- New collaborations thanks to participating in EOSC DIH community

Provider	Service
EOSC DIH DIGITAL INNOVATION HUB	Visibility Training & Support Consultancy for Marketplace onboarding Support in validation of the EOSC Computing services Business consultancy
EGI-ACE	EOSC Computing services

ELD-ADVANCE *OpenAIRE ELD-Enrich Local Data via the OpenAIRE Graph – ADVANCE*	4SCIENCE

Company: 4Science

Country: Italy

Sector: Open Science

Description: In spring 2021, OpenAIRE ELD released two new services: Data Correction (based on the OpenAIRE Notification Broker), to enrich repository data by exploiting the vast amount of information made available by OpenAIRE, and the Publication Claim (based on the OpenAIRE Graph), to ensure that the repository stays up-to-date by automatically discovering new content produced by the institution's researchers in the OpenAIRE Graph, thus reducing the manual input from researchers. OpenAIRE ELD produced a merge in DSpace-CRIS code for version 7, and a proposal for inclusion in DSpace code. In summer 2021, DSpace 7 was released, and the community would need an update and actual inclusion in the code to enhance the visibility of the services and encourage their exploitation.

How they used EOSC Services: 4Science made OpenAIRE services available out-of-box in the latest releases of DSpace as it was already done in DSpace-CRIS, for the international community of adopters, in collaboration with the OpenAIRE team.

Achievements:

- updated OpenAIRE ELD DSpace PR to align with release 7.2.
- added support for OpenAIRE notification broker client.
- work with the community for official acceptance into DSpace
- official and validated delivery of the two new features

Impact:

- Increase of the TRL, from TRL 5, since the pilot of the same was applied on an institutional repository (at the University of Trieste): thanks to this further completion activity, the solution reached TRL 6, as the integration/demonstration that was be proposed and presented to the entire DSpace Community.
- "Aiming to achieve full impact by providing a benefit to the entire research community and supporting Open Access and Open Science policies that are spreading throughout Europe and beyond, two services will be extended to DSpace repositories. The Data Correction (based on the OpenAIRE Notification Broker), to enrich repository data by exploiting the vast amount of information made available by OpenAIRE, and the Publication Claim (based on the OpenAIRE Graph), automatically discovering new content produced by the institution's researchers in the OpenAIRE Graph, thus reducing the manual input from researchers.
- The project achieves refinement and improvement of the results of the previous OpenAIRE ELD project (https://www.openaire.eu/openaire-eld-enrich-local-data-via-the-openaire-graph), targeting a deeper integration between OpenAIRE services and DSpace, the world's most widely used repository technology, in its latest and most stable version 8 through one final phase.
- The integration with the OpenAIRE Notification Broker will be streamlined allowing the repository manager in a single step to retrieve and process the information from the OpenAIRE Notification Broker without the need to use external process to download from here the needed information. The correction service has been generalized so that other providers in future will be able to suggest amendments to existing records to improve the repository data quality.
- The ELD-ADVANCED solution uses the DSpace REST API as integration layer for all the components, so an important thing is that this technology will be "agnostic" and could be applied not only for DSpace, but also for different repositories technologies!
- At the time of writing the PR to merge these new features in DSpace has been set by the DSpace working group in the scope of the 8 release.For a long time, 4Science has been working and collaborating with the EOSC and many important value-driven organisations (OpenAIRE, COAR, JISC) on the creation of new valuable content, donating it to the community for the benefit of Open Science, acting - as Platinum Certified Provider and leading contributor to the DSpace Community - as the main interlocutor and mediator for the adoption of new international standards in the field of FAIRness and interoperability.

Provider	Service
NEXUS	OpenAIRE Research Graph OpenAIRE Broker
EOSC DIH DIGITAL INNOVATION HUB	Visibility Training & Support

OPEN SCIENCE LENS ***Offering in-place access to millions of Open Science Research Products, at a glimpse.***	CITE

Company: Cite

Country: Greece

Sector: Open Science

Description: Open Science Lens (OSL) delivers an innovative technological approach to empower Open Science (OS) and bring the scholarly works available on OpenAIRE e-infrastructure, at the reach of research stakeholders, citizens. To deliver its objectives, OSL builds on the OpenAIRE Research Graph a set of services, offering a tool-suite that can be integrated in a browser or directly in a science-oriented web page enhancing the user experience with regards to OS exploration.

How they used EOSC Services: The OSL Web Browser Plugin is a component that operates within a web browser and is based on the detection of DOIs for rendering additional information retrieved through OpenAIRE APIs.
The OSL Page Enhancer supports the case of providers of science-oriented page/site that seek to benefit from OpenAIRE Graph API, with a non-disruptive approach. Integrating a small (JavaScript) library and some minimal additional markup, it reveals much of OS information residing in OpenAIRE into the page/site which becomes a live source of information.

Achievements:

- Setup, configure and utilize the platform to run, test, and evaluate the solution, through the usage of the EGI-ACE services of EGI Cloud Compute and EGI Cloud Container Compute
- Reuse selected EOSC services to provide value adding services to end users, through the integration of the existing Open Science Lens solution with the OpenAIRE and EOSC services
- Utilize knowhow and technical consultancy from EOSC service providers, through the close collaboration directly with the EOSC Service Providers
- Measure and validate required throughput for supporting large scale usage both directly through the browser extension as well as indirectly through high traffic sites integrating OSL Enhancer by utilizing the available resources to simulate and profile usage patterns and observed behavior in coordination with Service Providers
- Integrate, streamline, and validate OSL offerings by testing and verifying the measurable performance and cooperating with leading Open Science related service providers offering needed consultancy and guidance

Impact:

- Exploring the potential of offering the OSL service as an EOSC service which is currently being considered
- The OSL extended it readiness level from TRL7 to TRL8, marking the system complete and qualified
- In addition to other gains, through this pilot we gained insight and explored the possible options to further sustain the OSL

Provider	Service
OpenAIRE NEXUS	OpenAIRE Graph OpenAIRE login OpenAIRE explore
EGI-ACE	EGI Cloud Compute EGI Cloud Container Compute
EOSC DIH DIGITAL INNOVATION HUB	Visibility Training & Support

ANESYS ***integrAted iNtelligent thErmostat SYStem.***	

Company: Inteligg

Country: Greece

Sector: Smart City

Description: INTELIGG provides to the Building Manager with an Excel Sheet (created by INTELIGG P.C.) where is asked the required technical details of the building characteristics (i.e., BEMS, m2, existing energy system, # of floors, etc) while providing also full access to the BEMS and architectural/civil plans. The company provide a feasibility study for further energy saving in the Pilot building. The integration of the cloud server to the BEMS is the step after finalizing step a mentioned before. The company initiates the integration process where all information from the BEMS would be accessible by the cloud server and the data is readable by the cloud server and the generated commands are properly received by the BEMS. Finally, once communication between cloud and BEMS is checked and works then building measurements are utilized to generate and optimize corresponding building energy profile in our IoT platform. At the same time all these is accessible by the building manager via his PC/Smartphone while showing the great energy efficiency benefits to the manager and INTELIGG for large building also. The idea of this pilot/feasibility study was to validate usefulness of the EOSC service (Amnesia) and use the Cloud services for selected building use case. EOSC DIH was about to support the process of identifying relevant building for the test and validation within its network.

This Pilot proposal suggests a system be applied first on a large building with an already installed Building Energy Management System (BEMS). It was preferable that the already installed BEMS works according to one of the available protocols for building automation such as Bacnet. Using a cloud server will make stable communication within the local network and the server where AI algorithms will communicate the optimal performance of the HVAC system (thus our server is only acting as a PaaS/SaaS model).

How they used EOSC Services:

- Used EGI Ace Cloud Compute to install their services, as part of validation,
- Validated AMNESIA service
- Used EOSC DIH matchmatking service for starting collaboration with other partners

Results:

- EOSC DIH was performing many activities towards identifying together with company relevant building, organising meetings with potential cases to test the SMARTH-PROP system. Unfortunately, none of the building was or suitable, or the owners in the end interested in using the service.
- EOSC DIH found the company from Canada managing around 2000 buildings that have been interested in collaboration and pilot. We had moderated and established few meetings to help establishing the collaboration, however the final business-oriented decision was still pending on Intellig.
- INTELIGG team validated Amnesia service, however it resulted in the outcome that it not fit fully into their specific detailed scenario.
- EOSC DIH was supporting the team also in finding suitable other source of funding for possible scenario where the building does not have the BEMS. However, in the end Intellig did not succeed in getting the funding in suggested open calls.

Impact:

- Lesson learned: Through many of the discussions on the potential interest in the solution of the company, it was found out that there is a barrier while discussing with potential customers on providing their building data even for trials, and even considering potential economic benefits for the companies using the solution. The company need to work out better strategy towards approaching potential clients.

Provider	**Service**
EGI-ACE	Cloud Compute

NEXUS	Amnesia
EOSC DIH DIGITAL INNOVATION HUB	Funding opportunities Matchmaking

AGRIFOOTPRINT ***Cloud model for Carbon Footprint assessment in crop growing and agri food value chains.***	BIOINVEST-AGRO INNOVATION COMPANY

Company: BIOINVEST-AGRO LLC

Country: Ukraine

Sector: Agricultural

Description:

The INNOVATION COMPANY BIOINVEST-AGRO LLC. (Ukraine) has been on the market since 2004. The company focuses on the development of innovative adaptive technologies for plant growing that enhance productivity and quality of crop production. The company's solutions allow to reduce operating costs and risks, to optimise the use of nutrients and plant protection products, to reduce the losses of the transitional period during the introduction of energy saving technologies in the soil cultivation practices (No-till, Mini, Strip-Till).
Ukrainian INNOVATION COMPANY BIOINVEST-AGRO LLC. contributes to the greening of agricultural crop growing process and the development of technologies for growing plant products adapted to climate change. Recently, the company began to elaborate on the biologicalization direction of agricultural production using modern digital technologies, which allows it to accelerate the innovations implementation. One example of IT technologies implementation is the project on monitoring the processes of plant growth, resource provision, and assessment of the carbon footprint in the production process, its planning, and yield management.
The aim of the AgriFootprint project is to create a service for the assessment of carbon footprint of agricultural products in the process of growing. Also, it is the tool for sound adjustment of agrotechnological, organisational and management decisions by food producers of plant origin. The service meets demand among crop producers and will create a new niche of eco-economic services.
The project is based on the following components:

- Own methodology for assessing and monitoring the carbon footprint in crop production based on international best practices and guidelines.
- The prototype of AgriMeasure complex for obtaining the values of agro-climatic indicators of crop production in the fields of customers
- The concept of AgriModel tool for carbon equivalent calculations based on verified algorithms.

How they used EOSC Services:
The AgriFootprint project implementation requires building IT infrastructure that will allow:
1. To set up a code repository and own CI/CD for carbon footprint modelling core.
2. To collect, structure and store clients' datasets with additional meta information. Datasets will contain data based on 8-10 parameters of growing crops processes on different fields located in different climate zones.
3. To perform modelling with using separate different algorithms of carbon footprint estimations and to iterative learn models on prepared datasets.
4. To create monitoring dashboards with actual results of data modelling processes in real time.
5. To share the collected data as a result of modelling iterations with experts, members of the project team and clients.
6. To create a site where the stable version of modelling core will be used as a backend of commerce service.

According to the mentioned need Bioinvest-agro used:
1. Storage for datasets.
2. Platform for real and masked data sharing including graphs and file storage.
3. Kubernetes cluster for testing modelling algorithms.
4. Kubernetes cluster for the one commerce version of carbon footprint estimation service with monitoring tools.

For those needs identified services from EGI-ACE were used including EGI Cloud Compute
EGI Cloud Container Compute, EGI Online Storage (relational DB like PostgreSQL/MySQL), Elastic Cloud Compute Cluster (EC3) (for Kubernetes or PaaS/SaaS). Also, several OpenAIRE Nexus have been evaluated.

Achievements:

- Due to the war in Ukraine that affected the pilot just after start, it was on hold for over 6 months.
- Consultancy and education in appropriate use of EOSC services
- Configuring of the requested services and support in its use
- The use of IT technologies was initiated by the NOSC-UA DIH and was supported by EOSC DIH. As part of the cooperation, a cloud-based model for the carbon footprint estimation in crop production and agro-food added value chains has been worked out.
- Prototype of cloud service for the carbon footprint estimation during the process of agricultural products growth has been developed and tested.

- Virtual Centre for Digital Innovation NOSC-UA DIH as an i4trust ambassador and wasis preparing an experiment for agricultural data exchange between SMEs from France, Spain, Greece, Italy and Ukraine to apply for i4Trust 2nd Call. This project will involve data providers and users of the data services. Looks like the perspective way to build such a commerce platform. EOSC DIH supported the application, and the complementary funding has been granted from i4Trust call with support of EOSC DIH and in the scope of I4Trust 2nd Open Call the application was prepared and, as a result, i4Trust Data Spaces Experiment "Carbon Agri Data Space (CADS) was realized. The cloud model AgriModel for the Carbon footprint estimation was developed in the bounds of EOSC DIH AgriFootprint pilot and then adapted to the requirements for i4Trust Dataspaces.

Impact:

- Thanks to the support of the pilot, the an upgrade of TRL 2 to the TRL 6 has been possible.
- CADS Consortia with participants from 6 European countries was fully supported by i4Trust's core partners to test, pilot and scale the service around secure and effective data sharing in agrifood domain to calculate carbon footprint. It will be helpful for farmers and Farm Management Information Systems (FMIS) to estimate and trace carbon footprint during food production.
- We have successfully finished prototyping and testing our technical solution for data exchange between 3 farmers (from Spain and Ukraine) and 3 FMIS (Greece, France and Italy). At the moment the service is ready to support different players in using our data spaces based on common standard mechanisms for data interoperability, data value creation, and data sovereignty and trust.

Provider	Service
EGI-ACE	EGI Cloud Compute EGI Cloud Container Compute EGI Data Transfer EGI Online Storage (relational DB like PostgreSQL/MySQL) Elastic Cloud Compute Cluster (EC3) (for Kubernetes or PaaS/SaaS)
NEXUS	OpenAIRE Research Graph Zenodo Amnesia OpenAIRE MONITOR OpenAIRE Broker-
EOSC DIH DIGITAL INNOVATION HUB	Consultancy and education in appropriate use of EOSC services Training and support Visibility Funding opportunities

OiPub ***A Digital Platform for Enhanced Discovery & Discussion of Research***	OiPub

Company: OiPub

Country: Malta

Sector: Open Science

Description: This EOSC pilot aimed to build OiPub's Minimum Viable Product (MVP) design, focusing on the core aspects that bring the most value to its users.

OiPub works to address a wide variety of issues that researchers face, all in one convenient easy to use platform. OiPub is building a new research categorisation and organisation model that makes information faster and easier to find & share for researchers. This is done through our tagging & broadcasting system which allows us to create information & discussion hubs for any and every research niche.
These information and discussion hubs are then coupled with a variable user privilege and voting system. This allows for: expert-based moderation of our platform; new research and researcher metrics through topic expert voting; and a peer review system which allows us to create a new open access publishing model. Through this publishing model, we aim to make OA publishing cheaper and easier while maintaining scientific rigour, thus accelerating the open access movement.
In web platform OiPub, researchers can Discover, Discuss and Publish research. Through platform, researcher save time and effort that would otherwise be spent on laborious, costly research efforts. We make information faster and easier to find for researchers. Platform connects researchers across the globe, both within and across disciplines. Platform foster discourse between experts and promote the open access publishing movement through a new lower cost yet rigorous publishing model.
The platform was in initial development and scaling up stages. OiPub has received initial validation testing, support and seed funding from local Maltese accelerators and start-up support schemes which has allowed us to build our alpha version.

How they used EOSC Services:
Oipub used EOSC DIH's computational support through EGI, service expert consulting and support through OpenAIRE. Oipub integrate various services, APIs & data dumps into their databases. These include CrossRef, ORCID, Altmetrics, as well as EOSC / OpenAIRE services such as ScholExplorer, OpenCitations & most importantly OpenAIRE Research Graph for paper metadata. OpenAIRE Research Graph was aslo an important data source.), as well as business strategy consulting, product design review and user testing support through the EGI DIH team. OiPub also learned of many funding opportunities and successfully received support through some of these thanks to EOSC's support in our application process.

Achievements:

- **Product Strategy & Design Review**
  Co-design & validation of the MVP, including direct feedback from prospective end-users. Investigation & evaluation of EOSC services that may be relevant & useful to the product.
- **Business & Strategy Consulting**
  Review & feedback of business & growth strategy.
- **MVP Development**
  Development of the OiPub MVP
- **Testing & Feedback**
  User testing and feedback on the MVP, with feedback from the EOSC team and external prospective users.

Impact:

- Increase of TRL3-> TRL6
- Received important support on co-deign the product basing on early design.
- Aligned the OpenAire Graph data dump with the internal Topic-based broadcasting systems in preparation for work on our platform's broadcasting, ranking, and sorting tools.
- Receiving user feedback leading to design tweaks for the upcoming open beta release.
- Received a significant funding grant that provided much needed financial support and allowed to accelerate and grow the business, thanks to EOSC DIH's support.
- Finally, EOSC and its related services ran a number of events and conferences over the period of pilot which provided a platform for pilot to demonstrate system to early audiences and receive awareness, recognition and

support that helped OiPub grow, network, be exposed to and accepted for further valuable opportunities, and reach the right audiences for platform and business to grow.

Provider	Service
EOSC DIH DIGITAL INNOVATION HUB	Cloud Computing infrastructure and support Proof of concept Service/product design Testing Technical consultancy Commercialisation and business coaching
NEXUS	OpenAIRE Research Graph OpenCitations ScholExplorer OpenAIRE Explore

2nd Pilot Campaign

IRAZ: Integration of RSpace ELN with Argos and Zenodo	RSpace

Company: Research Innovations Ltd

Country: Scotland

Sector: Open science

Description: The pilot will involve the design and development of two integrations, one between the RSpace ELN and Zenodo, and the other between the RSpace ELN and Argos. The aim of both integrations is to further promote and use the FAIR principles.

How they are using EOSC Services: Two workflows will be enabled via the integrations:
1. RSpace – Argos. Through this integration, it will be possible to pull data created during a research project in RSpace (including related data in other tools as noted above) from RSpace into Argos. In Argos this data will be added to the data captured in relation to the data management plan associated with the research project. This data will then be included when the Argos data management plan is exported to Zenodo.
This will result in the information about the project included in Argos and then Zenodo being more comprehensive and give users of Zenodo a more complete and picture of the project, enhancing discoverability and reproducibility.
This will be the first ever integration of Argos with an electronic lab notebook.
2. RSpace – Zenodo. Through this integration, it will be possible to deposit data created during a research project in RSpace (including related data in other tools as noted above) from RSpace into Zenodo. This will result in the information about the project included in Zenodo being more comprehensive and give users of Zenodo a more complete and accurate picture of the project, enhancing discoverability and reproducibility.
This will be the first ever integration of Zenodo with an electronic lab notebook.

Achievements:

- Integration of RSpace with Zenodo. Research Space use the Zenodo API to implement the integration.
- Integration of RSpace with Argos.

Impact:

- The initial TRL is 3 - 'Proof-of-Concept Research'. The individual components of the integrations were mature, commercial products, but the workflow and integrations were speculative. After completion of the pilot, TRL is 6 = 'Simulated Environment Pilot'
- a working prototype will have been produced where integration and technology issues have been resolved.

Provider	Service
NEXUS	Argos Zenodo
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility

PreMaCOOL *AI For Predictive Maintenance In* *Commercial Refrigeration Unit System*	

Company: Klimamichaniki

Country: Greece

Sector: Energy

Description: PreMaCOOL aims to enable the development of an AI model that will serve as a predictive maintenance tool for Refrigeration Condensing Units. Scope of PreMaCOOL is to engage a conventional HVAC SME (Klimamichaniki) into developing a predictive maintenance machine learning (ML) model for Refrigeration Condensing Units (RCU). Core of the development will be a dataset which is collected by numerous sensors at an installed system, in one of Klimamichaniki's pilot use cases. Additionally, public datasets will be used for baseline and transfer learning reasons. The targeted ML model is at a stage between conceptualization and prototype development, since the sensorial network has been recently installed and is continuously collecting data, aiming at utilising data-driven methodologies. Since it is in its early stage, experts from the informatics and data science domain can guide and assist Klimamichaniki via their offered services, and allow them to use ML algorithms for development, training, and validation of a robust ML model. This will enable Klimamichaniki in the future, to be able to build innovative, state-of-the-art services for customers that would make them stand above the competition and create new sources of revenue for the company.

How they were using EOSC Services:
Use of the EOSC services for developing AI models and advancing the product. OpenAIRE EXPLORE was used as a starting point for the pilot. Extensive research on relative applications served as a baseline for the progress of the pilot, and allowed the involved members to be up-to-speed with the latest scientific progress. The EGI Notebook served as the main tool for working on code, documentation, and of course visualization. The notebook environment provides an easy-to-use interface, even to seasoned programmers, and in can be configured as such to easily create reports with results that can be publicly shown to stakeholders or research communities. The Deep training facility was used to train the AI models that will serve as the main core of the pilot. Access to powerful hardware will offer rapid time for testing and evaluating trained model, ergo lead to faster prototyping. ARGOS was used for creating a clear and concise Data Management Plan (DMP), that was used as a point of reference for the entire pilot. The created DMP will be serve as a living document and will incorporate the guidelines and management aspects for the data that will be generated and/or used within the pilot. B2SHARE was used as a hub to research for relevant datasets, similar or relative applications, and state-of-the-art technologies that will be useful to successfully tackle the problem at hand.

Achievements:

- Developed forecasting models with LSTM neural networks, Transformers and SARIMA architectures
- Forecasts reach up to 3-days ahead
- Developed anomaly detection models with Isolation Forest, LSTM autoencoders and CNN autoencoders
- Point-wise and pattern-wise anomaly detection
- Integration of the two types of models in order to be able to run anomaly detection on the forecasts

Impact

- Core idea taken from conceptualization and proof of concept, to production-ready trained models (TRL 3 -> TRL 5)
- Validated the effectiveness of AI models in the specific problem.
- Solidified Klimamichaniki's vision towards building a software service

Provider	Service
NEXUS	OpenAIRE EXPLORE ARGOS
EGI-ACE	EGI Notebook Deep training facility

DICE Data Infrastructure Capacity for EOSC	B2SHARE
AI4 | eosc	Deep platform consultancy
EOSC DIH DIGITAL INNOVATION HUB	Training Visibility Funding opportunities

REGREEN	deepblue

Company: Deep Blue Srl

Country: Italy

Sector: Energy

Description: The ambition of the Pilot is to create a software solution to support the EU transition away from fossil fuels and towards carbon neutrality by developing an artificial-intelligence-based solution to identify the best energy generation sites of three renewable energy sources (RES): solar, wind and hydropower. The objective is to produce a map of the sites which are suitable for an efficient production of at least two out of three RES. The rationale of multiple-source energy production at the same location is to overcome the challenges hindering RES penetration: reliability, as energy is only useful if available when and where it is needed, and transmission stability, as voltage and frequency fluctuations in energy generation can potentially compromise the stability and security of the system. REGREEN proposes to use multiple-energy-source production as a mean to enhance reliability and transmission stability. In a production site with at least two sources of energy, the probability of all being unavailable is low. Also, the system can be optimised to compensate the fluctuation locally and guarantee a stable energy transmission to the grid.

How they used EOSC Services: To overcome the challenges of the REGREEN project, Deep Blue has used the following services, among those supported by the EOSC DIH:

- ADAM Platform. Simplified access to Earth Observation data, in particular daily solar irradiance, air temperature and humidity, and ERA5 reanalyses. In particular, ERA5 could be used as source of the wind speed and also, as an initial test on uniformly gridded data, the other above-mentioned types of data.
- EGI Online Storage/EGI Data Hub. For large batches of data need to be stored either for the training of the AI algorithms and also to build a repository of the results.
- Zenodo. The Open Powerplant Database published by the JRC provides data about EU powerplants, including the nominal power generation capacity at each plant, which can be used to normalise the generated power and calculate the efficiency of a site.

Achievements:

- Created a dataset of 'features' based on Earth Observations and reanalysis from the Copernicus CDS for the AI algorithm (CNN or else) to be trained on this data. The dataset will include e.g., daily radiation, temperature, wind speed, humidity, and terrain elevation, slope, and orientation with a geographical scope initially focussed on Italy. This dataset covers a time interval of two years to guarantee enough data for reliable training and testing of the AI algorithm.
- Other planned activities could not be achieved as the company had to dedicate time towards new project. The reason is clarified as follows. In the original plan, part of the actions included the interviews to potential users to elicit the technical and functional requirements of the envisaged solution. Also, thanks to the network of organisations linked to the EOSC Future programme, the opportunity came to discuss with several companies in the energy and space domains, including energy producers, energy service providers, and satellite service providers. Thanks to these connections, Deep Blue was offered the opportunity to apply for two different funding programmes of the European Space Agency (ESA). ESA is interested in business ideas that bring the advantages of satellite technology to various sectors, including energy, and hence they proposed sponsor the de-risking of the REGREEN solution. However, as a pre-condition to fund the REGREEN concept, ESA requested the preliminary development of the value proposition and business case of the solution. This required a more thorough interaction with the stakeholders in the energy domain which, while very valuable to better define the scope and benefits of the proposed solution, it also proved very time-consuming and hindered the technical development of the solution. In conclusion, while the EOSC Future programme gave the opportunity to start working on the REGREEN solution, the opportunity to secure ESA funding forced to shift the scope of the performed activities from technical development to business-case definition, and user/customer identification and engagement.

Impact:

- The solution was a TRL equal to 2, it reached TRL 3.

Provider	Service
EGI-ACE	EGI Online Storage

NEXUS	Zenodo
Reliance	Adam Platform
EOSC DIH DIGITAL INNOVATION HUB	Training Visibility Funding opportunities

SOFIA ***A Decision Support System to Automate the Innovation Scoring Process in the Financial Sector***	

Company: RENVIS
Country: Greece

Sector: Financial

Description: SOFIA Innovation Scoring is a Decision Support System (DSS) for measuring business Innovation Scoring, that:

- Integrates data from various sources and offers a unified, friendly UI for creating Innovation Scorecards and customizing Innovation Scoring Models.
- Guarantees data integrity and secure user access, so that it can be immediately part of an alternative evaluation process (Credit & Investment Scoring) beyond traditional banking criteria.

The implementation of the pilot will introduce to the market the new version of SOFIA (SOFIA 4.0), that adds the ability to provide suggestions based on existing, external, and newly created datasets. SOFIA 4.0 will therefore introduce the following innovations:

- An Innovation Scoring tool that is applicable on an international level and can be customized to meet any market needs.
- ML models stemming from financial banking transactions, consumer behaviours, and macro-economic company datasets.
- An alternative Scoring process for companies, irrespective of their size and stage.

How they used EOSC Services:

- Usage of the EGI DataHub, Zenodo, ARGOS and Enrichment API or Reliance for implementing new features of SOFIA
- EOSC DIH assisted in communicating the pilot through newsletters campaigns, participation in events/webinars/seminars related to Innovation Scoring and the use of ML/AI into SaaS DSS.

Achievements:

During our participation in EOSC DIH Business Pilot, we have achieved the following:

- Used the EGI Datahub for making available SOFIA Innovation Scoring final datasets.
- Disseminated the use case to EOSC partners and general audience.
- Delivered a webinar and used it for marketing and dissemination purposes.

Impact:

- SOFIA increased TRL 7 to TRL 8.
- Through the regular meetings and assistance of the EOSC partners, we have been keeping up with the updates, been informed about funding and event participation opportunities, and increased our reach.
- EOSC DIH added more value to our project and product (SOFIA), by reaching a larger audience and receiving feedback on our efforts.

Provider	Service
	EGI DataHub
	Zenodo ARGOS

Reliance	Enrichment API
EOSC DIH DIGITAL INNOVATION HUB	Training Visibility Funding opportunities

YDMS - Yuppies Data Management System for Smart Building Analysis	YUPPIES SERVICES

Company: Yuppies Service Srl

Country: Italy

Sector: Energy

Description: The pilot stems from both the request to innovate the survey services and the need to manage the large amount of data required to set-up a building's technical registry record. A technical registry record consists in a dataset collection that stores all the components of the facility-building system, through survey information maps and graphic restitutions in CAD, BIM or RCP files. The pilot focuses on the creation of the Yuppies Data Management System (YDMS), a data lake-based infrastructure containing building's technical registry records in order to allow free research and a flexible data organisation to perform smart data analytics. By generating the software (YoDS) to import the heterogeneous types of facility-building system datasets in a structured scheme, it is possible to provide interested end-users with all available information collected with the purpose of improving the facility management, the energy management and, in general, the restoration of the Italian public heritage. In fact, the aim of the YDMS is to combine data collected in the past on different public buildings and make them searchable according to different criteria: for instance, by ownership, use, location and other peculiarities. Furthermore, the availability of time-series data on the same assets permits to analyse potential changes in terms of investments, technologies adopted and developments in the different sites.

How they used EOSC Services:

- Usage of B2Safe for implementing the YDMS, use of the consultancy, training, and proof of concept

Achievements:

- Identification of technical requirements of the Data lake based platform and components to integrate. T
- Implementation of the data management system YDMS
- Implementation of the Import data software YoDS
- Testing and Validation . The aim is testing was the benchmark – datasets on buildings for the use of the health system - in the use of YDMS infrastructure implemented through the software YoDS.

Impact:

- The increase of the TRL score 3-> 5.
- To achieve this, techniques were defined to manage this amount of data, YDMS was benchmark-verified and eventually disseminated.

Provider	Service
DICE Data Infrastructure Capacity for EOSC	Proof of concept Technical consultancy Training B2Safe
EOSC DIH DIGITAL INNOVATION HUB	Training Visibility Funding opportunities

UDOS *Urban Dynamics Observation Service*	ubicube

Company: ubicube GmbH

Country: Austria

Sector: Real estate

Description: Accurate information about the current extent of built-up areas and their change over time is not only crucial for sustainable urban development but also relevant for commercial applications in different industries (e.g., real estate). In that context, the start-up ubicube GmbH developed a promising pilot base service: the high-resolution built-up detection with continuous/regular monitoring.

The literature has tremendous scientific studies that prove the feasibility of monitoring urban structures by satellite data from various sensors. Which can help to satisfy their customers' need to get ready-to-use information about urban dynamics down to the individual property-level, without the hassle of having the experience and the knowledge in processing satellite images.
Therefore, the company is developing a prototype system for monitoring built-up areas. With the proposed EOSC DIH pilot the company intend to develop this system further and certify its transferability and its extensibility to larger geographic areas. The API service relies on data from the Copernicus Sentinel program to quarterly map the built-up areas and monitor their change. The novelty of the proposed service is its flexibility to be tailored to the needs of the real estate industry for different use cases: e.g., robust, scalable, and property-level insights. That is, their service facilitates the outreach of the created information by enabling access to highly accurate geodata through a consistent and scientifically-sound monitoring system.

How they used EOSC Services:

- In the pilot the C-SCALE Compute and Data Federation service were used to improve, scale, and validate ubicubes' satellite data enabled urban dynamics monitoring service. The overall aim is to produce an urban extent monitoring system with unprecedented temporal and spatial resolutions that can be used for various use cases from the national to the local scale, enabling insights down to the individual property level.

Achievements

- Mapping of the issues and potential improvements in the preliminary pilot application
- Creating revised service prototypes, conduct a team meeting and discuss the proposed design.
- Presentation of the proposed new service with preliminary results in different test areas at different scales to a set of potential clients and gather their initial feedback.
- Implementation sprints through C-SCALE services to improve and optimize the application, including design revisions.
- Complete the full-scale development cycle.
- Conducted a final round of feedback to ensure the processing pipeline for the full-scale service through C-SCALE is optimized and launch the service.
- Successful implementation of a SAR Coherence processing pipeline
- Significant reduction of processing time (in comparison to our initial tests running on local computers)

Impact:

- Upgrade of TRL4 to TRL6
- System prototype demonstration in an operational environment.
- Improvement of our urban monitoring system (quantification of improvement is currently still going on)
- Using the C-Scale service helped us to realize, that we need to outsource all our processing to the cloud. The pilot reinforced our strategic decision to do so.

Provider	Service
C-SCALE	Copernicus – eoSC AnaLytics Engine FedEarthData: Federated Earth System Simulation and Data Processing Platform

EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

TWC-SCUP	

Company: Tama Group

Country: Germany

Sector: Forestry

Description: The Tama WaldCursor provides integrated management tools for forestry operations and forestry owners. The cloud and app based WaldCursor is designed on a remote sensing backbone, sponsored by ESA (TSMF 10CM DP). Today's target users of the cloud product are medium to small scale forestry companies and private forestry owners. The WaldCursor was commercially launched in April 2022.

TWC-SCUP now intends to investigate and test the capabilities of the currently available algorithms, data handling structures and system performance to achieve a system scale up of the current average of 5km² per user -as normal in private forestry operations- to an average of 50km² per account -as expected with environmental use cases for local eco-systems. The scale up factor of 10 per login requires intensive testing on a larger machine as currently available.

How they used EOSC Services:

- Tama used the C-SCALE's service: FedEarthData: Federated Earth System Simulation and Data Processing Platform for satellite image analysis, and C-SCALE resources for scaling-up. In addition, Tama used the expertise of the experts for the exploratory and scale up phases. The project has been divided into several scal-up phases, increasing the amount of the resources and complexity.

Achievements:

- Used with Satellite image (ESA Sentinel-2) based analysis of a customer defined area in the Dominican Republic, stretching by a bounding box over an area of 1.6mio ha (16,000km²); net investigation area: 1,180ha
- Explore addition of resources, protocols and processing modules of the commercially available Tama WaldCursor (www.waldcursor.com) by resources from EODC C-SCALE / EOSC-DIH, to achieve this scale-up.

Impact:

- the project allowed Tama Group to accelerate feature development for a new feature; this allowed us to reach TRL 6 for this new feature within the project period (having started at TRL 2
- this acceleration saved us about 1 year time to market for this feature

Provider	Service
C-SCALE	FedEarthData: Federated Earth System Simulation and Data Processing Platform
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

3rd Pilot Campaign

MRADSIMIDE	

Company: Beamide

Country: Italy

Sector: Radiation

Description: The BEAMIDE is an innovative spin-off of INFN (Italian National Institute for Nuclear Physics) with core business of radiation hardness assurance services tests and software & innovative radiation detectors r&d . The pilot is about the development of a software set to simulate the radiation effects on electronic and electro-mechanical systems/subsystems (DUT). In doing that use the power of open source GEANT4 package developed for high energy physics experiments (i.e. at CERN or space-borne experiments as AMS on ISS) for particle transportation from radiation source to the DUT. MRADSIM (www.mardsim.com) is a cross-platform system using OpenCascade, Qt5, CMake etc. and it provides a user-friendly interface to the users which are not experts in computing to do their simulations in autonomy.
The radiation has been and it of concern and a potential danger for all space-borne applications, from the smallest nano-sats to the largest telecom ones. Eve3ry single electronics part, in particular those based on semiconductors (i.e CPUs, FPGAs, Memories and all other active ICs) has to be evaluated for radiation hardness susceptibility on Earth prior to fly. The evaluation starts with design phase and continuous until the flight. MRADSIM will give opportunity to for instance radiation engineer, non-expert in computing coding, to simulate the radiation effects during design phases and optimize positions of critical DUTs, optimize their shielding or implement mitigation technics against possible radiation effects. The solution that she/he will apply will affect the overall mission limits (i.e in weight or power consumption) and help their optimization too. In doing these he will run MRADSIM by giving into it a CAD (.STP format) file even of a full satellite, indicate the locations of DUTs under study and provide mission parameters (orbit, epoch etc.). MRADSIM will interface with user over a single window to exchange this information and it will provide particle transport by using both forward or reverse montecarlo method. The output is a set of histograms and 3D profiles providing LET (linear energy transfer) fluxes, charging effects, path length information as well as 3 D dose profiles (dose-depth curves) which are essential to evaluate the criticality of the component during its mission. Further, user will be able to try real-time shielding solutions or change the location of DUT. In a single run user will be able to define multi targets (DUTs) and see the effects at the end for each one of them. A beat version of MRADSIM Space version is under test by experienced users in INFN but there is still to improve prior to go on market. In particular the optimization of multithread running and implementation of to be able to run on several CPUs and using GPU power are planned.

How they used EOSC Services:

- Use EGI ACE, EGI CLoud Compute, ROHub from Reliance, API from Reliance
- Use of expertise from AI4EOSC

Achievements

- In the EOSC DIH collaboration we have uploaded our programs to test the first apporoaches focused to implement superresolution issue. namely, to improve the 3D dose distribution obtained with a limited number of simulated events. to do that on EIG infratrtucures we have tested algorithms by loading the known images created with about 10**4 events and implement the AI algorithms to extrpolate, using GPU structure offered by EOSC, the 3D images in case of hypotetic 10**12 events. the first studies have been useful to selecet the correct algorithm among many avaiable on literature. after the end of EOSC period we have moved all on our own farm
- Implementation of multithread, multi-CPU computing in MRADSIM and in radiation detector's data acquisition, reconstruction and display codes
- Implementation of algorithms with AI/ML to have better images in MRADSIM 3D reconstructions for Dose-Depth Studies, better images in GamCam (a crsytal scintillator coupled to a Hamamatsu SIOPM array) using acquired data.

Impact:

- From initial TRL=6 to TRL=7 for space module.

Provider	Service
	EGI CLoud Compute

Reliance	ROHub from Reliance API from Reliance
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities
AI4 | eosc	AI expertise

Startup Radar	LINKNOVATE

Company: Linknovate

Country: Spain

Sector: Business

Description: STARTUP RADAR (SR) is Linknovate's latest R&D venture, whose first development steps were funded through an Open Call as part of the EUHubs4Data project (funded by the EC).
The first step of the SR tool is the automatic extraction of semantic relationships between entities: Relation extraction (RE) and NLP.
Traditional RE models have limitations in generalization and require huge datasets with tags. Developing models based on distance-based relationship learning, and open information extraction models seem to be suitable for our case. Therefore, RE will enable STARTUP RADAR to maintain up-to-date, structured information on products, financing, and M&A events (i.e., relationships).
Linknovate provides an "innovation search engine" to R&D and strategic divisions of different king of organizations. They have incorporated and structured more heterogeneous data sources than any other solution (publications, patents, funding data, specialized news, web monitoring...), allowing clients to collectively monitor these "innovation signals." This translates into time savings and improved internal communication.
In this regard, the enrichment of their datasets with thousands (or millions) of additional scientific publications should boost the scouting capabilities of users cross-industry. Nowadays, Linknovate dataset includes more than 33 million of scientific publications.

How they intended to use EOSC Services:

- enriching datasets in STARTUP RADAR and INNOSCOUT (a backbone search engine) with OpenAIRE's graph
- technical feedback from OpenAIRE on the use of the graph
- using OpenAIRE Monitor to enhance our data analysis capabilities.

Achievements:

- **They downloaded the last version of the OpenAIRE organizations dataset which contains 311,492 profiles. Crossing that dataset with thiers, they have managed to match 88,954 common profiles. So, these are the organization profiles to be improve in various ways.**
    - Deduplication of Organizations' Profiles in our platform: Additionally, the OpenAIRE "alternativenames" added as aliases help improve the association of future indexed records (patents, publications, news...).
    - Website Information: We enriched 12,811 existing profiles of organizations by adding valid website addresses from OpenAIRE data, enhancing profile completeness and refining organization descriptions.
    - Location Information: The inclusion of precise location data (18,792 organization profiles improved) from OpenAIRE. This fine-tunes user search capabilities in our platform, particularly for country filtering in their queries.
    - Organization IDs: We compiled various standard IDs (ROR, GRID, etc.) to facilitate future data integration.
- Improvement path: During our conversations with OpenAIRE staff, we have gained valuable insights into how we can improve our data and platform. The most significant improvement involves finding new methods to curate private organizations' data, potentially paving the way for us to become a data provider for third parties like OpenAIRE and various other organizations with diverse use cases.
- Lessons learned:
    - OpenAIRE publishes the whole dump in zenodo. The OpenAIRE Graph is available for download in multiple partial datasets, allowing users to select and retrieve specific areas of interest: publications, organizations, datasets...
        - This dump is published and replaced every 6 months. The data cannot be built incrementally,so they need to replace the whole graph. More than the 99% of identifiers of the graph are persistente IDs. Due to the recreation of the graph because of some data sources from Japan, Australia, etc, some publications may disappear and appear again.
        - As a result of this approach, there are some shortcomings at LKN side to make use of the OpenAIRE Graph:

- One of the primary features of LKN's value proposition is to enable users to stay updated on topics of their interest. If openly accessible scientific publications are not made available to our users until six months later, we will be unable to deliver the most current "innovation signals" precisely when they are needed, affecting our ability to provide timely updates.
- Another significant issue is that OpenAIRE refreshes the entire dataset periodically. Re-indexing the complete dataset every six months is not feasible for LKN due to the time and computational expenses involved.
- Taking into account that most of the IDs are persistent, we checked the possibility to go through the dump and just index those publications with collection date or modification date since the last published graph. The problem is that the modification date is also updated each 6 months and the collection date is not stable. So, this should involve once again to waste undesired time and computational costs..

Impact:
Feedback from pilot:

- Unfortunately, we couldn't achieve the impact that we have planned at the beginning of the pilot, but we have been able to mitigate one of our main issues in the platform (curation of the Organization profiles).
- we have gained understanding of new improvements to be done on our side to enhance our data and platform. The most important one is figuring out new ways to curate the private organizations data. This enhancement will open us the possibility of become a data provider for 3rd party like OpenAIRE and other multiple organizations with different use cases.
- Furthermore, we conclude the pilot with a clearer understanding of potential future collaboration between OpenAIRE and LKN. We initiated this pilot with the belief that there were several opportunities for collaboration between our organizations. While certain limitations prevented us from advancing further at this moment, we remain steadfast in our belief that synergies can be established in the future.
- Therefore, we will closely monitor the evolution of the OpenAIRE graph, as its development could eventually provide us with the opportunity to expand our publications dataset, as originally planned in this pilot. Additionally, we will keep an eye on potential collaboration opportunities, either as a service provider for OpenAIRE or for third parties through OpenAIRE as an intermediary.

Provider	Service
NEXUS	OpenAIRE Graph OpenAIRE MONITOR
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

EnergyDeel	

Company: Builtrix

Country: Portugal

Sector: Energy

Description: EnergyDeeL is a data driven software technology built by open-source big data tools and Artificial Intelligence (AI). EnergyDeeL is a Virtual Disaggregation technology, also known as Non-intrusive Load Monitoring (NILM). It intends to identify the operational state (on/off) and the precise power consumption of individual electrical loads, considering as input only the aggregated consumption from the central smart meter. The use of NILM technology is so far limited to small-scale residential pilots. During the EnergyDeeL pilot we was model and test our technology in a local community including service and residential spaces. EnergyDeeL was run as part of Builtrix energy analytics platform interoperating with the rooftop photovoltaic (PV) plants, distribution system operator (DSO) smart meters,Energy and Building management systems, Electric Vehicle (EV) chargers and other stakeholders.

How they used EOSC Services:

- OpenAIRE-Nexus services: Amnesia for data anonymization.
- OpenAIRE-Nexus services: ARGOS for data management plan workshop/training

In addition, they used:

- EGI Cloud Container Compute
- Elastic Cloud Compute Cluster (EC_3)

Achievements:

During the pilot phase, Builtrix meticulously modeled and rigorously tested EnergyDeeL in a local community, encompassing both service and residential sectors. EnergyDeeL seamlessly integrated into Builtrix's energy analytics platform, working in harmony with rooftop photovoltaic (PV) plants, distribution system operator (DSO) smart meters, Energy and Building management systems, Electric Vehicle (EV) chargers, and other stakeholders.

This ground-breaking pilot project unfolded in a pilot community of energy prosumers located in Cascais, Portugal, and played a pivotal role in empowering service buildings to make informed, data-driven decisions regarding the deployment and utilization of renewable resources, as well as the efficient management of energy-consuming devices within their structures. Throughout the pilot phase, EnergyDeeL showcased its innovation as an intelligent decision support tool for demand-side response (DSR) planning in buildings. Leveraging appliance-level consumption data and short-term (hourly/daily) PV production forecasts, EnergyDeeL proved its mettle in enabling proactive and efficient energy management practices.

Impact:

- Upgrade of TRL 6 to the TRL level to 8
- The goal was increasing the number of pilot buildings (up to 250) and using the technology in demand side flexibility use case, saving energy for the end-users and offering the service as a SaaS model based on monthly or annual.
- subscription.
- The collaboration and using EOSC services were in phase with a large-scale pilot with our potential customer and we could use EOSC services to amplify our learnings and speed up our developments during this pilot and finally get a success case to scale it to other similar customers.
- EOSC DIH also helped us to find partners for EU open calls and Horizon Europe calls.

Provider	Service
EGI-ACE	EGI Cloud Container Compute Elastic Cloud Compute Cluster (EC_3)

NEXUS	OpenAIRE-Nexus services: Amnesia ARGOS
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

B2PREDICT	

Company: BIKE SQUARE

Country: Italy

Sector: Mobility

Description: BikeSquare is an innovative startup with a social vocation that has developed high expertise in the cycling sector and has defined a model of cycle tourism circuit that contemplates the networking of public and private entities. The company has defined guidelines for the realization of works and regulations for the adhesion of private entities. This organization is on the market with four specific products: Platform web WhiteLabel + APP, Regional Portals (ex: www.cicloturismo.piemonte.it) and APP, The e-bike cycling portal (http://ebike.bikesquare.eu), and a Smart-Bikes Platform: Fleet Management, Analytics, Administrative Console.

The last one of the products is mainly related to operators in the sector (Renters, Tour Operators, Tourist Promotion Consortia, etc.) who wish to have a complete platform for the management of their route or their rental services. This system allows knowing where the bikes are located, turning on or off the bikes remotely if the user has already paid (or not) for the use of the bike, monitoring the bikes in case of theft, counting the commissions between the various partners, identifying the most popular routes, the best structures, etc.

This product consists of a web page platform and an IoT device for geolocation (optional) that the renter installs on the e-bikes. Tour operators can offer self-guided tours to their customers and get the visibility they need on the Web and APP. With the information collected with the IoT devices and the web page platform, we have a lot of information to implement different AI algorithms. For this pilot, we would like to implement a predictive maintenance system for the e-bikes and an alert system that gives us the status of the bicycles and IoT devices.

Predictive maintenance is a novel research topic that not only allows e-bike users to ride bicycles safely but helps e-bike renters to save money and time. For example, if the system suggests the company to buy new brakes in advance, the company will change them on time avoiding damages and having non-operative bikes while waiting for the brakes to arrive. Therefore, the company will prevent money waste.

Regarding the alert system, BikeSquare manages many e-bikes. Therefore, it is hard to know the status of all of them. For that reason, it could be helpful to have a system that notifies if a bicycle that disappears, moves unexpectedly, or does not send the geolocation information for a very long time.

How they used EOSC Services:
Usage and tests of EGI ACE cloud computing and online storage to develop and test services within the activities:

- Developing a pipeline that collects, processes, and predicts possible damages or failures in the electric bikes.
- Collect the information produced by the platform.
    - Evaluate, develop and test different algorithms to perform the prediction, and select the best option.
    - Develop a notification system to alert the BikeSquare team (Dashboard, emails..)
- Developing a system to detect abnormal behaviour in the rented bicycles, considering measures taken from the IoT devices installed in the bikes.
    - Collect data from the devices.
    - Develop an algorithm to control if the measures are in normal ranges.
    - Develop a notification system.
- Evaluating the performance of the algorithms.

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Achievements:

- Regarding the activities proposed for the pilot, we have successfully completed most of the tasks for the first and second activities.
- We organized and collected GPS data and created a way to collect maintenance data correctly.
- We have also developed an analytics page where users can view a table displaying maintenance performed on bicycles, as well as graphs summarizing costs and the most common maintenance tasks.

Impact:

- Upgrade of TRL 3 to TRL 6
- In terms of impact, we can confidently state that our pilot has reached the seventh Technology Readiness Level (TRL). This signifies that we have developed a working prototype that users can interact with. This prototype is a minimum viable product (MVP), which means it has the core features needed to validate our concept.

Provider	Service
EGI-ACE	Cloud Compute Online Storage
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

SAFAN ISP VA	

Company: SAFAN Bioninformatics

Country: Italy

Sector: Pharma

Description: Due to the high costs of the drug development process, within the pharmaceutical industry there is a general interest in applications that can be used for target deconvolution / off-target prediction such as our tool SAFAN-ISP. However, in order to trust a new application, the pharmaceutical industry asked for deep validation that performed within this project. Validation been done on a limited number of cases in vitro or on a much larger amount of data in silico. The resulting statistical analysis was extremely important for SAFAN-ISP validation in order promote its diffusion within the pharmaceutical industry.

How they used EOSC Services:

SAFAN-ISP was implementing a workflow running with a docker container performing a complete calculation with 15' for each compound on one core. With the support from EOSC DIH experts, the workflow was adapted to a cloud HPC environment to increase performance and make it able to analyse a dataset large enough for commercial purpose. Subsequently, BindingDB data not overlapping with ChEMBL was analysed in more in depth to obtain different subsets of about 10000 compounds for pilot testing. Simulation runs were done in waves, alternated with results analysis and refinement. Computational resources were used at CINECA. EOSC DIH provided support for porting of the code on the selected machine (Galileo100)

Achievements

Selection of BindingDB data not overlapping with SAFAN-ISP database

- Running SAFAN-ISP on the selected compounds
- Statistical analysis of affinities obtained from running SAFAN-ISP on the selected compounds.

Impact:

- Update of the TRL 4 to TRL 5, where SAFRAN technology is validated with an ndustrially-relevant dataset

Provider	Service
DICE	Computational resources Porting of the code on the selected machine (Galileo100)
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

4rd Pilot Campaign

SNOWPOWER	Amigo

Company: AMIGO

Country: Italy

Sector: Energy

Description: Amigo has developed a new software as a service: SnowPower. This is the first commercial climate service of its kind that combines a satellite-based snow water equivalent with climate data to estimate and predict the energy generated by hydropower plants up to six months in advance. SnowPower consists of three components that work in sequence, combining the use of data and AI/ML algorithms with the aim of providing a reliable and accurate forecast of hydropower generation in the short (7 days) and medium term (1 to 6 months). The three components are:

1) Snow: The local snow water equivalent (SWE) was assessed using a ML approach that combines data from different sources, including in situ measurements and Earth observations. The spatial distribution of SWE is derived from the extent of snow cover via remote sensing and a ML method.
2) Melt: Water runoff and availability for hydropower generation are assessed by combining SWE with temperature and precipitation data from the seasonal forecast. A ML algorithm is used to predict runoff in the basin.
3) Electricity: Hydropower generation is estimated using a ML approach developed by Amigo.

How they used EOSC Services:
Usage of the following services:

- C-SCALE's service: FedEarthData: Federated Earth System Simulation and Data Processing Platform
- Workflow Solution: On demand seasonal river discharge forecasting

Achievements:

- Our Snowpower project has successfully reached important milestones. Here we briefly list the main highlights that illustrate our progress:
- We introduced a methodological improvement, including a revision of the criteria for determining catchment areas.
- We tested newly identified variables related to the energy market to optimise the energy module.
- We have developed a detailed business plan to guide the future operation of the Snowpower project.

Impact:

- Upgrade of TRL7 to TRL9
- Advancement of Business Strategy and Operational Processes: a comprehensive business plan for the Snowpower project outlines the necessary processes for successful implementation and management. We are ready to achieve TRL9
- Market Expansion and Competitiveness: identifying and testing new variables related to the energy market can create new market segments and help Amigo expand and be more competitive in existing and potential markets.
- Technical superiority and User Experience: The project developed several user-friendly solutions that take into account the different characteristics of hydropower plants.

Provider	Service
C-SCALE	C-SCALE's service: FedEarthData
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

Granoole	

Company: Granoole

Country: Poland
Sector: Agriculture
Description: Granoole is creating a marketplace for small farmers to sell their raw materials through the platform to customers who are looking for niche grains for their finished products. The platform is still in the early stage and the support through EOSC DIH pilot will help evolve and evaluate potential EOSC services and available data that could be used to further implement the platform.
How they are using EOSC Services:

- EOSC DIH is the way to get an access to reliable data sources.

Status and next actions:

- Analysis of the solutions made available by EOSC DIH for implementation on platform granoole.com.
- Overview of data sources that can be provided by EOSC DIH

Provider	Service
PSNC	Support in Analysis of the solutions Overview and provide data sources from EOSC DIH
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

S-LABS	S-LABS

Company: S-LABS

Country: Poland

Sector: Smart Energy

Description: S-LABS is the trusted provider of home energy management solutions with the mission to improve the energy efficiency of buildings. The company offers a well-developed and easy-to-use software and product suite, comprising the Appartme software, measuring devices and indicators. We deliver the Appartme system for the residential market and its functions focus on controlling electricity and heat as well as protection against flooding. We also make the solution available via API to third-party partners to provide new types of services for our clients. Appartme solutions save 29.9% of energy consumption as assessed by the AGH University of Science and Technology and has successfully been integrated in 80 real estate projects across 25 cities in Poland. Supported by strategic partnerships with blue chip clients from the TMT, infrastructure, electronic and energy sectors, S-LABS has built a client base that comprises leading real estate development companies.

With appartmerent, an all-in-one software solution will be launched that is specifically tailored to the needs of the rental market. The business is highly profitable at a 27% gross profit margin (2023B) while growing top line at a CAGR of 110.5% throughout the years 2019 to 2023B

How they are using EOSC Services: Access for EOSC Marketplace

- EOSC DIH consultancy on the technical solutions, and EOSC offered services.

Status and next actions:

- Onboard the S-Labs service into the EOSC-Marketplace (for potential usage by researchers)
- Evaluate the EOSC offered services for further development.
- Analyse possibility to create new services with Third Party partnership based on Appartme platform API and EOSC DIH tools.

Provider	Service
PSNC	Access for EOSC Marketplace
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

MIFOOD	

Company: Mifood

Country: Polska

Sector: Agriculture

Description: Farmers are unable to find workers to perform tasks in farms, there is a very high labor shortage of more than 5 million people required, labour cost is also very high. Another problem in farms is food waste and crop losses, representing 30% of losses for the farmers, harvesting food in a farm currently involves damaged produce, low hygiene, higher and significant risk of accidents in the farms.

To solve all these problems our team has developed a solution based in Artificial Intelligence and Robotics.

The MiFood Robot automates harvesting and collecting food in farms. The robot collects and stores food items including fruit and vegetables in farms faster and maximizes crops produced and enhances sustainability increasing efficiency and reducing co2 emission on harvesting.

The result is quicker harvesting time, food waste reduction, labour shortage reduction, more efficient collecting, lower labour costs, and reduced risk of accidents.

How they are using EOSC Services:

- Integration of the MiFood Robot with EOSC Services: compute services, AI platform
- EOSC DIH consultancy on the technical solutions

Status and next actions:

- MiFood is analysing different solutions for improvement and further development of robotic solutions. With the new possible appliances new AI models are required, as well as integration with the Cloud services compared to the current solution.
- There is an ongoing assessment of technical feasibility of usage of the EOSC services, and further development of the MiFood solution.

Provider	Service
PSNC	AI4EOSC DEEPAsTraining service DEEPasAService Cloud resources
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

PHIX	atelierul de idei

Company: Atelierul de Idei

Country: Romania

Sector: innovation & culture agency

Description: PHIX is a digital solution that prioritizes employee wellbeing within the manufacturing industry. Leveraging advanced algorithms, we empower businesses to monitor and assess psychosocial risks in the workplace, facilitating a safer, more inclusive environment for all workers, including those with disabilities. Our unique solution combines real-time data with intelligent insights to enable proactive interventions, reducing workplace stress and enhancing productivity. With our user-friendly interface, companies can readily access detailed analytics and customized reports, supporting informed decision-making and fostering a culture of care. Whether you're a small enterprise or a large corporation, PHIX helps you put people first, fostering a happy, healthy, and inclusive workplace.

How they are using EOSC Services:

- Use of EOSC DIH consultancy services for further product design

Status and next actions:

- Assessment of technical feasibility for development of a predictive analytics tool for psychosocial risk & hazards.
- Analysis of potential usefulness of the EOSC services for the pilot.

Provider	Service
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

AWARE	VERTLINER™

Company: Vertliner

Country: Greece

Sector: Drones and application

Description: VERTLINER is developing aerial robotic platforms to improve waste management in indoor construction sites. Our UAVs detect and categorise waste using advanced sensors, producing rich data that could be subject to train neural-based powerful AI models with EOSC DIH's computing resources and AI training services. After thorough field testing and feedback, we continuously refine our approach, emphasising both technological progress and real-world construction solutions.

VERTLINER is a pioneering field robotics company specialising in the creation of autonomous robotic aerial platforms for indoor asset assessments. Our newest pilot, AWARE, leverages a semi-autonomous UAV equipped with advanced sensor modalities. This software's purpose is to detect materials frequently seen on construction sites. By identifying these materials, we aim to significantly improve waste management processes.

How they are using EOSC Services:

- Usage of the AI4EOSC platform for trainig of the models
- Usage of the computing resources
- Training and support, Visibility, Funding opportunities from EOSC DIH

Status and next actions:

- Access to the services and resources has been provided
- COnsultations with AI4EOSC platform are ongoing
- Work on achieving the results using the platform

Provider	Service
AI4 | eosc	AI4EOSC Platform for AI Training Computing resources
EOSC DIH DIGITAL INNOVATION HUB	Training and support Visibility Funding opportunities

9 Annex 2: List of Events

	Start date	Name	Main Target Audience	Link	Format
1	15/06/2021	EOSC Symposium 2021	EOSC	https://eosc.eu/events/eosc-symposium-2021	Virtual
2	31/08/2021	ITM Industry Europe Fairs	Industry	https://itm-europe.pl/en/	Virtual
3	18/10/2021	EGI Conference 2021	Research and Industry	https://indico.egi.eu/event/5464/	Virtual
4	26/10/2021	DIHNET Final Event	ICT	https://dihnet.eu/2021/10/dihnet-final-event-future-and-shape-of-the-eu-dih-ecosystem/	Virtual
5	23/11/2021	EOSC Future Open Days	EOSC	https://eosc-portal.eu/news-and-events/events/eosc-future-open-days	Virtual
6	29/11/2021	EBDVF2021	Industry ICT	https://www.bdva.eu/node/1817	Virtual
7	09/12/2021	Evidence Based Policymaking in Europe Summit 2021	Public Admin Industry	https://intelcomp.eu/events/evidence-based-policymaking-europe-summit-2021	Virtual
8	08/02/2022	EU Industry Days	Industry	https://eu-industry-days.ec.europa.eu/programme	Virtual
9	28/04/2022	EOSC Providers' Day	EOSC Industry	https://eoscfuture.eu/eventsfuture/provider-days/	Virtual
10	31/05/2022	ITM INDUSTRY EUROPE	Industry	https://www.itm-europe.pl/en	Physical
11	01/06/2022	Data Week	Industry	https://www.big-data-value.eu/data-week-2022/	Virtual
12	20/06/2022	Dublin Tech Summit	Global tech Industry	https://iotweek.org/	Physical
13	19/09/2022	EGI Conference 2022	Research and Industry	https://www.egi.eu/event/egi2022/	Physical
14	22/09/2022	IT Future Expo	Industry	https://itfuture.pl/	Physical
15	16/11/2022	Smart City Expo World Congress	IoT Industry	https://www.smartcityexpo.com/	Physical
16	21/11/2022	EBDVF2022	Industry	https://european-big-data-value-forum.eu/	Physical
17	22/11/2022	EOSC Symposium	EOSC	https://events.eoscfuture.eu/symposium2022/2606111	Physical
18	21/03/2023	Dataspace Symposium	Industry	https://internationaldataspaces.org/data-spaces-symposium/	Physical
19	30/03/2023	EUH4D Forum	Industry	https://euhubs4data.eu/data-forum/	Physical
20	30/05/2023	ITM INDUSTRY EUROPE	Industry	https://itm-europe.pl/pl/aktualnosci/panele-platformy-przemyslu-przyszlosci-na-targach-itm-industry-europe/	Physical
21	01/06/2023	National Fields days	Industry	https://www.psnc.pl/psnc-at-the-national-field-days-2023/	Physical
22	07/06/2023	WomenInTechSummit	Industry	https://womenintechsummit.pl/	Physical
23	13/06/2023	Data week	Industry	https://data-week.eu/	Physical
24	19/06/2023	EGI2023	Research and industry	https://www.egi.eu/event/egi2023/	Physical
25	20/09/2023	EOSC Symposium 2023	EOSC	https://symposium23.eoscfuture.eu/	Physical
26	25/09/2023	AI&BIg Data Expo	Industry	https://www.ai-expo.net/europe/	Physical

10 Annex 3: Interview guidelines EOSC DIH – Pilots

General Satisfaction

1. From a grade of 1 to 5, (1- Lowest grade / 5-Highest grade), to what extent do you consider that the EOSC DIH has fulfilled your needs as a pilot?
2. Describe the strengths of the EOSC DIH from your experience.
3. Describe the weaknesses of the EOSC DIH from your experience.

Room for improvement:

Would have appreciated an option to extent the pilot to take advantage of the good results? OR you did not submit a longer pilot period?

Have a networking session with the other companies? Do you want that?

Communication

4. From a grade of 1 to 5, how do you rate communication

- with the pilot coordinator,
- with each provider of the service(s) you have benefited from?

Satisfaction with EOSC DIH services

Technical services

5. How do you rate your satisfaction with services received from a technical perspective? Please specify the type of technical service(s) you have benefited from and grade (from 1-5) each service received:

- Compute
- Storage Data management/ analytics,
- Machine Learning/ AI,
- Open Research Data,
- Tools & applications, services

Consultancy and training

6. How do you rate your satisfaction with the EOSC DIH from a digital training/acquired knowledge perspective? Please specify the digital training you have benefited from and grade each training.

7. How do you rate your satisfaction with the consultancy and commercialization services? Please specify the type of consultancy service(s) you have benefited from and grade (from 1-5) each service received:

- Consultancy services to assess technological readiness
- Service management:
- Commercialization:
- Business coaching:

Please specify if this question is non applicable as your pilot did not benefit from commercialization services.

Why did you not use service management and commercialisation

8. How do you rate (from 1-5) your satisfaction with the funding opportunities shared on the EOSC DIH website? Please specify if you have applied for any of the funding opportunities shared on the EOSC DIH website and provide more details.

Experimentation Services

9. How do you rate your satisfaction with experimentation services? Please specify the type of experimentation service(s) you have benefited from and grade (from 1-5) each service received:

- Requirement analysis:
- Test before invest:
- Pilots/Proofs of concepts:
- Service/Product design:
- PaaS/SaaS integration:

Value added of the EOSC DIH piloting

Business innovation capabilities

10. To what extent do you consider that the EOSC DIH has contributed to an

increase in your business innovation capabilities:

- in terms of optimizing processes:
- in terms of obtaining new customers:
- in terms of testing new technologies:
- in terms of opening new business opportunities:
- in terms of learning about new technologies?

Financial/Economic returns

11. To what extent has the EOSC DIH fulfilled your expectations for your business reducing costs?

12. Have you raised any investment/funding since the start of your pilot in EOSC DIH? If yes, how much, and what type/origin of funding have you secured (from a private entity, public grant, etc.)?

13. Have you increased the number of working positions since the start of your pilot? If yes, how many?

Market launch of piloted new/improves services & products

14. Have you created a new product/service or improved an already existing one (please specify, if it was an early stage idea, a prototype, a beta version, etc) that may be commercialized in the market? If yes, when, and where (if there is a geographic focus) will the new product/services be commercialized?

Follow-up

15. Would you be interested to get involved for a second time(or follow up) in such a European project that offers opportunities to SMEs and companies? Why?

16. Please share any suggestions for improving the services provided by the EOSC DIH to pilots (such as suggestions of additional trainings)

Onboarding

17. Please let us know if you have experienced any difficulties with the onboarding process.

11 Annex 4: Digital maturity Tool

N°	Questions	Score	Answer options			
	Digital Business Strategy					
1	**In which of the following business areas has your enterprise already invested in digitalisation? Please select all options that apply:**		**Yes, before piloting**	**Yes, after piloting**	**No but plans to invest**	**No**
	Product/Service design (incl. research, development and innovation)					
	Project planning and management					
	Operations (production of physical goods/manufacturing, packaging, maintenance, services, etc.)					
	Collaboration with other internal site locations or other companies in the value chain					
	Inbound logistics & warehousing					
	Marketing, sales & customer services (customer management, order processing, helpdesk, etc.)					
	Delivery (outbound logistics, eInvoices, etc.)					
	Administration and human resources					
	Purchasing and procurement					
	(Cyber)security and compliance with Personal Data regulations/GDPR					
	None of the above					
2	**In which of the following ways is your enterprise prepared for (more) digitalisation? Please select all options that apply**		**Yes, before piloting**	**Yes, after piloting**	**No but plans to invest**	**No**
	Digitalisation needs are identified and are aligned with business objectives					
	Financial resources (own, loans, subsidies) are identified to secure digitalisation during at least one year					
	IT infrastructures are ready to support digitalisation plans [0, 1 pt]					
	ICT specialists are employed/sub-contracted (or hiring/subcontracting needs have been identified)					
	Enterprise's management is ready to lead the necessary organisational changes					
	Concerned business departments and their staff are ready to support digitalisation plans					
	Business architecture and operational processes can be adapted if required by digitalisation					
	Manufactured products are already commercialised as a service (so-called Servitisation) or supplemented by services enabled by digital technologies					
	Clients' and partners' satisfaction with online services/interactions is monitored regularly (on social media channels, e-commerce operations, emails exchanges, etc.)					
	Risks of digitalisation (e.g. non-planned effects over other business areas) are considered					
	None of the above					
	Digital Readiness and adopation of Automation and Artificial Intelligence technologies					
3	**Which of the following digital technologies and solutions are used by your enterprise? Please select all options that apply**		**Yes, before piloting**	**Yes, after piloting**	**No but plans to invest**	**No**
	Connectivity infrastructure (high speed (fibre) internet, cloud computing services, remote access to office systems)					
	Enterprise's website					
	Web-based forms and blogs/forums to communicate with clients					
	Live chats, social networks and chatbots to communicate with clients					
	E-Commerce sales (Business-to-Consumer, Business-to-Business)					
	E-Marketing promotion (online ads, social media for business, etc.)					
	E-Government (online interaction with public authorities, including public procurement)					
	Remote business collaboration tools (e.g. teleworking platform, videoconferencing, virtual learning, business-specific)					
	Internal web portal (Intranet)					

	Information Management Systems (Enterprise Resources Planning, Product Lifecycle Management, Customer Relationship Management, Supply Chain Management, e-invoicing)				
	None of the above				
4	**Which of the following advanced digital technologies is your enterprise using? Please grade all options that apply**	**Yes, before piloting**	**Yes, after piloting**	**No but plans to invest**	**No**
	Simulation & digital twins (i.e. real-time digital representations of physical objects/processes)				
	Virtual reality, augmented reality				
	Computer-aided design (CAD) & manufacturing (CAM)				
	Manufacturing execution systems				
	Internet of Things (IoT) and Industrial Internet of Things (I-IoT)				
	Blockchain technology				
	Additive manufacturing (e.g. 3D printers)				
	Natural Language Processing incl. chatbots, text mining, machine translation, sentiment analysis				
	Computer vision / image recognition				
	Audio processing / speech recognition, processing and synthesis				
	Robotics and autonomous devices				
	Business intelligence, data analytics, decision support systems, recommendation systems, intelligent control systems				
	None of the above				
	Human-centric digitalisation				
5	**What does your enterprise do to re-skill and up-skill its staff for digitalisation? Please select all options that apply:**	**Yes, before piloting**	**Yes, after piloting**	**No but plans to implement**	**No**
	Performs staff skill assessment to identify the skills gaps				
	Organises short trainings, provides tutorials/guidelines and other e-learning resources				
	Facilitates learning-by-doing/peer learning/experimentation opportunities				
	Offers traineeships & job placements in key capacity areas				
	Sponsors staff participation in trainings organised by external organisations (training providers, academia, vendors)				
	Makes use of subsidised training and upskilling programmes				
	None of the above				
6	**When adopting new digital solutions, how does your enterprise engage and empower its staff? Please select all options that apply:**	**Yes, before piloting**	**Yes, after piloting**	**No but plans to implement**	**No**
	Facilitates staff awareness about new digital technologies				
	Monitors staff acceptance and takes measures to mitigate the potential collateral effects (e.g. fear to change; 'always on' culture vs. work-life balance; safeguards to risks of privacy breaches etc.)				
	Involves staff (including non-ICT staff) in the design and development of product/service/process digitalisation				
	Gives staff more autonomy and appropriate digital tools to take and execute decisions				
	Redesigns/Adapts jobs and workflows to support the ways that staff actually would like to work				
	Sets up more flexible working arrangements enabled by digitalisation (e.g. telework)				
	Puts at staff disposal a digital support team/service (internal/external)				
	None of the above				
	Data Management and Connectedness				
7	**How is your enterprise data managed (i.e. stored, organised, accessed and exploited)? Please select all options that apply:**	**Yes, before piloting**	**Yes, after piloting**	**No but plans to invest**	**No**
	Data is not collected digitally				
	Relevant data is stored digitally (e.g., office applications, email folders, stand-alone applications, CRM or ERP system, etc.)				

	Data is properly integrated (e.g. through interoperable systems, application programming interfaces) even when it is distributed amongst different systems				
	Data is accessible in real-time from different devices and locations				
	Collected data is systematically analysed and reported for decision-making				
	Data analytics are enriched by combining external sources with own data				
	Data analytics are accessible without need of expert assistance (e.g. through dashboards)				
	None of the above				
8	**Is your enterprise's data sufficiently secured? Please select all options that apply:**	**Yes, before piloting**	**Yes, after piloting**	**No but plans to invest**	**No**
	An enterprise data security policy/set of measures is in place				
	All client-related data is protected from cyberattacks				
	Staff is regularly informed and trained on cybersecurity and data protection issues/risks				
	Cyber-threats are regularly monitored and assessed				
	A fulll backup copy of critical business data is maintained (off-site/in the cloud)				
	A business continuity plan is in place in case of catastrophic failures (e.g. all data locked by a ransomware attack or physical damage to the IT infrastructure) [0, 1 pt] 7. None of the above				
	None of the above				

12 Annex 5: Annual Reports

Executive Summary – 1st Monitoring Report (until May 2022)

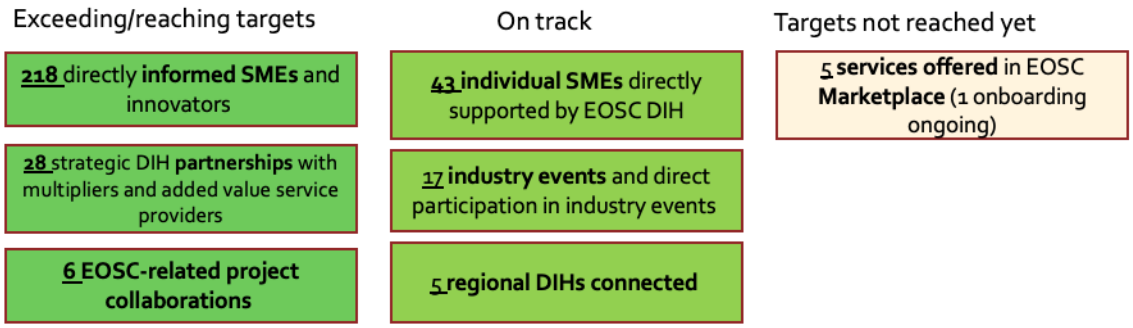
Targeted communication	The most used social media channels (Twitter and Linked) and the EOSC DIH website had a **surge in their activity** (i.e., the number of publications of content) during the month of November 2021, in the context the **social media campaign** aimed at recruiting the pilots. Peaks in activity occurred in March 2022 and April 2022 in terms of tweets and LinkedIn posts, and in January, February, May 2022 on the EOSC DIH website.
Community building actions	Collaborations with multipliers were established with **7 multipliers** from the start of the project to end of the reporting period (May 2022). In terms of joint activities resulting from the collaboration, the most common ones are the **mutual networking** and the identification of **funding opportunities** for the pilots and members of the EOSC DIH community. In total, the EOSC DIH attended to 10 events.
Creation of partnerships with data & service providers	The EOSC DIH has currently established **8 strategic partnerships** with service providers. In terms of type of services provided by the service provider and resulting from the partnership, most are related to Compute, Data management/analytics and Storage. DICE, EGI-ACE, OpenAire Nexus have also defined as part of their partnership agreement a list of service levels that they can guarantee to companies that request their services through the EOSC DIH.
Development of new/improved products or services	Since the start of the project EOSC Future, the EOSC DIH has selected **9 pilots**. While 2 pilots have finished their piloting (BigColdTrucks and DigiFarm), 6 pilots are ongoing (Trango, CloudSME, ELD-ADVANCE, ANESYS, OpenScienceLens and OiPub). Only one pilot (that has finished its piloting in April 2022) has resulted in a prototype.
Organisation of regular exchanges with other WPs (including with WP5)	No activity to report.
Provision of brokerage to funding opportunities	Since the start of the EOSC Future project, **29 funding opportunities** were posted on the EOSC DIH website – all of them focus on providing funding for companies located in the EU.
Purchase of new services for industry	No activity to report.

Executive Summary – 2nd Monitoring Report (until September 2022)

Targeted communication	The two most used **social media channels** (Twitter and LinkedIn) as well as the EOSC DIH website have witnessed an increase in their activity following the social media campaigns to recruit pilots (November 2021 & June 2022). The engagement levels were correlated to the high activity on Twitter and LinkedIn during November 2021 and September 2022.
Community building actions	Collaborations with multipliers were established **with 7 multipliers**. The most common joint activity is exploring complementarities in the services, the mutual networking, and the identification of funding opportunities for the pilots and members of the EOSC DIH community. In total, the EOSC DIH attended to **14**

	events. The main purpose for the EOSC DIH to attend to these events was networking, raising awareness inside the EOSC and identifying gaps.
Creation of partnerships with data & service providers	The EOSC DIH has established **8 strategic partnerships** with service providers. Most services provided are related to Compute, Data management/analytics and storage. An ongoing pilot expressed interest in being onboarded (Pundit).
Development of new/improved products or services	EOSC DIH selected **19 pilots**: 3 pilots have finished, 6 are ongoing, one is pending (in Ukraine), 9 were selected between June and September, but the SLAs are to be signed. The main channel to identify pilots is the **social media campaign**. The duration of piloting varied between **5 and 12 months**. 8 pilots have benefited from digital trainings. The EOSC DIH has established a **permanent pool or database of DIH Mentors/Experts**. The pilots are linked to various thematic areas such as agriculture, mobility, IT, and open data. **2 pilot campaigns** were launched, in November 2021 (with 5 pilots selected) and in May 2022 (9 pilots selected).
Organisation of regular exchanges with other WPs (including with WP5)	A meeting was organised between the EOSC DIH team as well as WP5, WP9 and WP10.
Provision of brokerage to funding opportunities	**36 funding opportunities** were posted on the EOSC DIH website – all of them focus on providing funding for companies located in the EU. Some of them are specifically linked to various fields such as to Artificial intelligence, the energy sector, HPC, earth observation or internet of things.
Purchase of new services for industry	Due to the incapacity to use the cascade funding in the Task, no option was identified that would allow support to the SMEs. Regarding the procurement, EGI worked with an internal procurement specialist and GEANT to develop a mechanism that would allow the procurement of a service that is in a pre-commercial status (finalisation to be achieved in Q4 2022).

EOSC DIH Progress to reach KPIs (against targets for **Sep. 2022** as defined in D8.4)



Executive Summary – 3rd Monitoring Report (until March 2023)

Targeted communication	The social media channels utilised during the months of **June and November 2022** in the context of a social media campaign, aimed at raising awareness and attracting new pilots, as well as at advertising several related events such as the EOSC Symposium 2022. Over the period from April 2022 to March 2023, a total of 74 posts were published on the EOSC DIH website, almost half of these posts were published during the month of November 2022.
Community building actions	The EOSC DIH has established collaborations with **12 multipliers** overall. This includes collaborations established with **7 multipliers** during the current reporting period (**4** with other DIHs, **1** with an **SME network**, **1** with an **industry association** and **1** with an ongoing **project**). The EOSC DIH participated in **14 events** from April 2022 to March 2023. **9** of these events were targeting primarily **industry stakeholders**.
Creation of partnerships with data & service providers	The EOSC DIH has established **10 strategic partnerships** with service providers, among which **3 collaborations** established during the current reporting period. The most recent contact was made in March 2022 with **LIRA** (for the provision of trainings) and with **AI4EOSC** focused on the provision of services related to Machine learning & AI. The pilot **Pundit** is in the process of onboarding its services into the EOSC Marketplace. The tool that will be co-developed by Poznań University of Life Sciences (PULS), the EOSC DIH and an SME (through the procedure for the **purchase of services**) will be integrated in the EOSC Marketplace.
Development of new/improved products or services	The EOSC DIH has selected **25 pilots** in total so far. While **6** pilots have finished their piloting, **19 pilots** are ongoing and at different stages of implementation. **4** pilots are currently finalizing their SLA. **2** pilots could not fully benefit from the ESOC DIH services (due to internal issues). **4** pilots have developed or improved a **prototype**. **All** pilots that have finished their piloting report an **increase in their TRL level** (compared to the level at the start). They report an increase ranging from **1** to **4** TRL levels. We regard this to be a tangible contribution of the EOSC DIH and EOSC Future project to the European SMEs.
Organisation of regular exchanges with other WPs (including with WP5)	One meeting was organised in February **with WP9** to collaborate on training activities. Another meeting was organised with **WP5 t**o provide input on the Business section of the EOSC portal. Furthermore, meetings with **WP10** were organised on a regular basis focusing on dissemination activities.
Provision of brokerage to funding opportunities	From April 20122 to March 2023, **20 funding opportunities** were posted on the EOSC DIH website – all of them focus on providing funding for companies located in the EU.
Purchase of new services for industry	The EOSC DIH has launched a procedure for the purchase of a "**software services for image analysis in phenological research with implementation, licensing, support and maintenance**". EOSC DIH selected the application of Poznań University of Life Sciences (PULS), in Poland. The tool will be co-developed by PULS, the EOSC DIH and an SME and will be available as open source and ready to be integrated in the **EOSC Marketplace**.

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EOSC DIH Progress to reach KPIs (against targets for **Sep. 2023** as defined in D8.4)

Exceeding/reaching targets	On track	Targets not reached yet
241 directly **informed SMEs** and innovators	**49 individual SMEs** directly supported by EOSC DIH	**5 services offered** in EOSC **Marketplace** (1 onboarding ongoing)
34 strategic DIH **partnerships** with multipliers and added value service providers	**19 industry events** and direct participation in industry events	
8 EOSC-related project collaborations	**6 regional DIHs connected**	

References

[1] Digital Europe Programme work programme (DIGITAL)
[2] https://eoscfuture.eu/newsfuture/eoi-for-dih-business-pilots-3rd-round/
[3] https://eosc-dih.eu/expression-of-interest/
[4] https://digital-strategy.ec.europa.eu/en/events/digital-maturity-tool-and-innovation-radar
[5] A good analysis and background of this model is provided in the following publication in Harvard Business Review: Is It Real? Can We Win? Is It Worth Doing?: Managing Risk and Reward in an Innovation Portfolio
[6] https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/digital-2021-edih-initial-01
[7] https://www.decido-project.eu/wp-content/uploads/2022/10/EOSC-Competence-Centre-for-Public-Authorities_2.pdf
[8] https://www.researchgate.net/publication/348399118_A_Multisided_Value_Proposition_Canvas_for_Online_Platforms
[9] https://eoscfuture.eu/wp-content/uploads/2022/12/EOSC-Future-WP8-EGI-Foundation-D8.4-DIH-Strategy-and-Plans-2021-09-30.pdf